2021 TRAINING COURSES
EXPLORATION & PRODUCTION

www.ifptraining.com
Emerging stronger with highly qualified personnel

With global warming challenges and consequent new cleaner energy mix perspective, the industry that will emerge from the crisis may look significantly different from the one we have known before. In this new reality, adapting energy specialists’ skills and roles to updated ways of working will remain crucial to building operating-model resilience and to respond to our industry key challenges.

Based on its 45 years of international experience IFP Training stands firmly through the current difficult period and responsively has adapted its competency development services Offer that can be customized to your organization’s requirements.

To ensure tomorrow’s energy competencies

As an integrated part of the IFP Group, IFP Training benefits from synergies with IFPEN multidisciplinary projects connected to industry needs as well as the field experience of sister companies like Axens and Beicip-Franlab.

Our competency-based training solutions cover sectors as varied as: Oil, Gas, Electricity, Refining, Petrochemicals & Chemicals, New Energies and Transport.

Please note that whether in-house or public, most of our face-to-face courses can be followed remotely. This year we also propose training simulators accessible 24/7, worldwide.

We invite you to browse our new 2021 offer. Our teams, especially our lecturers and associate experts, remain at your disposal to convince you that IFP Training’s competency development Offer is a reliable solution to help you succeed in your today and tomorrow’s challenges.
Course Index .............................................................................................................................................. 4

Course Calendar ........................................................................................................................................ 14

Career Paths ............................................................................................................................................... 18

Technical Fields .................................................................................................................................... 29 to 331
  E&P Chain ........................................................................................................................................ 29 to 73
  Exploration ......................................................................................................................................... 74 to 89
  Reservoir & Field Development ........................................................................................................... 90 to 141
  Drilling & Completion Engineering ...................................................................................................... 142 to 196
  Production Engineering ............................................................................................................................ 197 to 206
  Field Operations .................................................................................................................................... 207 to 236
  Surface Facilities Engineering ................................................................................................................... 237 to 251
  Project Management ............................................................................................................................... 252 to 275
  HSE ....................................................................................................................................................... 276 to 299
  Gas ......................................................................................................................................................... 300 to 310
  Unconventional .................................................................................................................................... 311 to 322
  Offshore ................................................................................................................................................ 323 to 331

Registration ............................................................................................................................................ 332

General Terms of Sale ............................................................................................................................... 334
## E&P Chain

### General Introduction to Technical Topics

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 days</td>
<td>17-21 May</td>
<td>In-house course</td>
<td>€3,690</td>
<td>EPMGT-EN-A</td>
<td>30</td>
</tr>
</tbody>
</table>

### Exploration & Production Overview

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 days</td>
<td>19-23 September</td>
<td>Rueil-Malmaison</td>
<td>€3,690</td>
<td>DCOUVEP-EN-A</td>
<td>31</td>
</tr>
<tr>
<td>NEW</td>
<td>15-19 November</td>
<td>Virtual Classroom</td>
<td>€3,690</td>
<td>DCOUVEP-EN-D</td>
<td>32</td>
</tr>
</tbody>
</table>

### Introduction to Petroleum Engineering

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 days</td>
<td>15-19 February</td>
<td>Rueil-Malmaison</td>
<td>€3,690</td>
<td>NFFPS-EN-A</td>
<td>33</td>
</tr>
</tbody>
</table>

### E&P Jobs

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 days</td>
<td>In-house course</td>
<td>Rueil-Malmaison</td>
<td>€3,690</td>
<td>EPETROLE-EN-A</td>
<td>34</td>
</tr>
</tbody>
</table>

### Fundamentals of Production

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 days</td>
<td>In-house course</td>
<td>Rueil-Malmaison</td>
<td>€3,690</td>
<td>CHANEP-EN-A</td>
<td>35</td>
</tr>
</tbody>
</table>

### Soft Skills Toolbox

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 days</td>
<td>In-house course</td>
<td>Rueil-Malmaison</td>
<td>€3,690</td>
<td>BSG-EN-P</td>
<td>36</td>
</tr>
</tbody>
</table>

### Petroleum Engineering Certification

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 days</td>
<td>30 November-2 December</td>
<td>Virtual Classroom</td>
<td>€2,550</td>
<td>COUS-EN-A</td>
<td>37</td>
</tr>
</tbody>
</table>

### Digitalization & Data Management

#### Petrotechnical Data Management - G & G Data

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 days</td>
<td>14-25 October</td>
<td>Rueil-Malmaison</td>
<td>€3,890</td>
<td>DMFUND-EN-P</td>
<td>39</td>
</tr>
<tr>
<td>3 days</td>
<td>6-8 September</td>
<td>Rueil-Malmaison</td>
<td>€2,800</td>
<td>DMFEPE-EN-A</td>
<td>40</td>
</tr>
</tbody>
</table>

#### Data Management Fundamentals (DAMA)

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 days</td>
<td>11-15 October</td>
<td>Virtual Classroom</td>
<td>€3,120</td>
<td>DMFORMA-EN-D</td>
<td>41</td>
</tr>
<tr>
<td>5 days</td>
<td>15-19 October</td>
<td>Virtual Classroom</td>
<td>€3,120</td>
<td>DMCBIR-EN-D</td>
<td>42</td>
</tr>
</tbody>
</table>

#### Fundamentals of Industrial Data Science: Data Analysis & Visualization

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 days</td>
<td>In-house course</td>
<td>Rueil-Malmaison</td>
<td>€28,250</td>
<td>DMTBS-EN-A</td>
<td>43</td>
</tr>
</tbody>
</table>

#### Data Management & Data Science for E&P Operations Certification

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 days</td>
<td>11 October-19 November</td>
<td>Virtual Classroom</td>
<td>€16,950</td>
<td>DMEP-EN-D</td>
<td>44</td>
</tr>
<tr>
<td>5 days</td>
<td>11-15 October</td>
<td>Virtual Classroom</td>
<td>€3,120</td>
<td>DMEP-EN-D</td>
<td>45</td>
</tr>
<tr>
<td>5 days</td>
<td>15-19 October</td>
<td>Virtual Classroom</td>
<td>€3,120</td>
<td>DMEP-EN-D</td>
<td>46</td>
</tr>
</tbody>
</table>

#### Data Management for E&P Operations

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 days</td>
<td>2-3 November</td>
<td>Virtual Classroom</td>
<td>€1,950</td>
<td>DMARCH-EN-D</td>
<td>47</td>
</tr>
</tbody>
</table>

#### Data Protection & Cybersecurity

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 days</td>
<td>4-5 November</td>
<td>Virtual Classroom</td>
<td>€1,950</td>
<td>DMTBS-EN-D</td>
<td>48</td>
</tr>
</tbody>
</table>

#### Data Architecture & Big Data

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 days</td>
<td>8-9 November</td>
<td>Virtual Classroom</td>
<td>€1,950</td>
<td>DATUR-EN-D</td>
<td>49</td>
</tr>
</tbody>
</table>

#### Data Management & Data Science for E&P Operations

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 days</td>
<td>22 November-17 December</td>
<td>Virtual Classroom</td>
<td>€6,180</td>
<td>DAS-EN-D</td>
<td>50</td>
</tr>
</tbody>
</table>

#### Data Science for E&P Operations

<table>
<thead>
<tr>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 day</td>
<td>22 November</td>
<td>Virtual Classroom</td>
<td>€970</td>
<td>DBASIC-EN-D</td>
<td>51</td>
</tr>
<tr>
<td>3 days</td>
<td>23-25 November</td>
<td>Virtual Classroom</td>
<td>€2,900</td>
<td>MLBASIC-EN-D</td>
<td>52</td>
</tr>
<tr>
<td>1 day</td>
<td>26 November</td>
<td>Virtual Classroom</td>
<td>€970</td>
<td>DAP-EN-D</td>
<td>53</td>
</tr>
<tr>
<td>1 day</td>
<td>29 November</td>
<td>Virtual Classroom</td>
<td>€970</td>
<td>MLK-EN-D</td>
<td>54</td>
</tr>
<tr>
<td>3 days</td>
<td>30 November-2 December</td>
<td>Virtual Classroom</td>
<td>€2,900</td>
<td>DTER-EN-D</td>
<td>55</td>
</tr>
<tr>
<td>1 day</td>
<td>3 December</td>
<td>Virtual Classroom</td>
<td>€970</td>
<td>MLVAL-EN-D</td>
<td>56</td>
</tr>
<tr>
<td>10 days</td>
<td>6-17 December</td>
<td>Rueil-Malmaison</td>
<td>€6,180</td>
<td>DMSPR-EN-P</td>
<td>57</td>
</tr>
<tr>
<td>5 days</td>
<td>17-21 May</td>
<td>Rueil-Malmaison</td>
<td>€3,120</td>
<td>DMQAL-EN-P</td>
<td>58</td>
</tr>
<tr>
<td>5 days</td>
<td>31 May-4 June</td>
<td>Virtual Classroom</td>
<td>€3,120</td>
<td>DBASE-EN-D</td>
<td>59</td>
</tr>
<tr>
<td>2 days</td>
<td>25-26 May</td>
<td>Virtual Classroom</td>
<td>€1,950</td>
<td>DMMING-EN-D</td>
<td>60</td>
</tr>
<tr>
<td>1 day</td>
<td>27 May</td>
<td>Virtual Classroom</td>
<td>€970</td>
<td>CYBOP-EN-D</td>
<td>61</td>
</tr>
<tr>
<td>1 day</td>
<td>28 May</td>
<td>Virtual Classroom</td>
<td>€970</td>
<td>CYBORM-EN-D</td>
<td>62</td>
</tr>
<tr>
<td>3 days</td>
<td>7-9 June</td>
<td>Virtual Classroom</td>
<td>€2,900</td>
<td>MLRES-EN-D</td>
<td>63</td>
</tr>
<tr>
<td>5 days</td>
<td>14-18 June</td>
<td>Virtual Classroom</td>
<td>€3,120</td>
<td>DIGTEC-EN-D</td>
<td>64</td>
</tr>
</tbody>
</table>

---

Tuition fees include instruction and documentation as well as meals and beverage breaks.
### Competency Management & Training Engineering

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competency Management in E&amp;P</td>
<td>3 days</td>
<td>In-house course</td>
<td>CMS-EN-A 68</td>
<td></td>
</tr>
<tr>
<td>Training Engineering in E&amp;P</td>
<td>5 days</td>
<td>In-house course</td>
<td>TRAINEEN-EN-P 69</td>
<td></td>
</tr>
<tr>
<td>Field/Site Trainers Accreditation</td>
<td>5 days</td>
<td>In-house course</td>
<td>ACFIELD-EN-P 70</td>
<td></td>
</tr>
<tr>
<td>Classroom Lecturers Accreditation</td>
<td>20 days</td>
<td>In-house course</td>
<td>ACCLASS-EN-P 71</td>
<td></td>
</tr>
<tr>
<td>Subject Matter Experts Accreditation</td>
<td>25 days</td>
<td>In-house course</td>
<td>ACSME-EN-P 72</td>
<td></td>
</tr>
<tr>
<td>Communication &amp; Behavioral Management</td>
<td>2 days</td>
<td>In-house course</td>
<td>COM-EN-A 73</td>
<td></td>
</tr>
</tbody>
</table>

### Exploration

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Basin Exploration</td>
<td>5 days</td>
<td>25-29 October</td>
<td>Virtual Classroom</td>
<td>€2,960</td>
<td>INFOBAS-EN-D 75</td>
</tr>
<tr>
<td>Hunting for Oil: Exploration &amp; Upstream Overview</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>HFO-EN-P 76</td>
</tr>
<tr>
<td><strong>Methods &amp; Tools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum Geophysics</td>
<td>10 days</td>
<td>29 November-10 December</td>
<td>Rueil-Malmaison</td>
<td>€6,180</td>
<td>GEOPHY-EN-A 77</td>
</tr>
<tr>
<td>Seismic Reflection Fundamentals</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>SEISREF-EN-A 78</td>
</tr>
<tr>
<td>Petroleum Systems: Hydrocarbons from Source Rock to Reservoirs</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>GEOCHIM-EN-A 79</td>
</tr>
<tr>
<td>Structural Geology, Basin Development &amp; Associated Traps</td>
<td>5 days</td>
<td>27 September-1 October</td>
<td>Virtual Classroom</td>
<td>€2,960</td>
<td>STRUCT-EN-P 80</td>
</tr>
<tr>
<td>Well Logging &amp; Qualitative Log Interpretation</td>
<td>10 days</td>
<td>15-26 November</td>
<td>Rueil-Malmaison</td>
<td>€6,180</td>
<td>SEISLOG-EN-P 82</td>
</tr>
<tr>
<td>3D Seismic Interpretation Workshop</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>SEQSTRA-EN-P 83</td>
</tr>
<tr>
<td>Sedimentology &amp; Sequence Stratigraphy</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>STRAT-EN-P 84</td>
</tr>
<tr>
<td>Stratigraphic Modeling: Basin Architecture &amp; Sediment Distribution</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>TEMIS-EN-P 85</td>
</tr>
<tr>
<td>Basin Modeling: Thermicity, Maturation &amp; Migration</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>WSGEOL-EN-A 86</td>
</tr>
<tr>
<td><strong>From Basin to Prospect Evaluation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basin Assessment &amp; Modeling Certification</td>
<td>65 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>BAM-EN-P 87</td>
</tr>
<tr>
<td>Play Assessment &amp; Prospect Generation</td>
<td>5 days</td>
<td>21-25 June</td>
<td>Rueil-Malmaison</td>
<td>€3,120</td>
<td>PLA-EN-P 88</td>
</tr>
<tr>
<td>Exploration Blocks Management</td>
<td>15 days</td>
<td></td>
<td></td>
<td></td>
<td>BLOCK-EN-P 89</td>
</tr>
</tbody>
</table>

### Reservoir & Field Development

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reservoir Characterization &amp; Modeling</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Reservoir Characterization</td>
<td>5 days</td>
<td>20-24 September</td>
<td>Virtual Classroom</td>
<td>€2,960</td>
<td>INFORCM-EN-D 91</td>
</tr>
<tr>
<td>Integrated Petrophysics for Reservoir Characterization &amp; Modeling Certification</td>
<td>90 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>PETRORE-EN-P 92</td>
</tr>
<tr>
<td>Reservoir Characterization &amp; Modeling Certification</td>
<td>58 days</td>
<td>20 September-10 December</td>
<td>Rueil-Malmaison</td>
<td>€32,380</td>
<td>RESM-EN-P 93</td>
</tr>
<tr>
<td>Quantitative Well Log Analysis</td>
<td>5 days</td>
<td>20-24 September</td>
<td>Rueil-Malmaison</td>
<td>€3,250</td>
<td>LOGADV-EN-P 94</td>
</tr>
<tr>
<td>Fundamentals of Facies Analysis &amp; Rock-Typing</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>ROCK-EN-P 95</td>
</tr>
<tr>
<td>Geological Modeling Workshop for Integrated Reservoir Studies</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>GEOMOD-EN-P 96</td>
</tr>
<tr>
<td>Hydrocarbons Accumulations, Reserves Estimation, Risk Analysis &amp; Uncertainties</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>DOIP-EN-P 97</td>
</tr>
<tr>
<td>Naturally-Fractured Reservoirs: Static &amp; Dynamic Modeling</td>
<td>5 days</td>
<td>15-19 November</td>
<td>Rueil-Malmaison</td>
<td>€3,250</td>
<td>FRACMOD-EN-P 98</td>
</tr>
<tr>
<td>Petrophysical Properties: Core, Log &amp; Test Data Integration for Reservoir Modeling</td>
<td>5 days</td>
<td>22-26 November</td>
<td>Rueil-Malmaison</td>
<td>€3,120</td>
<td>PETROD-EN-P 99</td>
</tr>
<tr>
<td>Upscaling: from Static to Dynamic Model</td>
<td>3 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>UPSCALE-EN-P 100</td>
</tr>
<tr>
<td>Borehole Imaging Interpretation Workshop with WellCad™</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>BIH-EN-P 101</td>
</tr>
<tr>
<td>Fracture &amp; Fault Modeling Workshop with FracaFlow™</td>
<td>4 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>FRA-EN-P 102</td>
</tr>
<tr>
<td>Tight Reservoir Petrophysics</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>TIGHT-EN-P 103</td>
</tr>
<tr>
<td>Tight Reservoir Characterization &amp; Modeling</td>
<td>10 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>TIGHT-EN-P 104</td>
</tr>
<tr>
<td>Advanced Facies Analysis &amp; Rock-Typing Certification</td>
<td>5 days</td>
<td></td>
<td>In-house course</td>
<td></td>
<td>AVO-EN-P 105</td>
</tr>
</tbody>
</table>

---

Tuition fees include instruction and documentation as well as meals and beverage breaks
## Course Index

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Date Range</th>
<th>Place</th>
<th>Fees</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Geological Characterization &amp; Modeling - Integrated Workshop Certification</strong></td>
<td>10 days</td>
<td>N/A</td>
<td>IRCM-EN-P</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td><strong>Pre-Stack Inversion</strong></td>
<td>5 days</td>
<td>N/A</td>
<td>PRESTAC-EN-P</td>
<td>108</td>
<td></td>
</tr>
<tr>
<td><strong>Post-Stack Inversion</strong></td>
<td>5 days</td>
<td>N/A</td>
<td>POSTAC-EN-P</td>
<td>109</td>
<td></td>
</tr>
<tr>
<td><strong>Static Model Construction: Field Constraints &amp; Integration with Subsurface Data</strong></td>
<td>5 days</td>
<td>N/A</td>
<td>CARFEIT-EN-P</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td><strong>Fundamentals of Reservoir Geology</strong></td>
<td>15 days</td>
<td>N/A</td>
<td>RESGEOL-EN-P</td>
<td>111</td>
<td></td>
</tr>
<tr>
<td><strong>Core Analysis for Reservoir Characterization</strong></td>
<td>5 days</td>
<td>N/A</td>
<td>CONSICAL-EN-P</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td><strong>Special Core Analysis</strong></td>
<td>5 days</td>
<td>N/A</td>
<td>SCAL-EN-P</td>
<td>113</td>
<td></td>
</tr>
<tr>
<td><strong>Geomechanics for Geoscientists</strong></td>
<td>5 days</td>
<td>N/A</td>
<td>GEOMG-EN-P</td>
<td>114</td>
<td></td>
</tr>
<tr>
<td><strong>Reservoir Engineering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Reservoir Engineering</td>
<td>5 days</td>
<td>22-26 November</td>
<td>Virtual Classroom</td>
<td>€2,960</td>
<td>INFORES-EN-D</td>
</tr>
<tr>
<td>Reservoir Fluid Properties - PVT</td>
<td>5 days</td>
<td>11-15 October</td>
<td>Rueil-Malmaison</td>
<td>€3,250</td>
<td>PVT-EN-P</td>
</tr>
<tr>
<td>Drilling &amp; Completion - Wellbore Interface &amp; Well Productivity</td>
<td>5 days</td>
<td>18-22 October</td>
<td>Rueil-Malmaison</td>
<td>€3,120</td>
<td>WELPROD-EN-P</td>
</tr>
<tr>
<td>Well Testing &amp; Well Test Analysis</td>
<td>5 days</td>
<td>25-29 October</td>
<td>Rueil-Malmaison</td>
<td>€3,250</td>
<td>WTA-EN-P</td>
</tr>
<tr>
<td>Drive Mechanisms - Enhanced Oil Recovery</td>
<td>8 days</td>
<td>2-12 November</td>
<td>Rueil-Malmaison</td>
<td>€5,190</td>
<td>DRIVEIR-EN-P</td>
</tr>
<tr>
<td><strong>NEW</strong> Drive Mechanisms &amp; EOR</td>
<td>4 days</td>
<td>17-20 May</td>
<td>Virtual Classroom</td>
<td>€2,880</td>
<td>DRIVE-EN-D</td>
</tr>
<tr>
<td>Dynamic Reservoir Simulation</td>
<td>10 days</td>
<td>22 November-3 December</td>
<td>Rueil-Malmaison</td>
<td>€6,180</td>
<td>DSMRES-EN-P</td>
</tr>
<tr>
<td>EOR Concepts &amp; Applications</td>
<td>5 days</td>
<td>27 September-1 October</td>
<td>Pau</td>
<td>€3,250</td>
<td>EOR-EN-P</td>
</tr>
<tr>
<td><strong>NEW</strong> Miscible Gas EOR Certification</td>
<td>5 days</td>
<td>In-house course</td>
<td>EOR-G-EN-P</td>
<td>123</td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong> Chemical EOR Certification</td>
<td>5 days</td>
<td>In-house course</td>
<td>EOR-C-EN-P</td>
<td>124</td>
<td></td>
</tr>
<tr>
<td>Advanced Dynamic Reservoir Simulation</td>
<td>5 days</td>
<td>In-house course</td>
<td>SIMRADV-EN-P</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong> Reservoir Simulation Workshop Certification</td>
<td>10 days</td>
<td>In-house course</td>
<td>SIMSRES-EN-P</td>
<td>126</td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong> Advanced Well Test Analysis Certification</td>
<td>5 days</td>
<td>In-house course</td>
<td>WTAW-EN-P</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>Dynamic Reservoir Simulation</td>
<td>5 days</td>
<td>In-house course</td>
<td>PVTMOD-EN-P</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>Decline Curves Analysis</td>
<td>5 days</td>
<td>In-house course</td>
<td>DCA-EN-A</td>
<td>129</td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong> Introduction to Petrophysics</td>
<td>5 days</td>
<td>7-11 June</td>
<td>Virtual Classroom</td>
<td>€2,960</td>
<td>PETROF-EN-D</td>
</tr>
<tr>
<td><strong>Reservoir Management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservoir Engineering Certification</td>
<td>63 days</td>
<td>20 September-17 December</td>
<td>Rueil-Malmaison</td>
<td>€35,490</td>
<td>RESENG-EN-P</td>
</tr>
<tr>
<td>Reservoir Management Workshop</td>
<td>5 days</td>
<td>15-19 November</td>
<td>Rueil-Malmaison</td>
<td>€3,120</td>
<td>RMNWT-EN-P</td>
</tr>
<tr>
<td><strong>NEW</strong> Reservoir Management Foundation</td>
<td>4 days</td>
<td>14-17 June</td>
<td>Virtual Classroom</td>
<td>€2,880</td>
<td>RMNSTF-EN-P</td>
</tr>
<tr>
<td><strong>NEW</strong> Gas Reservoir Management</td>
<td>5 days</td>
<td>In-house course</td>
<td>GASPMET-EN-P</td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>Reserves Evaluation - Risks &amp; Uncertainties</td>
<td>5 days</td>
<td>4-9 October</td>
<td>Virtual Classroom</td>
<td>€2,960</td>
<td>R Nuggets-EN-D</td>
</tr>
<tr>
<td>Mature Fields - Subsurface Issues</td>
<td>5 days</td>
<td>In-house course</td>
<td>MATFILD-EN-A</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>IRM - Integrated Reservoir Management</td>
<td>45 days</td>
<td>In-house course</td>
<td>IRM-EN-P</td>
<td>137</td>
<td></td>
</tr>
<tr>
<td><strong>Field Development</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong> Introduction to Geothermal Energy Uses &amp; Operations</td>
<td>3 days</td>
<td>8-10 November</td>
<td>Virtual Classroom</td>
<td>€2,800</td>
<td>GEOTHER-EN-D</td>
</tr>
<tr>
<td>Field Development Project &amp; Uncertainties</td>
<td>5 days</td>
<td>In-house course</td>
<td>FDP-EN-P</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong> FPSO Main Utilities Systems</td>
<td>5 days</td>
<td>In-house course</td>
<td>F-UTIL-EN-A</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>Field Development Project</td>
<td>15 days</td>
<td>18 October-5 November</td>
<td>Rueil-Malmaison</td>
<td>€9,840</td>
<td>FDEV-EN-P</td>
</tr>
</tbody>
</table>

Tuition fees include instruction and documentation as well as meals and beverage breaks.
# Course Index

## Drilling & Completion Engineering

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Drilling &amp; Completion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well Operations &amp; Completion Engineering Certification</td>
<td>40 days</td>
<td>15-26 November</td>
<td>Rueil-Malmaison</td>
<td>€6,970</td>
<td>INTP-EN-P</td>
<td>143</td>
</tr>
<tr>
<td>Supervisor Training on Drilling Simulator</td>
<td>5 days</td>
<td>20-24 September</td>
<td>In-house course</td>
<td></td>
<td>FGSM-EN-P</td>
<td>144</td>
</tr>
<tr>
<td>Drilling Fundamentals</td>
<td>5 days</td>
<td>1-5 February</td>
<td>Pau</td>
<td>€3,690</td>
<td>INFOR-EN-P</td>
<td>145</td>
</tr>
<tr>
<td>Well Completion &amp; Servicing</td>
<td>5 days</td>
<td>8-12 March</td>
<td>Pau</td>
<td>€3,690</td>
<td>INTP-EN-A</td>
<td>146</td>
</tr>
<tr>
<td>Drilling &amp; Completion Engineering Certification</td>
<td>98 days</td>
<td>25 January-11 June</td>
<td>Pau</td>
<td>€50,420</td>
<td>FOSPC-EN-P</td>
<td>147</td>
</tr>
<tr>
<td>Drilling Engineering</td>
<td>83 days</td>
<td>25 January-12 February</td>
<td>Pau</td>
<td>€42,840</td>
<td>FOSPC-EN-P</td>
<td>148</td>
</tr>
<tr>
<td>Completion Engineering</td>
<td>58 days</td>
<td>25 January-5 March</td>
<td>Pau</td>
<td>€30,890</td>
<td>FOSPC-EN-P</td>
<td>149</td>
</tr>
<tr>
<td><strong>NEW</strong> DeepWater Drilling and Completion Certification</td>
<td>50 days</td>
<td>6-9 April</td>
<td>Pau</td>
<td>€3,690</td>
<td>DWE-EN-P</td>
<td>150</td>
</tr>
<tr>
<td><strong>Drilling</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical Aspects of Well Construction &amp; Planning</td>
<td>10 days</td>
<td>15-26 November</td>
<td>Rueil-Malmaison</td>
<td>€6,970</td>
<td>PAWPCE-EN-P</td>
<td>151</td>
</tr>
<tr>
<td>Geological Field Trip for Drillers</td>
<td>5 days</td>
<td>25-29 January</td>
<td>Pau</td>
<td>€3,690</td>
<td>FTFP-EN-P</td>
<td>152</td>
</tr>
<tr>
<td>Fundamentals of Drilling &amp; Completion</td>
<td>5 days</td>
<td>1-5 February</td>
<td>Pau</td>
<td>€3,690</td>
<td>BAPFP-EN-P</td>
<td>153</td>
</tr>
<tr>
<td>Well Architecture &amp; Equipment</td>
<td>5 days</td>
<td>8-12 March</td>
<td>Pau</td>
<td>€3,690</td>
<td>ARCHP-EN-P</td>
<td>154</td>
</tr>
<tr>
<td>Bit &amp; Drill String &amp; Fishing while Drilling</td>
<td>5 days</td>
<td>29 March-2 April</td>
<td>Pau</td>
<td>€3,690</td>
<td>OUTGAR-EN-P</td>
<td>155</td>
</tr>
<tr>
<td>Rig, BOP’s &amp; Well Control Equipment</td>
<td>5 days</td>
<td>12-16 April</td>
<td>Pau</td>
<td>€3,690</td>
<td>BOP-EN-P</td>
<td>156</td>
</tr>
<tr>
<td>Data Acquisition during Drilling Operations</td>
<td>5 days</td>
<td>19-23 April</td>
<td>Pau</td>
<td>€3,690</td>
<td>LOGH-EN-P</td>
<td>157</td>
</tr>
<tr>
<td>HSE in Drilling Operations</td>
<td>5 days</td>
<td>3-7 May</td>
<td>Pau</td>
<td>€3,690</td>
<td>HSEFOR-EN-P</td>
<td>158</td>
</tr>
<tr>
<td>Directional &amp; Horizontal Drilling Certification</td>
<td>4 days</td>
<td>25-28 May</td>
<td>Pau</td>
<td>€3,690</td>
<td>FDTDH-EN-P</td>
<td>159</td>
</tr>
<tr>
<td><strong>Geomechanics for Drillers</strong></td>
<td>3 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>GEOA-EN-P</td>
<td>160</td>
</tr>
<tr>
<td>Underbalanced &amp; Managed Pressure Drilling: Applications, Design &amp; Operations</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>UBD-EN-P</td>
<td>161</td>
</tr>
<tr>
<td><strong>Geosteering</strong></td>
<td>3 days</td>
<td>29 November-1 December</td>
<td>Rueil-Malmaison</td>
<td>€3,690</td>
<td>GEOST-EN-P</td>
<td>162</td>
</tr>
<tr>
<td>Deepwater Drilling &amp; Development Certification</td>
<td>4 days</td>
<td>25-28 May</td>
<td>Pau</td>
<td>€3,690</td>
<td>OFDH-EN-P</td>
<td>163</td>
</tr>
<tr>
<td>Wellhead &amp; Blowout Preventers</td>
<td>3 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>WHEAD-EN-P</td>
<td>164</td>
</tr>
<tr>
<td><strong>Cementing Practices</strong></td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>STUCCP-EN-P</td>
<td>165</td>
</tr>
<tr>
<td><strong>HPHT Drilling Design &amp; Operations</strong></td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>HPHT-EN-P</td>
<td>166</td>
</tr>
<tr>
<td><strong>Fluids</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drilling Fluids</td>
<td>5 days</td>
<td>15-19 March</td>
<td>Pau</td>
<td>€3,690</td>
<td>FLU-EN-P</td>
<td>167</td>
</tr>
<tr>
<td>Cementing Practices</td>
<td>5 days</td>
<td>22-26 March</td>
<td>Pau</td>
<td>€3,690</td>
<td>CMI-EN-P</td>
<td>168</td>
</tr>
<tr>
<td>Advanced Cementing Practices</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>CMI2-EN-P</td>
<td>169</td>
</tr>
<tr>
<td><strong>Completion &amp; Well Operations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wellhead Selection &amp; Maintenance</td>
<td>5 days</td>
<td>8-12 February</td>
<td>Pau</td>
<td>€3,690</td>
<td>WMMINT-EN-P</td>
<td>170</td>
</tr>
<tr>
<td>Well Productivity &amp; Reservoir - Wellbore Interface</td>
<td>5 days</td>
<td>26-30 April</td>
<td>Pau</td>
<td>€3,690</td>
<td>WPPLCT-EN-P</td>
<td>171</td>
</tr>
<tr>
<td>Well Test Operation</td>
<td>5 days</td>
<td>15-19 February</td>
<td>Pau</td>
<td>€3,690</td>
<td>WPWELST-EN-P</td>
<td>172</td>
</tr>
<tr>
<td>Well-Completion Equipment &amp; Procedures for Flowing Wells</td>
<td>5 days</td>
<td>15-19 February</td>
<td>Pau</td>
<td>€3,690</td>
<td>WPWELITP-EN-P</td>
<td>173</td>
</tr>
<tr>
<td>Tubing Movement &amp; Forces</td>
<td>3 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>TUMB-EN-P</td>
<td>174</td>
</tr>
<tr>
<td>Wellbore Treatments</td>
<td>5 days</td>
<td>22-26 February</td>
<td>Pau</td>
<td>€3,690</td>
<td>TRAT-EN-P</td>
<td>175</td>
</tr>
<tr>
<td>Matrix Acidizing</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>ACD-EN-P</td>
<td>176</td>
</tr>
<tr>
<td>Basic Hydraulic Fracturing</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>FAC-EN-P</td>
<td>177</td>
</tr>
<tr>
<td>Artificial Lift &amp; Well Intervention Fundamentals</td>
<td>5 days</td>
<td>1-5 March</td>
<td>Pau</td>
<td>€3,690</td>
<td>TAKO-EN-P</td>
<td>178</td>
</tr>
<tr>
<td>Artificial Lift: Gas Lift</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>GLIFT-EN-P</td>
<td>179</td>
</tr>
<tr>
<td>Artificial Lift: Pumping</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>APPMP-EN-P</td>
<td>180</td>
</tr>
<tr>
<td>Coiled Tubing &amp; Nitrogen Operations in Completion &amp; Workover</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>CAT-EN-P</td>
<td>181</td>
</tr>
<tr>
<td>Well Equipment &amp; Operation for Production Engineer</td>
<td>5 days</td>
<td>18-22 October</td>
<td>Rueil-Malmaison</td>
<td>€3,690</td>
<td>TIPP-EN-A</td>
<td>182</td>
</tr>
<tr>
<td>Well Servicing &amp; Workover</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>WSWO-EN-P</td>
<td>183</td>
</tr>
<tr>
<td>Well Performance</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>WPERF-EN-A</td>
<td>184</td>
</tr>
</tbody>
</table>

Tuition fees include instruction and documentation as well as meals and beverage breaks.
## Course index

### Advanced Well Performance
- **Duration:** 10 days
- **Location:** In-house course
- **Reference:** WPERF2-EN-P
- **Page:** 185

### Well Integrity
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** WELINT-EN-P
- **Page:** 186

### Well Production Integrity
- **Duration:** 2 days
- **Location:** In-house course
- **Reference:** WPINT-EN-A
- **Page:** 187

### Well Production Integrity Management
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** WELINTM-EN-P
- **Page:** 188

### Well Performance Engineering Certification
- **Duration:** 35 days
- **Location:** In-house course
- **Reference:** WPERFE-EN-P
- **Page:** 189

### Well Integrity Engineering Certification
- **Duration:** 35 days
- **Location:** In-house course
- **Reference:** WELINTE-EN-P
- **Page:** 190

### Well Control

#### Well Control - Level 2
- **Duration:** 5 days
- **Dates:** 8-12 March
- **Location:** In-house course
- **Tuition Fee:** €2,490
- **Reference:** FPE2-EN-A
- **Page:** 191

#### Well Control - Level 3 or 4
- **Duration:** 5 days
- **Dates:** 17-21 May
- **Location:** Pau
- **Tuition Fee:** €2,490
- **Reference:** FPE3-4-EN-A
- **Page:** 192

### Well Intervention & Pressure Control - Level 2
- **Duration:** 5 days
- **Dates:** 13-17 September
- **Location:** Pau
- **Tuition Fee:** €3,580
- **Reference:** CP2-EN-A
- **Page:** 193

### Enhanced Well Control - Level 4
- **Duration:** 5 days
- **Dates:** 31 May-4 June
- **Location:** Pau
- **Tuition Fee:** €3,580
- **Reference:** CP3-4-EN-A
- **Page:** 194

### Well Intervention & Pressure Control - Level 3 or 4
- **Duration:** 5 days
- **Dates:** 8-12 March
- **Location:** In-house course
- **Tuition Fee:** €2,490
- **Reference:** CP2-EN-A
- **Page:** 195

### Stripping
- **Duration:** 3 days
- **Location:** In-house course
- **Reference:** STRIP-EN-P
- **Page:** 196

### Production Engineering Certification
- **Duration:** 60 days
- **Location:** In-house course
- **Reference:** PRODENG-EN-A
- **Page:** 198

### Metering & Allocation
- **Duration:** 5 days
- **Dates:** 27 September-1 October
- **Location:** Pau
- **Tuition Fee:** €3,930
- **Reference:** METER-EN-P
- **Page:** 199

### Integrated Production Modeling - Module 1
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** OPT1-EN-P
- **Page:** 200

### Integrated Production Modeling - Module 2 (Project)
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** OPT2-EN-P
- **Page:** 201

### Gathering Network: Design Engineering
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** NETWORK-EN-P
- **Page:** 202

### Pipeline Network Engineering & Operation Certification
- **Duration:** 60 days
- **Location:** In-house course
- **Reference:** PIPEENG-EN-P
- **Page:** 203

### Mature Fields - Surface Production Issues
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** MATURP-EN-P
- **Page:** 204

### Heavy Oil Production & Processing
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** HEAVY-EN-P
- **Page:** 205

### Gas Cycling: an Integrated Approach
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** GASCYCL-EN-P
- **Page:** 206

### Field Operations

### Production Operations

#### Oil Terminals, FSO & FPSO
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** TERM-EN-A
- **Page:** 208

#### Oil & Gas Field Processing
- **Duration:** 5 days
- **Dates:** 22-26 November
- **Location:** Rueil-Malmaison
- **Tuition Fee:** €3,680
- **Reference:** OGF-EN-A
- **Page:** 209

#### Field Processing & Surface Production Facilities
- **Duration:** 10 days
- **Dates:** 22 November-3 December
- **Location:** Rueil-Malmaison
- **Tuition Fee:** €6,970
- **Reference:** FPSPF-EN-A
- **Page:** 210

#### Oil & Gas Field Processing Troubleshooting
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** TROUBLE-EN-P
- **Page:** 211

#### Preparatory Course for Production Operator
- **Duration:** 25 days
- **Location:** In-house course
- **Reference:** CPIBBA-EN-A
- **Page:** 212

#### Field Operator Certification
- **Duration:** 185 days
- **Location:** In-house course
- **Reference:** BOAM-EN-A
- **Page:** 213

#### Panel Operator Certification
- **Duration:** 35 days
- **Location:** In-house course
- **Reference:** PANELOP-EN-P
- **Page:** 214

#### Production Supervisor Certification
- **Duration:** 45 days
- **Location:** In-house course
- **Reference:** PRODSUP-EN-A
- **Page:** 215

#### Production Superintendent Certification
- **Duration:** 58 days
- **Dates:** 8 September-1 December
- **Location:** Pau
- **Tuition Fee:** €42,020
- **Reference:** PRODSI-EN-P
- **Page:** 216

#### Field Operations Engineer Certification
- **Duration:** 60 days
- **Dates:** 30 August-19 November
- **Location:** Rueil-Malmaison
- **Tuition Fee:** €35,480
- **Reference:** FIELDIG-EN-A
- **Page:** 217

#### Well Operation & Testing
- **Duration:** 3 days
- **Location:** In-house course
- **Reference:** WELLOP-EN-P
- **Page:** 218

#### Operation of Gas Lift Wells
- **Duration:** 3 days
- **Location:** In-house course
- **Reference:** GALSIFT-EN-P
- **Page:** 219

#### Chemicals used in Production Activities
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** CHIMIEP-EN-P
- **Page:** 220

#### Production Facilities Control Room Operation
- **Duration:** 10 days
- **Location:** In-house course
- **Reference:** ADVCCRR-EN-P
- **Page:** 221

#### Laboratory Analyses for Oil & Gas Production
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** LABO-EN-P
- **Page:** 222

#### Refresher Course for Production Operator
- **Duration:** 15 days
- **Location:** In-house course
- **Reference:** REFREOP-EN-A
- **Page:** 223

#### Pumps Operation
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** PUMPSEP-EN-A
- **Page:** 224

#### Compressors Operation
- **Duration:** 5 days
- **Location:** In-house course
- **Reference:** COMPOEP-EN-A
- **Page:** 225

---

Tuition fees include instruction and documentation as well as meals and beverage breaks.
## Production Excellence & Management

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Planning &amp; Monitoring</td>
<td>5 days</td>
<td></td>
<td></td>
<td></td>
<td>PLANING-EN-P 226</td>
</tr>
<tr>
<td>Production Accounting &amp; Material Balance</td>
<td>3 days</td>
<td></td>
<td></td>
<td></td>
<td>BILMAT-EN-P 227</td>
</tr>
<tr>
<td>Asset Integrity Management</td>
<td>5 days</td>
<td></td>
<td></td>
<td></td>
<td>INTEGRI-EN-P 228</td>
</tr>
</tbody>
</table>

## Maintenance

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround Management</td>
<td>5 days</td>
<td></td>
<td></td>
<td></td>
<td>TURNARO-EN-P 229</td>
</tr>
<tr>
<td>Fundamentals of Mechanical Maintenance</td>
<td>5 days</td>
<td></td>
<td></td>
<td></td>
<td>GENMAIN-EN-A 230</td>
</tr>
<tr>
<td>Pump Maintenance Workshop</td>
<td>10 days</td>
<td></td>
<td></td>
<td></td>
<td>PPMAN-EN-A 231</td>
</tr>
<tr>
<td>Compressors Maintenance</td>
<td>5 days</td>
<td></td>
<td></td>
<td></td>
<td>COMPMAI-EN-P 232</td>
</tr>
<tr>
<td>Maintenance Management Certification</td>
<td>5 days</td>
<td>25-29 October</td>
<td>Pau</td>
<td>€3,680</td>
<td>GESMAIN-EN-P 233</td>
</tr>
<tr>
<td>Upstream Maintenance Engineer Certification</td>
<td>60 days</td>
<td></td>
<td></td>
<td></td>
<td>INGMAIN-EN-A 234</td>
</tr>
<tr>
<td>Maintenance Supervisor Certification</td>
<td>35 days</td>
<td></td>
<td></td>
<td></td>
<td>MAINSUP-EN-A 235</td>
</tr>
<tr>
<td>Maintenance Superintendent Certification</td>
<td>58 days</td>
<td>8 September-1 December</td>
<td>Pau</td>
<td>€42,620</td>
<td>MAINSI-EN-P 236</td>
</tr>
</tbody>
</table>

## Surface Facilities Engineering

### Process Engineering

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil &amp; Gas Process Engineering Certification</td>
<td>60 days</td>
<td></td>
<td></td>
<td></td>
<td>OGPROC-EN-A 238</td>
</tr>
<tr>
<td>Advanced Oil &amp; Gas Process Engineering Certification</td>
<td>35 days</td>
<td></td>
<td></td>
<td></td>
<td>OGADV-EN-A 239</td>
</tr>
<tr>
<td>Advanced Oil &amp; Gas Field Processing Certification</td>
<td>15 days</td>
<td>13-17 September</td>
<td>Rueil-Malmaison</td>
<td>€3,980</td>
<td>ADVI-EN-P 241</td>
</tr>
<tr>
<td>Module 1: Thermodynamics Applied to Well Effluent Processing</td>
<td>5 days</td>
<td>20-24 September</td>
<td>Rueil-Malmaison</td>
<td>€3,980</td>
<td>ADV-EN-P 242</td>
</tr>
<tr>
<td>Module 2: Gas Processing &amp; Conditioning</td>
<td>5 days</td>
<td>27 September-1 October</td>
<td>Rueil-Malmaison</td>
<td>€3,980</td>
<td>ADV-EN-P 243</td>
</tr>
<tr>
<td>Oil &amp; Gas Process Simulation</td>
<td>5 days</td>
<td>6-10 December</td>
<td>Rueil-Malmaison</td>
<td>€3,980</td>
<td>SIMUL-EN-P 244</td>
</tr>
<tr>
<td>Gas Sweetening &amp; Sulfur Recovery</td>
<td>5 days</td>
<td></td>
<td></td>
<td></td>
<td>ACIDE-EN-P 245</td>
</tr>
<tr>
<td>Technical Standards for Surface Facilities Design</td>
<td>5 days</td>
<td></td>
<td></td>
<td></td>
<td>STAND-EN-P 246</td>
</tr>
</tbody>
</table>

### Static Equipment

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Equipment Engineering</td>
<td>5 days</td>
<td></td>
<td></td>
<td></td>
<td>EDESEI-EN-P 247</td>
</tr>
<tr>
<td>Flare Network Design Engineering</td>
<td>5 days</td>
<td></td>
<td></td>
<td></td>
<td>FLARE-EN-P 248</td>
</tr>
</tbody>
</table>

### Electricity & Instrumentation

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>E&amp;I Technology for Oil &amp; Gas Facilities</td>
<td>5 days</td>
<td>4-8 October</td>
<td>Pau</td>
<td>€3,680</td>
<td>E&amp;I-EN-P 249</td>
</tr>
</tbody>
</table>

## Maintenance & Inspection

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion Prevention in Oil &amp; Gas Production</td>
<td>5 days</td>
<td></td>
<td></td>
<td></td>
<td>CORR-EN-A 250</td>
</tr>
<tr>
<td>Maintenance &amp; Inspection of Static Equipment</td>
<td>20 days</td>
<td></td>
<td></td>
<td></td>
<td>INSPECT-EN-P 251</td>
</tr>
</tbody>
</table>

Tuition fees include instruction and documentation as well as meals and beverage breaks.

www.itptraining.com
## Course Index

<table>
<thead>
<tr>
<th>Project Management</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Implementation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Management Certification</td>
<td>5 days</td>
<td>7-11 June</td>
<td>Rueil-Malmaison</td>
<td>€3,680</td>
<td>PROJ-EN-P</td>
<td>253</td>
</tr>
<tr>
<td>Upstream Project Management Certification</td>
<td>65 days</td>
<td>15-19 November</td>
<td>Rueil-Malmaison</td>
<td>€3,680</td>
<td>PROJAP-EN-A</td>
<td>254</td>
</tr>
<tr>
<td>E&amp;P Value Chain &amp; Front-End Development</td>
<td>5 days</td>
<td>18-22 October</td>
<td>Rueil-Malmaison</td>
<td>€3,680</td>
<td>PROJVA-EN-P</td>
<td>255</td>
</tr>
<tr>
<td>E&amp;P Projects Value Management</td>
<td>5 days</td>
<td>18-22 October</td>
<td>In-house course</td>
<td>€3,680</td>
<td>PVM-EN-P</td>
<td>256</td>
</tr>
<tr>
<td>E&amp;P Project Risk &amp; Decision Analysis Workshop</td>
<td>5 days</td>
<td>18-22 October</td>
<td>In-house course</td>
<td>€3,680</td>
<td>PPRD-EN-A</td>
<td>257</td>
</tr>
<tr>
<td>E&amp;P Project Quality &amp; Risk Management</td>
<td>3 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>PROQA-EN-P</td>
<td>258</td>
<td></td>
</tr>
<tr>
<td>Offshore E&amp;P Project Management</td>
<td>3 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>OFFP-EN-P</td>
<td>259</td>
<td></td>
</tr>
<tr>
<td>Building a Project Management Office (PMO)</td>
<td>3 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>PMO-EN-P</td>
<td>260</td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Logistics Management</td>
<td>5 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>LOGP-EN-P</td>
<td>261</td>
<td></td>
</tr>
<tr>
<td><strong>Project Control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Control Tools</td>
<td>5 days</td>
<td>11-15 October</td>
<td>Rueil-Malmaison</td>
<td>€3,680</td>
<td>PCGB-EN-P</td>
<td>262</td>
</tr>
<tr>
<td>E&amp;P Technical Service Contracts</td>
<td>5 days</td>
<td>25-29 October</td>
<td>Rueil-Malmaison</td>
<td>€3,680</td>
<td>CONTRA-EN-P</td>
<td>263</td>
</tr>
<tr>
<td>E&amp;P Technical Contract Negotiation</td>
<td>4 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>NEGO-EN-P</td>
<td>264</td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Cost Estimation &amp; Control Certification</td>
<td>5 days</td>
<td>22-26 November</td>
<td>Rueil-Malmaison</td>
<td>€3,680</td>
<td>ESTIM-EN-A</td>
<td>265</td>
</tr>
<tr>
<td>E&amp;P Project Operating Expenses Optimization</td>
<td>2 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>OPEX-EN-P</td>
<td>266</td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Planning &amp; Scheduling Workshop</td>
<td>5 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>PSPC-EN-P</td>
<td>267</td>
<td></td>
</tr>
<tr>
<td><strong>Project Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upstream Project Construction Techniques</td>
<td>5 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>CONST1-EN-P</td>
<td>268</td>
<td></td>
</tr>
<tr>
<td>Upstream Project Construction Site Administration</td>
<td>5 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>CONST2-EN-P</td>
<td>269</td>
<td></td>
</tr>
<tr>
<td>Upstream Project Construction HSE Management</td>
<td>5 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>CONST3-EN-P</td>
<td>270</td>
<td></td>
</tr>
<tr>
<td>Offshore Oil &amp; Gas Project Installation</td>
<td>5 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>CONST4-EN-P</td>
<td>271</td>
<td></td>
</tr>
<tr>
<td>Upstream Project Construction Works Supervision</td>
<td>5 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>CONSUP-EN-P</td>
<td>272</td>
<td></td>
</tr>
<tr>
<td>Upstream Project Abandonment Operations</td>
<td>5 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>DISMGB-EN-P</td>
<td>273</td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Construction Certification</td>
<td>60 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>CONENG-EN-P</td>
<td>274</td>
<td></td>
</tr>
<tr>
<td>E&amp;P Construction Superintendent Certification</td>
<td>60 days</td>
<td>In-house course</td>
<td>€3,680</td>
<td>CONESSI-EN-P</td>
<td>275</td>
<td></td>
</tr>
</tbody>
</table>

Tuition fees include instruction and documentation as well as meals and beverage breaks.
## Course index

### HSE

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational HSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSE Superintendent Certification</td>
<td>58 days</td>
<td>8 September-1 December</td>
<td>Pau</td>
<td>€42,620</td>
<td>HSSEG-EN-P</td>
<td>277</td>
</tr>
<tr>
<td>HSE in Surface Production Operations</td>
<td>5 days</td>
<td>27 September-1 October</td>
<td>Pau</td>
<td>€3,680</td>
<td>EPASFOP-EN-P</td>
<td>278</td>
</tr>
<tr>
<td>Positive HSE Culture</td>
<td>2 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>POSCULT-EN-A</td>
<td>279</td>
</tr>
<tr>
<td>HSE in Maintenance &amp; Construction Activities</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>EPWONK-EN-P</td>
<td>280</td>
</tr>
<tr>
<td>Occupational Safety</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>OCCEFSAF-EN-A</td>
<td>281</td>
</tr>
<tr>
<td>Occupational Health</td>
<td>3 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>OCCEHEAL-EN-A</td>
<td>282</td>
</tr>
</tbody>
</table>

### Process Safety & Safety Engineering

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Safety Engineer Certification</td>
<td>40 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>PSENG-EN-P</td>
<td>283</td>
</tr>
<tr>
<td>Fundamentals of Process Safety</td>
<td>4 days</td>
<td>2-5 November</td>
<td>Pau</td>
<td>€3,680</td>
<td>FUNDPSM-EN-P</td>
<td>284</td>
</tr>
<tr>
<td>Process Safety Management</td>
<td>10 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>PSMA-EN-P</td>
<td>285</td>
</tr>
<tr>
<td>Safety Engineering Certification</td>
<td>15 days</td>
<td>15 November-3 December</td>
<td>Pau</td>
<td>€8,680</td>
<td>SAFENG-EN-P</td>
<td>286</td>
</tr>
<tr>
<td>Safety Engineering - Module 1</td>
<td>5 days</td>
<td>15-19 November</td>
<td>Pau</td>
<td>€3,680</td>
<td>SAFENG1-EN-P</td>
<td>287</td>
</tr>
<tr>
<td>Safety Engineering - Module 2</td>
<td>5 days</td>
<td>22-26 November</td>
<td>Pau</td>
<td>€3,680</td>
<td>SAFENG2-EN-P</td>
<td>288</td>
</tr>
<tr>
<td>Safety Engineering - Module 3 (Project)</td>
<td>5 days</td>
<td>29 November-3 December</td>
<td>Pau</td>
<td>€3,680</td>
<td>SAFENG3-EN-P</td>
<td>289</td>
</tr>
</tbody>
</table>

### Sustainable Development

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental &amp; Social Risk Management</td>
<td>5 days</td>
<td>15-19 November</td>
<td>Rueil-Malmaison</td>
<td>€3,680</td>
<td>ENVSSOC-EN-A</td>
<td>290</td>
</tr>
<tr>
<td>Social Risk Management</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>SOCIAL-EN-A</td>
<td>291</td>
</tr>
<tr>
<td>Environmental Management</td>
<td>5 days</td>
<td>18-22 October</td>
<td>Pau</td>
<td>€3,680</td>
<td>ENVEMST-EN-A</td>
<td>292</td>
</tr>
</tbody>
</table>

### HSE Management

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSE Engineer Certification</td>
<td>60 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>HSSEEING-EN-P</td>
<td>294</td>
</tr>
<tr>
<td>HSE Management</td>
<td>5 days</td>
<td>25-29 October</td>
<td>Pau</td>
<td>€3,680</td>
<td>HSESTMT-EN-P</td>
<td>295</td>
</tr>
<tr>
<td>Emergency Response Planning</td>
<td>3 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>CRISIS-EN-P</td>
<td>296</td>
</tr>
<tr>
<td>Major Emergency Management - Initial Response Training</td>
<td>3 days</td>
<td>3-5 November</td>
<td>Pau</td>
<td>€2,220</td>
<td>MMEMR-EN-P</td>
<td>297</td>
</tr>
<tr>
<td>HSE for Support Personnel</td>
<td>60 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>HSSESUP-EN-P</td>
<td>298</td>
</tr>
</tbody>
</table>

### Energy Transition Engineer Certification

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Transition Engineer Certification</td>
<td>60 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>NRJENG-EN-A</td>
<td>299</td>
</tr>
</tbody>
</table>

### Gas

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas Chain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Gas</td>
<td>5 days</td>
<td>4-8 October</td>
<td>Rueil-Malmaison</td>
<td>€3,680</td>
<td>NATGAS-EN-A</td>
<td>301</td>
</tr>
<tr>
<td>Natural Gas Storage</td>
<td>2 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>NISSTOCK-EN-P</td>
<td>302</td>
</tr>
<tr>
<td>Natural Gas Transport by Pipeline</td>
<td>2 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>NITRANS-EN-P</td>
<td>303</td>
</tr>
<tr>
<td>From Gas to Energy</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>ENERG-EN-A</td>
<td>304</td>
</tr>
<tr>
<td>Gas Production &amp; Processing Engineer Certification</td>
<td>70 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>NGAZ-EN-P</td>
<td>305</td>
</tr>
<tr>
<td>Gas Processing &amp; Compression Operations</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>GCHAIN-EN-P</td>
<td>306</td>
</tr>
</tbody>
</table>

### LNG Chain

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquefied Natural Gas (LNG)</td>
<td>5 days</td>
<td>15-19 November</td>
<td>Rueil-Malmaison</td>
<td>€4,840</td>
<td>LNG-EN-A</td>
<td>307</td>
</tr>
<tr>
<td>LNG Processing Engineer Certification</td>
<td>60 days</td>
<td>In-house course</td>
<td></td>
<td></td>
<td>LNGENG-EN-A</td>
<td>308</td>
</tr>
<tr>
<td>Natural Gas Liquids Extraction</td>
<td>3 days</td>
<td>23-25 March</td>
<td>Rueil-Malmaison</td>
<td>€2,950</td>
<td>NIL-EN-P</td>
<td>309</td>
</tr>
<tr>
<td>LNG Process Simulation</td>
<td>5 days</td>
<td>20-24 September</td>
<td>Rueil-Malmaison</td>
<td>€4,270</td>
<td>LINSGM-EN-B</td>
<td>310</td>
</tr>
</tbody>
</table>

Tuition fees include instruction and documentation as well as meals and beverage breaks
## Course index

### Unconventional

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Duration</th>
<th>Dates</th>
<th>Location</th>
<th>Tuition Fees excl. VAT</th>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tight Sand &amp; Shale Plays - In Unconventional Settings</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td>SHALEP-EN-P</td>
<td>312</td>
<td></td>
</tr>
<tr>
<td>Hydrocarbons in Unconventional Settings</td>
<td>3 days</td>
<td>In-house course</td>
<td></td>
<td>UNCON-EN-A</td>
<td>313</td>
<td></td>
</tr>
<tr>
<td>Unconventional Resources - Shale Gas Fundamentals</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td>UNCONV-EN-A</td>
<td>314</td>
<td></td>
</tr>
<tr>
<td>Unconventional Resources - “Tight &amp; Shale Gas: an Integrated Subsurface to Surface Approach”</td>
<td>50 days</td>
<td>In-house course</td>
<td></td>
<td>UNCONV-EN-P</td>
<td>315</td>
<td></td>
</tr>
<tr>
<td>Unconventional Resources - Shale Gas Characterization, Modeling &amp; Engineering</td>
<td>10 days</td>
<td>In-house course</td>
<td></td>
<td>SHALEP-EN-P</td>
<td>316</td>
<td></td>
</tr>
<tr>
<td>Well Architecture &amp; Directional Drilling in Unconventional Wells</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td>UNRCD-EN-P</td>
<td>317</td>
<td></td>
</tr>
<tr>
<td>Unconventional Reservoirs Completion &amp; Stimulation</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td>UTC-EN-P</td>
<td>318</td>
<td></td>
</tr>
<tr>
<td>Well Performance: Shale Gas Wells</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td>UPROD-EN-P</td>
<td>319</td>
<td></td>
</tr>
<tr>
<td>New Well Productivity &amp; Decline Curve Analysis in Unconventional Reservoirs</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td>UNCODCA-EN-P</td>
<td>320</td>
<td></td>
</tr>
<tr>
<td>Unconventional Resources: Environmental Management Certification</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td>UCEV-EN-A</td>
<td>321</td>
<td></td>
</tr>
<tr>
<td>Offshore</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offshore Field Architecture</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offshore Field Development - Pipelines &amp; Flow Assurance</td>
<td>5 days</td>
<td>18-22 October</td>
<td>Rueil-Malmaison</td>
<td>€3,680</td>
<td>OFFSH-EN-P</td>
<td>324</td>
</tr>
<tr>
<td>Offshore Field Development Engineering Certification</td>
<td>65 days</td>
<td>In-house course</td>
<td></td>
<td>€3,680</td>
<td>OFFSH-EN-P</td>
<td>325</td>
</tr>
<tr>
<td>Subsea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipeline Hydraulics &amp; Multiphase Flow</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td>HYDR-EN-P</td>
<td>326</td>
<td></td>
</tr>
<tr>
<td>Subsea Activities</td>
<td>9 days</td>
<td>In-house course</td>
<td></td>
<td>OFF-EN-A</td>
<td>327</td>
<td></td>
</tr>
<tr>
<td>Subsea Production Systems (SPS)</td>
<td>5 days</td>
<td>13-17 September</td>
<td>Rueil-Malmaison</td>
<td>€3,510</td>
<td>SPS-EN-A</td>
<td>328</td>
</tr>
<tr>
<td>Subsea Pipelines</td>
<td>4 days</td>
<td>20-23 September</td>
<td>Rueil-Malmaison</td>
<td>€2,750</td>
<td>SPIPE-EN-A</td>
<td>329</td>
</tr>
<tr>
<td>Subsea Integrity Management (I) - Inspection, Monitoring &amp; Testing</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td>SUBINT1-EN-P</td>
<td>330</td>
<td></td>
</tr>
<tr>
<td>Subsea Integrity Management (II) - Non Conformity Management</td>
<td>5 days</td>
<td>In-house course</td>
<td></td>
<td>SUBINT2-EN-P</td>
<td>331</td>
<td></td>
</tr>
</tbody>
</table>

Tuition fees include instruction and documentation as well as meals and beverage breaks.
<table>
<thead>
<tr>
<th>Title of the course</th>
<th>Location</th>
<th>Duration</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E&amp;P Chain</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Introduction to Technical Topics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exploration &amp; Production Overview</td>
<td>Rueil</td>
<td>5 d</td>
<td>17</td>
<td>17</td>
<td>21</td>
<td>06</td>
<td>10</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Petroleum Engineering</td>
<td>Rueil</td>
<td>5 d</td>
<td>13</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Capture, Utilization &amp; Storage (CCUS)</td>
<td>Pau</td>
<td>3 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Digitalization &amp; Data Management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Management Fundamentals (DAMA)</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Data Management for Operations</td>
<td>Rueil</td>
<td>3 d</td>
<td>09</td>
<td>08</td>
<td></td>
<td></td>
<td></td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>50 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Management for E&amp;P Operations</td>
<td>Virtual Classroom</td>
<td>30 d</td>
<td>11</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td>44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td>11</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td>13</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td>46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>2 d</td>
<td>02</td>
<td>03</td>
<td></td>
<td></td>
<td></td>
<td>47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtualization &amp; Data Transfer/IoT</td>
<td>Virtual Classroom</td>
<td>2 d</td>
<td>04</td>
<td>05</td>
<td></td>
<td></td>
<td></td>
<td>48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>2 d</td>
<td>08</td>
<td>09</td>
<td></td>
<td></td>
<td></td>
<td>49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fundamentals in Geographic Information Systems</td>
<td>Virtual Classroom</td>
<td>2 d</td>
<td>10</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From Data lakes to Digital Twins</td>
<td>Virtual Classroom</td>
<td>2 d</td>
<td>14</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td>51</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Data Repositories &amp; Data Rooms</td>
<td>Virtual Classroom</td>
<td>2 d</td>
<td>18</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td>52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Science for E&amp;P Operations</td>
<td>Virtual Classroom</td>
<td>10 d</td>
<td>22</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td>53</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>1 d</td>
<td>22</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td>54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>3 d</td>
<td>23</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td>55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>1 d</td>
<td>28</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td>56</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>1 d</td>
<td>29</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td>57</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>3 d</td>
<td>30</td>
<td>02</td>
<td></td>
<td></td>
<td></td>
<td>58</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation/Validation of Machine Learning Models</td>
<td>Virtual Classroom</td>
<td>1 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>59</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>10 d</td>
<td></td>
<td></td>
<td>06</td>
<td>17</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical Data Quality Management - DAMA</td>
<td>Rueil</td>
<td>5 d</td>
<td>17</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td>61</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Base Set up &amp; Evaluation</td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td>31</td>
<td>04</td>
<td></td>
<td></td>
<td></td>
<td>62</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>2 d</td>
<td>25</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Management Challenges for Managers</td>
<td>Virtual Classroom</td>
<td>1 d</td>
<td>27</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>1 d</td>
<td>28</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td>65</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>3 d</td>
<td>07</td>
<td>09</td>
<td></td>
<td></td>
<td></td>
<td>66</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW</strong></td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td>14</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td>67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title of the course</td>
<td>Location</td>
<td>Duration</td>
<td>January</td>
<td>February</td>
<td>March</td>
<td>April</td>
<td>May</td>
<td>June</td>
<td>July</td>
<td>August</td>
<td>September</td>
<td>October</td>
<td>November</td>
<td>December</td>
<td>Page</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------</td>
<td>----------</td>
<td>---------</td>
<td>----------</td>
<td>-------</td>
<td>-------</td>
<td>-----</td>
<td>------</td>
<td>------</td>
<td>--------</td>
<td>-----------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Exploration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Basin Exploration</td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods &amp; Tools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum Geophysics</td>
<td>Rueil</td>
<td>10 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well Logging &amp; Qualitative Log Interpretation</td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>3D Seismic Interpretation Workshop</td>
<td>Rueil</td>
<td>10 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>82</td>
</tr>
<tr>
<td><strong>From Basin to Prospect Evaluation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Play Assessment &amp; Prospect Generation</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>88</td>
</tr>
<tr>
<td><strong>Reservoir &amp; Field Development</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservoir Characterization &amp; Modeling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Reservoir Characterization</td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>91</td>
</tr>
<tr>
<td>Reservoir Characterization &amp; Modeling Certification</td>
<td>Rueil</td>
<td>58 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>93</td>
</tr>
<tr>
<td>Quantitative Well Log Analysis</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>94</td>
</tr>
<tr>
<td>Naturally-Fractured Reservoirs: Static &amp; Dynamic Modeling</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>98</td>
</tr>
<tr>
<td>Petrophysical Properties: Core, Log &amp; Test Data Integration for Reservoir Modeling</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>99</td>
</tr>
<tr>
<td><strong>Reservoir Engineering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Reservoir Engineering</td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>115</td>
</tr>
<tr>
<td>Reservoir Fluid Properties - PVT</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>116</td>
</tr>
<tr>
<td>Drilling &amp; Completion - Wellbore Interface &amp; Well Productivity</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>117</td>
</tr>
<tr>
<td>Well Testing &amp; Well Test Analysis</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>118</td>
</tr>
<tr>
<td>Drive Mechanisms - Enhanced Oil Recovery</td>
<td>Rueil</td>
<td>8 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>119</td>
</tr>
<tr>
<td>Dynamic Reservoir Simulation</td>
<td>Rueil</td>
<td>10 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>120</td>
</tr>
<tr>
<td>EOR Concepts &amp; Applications</td>
<td>Pau</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>121</td>
</tr>
<tr>
<td>Introduction to Petrophysics</td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>130</td>
</tr>
<tr>
<td><strong>Reservoir Management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservoir Engineering Certification</td>
<td>Rueil</td>
<td>63 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>131</td>
</tr>
<tr>
<td>Reservoir Management Workshop</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>132</td>
</tr>
<tr>
<td>Reservoir Management Foundation</td>
<td>Virtual Classroom</td>
<td>4 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>133</td>
</tr>
<tr>
<td>Reserves Evaluation - Risks &amp; Uncertainties</td>
<td>Virtual Classroom</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>135</td>
</tr>
<tr>
<td><strong>Field Development</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Geothermal Energy Uses &amp; Operations</td>
<td>Virtual Classroom</td>
<td>3 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>138</td>
</tr>
<tr>
<td>Field Development Project</td>
<td>Rueil</td>
<td>15 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>141</td>
</tr>
<tr>
<td>Title of the course</td>
<td>Location</td>
<td>Duration</td>
<td>January</td>
<td>February</td>
<td>March</td>
<td>April</td>
<td>May</td>
<td>June</td>
<td>July</td>
<td>August</td>
<td>September</td>
<td>October</td>
<td>November</td>
<td>December</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>---------</td>
<td>----------</td>
<td>-------</td>
<td>-------</td>
<td>-----</td>
<td>------</td>
<td>------</td>
<td>--------</td>
<td>-----------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Drilling &amp; Completion Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Drilling &amp; Completion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drilling Fundamentals</td>
<td>Pau</td>
<td>5 d</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Well Completion &amp; Servicing</td>
<td>Rueil</td>
<td>5 d</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Drilling &amp; Completion Engineering Certification</td>
<td>Pau</td>
<td>98 d</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Drilling Engineering</td>
<td>Pau</td>
<td>83 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Completion Engineering</td>
<td>Pau</td>
<td>58 d</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Drilling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical Aspects of Well Construction &amp; Planning</td>
<td>Rueil</td>
<td>10 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Geological Field Trip for Drillers</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Fundamentals of Drilling &amp; Completion</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Well Architecture &amp; Equipment</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Bit &amp; Drill String &amp; Fishing while Drilling</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Rig, BOP’s &amp; Well Control Equipment</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Data Acquisition during Drilling Operations</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>HSE in Drilling Operations</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Directional &amp; Horizontal Drilling Certification</td>
<td>Pau</td>
<td>4 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Geosteering</td>
<td>Rueil</td>
<td>3 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Deepwater Drilling &amp; Development Certification</td>
<td>Pau</td>
<td>4 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Fluids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drilling Fluids</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Cementing Practices</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Completion &amp; Well Operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well Productivity &amp; Reservoir - Wellbore Interface</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Well Test Operation</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Well-Completion Equipment &amp; Procedures for Flowing Wells</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Wellbore Treatments</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Artificial Lift &amp; Well Intervention Fundamentals</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Well Equipment &amp; Operation for Production Engineer</td>
<td>Rueil</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Well Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well Control - Level 3 or 4</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Well Intervention &amp; Pressure Control - Level 3 or 4</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Production Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metering &amp; Allocation</td>
<td>Pau</td>
<td>5 d</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Title of the course</td>
<td>Location</td>
<td>Duration</td>
<td>January</td>
<td>February</td>
<td>March</td>
<td>April</td>
<td>May</td>
<td>June</td>
<td>July</td>
<td>August</td>
<td>September</td>
<td>October</td>
<td>November</td>
<td>December</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>---------</td>
<td>----------</td>
<td>-------</td>
<td>-------</td>
<td>-----</td>
<td>------</td>
<td>------</td>
<td>--------</td>
<td>-----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>-----</td>
</tr>
<tr>
<td><strong>Field Operations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production Operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil &amp; Gas Field Processing</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field Processing &amp; Surface Production Facilities</td>
<td>Rueil</td>
<td>10 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production Superintendent Certification</td>
<td>Pau</td>
<td>58 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field Operations Engineer Certification</td>
<td>Rueil</td>
<td>60 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance Management Certification</td>
<td>Pau</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance Superintendent Certification</td>
<td>Pau</td>
<td>58 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Surface Facilities Engineering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Process Engineering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 1: Thermodynamics Applied to Well Effluent Processing</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 2: Oil &amp; Water Processing</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 3: Gas Processing &amp; Conditioning</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil &amp; Gas Process Simulation</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electricity &amp; Instrumentation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;I Technology for Oil &amp; Gas Facilities</td>
<td>Pau</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Project Management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Project Implementation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Management Certification</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;P Value Chain &amp; Front-End Development</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Project Control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Control Tools</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;P Technical Service Contracts</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Cost Estimation &amp; Control Certification</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HSE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational HSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSE Superintendent Certification</td>
<td>Pau</td>
<td>58 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSE in Surface Production Operations</td>
<td>Pau</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Process Safety &amp; Safety Engineering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fundamentals of Process Safety</td>
<td>Pau</td>
<td>4 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Engineering Certification</td>
<td>Pau</td>
<td>15 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Engineering - Module 1</td>
<td>Pau</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Engineering - Module 2</td>
<td>Pau</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Engineering - Module 3 (Project)</td>
<td>Pau</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sustainable Development</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental &amp; Social Risk Management</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Management</td>
<td>Pau</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HSE Management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSE Management</td>
<td>Pau</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major Emergency Management - Initial Response Training</td>
<td>Pau</td>
<td>3 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Course calendar

<table>
<thead>
<tr>
<th>Title of the course</th>
<th>Location</th>
<th>Duration</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Gas Chain</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>301</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>301</td>
</tr>
<tr>
<td>LNG Chain</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>301</td>
</tr>
<tr>
<td>LNG Process Simulation</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>301</td>
</tr>
<tr>
<td><strong>Offshore</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offshore Field Architecture</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>324</td>
</tr>
<tr>
<td>Offshore Field Development - Pipelines &amp; Flow Assurance</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>324</td>
</tr>
<tr>
<td><strong>Subsea</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subsea Production Systems (SPS)</td>
<td>Rueil</td>
<td>5 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>328</td>
</tr>
<tr>
<td>Subsea Pipelines</td>
<td>Rueil</td>
<td>4 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>329</td>
</tr>
</tbody>
</table>
Geosciences Reservoir Engineering
Career Path

Digitalization & Data Management

Conventional Exploration

Unconventional Exploration

Reservoir & Field Development

Diagnostic & Data Management

Conventional Exploration

Unconventional Exploration

Unconventional Production

DIgITALIZATION & DATA MANAGEMENT

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrotechnical Data Management - G &amp; G Data</td>
<td>5 days</td>
<td>DMPETRO-EN-A</td>
</tr>
<tr>
<td>Data Management Fundamentals (DAMA)</td>
<td>5 days</td>
<td>DMFUND-EN-P</td>
</tr>
<tr>
<td>Introduction to Data Management for Operations</td>
<td>3 days</td>
<td>DMIFP-EN-A</td>
</tr>
</tbody>
</table>

UNCONVENTIONAL

EXPLORATION: From Unconventional Play to Geological Sweet Spot

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tight Sand &amp; Shale Plays - In Unconventional Settings</td>
<td>5 days</td>
<td>SHALEP-EN-P</td>
</tr>
<tr>
<td>Hydrocarbons in Unconventional Settings - The Geology Perspective</td>
<td>3 days</td>
<td>UNCONV-EN-A</td>
</tr>
<tr>
<td>Unconventional Resources - Shale gas Fundamentals</td>
<td>5 days</td>
<td>UNCONV-EN-A</td>
</tr>
<tr>
<td>Tight Reservoir Petrophysics</td>
<td>5 days</td>
<td>TIGHTPE-EN-P</td>
</tr>
</tbody>
</table>

UNCONVENTIONAL PRODUCTION

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconventional Resources - Shale Gas Characterization, Modeling &amp; Engineering</td>
<td>10 days</td>
<td>SHALE-EN-P</td>
</tr>
<tr>
<td>Tight Reservoir Characterization &amp; Modeling</td>
<td>10 days</td>
<td>TIGHT-EN-P</td>
</tr>
<tr>
<td>Well Architecture &amp; Directional Drilling in Unconventional Wells*</td>
<td>5 days</td>
<td>URPCD-EN-P</td>
</tr>
<tr>
<td>Unconventional Reservoirs Completion &amp; Stimulation*</td>
<td>5 days</td>
<td>UPRCD-EN-P</td>
</tr>
<tr>
<td>Unconventional Resources: Safety Issues*</td>
<td>5 days</td>
<td>UCSAFS-EN-A</td>
</tr>
<tr>
<td>Unconventional Resources: Environmental Management Certification*</td>
<td>5 days</td>
<td>UCENV-EN-A</td>
</tr>
<tr>
<td>Unconventional Resources - &quot;Tight &amp; Shale Gas: an Integrated Subsurface to Surface Approach</td>
<td>50 days</td>
<td>UNCONVR-EN-A</td>
</tr>
</tbody>
</table>

CONVENTIONAL - EXPLORATION

GENERAL

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Basin Exploration</td>
<td>5</td>
<td>INFOBAS-EN-D</td>
</tr>
<tr>
<td>Hunting for Oil: Exploration &amp; Upstream Overview</td>
<td>5</td>
<td>HFO-EN-P</td>
</tr>
</tbody>
</table>

METHODS & TOOLS

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum Geophysics</td>
<td>10</td>
<td>GEOPHY-EN-A</td>
</tr>
<tr>
<td>Seismic Reflection Fundamentals</td>
<td>5</td>
<td>SEISREF-EN-A</td>
</tr>
<tr>
<td>Petroleum Systems: Hydrocarbons from Source Rock to Reservoirs</td>
<td>5</td>
<td>SEISHRM-EN-A</td>
</tr>
<tr>
<td>Structural Geology, Basin Development &amp; Associated Traps</td>
<td>5</td>
<td>STRUCT-EN-P</td>
</tr>
<tr>
<td>Well Logging &amp; Qualitative Log Interpretation</td>
<td>5</td>
<td>LOGF-EN-D</td>
</tr>
<tr>
<td>3D Seismic Interpretation Workshop</td>
<td>10</td>
<td>SEIS3D-EN-P</td>
</tr>
<tr>
<td>Sedimentology &amp; Sequence Stratigraphy (Workshop)</td>
<td>5</td>
<td>SEGSTRA-EN-P</td>
</tr>
<tr>
<td>Stratigraphic Modeling: Basin Architecture &amp; Sediment Distribution</td>
<td>5</td>
<td>DIGINS-EN-P</td>
</tr>
<tr>
<td>Basin Modeling: Thermicity, Maturation &amp; Migration</td>
<td>5</td>
<td>TEMIS-EN-P</td>
</tr>
<tr>
<td>Wellsite Geology</td>
<td>5</td>
<td>WSGEOL-EN-A</td>
</tr>
</tbody>
</table>

FROM BASIN TO PROSPECT EVALUATION

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin Assessment &amp; Modeling Certification</td>
<td>65</td>
<td>BAMB-EN-P</td>
</tr>
<tr>
<td>Play Assessment &amp; Prospect Generation</td>
<td>5</td>
<td>PLAY-EN-P</td>
</tr>
<tr>
<td>Exploration Blocks Management</td>
<td>15</td>
<td>BLOCK-EN-P</td>
</tr>
</tbody>
</table>

* Belongs to another EP discipline (Drilling/Production) - See referenced listing
## CONVENTIONAL - RESERVOIR & FIELD DEVELOPMENT

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RESERVOIR CHARACTERIZATION &amp; MODELING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Reservoir Characterization</td>
<td>5 days</td>
<td>INFORCM-EN-D</td>
</tr>
<tr>
<td>Integrated Petrophysics for Reservoir Characterization &amp; Modeling Certification</td>
<td>90 days</td>
<td>PETRORE-EN-P</td>
</tr>
<tr>
<td>Reservoir Characterization &amp; Modeling Certification</td>
<td>58 days</td>
<td>RCN-EN-P</td>
</tr>
<tr>
<td>Quantitative Well Log Analysis</td>
<td>5 days</td>
<td>LOGADV-EN-P</td>
</tr>
<tr>
<td>Fundamentals of Facies Analysis &amp; Rock Typing</td>
<td>5 days</td>
<td>ROCKTYP-EN-A</td>
</tr>
<tr>
<td>Geological Modeling Workshop for Integrated Studies</td>
<td>5 days</td>
<td>GEOMOD-EN-P</td>
</tr>
<tr>
<td>Hydrocarbons Accumulations, Reserves Estimation, Risk Analysis &amp; Uncertainties</td>
<td>5 days</td>
<td>OSP-EN-P</td>
</tr>
<tr>
<td>Naturally-Fractured Reservoirs: Static &amp; Dynamic Modeling</td>
<td>5 days</td>
<td>FRACTMOD-EN-P</td>
</tr>
<tr>
<td>Petrophysical Properties: Core, Log &amp; Test Data Integration for Reservoir Modeling</td>
<td>4 days</td>
<td>PETROD-EN-P</td>
</tr>
<tr>
<td>Upscaling: from Static to Dynamic Model</td>
<td>3 days</td>
<td>UPSCALE-EN-P</td>
</tr>
<tr>
<td>Borehole Imaging Interpretation Workshop With WellCad™</td>
<td>5 days</td>
<td>BH-EN-P</td>
</tr>
<tr>
<td>Fracture &amp; Fault Modeling Workshop with Fracaflow™</td>
<td>4 days</td>
<td>FRACA-EN-P</td>
</tr>
<tr>
<td>Advanced Facies Analysis &amp; Rock-Typing Certification</td>
<td>5 days</td>
<td>ROCKADV-EN-P</td>
</tr>
<tr>
<td>Geological Characterization &amp; Modeling - Integrated Workshop Certification</td>
<td>10 days</td>
<td>IRCM-EN-P</td>
</tr>
<tr>
<td>Tools for Seismic Reservoir Characterization: Pre-Stack Seismic Inversion</td>
<td>5 days</td>
<td>PRESTAC-EN-P</td>
</tr>
<tr>
<td>Tools for Seismic Reservoir Characterization: Post-Stack Seismic Inversion</td>
<td>5 days</td>
<td>POSTAC-EN-P</td>
</tr>
<tr>
<td>Static Model Construction: Field Constraints &amp; Integration with Subsurface Data</td>
<td>5 days</td>
<td>CARBFTP-EN-P</td>
</tr>
<tr>
<td>Fundamentals of Reservoir Geology</td>
<td>15 days</td>
<td>RESGEOL-EN-P</td>
</tr>
<tr>
<td>Core Analysis for Reservoir Characterization</td>
<td>5 days</td>
<td>CONSCAL-EN-P</td>
</tr>
<tr>
<td>Special Core Analysis</td>
<td>5 days</td>
<td>SCAL-EN-P</td>
</tr>
<tr>
<td>Geomechanics for Geoscientists</td>
<td>5 days</td>
<td>GEOMG-EN-P</td>
</tr>
<tr>
<td><strong>RESERVOIR ENGINEERING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Reservoir Engineering</td>
<td>5 days</td>
<td>INFORRES-EN-D</td>
</tr>
<tr>
<td>Reservoir Fluid Properties - PVT</td>
<td>5 days</td>
<td>PVT-EN-P</td>
</tr>
<tr>
<td>Drilling &amp; Completion - Wellbore Interface &amp; Well Productivity</td>
<td>5 days</td>
<td>WELPROD-EN-P</td>
</tr>
<tr>
<td>Well Testing &amp; Well Test Analysis</td>
<td>5 days</td>
<td>WTPA-EN-P</td>
</tr>
<tr>
<td>Drive Mechanisms - EOR</td>
<td>8 days</td>
<td>ORP-EN-P</td>
</tr>
<tr>
<td>Dynamic Reservoir Simulation</td>
<td>10 days</td>
<td>SIMRES-EN-P</td>
</tr>
<tr>
<td>EOR Concepts &amp; Application</td>
<td>5 days</td>
<td>EOR-EN-P</td>
</tr>
<tr>
<td>Miscible Gas Injection EOR Certification</td>
<td>5 days</td>
<td>EOR-M-EN-P</td>
</tr>
<tr>
<td>Chemical EOR Certification</td>
<td>5 days</td>
<td>EOR-C-EN-P</td>
</tr>
<tr>
<td>Advanced Dynamic Reservoir Simulation</td>
<td>5 days</td>
<td>SIMADV-EN-P</td>
</tr>
<tr>
<td>Reservoir Simulation Workshop Certification</td>
<td>10 days</td>
<td>RESW-EN-P</td>
</tr>
<tr>
<td>Advanced Well Test Analysis Certification</td>
<td>5 days</td>
<td>WTAADV-EN-P</td>
</tr>
<tr>
<td>PVT Modeling</td>
<td>5 days</td>
<td>PVTPROD-EN-P</td>
</tr>
<tr>
<td>Decline Curves Analysis</td>
<td>3 days</td>
<td>DCA-EN-A</td>
</tr>
<tr>
<td><strong>RESERVOIR MANAGEMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservoir Engineering Certification</td>
<td>64 days</td>
<td>RESENG-EN-P</td>
</tr>
<tr>
<td>Reservoir Management Workshop</td>
<td>4 days</td>
<td>RMW-EN-P</td>
</tr>
<tr>
<td>Reserves Evaluation - Risk &amp; Uncertainties Certification</td>
<td>5 days</td>
<td>RISKUNL-EN-D</td>
</tr>
<tr>
<td>Mature Fields - Subsurface Issues</td>
<td>5 days</td>
<td>MAINT-EN-A</td>
</tr>
<tr>
<td>Integrated Reservoir Management Certification</td>
<td>45 days</td>
<td>IRM-EN-P</td>
</tr>
<tr>
<td><strong>FIELD DEVELOPMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field Development Project &amp; Uncertainties</td>
<td>5 days</td>
<td>FDP-EN-P</td>
</tr>
</tbody>
</table>
## Drilling Supervisor Career Path

### Initial Training
- **Drilling Fundamentals**
  - 5 days
  - Reference: INFOR-EN-P
- **Well Completion & Servicing**
  - 5 days
  - Reference: INPF-EN-A

*On an Onshore Rig, as a Member of a Drilling Contractor Team*
- **Roughneck Floorman**
  - Estimated: 2 months
- **Derrickman Course**
  - 10 days
- **Assistant Driller Course**
  - Estimated 4 months
- **Assistant Driller**
  - Estimated 4 months

### Long Professionalizing Training Course (98 days) Drilling & Completion
- **Drilling & Completion Engineering Certification** *(including HSE module & IWCF certification)*
  - 98 days
  - Reference: FOSIM-EN-P

### Junior Supervisor (night)

### Drilling Supervisor

## Drilling Supervisor

### Initial Training

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling Fundamentals</td>
<td>5 days</td>
<td>INFOR-EN-P</td>
</tr>
<tr>
<td>Well Completion &amp; Servicing</td>
<td>5 days</td>
<td>INPF-EN-A</td>
</tr>
</tbody>
</table>

### On an Onshore Rig, as a Member of a Drilling Contractor Team

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roughneck Floorman</td>
<td>Estimated 2 months</td>
<td></td>
</tr>
<tr>
<td>Derrickman Course</td>
<td>10 days</td>
<td></td>
</tr>
<tr>
<td>Assistant Driller Course</td>
<td>Estimated 4 months</td>
<td></td>
</tr>
<tr>
<td>Assistant Driller</td>
<td>Estimated 4 months</td>
<td></td>
</tr>
</tbody>
</table>

### Long Professionalizing Training Course Drilling & Completion

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling &amp; Completion Engineering Certification <em>(including HSE module &amp; IWCF certification)</em></td>
<td>98 days</td>
<td>FOSIM-EN-P</td>
</tr>
</tbody>
</table>

### Advanced Courses

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor Training on Drilling Simulator</td>
<td>5 days</td>
<td>FOSIM-EN-P</td>
</tr>
<tr>
<td>Advanced Cementing Practices</td>
<td>5 days</td>
<td>CIM2-EN-P</td>
</tr>
<tr>
<td>Stuck Pipe Prevention</td>
<td>3 days</td>
<td>STUCKP-EN-P</td>
</tr>
<tr>
<td>Stripping</td>
<td>3 days</td>
<td>STRIP-EN-P</td>
</tr>
<tr>
<td>Well Test Operation</td>
<td>10 days</td>
<td>WELTEST-EN-A</td>
</tr>
<tr>
<td>Matrix Acidizing</td>
<td>5 days</td>
<td>ACID-EN-P</td>
</tr>
<tr>
<td>Coiled Tubing &amp; Nitrogen Operations in Completion &amp; Workover</td>
<td>5 days</td>
<td>CTA-EN-P</td>
</tr>
</tbody>
</table>

### Well Intervention & Pressure Control *(IWCF certification)*

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Production Integrity</td>
<td>2 days</td>
<td>WELLINT-EN-P</td>
</tr>
<tr>
<td>Introduction to Reservoir Engineering</td>
<td>5 days</td>
<td>INFORES-EN-D</td>
</tr>
<tr>
<td>Well Performance</td>
<td>5 days</td>
<td>WPERF-EN-A</td>
</tr>
<tr>
<td>Artificial Lift: Gas Lift</td>
<td>5 days</td>
<td>GLIFT-EN-P</td>
</tr>
<tr>
<td>Artificial Lift: Pumping</td>
<td>5 days</td>
<td>APUMP-EN-P</td>
</tr>
</tbody>
</table>
Well Intervention Supervisor
Career Path

### Initial Training

- **Well Completion & Servicing**: 5 days [INPF-EN-A]
- **Safety Induction - Rig**: Variable
- **Practical Training on Rig School**: 5 days
- **Sea Survival, Firefighting, First Aid**: Variable

### Long Professionalizing Training Course Well Operations & Completion Engineering

- **Well Operations & Completion Engineering (including IWCF certification)**: 40 days [INTP-EN-P]

### Advanced Courses

- **Supervisor Training on Drilling Simulator**: 5 days [FOSIM-EN-P]
- **Well Test Operation**: 5 days [WELTEST-EN-A]
- **Matrix Acidizing**: 5 days [ACID-EN-P]
- **Coiled Tubing & Nitrogen Operations in Completion & Workover**: 5 days [CTA-EN-P]
- **Well Intervention & Pressure Control (IWCF certification)**: 5 days [CP2-EN-A & CP3-4-EN-A]
- **HSE Management**: 5 days [HSEMGT-EN-P]
- **Introduction to Reservoir Engineering**: 5 days [INFORES-EN-D]
- **Advanced Well Performance**: 10 days [WPERF2-EN-P]
- **Artificial Lift: Gas Lift**: 5 days [GLIFT-EN-P]
- **Artificial Lift: Pumping**: 5 days [APUMP-EN-P]
- **Well Production Integrity Management**: 5 days [WELINTM-EN-P]
# Drilling Engineer Career Path

## Initial Training

### Drilling Fundamentals
5 days
Reference: INFOR-EN-P

### Well Completion & Servicing
5 days
Reference: INPF-EN-A

### Safety Induction - Rig
Variable

### Slips & Tongs (Rig school)
5 days

### Sea Survival, Firefighting, First Aid
Variable

## Long Professionalizing Training Course Drilling & Completion

### Drilling & Completion Engineering Certification (including HSE module & IWCF certification)
98 days
Reference: FOFP-EN-P

## Junior Supervisor (night)

## Drilling Engineer

## DRILLING ENGINEER

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INITIAL TRAINING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drilling Fundamentals</td>
<td>5 days</td>
<td>INFOR-EN-P</td>
</tr>
<tr>
<td>Well Completion &amp; Servicing</td>
<td>5 days</td>
<td>INPF-EN-A</td>
</tr>
<tr>
<td><strong>ON AN ONSHORE RIG, AS A MEMBER OF A DRILLING CONTRACTOR TEAM</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Induction - Rig</td>
<td>Variable</td>
<td></td>
</tr>
<tr>
<td>Slips &amp; Tongs (Rig school)</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Sea Survival, Firefighting, First Aid</td>
<td>Variable</td>
<td></td>
</tr>
<tr>
<td><strong>LONG PROFESSIONALIZING TRAINING COURSE DRILLING &amp; COMPLETION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drilling &amp; Completion Engineering Certification (including HSE module &amp; IWCF certification)</td>
<td>98 days</td>
<td>FOFP-EN-P</td>
</tr>
<tr>
<td><strong>ADVANCED COURSES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervisor Training on Drilling Simulator</td>
<td>5 days</td>
<td>FOSIM-EN-P</td>
</tr>
<tr>
<td>Underbalanced &amp; Managed Pressure Drilling: Applications, Design &amp; Operations</td>
<td>5 days</td>
<td>UBD-EN-P</td>
</tr>
<tr>
<td>HPHT Drilling Design &amp; Operations</td>
<td>5 days</td>
<td>HPHT-EN-P</td>
</tr>
<tr>
<td>Stripping</td>
<td>3 days</td>
<td>STRP-EN-P</td>
</tr>
<tr>
<td>Advanced Cementing Practices</td>
<td>5 days</td>
<td>CIM2-EN-P</td>
</tr>
<tr>
<td>Stuck Pipe Prevention</td>
<td>5 days</td>
<td>STUCKP-EN-P</td>
</tr>
<tr>
<td>Well Test Operation</td>
<td>5 days</td>
<td>WELTEST-EN-A</td>
</tr>
<tr>
<td>Matrix Acidizing</td>
<td>5 days</td>
<td>ACID-EN-P</td>
</tr>
<tr>
<td>Coiled Tubing &amp; Nitrogen Operations in Completion &amp; Workover</td>
<td>5 days</td>
<td>CTA-EN-P</td>
</tr>
<tr>
<td><strong>Well Intervention &amp; Pressure Control</strong> (IWCF certification)</td>
<td>5 days</td>
<td>CP3-EN-A &amp; CP3.4-EN-A</td>
</tr>
<tr>
<td>HSE Management</td>
<td>5 days</td>
<td>HSEMGTP-EN-P</td>
</tr>
<tr>
<td>Introduction to Reservoir Engineering</td>
<td>5 days</td>
<td>INFORES-EN-D</td>
</tr>
<tr>
<td>Advanced Well Performance</td>
<td>10 days</td>
<td>WPERF2-EN-P</td>
</tr>
<tr>
<td>Artificial Lift: Gas Lift</td>
<td>5 days</td>
<td>GLIFT-EN-P</td>
</tr>
<tr>
<td>Artificial Lift: Pumping</td>
<td>5 days</td>
<td>APOMP-EN-P</td>
</tr>
<tr>
<td>Well Production Integrity Management</td>
<td>5 days</td>
<td>WELINTM-EN-P</td>
</tr>
<tr>
<td><strong>MANAGEMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated Reservoir Management (IRM)</td>
<td>45 days</td>
<td>IRM-EN-P</td>
</tr>
<tr>
<td>E&amp;P Project Management Certification</td>
<td>5 days</td>
<td>PROJ-EN-P</td>
</tr>
</tbody>
</table>
PRODUCTION/Maintenance Technician Career Path

Throughout the career path, IFP Training can implement specific short courses on the following topics:

► Production Operations & Processing
► Health, Safety & Environment
► Equipment & Maintenance
**ENGINEERS PROGRAMS**

<table>
<thead>
<tr>
<th>Session</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LONG PROFESSIONALIZING TRAINING COURSES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum Engineering Certification</td>
<td>100 days</td>
<td>EPETROL-EN-A</td>
</tr>
<tr>
<td><strong>ACCELERATED DEVELOPMENT PROGRAMS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production Engineering Certification</td>
<td>60 days</td>
<td>PRODENG-EN-A</td>
</tr>
<tr>
<td>Oil &amp; Gas Process Engineering Certification</td>
<td>60 days</td>
<td>OGPROC-EN-A</td>
</tr>
<tr>
<td>Advanced Oil &amp; Gas Process Engineering Certification</td>
<td>35 days</td>
<td>OGADV-EN-A</td>
</tr>
<tr>
<td>Pipeline Network Engineering &amp; Operation Certification</td>
<td>60 days</td>
<td>PIPENG-EN-P</td>
</tr>
<tr>
<td>Gas Production &amp; Processing Engineer Certification</td>
<td>70 days</td>
<td>INGGAZ-EN-P</td>
</tr>
<tr>
<td>LNG Processing Engineer Certification</td>
<td>60 days</td>
<td>LNGENG-EN-P</td>
</tr>
<tr>
<td>Field Operations Engineer Certification</td>
<td>60 days</td>
<td>FIELDIG-EN-A</td>
</tr>
<tr>
<td>Offshore Field Development Engineering Certification</td>
<td>65 days</td>
<td>OFFSHIN-EN-A</td>
</tr>
<tr>
<td>Upstream Maintenance Engineer Certification</td>
<td>60 days</td>
<td>INGMAIN-EN-A</td>
</tr>
<tr>
<td>HSE Engineer Certification</td>
<td>60 days</td>
<td>HSEENG-EN-P</td>
</tr>
<tr>
<td>Process Safety Engineer Certification</td>
<td>40 days</td>
<td>PSENG-EN-P</td>
</tr>
<tr>
<td><strong>ADVANCED COURSES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Oil &amp; Gas Field Processing Certification</td>
<td>15 days</td>
<td>ADV-EN-A</td>
</tr>
<tr>
<td>Safety Engineering Certification</td>
<td>15 days</td>
<td>SAFENC-EN-P</td>
</tr>
<tr>
<td>Asset Integrity Management</td>
<td>5 days</td>
<td>INTEGR-EN-P</td>
</tr>
<tr>
<td>Turnaround Management</td>
<td>5 days</td>
<td>TURNAR-EN-P</td>
</tr>
<tr>
<td><strong>EXECUTIVE CERTIFICATE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensive Overview of E&amp;P Management Certification</td>
<td>60 days</td>
<td>EPMST-EN-A</td>
</tr>
</tbody>
</table>
## Training Courses Spanning Through the Entire Oil Production Chain

### Long Professionalizing Training Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum Engineering Certification</td>
<td>100 days</td>
<td>EPETROL-EN-A</td>
</tr>
</tbody>
</table>

### Accelerated Development Programs

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Engineering Certification</td>
<td>60 days</td>
<td>PRODENG-EN-A</td>
</tr>
<tr>
<td>Oil &amp; Gas Process Engineering Certification</td>
<td>60 days</td>
<td>OGPROC-EN-A</td>
</tr>
<tr>
<td>Advanced Oil &amp; Gas Process Engineering Certification</td>
<td>35 days</td>
<td>OGADV-EN-A</td>
</tr>
<tr>
<td>Field Operations Engineer Certification</td>
<td>60 days</td>
<td>FIELDIS-EN-A</td>
</tr>
</tbody>
</table>

### Advanced Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Oil &amp; Gas Field Processing Certification</td>
<td>15 days</td>
<td>ADV-EN-A</td>
</tr>
<tr>
<td>Integrated Production Modeling - Module 1</td>
<td>5 days</td>
<td>IPT1-EN-P</td>
</tr>
<tr>
<td>Integrated Production Modeling - Module 2 (Project)</td>
<td>5 days</td>
<td>IPT2-EN-P</td>
</tr>
<tr>
<td>Gathering Networks: Design &amp; Engineering</td>
<td>5 days</td>
<td>NETWORK-EN-P</td>
</tr>
<tr>
<td>Subsea Production Systems</td>
<td>5 days</td>
<td>SPS-EN-A</td>
</tr>
<tr>
<td>Oil &amp; Gas Process Simulation</td>
<td>5 days</td>
<td>SIMUL-EN-P</td>
</tr>
<tr>
<td>Chemicals used in Production Activities</td>
<td>5 days</td>
<td>CHIMIC-EN-P</td>
</tr>
<tr>
<td>Oil &amp; Gas Field Processing Troubleshooting</td>
<td>5 days</td>
<td>TROUBLE-EN-P</td>
</tr>
<tr>
<td>Mature Fields - Surface Production Issues</td>
<td>5 days</td>
<td>MATURE-EN-P</td>
</tr>
<tr>
<td>Heavy Oil Production &amp; Processing</td>
<td>5 days</td>
<td>HEAVY-EN-P</td>
</tr>
<tr>
<td>Metering &amp; Allocation</td>
<td>5 days</td>
<td>METER-EN-P</td>
</tr>
<tr>
<td>Oil Terminals, FSO &amp; FPSO</td>
<td>5 days</td>
<td>TERM-EN-A</td>
</tr>
<tr>
<td>Production Accounting &amp; Material Balance</td>
<td>3 days</td>
<td>BILMAT-EN-P</td>
</tr>
<tr>
<td>Production Planning &amp; Monitoring</td>
<td>5 days</td>
<td>PLANNING-EN-P</td>
</tr>
</tbody>
</table>
Natural Gas Value Chain
Career Path

TRAINING COURSES SPANNING THROUGH THE ENTIRE NATURAL GAS VALUE CHAIN

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACCELERATED DEVELOPMENT PROGRAMS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas Production &amp; Processing Engineer Certification</td>
<td>70 days</td>
<td>INGGAZ-EN-P</td>
</tr>
<tr>
<td>Pipeline Network Engineering &amp; Operation Certification</td>
<td>60 days</td>
<td>PIPENG-EN-P</td>
</tr>
<tr>
<td>LNG Processing Engineer Certification</td>
<td>60 days</td>
<td>LNGENG-EN-A</td>
</tr>
<tr>
<td><strong>ADVANCED COURSES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From Gas to Energy</td>
<td>5 days</td>
<td>ENERGY-EN-A</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>5 days</td>
<td>NATGAS-EN-A</td>
</tr>
<tr>
<td>Gas Processing &amp; Conditioning</td>
<td>5 days</td>
<td>ADV3-EN-P</td>
</tr>
<tr>
<td>Gas Sweetening &amp; Sulfur Recovery</td>
<td>5 days</td>
<td>ACIDE-EN-P</td>
</tr>
<tr>
<td>Gas Cycling: an Integrated Approach</td>
<td>5 days</td>
<td>GASCYCL-EN-P</td>
</tr>
<tr>
<td>Natural Gas Transport by Pipeline</td>
<td>2 days</td>
<td>NGTRANS-EN-P</td>
</tr>
<tr>
<td>Natural Gas Storage</td>
<td>2 days</td>
<td>NGSTOCK-EN-P</td>
</tr>
<tr>
<td>Liquefied Natural Gas (LNG)</td>
<td>5 days</td>
<td>LNG-EN-A</td>
</tr>
<tr>
<td>LNG Process Simulation</td>
<td>5 days</td>
<td>LNGSIM-EN-B</td>
</tr>
<tr>
<td>Compressors Operation</td>
<td>5 days</td>
<td>COMPOP-EN-A</td>
</tr>
<tr>
<td>Compressors Maintenance</td>
<td>5 days</td>
<td>COMPMAI-EN-P</td>
</tr>
</tbody>
</table>
HSE COURSES SPANNING THROUGHOUT THE OIL & GAS PROJECTS LIFE CYCLE

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACCELERATED DEVELOPMENT PROGRAMS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSE Engineer Certification</td>
<td>80 days</td>
<td>HSEENG-EN-P</td>
</tr>
<tr>
<td>Process Safety Engineer Certification</td>
<td>40 days</td>
<td>PSEENG-EN-P</td>
</tr>
<tr>
<td><strong>ADVANCED COURSES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Engineering Certification</td>
<td>15 days</td>
<td>SAFENGIC-EN-P</td>
</tr>
<tr>
<td>HSE Management</td>
<td>5 days</td>
<td>HSEMGT-EN-P</td>
</tr>
<tr>
<td>Process Safety Management</td>
<td>10 days</td>
<td>PSM-EN-P</td>
</tr>
<tr>
<td>Environmental Management</td>
<td>5 days</td>
<td>ENMGT-EN-A</td>
</tr>
<tr>
<td>Environmental Pollution &amp; Waste Management</td>
<td>5 days</td>
<td>WASTMGT-EN-A</td>
</tr>
<tr>
<td>Major Emergency Management - Initial Response Training</td>
<td>3 days</td>
<td>MEMR-EN-P</td>
</tr>
<tr>
<td>HSE in Drilling Operations</td>
<td>5 days</td>
<td>HSEFOR-EN-P</td>
</tr>
<tr>
<td>Well Control - Level 2</td>
<td>5 days</td>
<td>FPE2-EN-A</td>
</tr>
<tr>
<td>Well Control - Level 3 or 4</td>
<td>5 days</td>
<td>FPE3-4-EN-A</td>
</tr>
<tr>
<td>Well Intervention &amp; Pressure Control - Level 2</td>
<td>5 days</td>
<td>CP2-EN-A</td>
</tr>
<tr>
<td>Well Intervention &amp; Pressure Control - Level 3 or 4</td>
<td>5 days</td>
<td>CP3-4-EN-A</td>
</tr>
<tr>
<td>HSE in Surface Production Operations</td>
<td>5 days</td>
<td>EPASAFIP-EN-P</td>
</tr>
<tr>
<td>HSE in Maintenance &amp; Construction Activities</td>
<td>5 days</td>
<td>EPWORK-EN-P</td>
</tr>
<tr>
<td>Unconventional Resources: Environmental Management</td>
<td>5 days</td>
<td>UCENV-EN-A</td>
</tr>
<tr>
<td>Unconventional Resources: Safety issues</td>
<td>5 days</td>
<td>UCSAFIP-EN-A</td>
</tr>
<tr>
<td>Positive HSE Culture</td>
<td>2 days</td>
<td>POSCULT-EN-A</td>
</tr>
</tbody>
</table>

Sustainability

HSE Engineering

HSE Management

HSE in Operations

IWCIF Certifications

HSE in Drilling & Completion

HSE in Production Operations

HSE in Processing facilities operations & maintenance
## Project Management Career Path

### Project Engineering Manager (PEM)
- Coordination/Reporting
- Contracts/Procedures
- Quality Management

### Construction Manager (CM)
- Planning/Safety/Logistics
- Procurement/Cost & Quality
- Commissioning

### Project Control Manager (PCM)
- Cost/Planning
- Risks
- Contracts/Claims

### Interfaces Manager (IM)
- Coordination
- Engineering Disciplines
- Contractual Aspects

### Project Manager (PM)
- Value Management
- Contracts/HSE/Quality
- HR/Negotiation/Conflicts

### Project Management

<table>
<thead>
<tr>
<th>Session</th>
<th>Duration</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROJECT IMPLEMENTATION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Management Certification</td>
<td>5 days</td>
<td>PROJ-EN-P</td>
</tr>
<tr>
<td>Upstream Project Management Certification</td>
<td>65 days</td>
<td>UPMC-EN-A</td>
</tr>
<tr>
<td>E&amp;P Value Chain &amp; Front-End Development</td>
<td>5 days</td>
<td>PROJFL-EN-P</td>
</tr>
<tr>
<td>E&amp;P Project Risk &amp; Decision Analysis Workshop</td>
<td>5 days</td>
<td>PRDAM-EN-A</td>
</tr>
<tr>
<td>E&amp;P Project Quality &amp; Risk Management</td>
<td>3 days</td>
<td>EPQAM-EN-P</td>
</tr>
<tr>
<td>Offshore E&amp;P Project Management</td>
<td>3 days</td>
<td>OFFPM-EN-P</td>
</tr>
<tr>
<td>Building a Project Management Office (PMO)</td>
<td>3 days</td>
<td>PMO-EN-P</td>
</tr>
<tr>
<td>E&amp;P Project Logistics Management</td>
<td>5 days</td>
<td>LOGP-EN-P</td>
</tr>
<tr>
<td><strong>PROJECT CONTROL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;P Project Control Tools</td>
<td>5 days</td>
<td>PCGB-EN-P</td>
</tr>
<tr>
<td>E&amp;P Technical Service Contracts</td>
<td>5 days</td>
<td>CONTRA-EN-P</td>
</tr>
<tr>
<td>E&amp;P Technical Contract Negotiation</td>
<td>4 days</td>
<td>NEGO-EN-P</td>
</tr>
<tr>
<td>E&amp;P Project Cost Estimation &amp; Control Certification</td>
<td>5 days</td>
<td>ESTIM-EN-A</td>
</tr>
<tr>
<td>E&amp;P Project Operating Expenses Optimization</td>
<td>2 days</td>
<td>OPEX-EN-P</td>
</tr>
<tr>
<td>E&amp;P Project Planning &amp; Scheduling Workshop</td>
<td>5 days</td>
<td>PSPC-EN-P</td>
</tr>
<tr>
<td><strong>PROJECT CONSTRUCTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upstream Project Construction Techniques</td>
<td>5 days</td>
<td>CONST1-EN-P</td>
</tr>
<tr>
<td>Upstream Project Construction Site Administration</td>
<td>5 days</td>
<td>CONST2-EN-P</td>
</tr>
<tr>
<td>Upstream Project Construction HSE Management</td>
<td>5 days</td>
<td>CONST3-EN-P</td>
</tr>
<tr>
<td>Offshore Oil &amp; Gas Project Installation</td>
<td>5 days</td>
<td>CONST4-EN-P</td>
</tr>
<tr>
<td>Upstream Project Construction Works Supervision</td>
<td>5 days</td>
<td>CONSU-EN-P</td>
</tr>
<tr>
<td>Upstream Project Abandonment Operations</td>
<td>5 days</td>
<td>DISMUB-EN-P</td>
</tr>
<tr>
<td>Subsea Production Systems (SPS)</td>
<td>5 days</td>
<td>SPS-EN-A</td>
</tr>
<tr>
<td>Subsea Pipelines</td>
<td>4 days</td>
<td>SPIPE-EN-A</td>
</tr>
<tr>
<td>E&amp;P Project Construction Certification</td>
<td>60 days</td>
<td>CONENG-EN-P</td>
</tr>
<tr>
<td>E&amp;P Construction Superintendent Certification</td>
<td>60 days</td>
<td>CONSSI-EN-P</td>
</tr>
</tbody>
</table>
E&P Chain

General Introduction to Technical Topics

- Comprehensive Overview of E&P Management Certification ......................................................... p. 30
- Exploration & Production Overview ........................................................................................................... p. 31
- Exploration & Production Overview ............................................................................................................ p. 32
- Introduction to Petroleum Engineering ......................................................................................................... p. 33
- E&P Jobs ..................................................................................................................................................... p. 34
- Fundamentals of Production .......................................................................................................................... p. 35
- Soft Skills Toolbox ....................................................................................................................................... p. 36
- Petroleum Engineering Certification ............................................................................................................. p. 37
- Carbon Capture, Utilization & Storage (CCUS) .............................................................................................. p. 38

Digitalization & Data Management

- Petrotechnical Data Management - G&G Data ............................................................................................... p. 39
- Data Management Fundamentals (DAMA) ...................................................................................................... p. 40
- Introduction to Data Management for Operations .......................................................................................... p. 41
- Fundamentals of Industrial Data Science: Data Analysis & Visualization” .................................................. p. 42
- Baker Hughes’ Data Analytics & Management course ..................................................................................... p. 43
- Data Management & Data Science for E&P Operations Certification .............................................................. p. 44
- Data Management for E&P Operations ......................................................................................................... p. 45
- E&P Data: Value & Format ............................................................................................................................... p. 46
- Data Protection & Cybersecurity ..................................................................................................................... p. 47
- E&P Data Architecture & Big Data .................................................................................................................... p. 48
- Virtualization & Data Transfer/IoT ..................................................................................................................... p. 49
- Fundamentals in Geographic Information Systems .......................................................................................... p. 50
- Earth Modeling, Data Integration & Knowledge ............................................................................................... p. 51
- From Data Lakes to Digital Twins .................................................................................................................... p. 52
- National Data Repositories & Data Rooms ...................................................................................................... p. 53
- Data Science for E&P Operations ..................................................................................................................... p. 54
- Introduction to Data Science & Analytics for O&G Professionals ..................................................................... p. 55
- Machine Learning Concepts ............................................................................................................................ p. 56
- Python Scripting ................................................................................................................................................ p. 57
- Text Analysis using Machine Learning ............................................................................................................. p. 58
- Object Detection .............................................................................................................................................. p. 59
- Evaluation/Validation of Machine Learning Models ........................................................................................ p. 60
- Data Management & Data Science Final Project ........................................................................................... p. 61
- Practical Data Quality Management - DAMA ................................................................................................... p. 62
- Data Base Set Up & Evaluation ........................................................................................................................ p. 63
- Data Management Challenges for Managers .................................................................................................. p. 64
- Cybersecurity for O&G Professionals ............................................................................................................. p. 65
- Cybersecurity for Managers ............................................................................................................................. p. 66
- Introduction to Data Analytics & Machine Learning Techniques for Geosciences & Reservoir Engineering ................................................................................................................................................. p. 67

Competency Management & Training Engineering

- Competency Management in E&P ................................................................................................................ p. 68
- Field/Site Trainers Accreditation ..................................................................................................................... p. 69
- Training Engineering in E&P ........................................................................................................................... p. 70
- Classroom Lecturers Accreditation ................................................................................................................ p. 71
- Subject Matter Experts Accreditation ............................................................................................................. p. 72
- Communication & Behavioral Management .................................................................................................... p. 73
This course can be adapted to virtual classroom mode - Executive Certificate

Comprehensive Overview of E&P Management Certification

Level: AWARENESS

Purpose

This training aims to acquire practical know-how of Exploration & Production management, spanning from surface and subsurface engineering and operational issues to HSE economics and E&P value management.

Audience

Managers and high potentials of the Oil & Gas industry seeking to acquire a broad and comprehensive knowledge of the Exploration & Production business, from petroleum engineering and operations to contractual, environmental and societal issues, with an understanding of the tools needed to evaluate and manage E&P projects.

Learning Objectives

Upon completion of the course, the participants will be able to:
- explain petroleum engineering techniques and workflow from the exploration to the production phase,
- implement industry best practices of integrated production management,
- identify main steps and tools in E&P projects management and logistics,
- participate in front-end project studies,
- appraise environmental and societal matters throughout the life cycle of an upstream project.

Ways & Means

- Highly interactive training course delivered by industry experts and adapted to participants’ experience.
- Numerous industrial case studies.

Learning Assessment

Continuous assessments all-along the program.

Prerequisites

1 year experience in an Oil & Gas company or consulting firm.

Why an IFP Training Certification?

- An international recognition of your competencies.
- A Executive Certificate delivered.
- An expertise confirmed in Comprehensive Overview of E&P Management Certification.
- Ready-to-use skills.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

60 days

FROM DISCOVERY TO PRODUCTION


BASIN ANALYSIS TO PROSPECT EVALUATION - FROM PLAY TO PROSPECT

Petroleum systems and basin analysis. Geoscientific tools: seismic and well data. Risk analysis and prospect evaluation, reserves estimation.

FUNDAMENTALS OF RESERVOIR ENGINEERING


DRILLING, COMPLETION & WELL PERFORMANCE


SURFACE PRODUCTION


RESERVOIR MANAGEMENT


HSE MANAGEMENT


ENVIRONMENTAL & SOCIETAL ASPECT MANAGEMENT


E&P CHAIN VALUE MANAGEMENT

E&P risk dynamics. Critical decision points and value creation. Decision process from exploration block evaluation to development and production. Contracts and economic rent sharing. Field development studies and economic indicators.

PROJECT MANAGEMENT


CONTRACTS & PROCUREMENT


LOGISTICS MANAGEMENT

Logistics base management. Base operations. Warehouse management. Lifting and handling operations.

Reference: EPMGT-EN-A. Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: EPMGT-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

Exploration & Production Overview

Level: AWARENESS

Purpose

This training aims to give a complete overview of the main activities of Exploration & Production through its global process, by going through the key stages of the valorization of a hydrocarbon field. You will discover the fundamentals and vocabulary of Exploration & Production techniques: geosciences, reservoir engineering (enhanced recovery, unconventional resources, CO₂ capture and storage), drilling, completion, production, projects, decision-making process, economic aspects and patrimonial contracts.

Audience

All professionals in contact with the oil industry: directors, ministries, executives, technicians, support trades... wishing to acquire the basic knowledge of oil exploration & production techniques and the associated vocabulary in order to interact effectively with specialists in different disciplines.

Learning Objectives

Upon completion of the course, participants will be able to:

- explain the various phases of Oil & Gas development projects;
- identify the contribution of all experts and technologies involved through a field development project;
- understand the E&P value chain from prospect to market and associated contractual framework;
- describe techniques involved in field development in order to efficiently interact with technical teams.

Ways & Means

- Highly interactive course delivered by experts of the E&P industry.
- Numerous examples and feedbacks from the industry. Numerous videos and animations.

Learning Assessment

Table game in small groups.

Prerequisites

Basic technical knowledge in the Oil & Gas industry.

More info

Other training duration availability on request.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION TO THE OIL &amp; GAS INDUSTRY</td>
<td>0.25 d</td>
</tr>
<tr>
<td>GEOSCIENCES &amp; RESERVOIR ENGINEERING</td>
<td>1.25 d</td>
</tr>
<tr>
<td>FIELD OPERATIONS &amp; DEVELOPMENT</td>
<td>2.25 d</td>
</tr>
<tr>
<td>OIL &amp; GAS FIELD DEVELOPMENT PROJECTS: DECISION MAKING PROCESS, ECONOMICS &amp; LEGAL FRAMEWORK</td>
<td>1 d</td>
</tr>
<tr>
<td>SERIOUS GAME: OIL FIELD DEVELOPMENT CYCLE</td>
<td>0.25 d</td>
</tr>
</tbody>
</table>

Reference: DCOUVEP-EN-A  Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

Location | Start Date | End Date | Tuition Fees excl. VAT |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>17 May</td>
<td>21 May</td>
<td>€3,690</td>
</tr>
<tr>
<td>Rueil-Malmaison</td>
<td>13 September</td>
<td>17 September</td>
<td>€3,690</td>
</tr>
<tr>
<td>Rueil-Malmaison</td>
<td>6 December</td>
<td>10 December</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: DCOUVEP-FR-A. Please contact us for more information.
General Introduction to Technical Topics

Virtual Classroom
This course is available in face-to-face mode

NEW Exploration & Production Overview

Level: AWARENESS

Purpose
This training aims to give a complete overview of the main activities of Exploration & Production through its global process, by going through the key stages of the valorization of a hydrocarbon field. You will discover the fundamentals and vocabulary of Exploration & Production techniques: geosciences, reservoir engineering (enhanced recovery, unconventional resources, CO2 capture and storage), drilling, completion, production, projects, decision-making process, economic aspects and patrimonial contracts.

Audience
All professionals in contact with the oil industry: directors, ministries, executives, technicians, support trades... wishing to acquire the basic knowledge of oil exploration & production techniques and the associated vocabulary in order to interact effectively with specialists in different disciplines.

Learning Objectives
Upon completion of the course, participants will be able to:
- explain the various phases of Oil & Gas development projects;
- identify the contribution of all experts and technologies involved through a field development project;
- understand the E&P value chain from prospect to market and associated contractual framework;
- describe techniques involved in field development in order to efficiently interact with technical teams.

Ways & Means
- Highly interactive course delivered by experts of the E&P industry.
- Numerous examples and feedbacks from the industry. Numerous videos and animations.

Learning Assessment
Table game in small groups.

Prerequisites
Basic technical knowledge in the Oil & Gas industry.

More info
Other training duration availability on request.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION TO THE OIL &amp; GAS INDUSTRY</td>
<td>0.25 d</td>
</tr>
<tr>
<td>GEOSCIENCES &amp; RESERVOIR ENGINEERING</td>
<td>1.25 d</td>
</tr>
<tr>
<td>FIELD OPERATIONS &amp; DEVELOPMENT</td>
<td>2.25 d</td>
</tr>
<tr>
<td>OIL &amp; GAS FIELD DEVELOPMENT PROJECTS: DECISION MAKING PROCESS, ECONOMICS &amp; LEGAL FRAMEWORK</td>
<td>1 d</td>
</tr>
<tr>
<td>SERIOUS GAME: OIL FIELD DEVELOPMENT CYCLE</td>
<td>0.25 d</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>15 November</td>
<td>19 November</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

Reference: DCOUEP-EN-D

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

Virtual Classroom

Can be organized as an In-House course.
Introduction to Petroleum Engineering

Course Content

INTRODUCTION TO THE OIL & GAS INDUSTRY

Introduction to the energy business: energy resources; energy demand and supply.
Scope of the Oil & Gas industry:
- Context: producer and consumer countries; national/ independent/ international oil companies; services companies; international organizations.
- Risks related to the Oil & Gas industry.

RESERVOIR ENGINEERING

Introduction to petroleum geology:
- Clastic and carbonate depositional environments and reservoirs.
- Elements and processes of the petroleum system (source, reservoir, seal, traps).

Subsurface models, inputs data and concepts:
- Seismic data gathering, processing and interpretation.
- Well data acquisition and analysis.
- Formation evaluation and sampling (logs and cores).
- Reservoir characterization and modeling:
  - Data integration; introduction to reservoir modeling.
  - Management of subsurface uncertainties.
  - Volumetrics (in-place hydrocarbon estimation).

Subsurface Development Options: reservoir engineering:
- Field development planning.
- Drainage mechanisms: introduction to EOR and storage.
- Different types of reservoir effluents and their behavior.
- Unconventional resources:
  - Introduction to unconventional developments.
  - Non-conventional resources and their extraction techniques.
  - Environmental aspects.

WELL

Drilling:
- Organization on site.
- Well design.
- Drilling rig: functions hoisting, rotations, pumping, power and safety.
- Drilling rigs.
- Drilling operations chronology.
- Drilling operations: casing, cement job, directional drilling, fishing, D.S.T.

Downhole production/completion:
- Completion design.
- Reservoir-wellbore interface.
- Well stimulation.
- Well equipment and maintenance.
- Activation.

Offshore wells:
- Selection of the drilling and production rigs - Platforms.
- Design and specific equipment.

OIL & GAS PROCESSING FACILITIES

Produced fluid properties.
- Gathering system, hydrate inhibition.
- Crude oil treatment: separation, crude oil dehydration and desalting processes.
- Gas processing: dehydration, sweetening, NGL recovery processes.
- Metering and shipment.
- Visit of a production site (if available)*.

Ways & Means

- Interactive animation by E&P senior experienced lecturers.
- Visits to a drilling rig and a production site (in Pau training center)*.
- Numerous videos.
- When the course is delivered in Rueil-Malmaison, practical illustration is provided by video.

Learning Assessment

Quiz on request.

Prerequisites

Basic technical knowledge in the Oil & Gas industry.

More info

Refer to the following complementary courses, which might be of interest:
- “Introduction to Reservoir Engineering”;
- “Drilling Fundamentals”;
- “Well Completion & Servicing”;
- “Oil & Gas Field Processing”.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: INFPG-EN-A

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>15 February</td>
<td>19 February</td>
<td>€3,690</td>
</tr>
<tr>
<td>Rueil-Malmaison</td>
<td>22 November</td>
<td>26 November</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

* This course is also available in French: INFPG-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

E&P Jobs

Course Content

INTRODUCTION TO THE OIL & GAS INDUSTRY - E&P ACTIVITIES
Scope of the Oil & Gas industry.
Stakeholders: producer and consumer countries; national/independent/international oil companies; service companies.
Oil & Gas field life cycle: introduction to E&P activities and workflow from exploration to abandonment.

GEOSCIENCES & RESERVOIR ENGINEERING
Activities:
- Exploration. Reservoir characterization and modeling. Reservoir engineering.
- Impact on drilling and production activities.
Professions:
- Exploration manager. Reservoir/development manager.
- PVT Technician/engineer. Data management technician/engineer.
- Service companies.

DRILLING, WELL COMPLETION & WELL INTERVENTIONS
Activities: drilling, completion, well intervention and workover.
Professions:
- Organization of operating and well servicing companies.
- Drilling: drilling manager, drilling engineer, mud logging engineer/technician, company man…
- Completion: well completion technician, well engineer, well performance engineer…
- Well intervention: well intervention engineer/technician, work-over engineer, stimulation engineer…

PRODUCTION
Activities:
Professions:
- Production engineering: operations manager, production engineer/operator, flow assurance engineer, well test technician/operator, well surveillance engineer…
- Field operations: OIM, field operations engineer, process engineer, production superintendent/supervisor/panel operator/field operator, laboratory engineer/technician…
- Maintenance: mechanical engineer, method engineer, maintenance superintendent, mechanical/electrical/instrumentation technician…

HSE
HSE activities throughout Oil & Gas project lifecycle.
Professions: HSE manager, safety engineer; process safety engineer; environment engineer; prevention/intervention technician…

ENGINEERING & PROJECT MANAGEMENT
Activities:
- Project Management. Estimation and cost control.
Professions:
- Construction engineer. Commissioning engineer. Facilities engineer…

E&P SUPPORT FUNCTIONS
Economists. Finance and audits. Human resources.
Rig logistics. Production operations logistics.
Procurement. IT. Planning and methods.

Level: AWARENESS

Purpose
This program aims at introducing E&P activities and providing a comprehensive overview of professions and skills involved throughout Oil & Gas field development projects.

Audience
Non-technical and technical personnel alike, seeking to acquire a global understanding of the E&P chain structure and the professions it involves.

Learning Objectives
Upon completion of the course, participants will be able to:
- identify the various phases and activities of Oil & Gas field development projects,
- list professions and describe skills involved throughout Oil & Gas field development projects lifecycle,
- explain interactions between the various professions involved.

Ways & Means
- Highly interactive course delivered in non-technical language by experts of the E&P industry.
- Numerous examples and feedbacks from the industry.

Learning Assessment
The assessment takes place during the different periods of group work.

Prerequisites
No prerequisites for this course.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: EPMETIE-EN-A
Only available as an In-House course.
Contact: ep.contact@ifptraining.com

This course is also available in French: EPMETIE-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

Fundamentals of Production

Level: AWARENESS

Purpose
This course provides an introduction to Oil & Gas production, along with a glossary of terms, covering fundamentals of technology, chain structure from well to export terminal, skills and job positions involved in operating production facilities.

Audience
Non-technical staff or technical professionals not directly involved in hydrocarbons production (managers, executives, technicians, staff of human resources, finance of projects departments…).

Learning Objectives
Upon completion of the course, participants will be able to:
- understand the different phases of the Oil & Gas production process,
- grasp the specific issues of offshore Oil & Gas production,
- understand organizations, skills and job positions involved in operating production facilities,
- acquire a complete view of the Oil & Gas production chain, stretching over technical, business and economic issues.

Ways & Means
- Course delivered by industry specialists.
- Numerous illustrations and case studies.

Learning Assessment
Continuous assessments all along the program.

Prerequisites
No prerequisites for this course.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

THE OIL & GAS CHAIN: PRODUCTION POSITION
Positioning of the production in the value E&P chain.
World primary production.
Issues and technical constraints:
- Conventional resources.
- Unconventional resources.
Job descriptions and skills for production activities.

ONSHORE & OFFSHORE PRODUCTION
Technical specifications, operating modes.
Operating patterns and mapping fields.
Technical architectures.
Organization (remote site, extreme conditions, manning, shift…).
Case studies: FPSO, wet gas field (onshore), oil fields operated with reinjection, remote control room, early production facilities…

FROM WELL TO EXPORT POINT
From reservoir to wellhead: hydrocarbons and well effluent behavior.
Well techniques, production techniques and well servicing.
Surface facilities and treatment operations.
Metering and expedition.
Health Safety and Environment, sustainability.
Budgets (CAPEX, OPEX) during the life cycle of a production field.

Reference: CHAINEP-EN-A
Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: CHAINEP-FR-A. Please contact us for more information.
This training is available on face-to-face or virtual classroom mode - Vocational Certificate

Soft Skills Toolbox
An established methodology for training operators in Oil & Gas/Chemical industry

Level: KNOWLEDGE

**Purpose**
This course aims at communicating in a better way in order to deal with most of the common professional situations.

**Audience**
Graduate engineers from all technical disciplines.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- put in practice the learned soft skill disciplines,
- write better technical reports,
- communicate efficiently with colleagues, customers and suppliers,
- avoid pitfall situations, related to soft skills and emotional intelligence.

**Ways & Means**
- Participative lecturing.
- Numerous case studies.
- Team work/mini-project.

**Learning Assessment**
Quiz.

**Prerequisites**
Engineer diploma or equivalent experience.

**Why an IFP Training Certification?**
- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in Soft Skills Toolbox.
- Ready-to-use skills.

**Course Content**

**COMMUNICATION SKILLS**
Interpersonal communication - Understanding people - Different styles recognition. Basic skills - Really listening - Tuning in - Meetings - Rapport - The empowering route. Bridging differences - Reaching agreement.

**TEAM BUILDING**
People as working environment - Understanding ourselves and other people. Creating rapport - Handling conflicts. Managing your impression - Ten tips for intercultural harmony.

**PRESENTATION SKILLS**

**TECHNICAL REPORT WRITING**
Identification and use of the key features engineering report-writing.

**CONFLICT**
Exploring conflict - Knowing yourself - Understanding conflict - Values and perceptions. Resolving conflict situations.

**COACHING & DEVELOPING PEOPLE**
Principles of coaching - Purpose, impact and importance of goals - Features of great goals - Deep questioning use - Sequencing questions employment - Summarization and reflection - Progress obstacles identification - Unhelpful assumptions avoidance.

**MINI-PROJECT** 2 d

**Reference:** BOC-EN-P  
*Only available as an In-House course.*  
*Contact: ep.contact@ifptraining.com*
This course can be adapted to virtual classroom mode - Graduate Certificate

Petroleum Engineering Certification

**Level: KNOWLEDGE**

**Purpose**

This course provides in-depth technical knowledge of Oil & Gas production in order to hold rapidly, and very effectively, the position of field engineer, design engineer, or project engineer.

**Audience**

Engineers (particularly recently graduated engineers or engineers in conversion) looking to acquire in-depth knowledge and best practices of Oil & Gas production.

**Learning Objectives**

Upon completion of this course the participants will be able to:
- Grasp fundamentals of reservoir engineering and drilling,
- Explain well completion and servicing, well performance and artificial lift,
- Understand fundamental concepts underlying Oil & Gas processing,
- Understand in detail operating conditions and basic design of oil, water and gas treatment,
- Describe technology of static equipment and rotating machinery used in production facilities,
- Explain offshore development techniques and flow assurance issues,
- Identify main risks related to Oil & Gas production operations and review safety engineering best practices,
- Contribute to the dynamics of field development projects studies,
- Explain main contracts in E&P and assess project profitability.

**Ways & Means**

- Highly interactive training with industry specialist lecturers.
- Multiple teamwork sessions and industrial case studies.
- Numerous process simulation exercises using PRO/II™ software.
- Final 10-day group project on a real field development case study, result of which are presented to a jury.

**Learning Assessment**

Quiz.

**Prerequisites**

Engineering degree or equivalent professional experience within the Oil & Gas industry.

**Why an IFP Training Certification?**

- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Petroleum Engineering Certification.
- Ready-to-use skills.

**Expertise & Coordination**

IFP Training (permanent or contracted) expert in data management with a wide experience and whose competencies are kept up-to-date in industry projects.

---

**Course Content**

- **INTRODUCTION TO PETROLEUM GEOSCIENCES**
  - Elements & processes of petroleum systems. Exploration tools (seismic & well data). Prospect evaluation.
  - Duration: 5 days

- **INTRODUCTION TO RESERVOIR CHARACTERIZATION**
  - Duration: 5 days

- **INTRODUCTION TO RESERVOIR ENGINEERING**
  - Duration: 5 days

- **DRILLING FUNDAMENTALS**
  - Drilling operations. Architecture of the well & completion.
  - Duration: 5 days

- **WELL PRODUCTIVITY & RESERVOIR - WELLBORE INTERFACE**
  - Well productivity. Reservoir wellbore interface implementation.
  - Duration: 5 days

- **ARTIFICIAL LIFT & WELL INTERVENTION FUNDAMENTALS**
  - Duration: 5 days

- **WELL CONTROL**
  - Duration: 5 days

- **THERMODYNAMICS APPLIED TO WELL EFFLUENT PROCESSING**
  - Duration: 5 days

- **OIL & WATER TREATMENT**
  - Duration: 5 days

- **GAS PROCESSING & CONDITIONING**
  - Gas processing: dehydration, sweetening, NGL recovery. Fundamentals of Liquefied Natural Gas (LNG) chain.
  - Duration: 5 days

- **STATIC EQUIPMENT & SCHEMATIZATION**
  - Duration: 5 days

- **ELECTRICITY & INSTRUMENTATION**
  - Duration: 5 days

- **METERING - MATERIAL BALANCE - ALLOCATION**
  - Duration: 5 days

- **ROTATING MACHINERY**
  - Duration: 5 days

- **OFFSHORE FIELD DEVELOPMENT - FLOW ASSURANCE**
  - Duration: 5 days

- **SAFETY & ENVIRONMENT IN SURFACE PROCESSING FACILITIES**
  - Hazards and risks in production operations. Safety in production operations and during construction or maintenance works. HSE management.
  - Duration: 5 days

- **SAFETY ENGINEERING**
  - HAZID application, HAZOP exercise, plant layout exercise. QRA and consequence analysis methodology. SIS and relief systems design.
  - Duration: 5 days

- **PETROLEUM ECONOMICS & PROJECT MANAGEMENT**
  - Duration: 5 days

- **FIELD DEVELOPMENT PROJECT - JURY**
  - Duration: 10 days

---

Reference: EPETROL-EN-A  
Only available as an In-House course.  
Contact: ep.contact@ifptraining.com  
[This course is also available in French: EPETROL-FR-A. Please contact us for more information.]

www.ifptraining.com
This course can be adapted to virtual classroom mode

Carbon Capture, Utilization & Storage (CCUS)

**Course Content**

<table>
<thead>
<tr>
<th>3 days</th>
</tr>
</thead>
</table>

**WHAT IS CCUS?**

0.25 d

- CCS technology overview: past, present and future.
- Energy scenarios: the potential environmental impact of CCS within the IEA 2 degrees scenario.
- CO₂ properties.

**THE BASIS FOR CO₂ CAPTURE**

0.25 d

- CO₂ capture systems:
  - Industrial process capture system.
  - Post-combustion.
  - Pre-combustion.
  - Oxy-fuel.
  - New technologies.
- CO₂ capture technologies:
  - Separation with absorbent.
  - Separation with membranes.

**CO₂ TRANSPORT TECHNOLOGIES**

0.25 d

- Pipeline.
- Ships.
- HSE problems.

**CO₂ GEOLOGICAL STORAGE TECHNOLOGIES**

2 d

- Storage mechanisms and security.
- CO₂ Storage Resources Management System (SRMS).
- Geological characterization.
- Performance prediction.
- Integrity.
- Measurement, Monitoring and Verification (MMV).

**CCUS: GAPS & KNOWLEDGES**

0.25 d

- Worldwide CCUS case studies.
This course can be adapted to virtual classroom mode

Petrotechnical Data Management - G&G Data

**Level: AWARENESS**

**Purpose**

This course proposes an overview of geoscientific Data Management (DM) specifically regarding the subsurface domain. It provides in a practical and effective way, an understanding of DM principles and concepts, as well as methods and tools necessary to participate in structured DM workflow.

**Audience**

Data managers, information managers, technical managers and assistants, technologists, geologists, geophysicists requiring an introduction to management of specific data types.

**Learning Objectives**

Upon completion of the course, participants will be able to:
- describe data management and understand data as an asset,
- describe data life-cycle, the benefits of good data management and its potential value,
- describe the core data types in the E&P industry and the corresponding best practices,
- discuss common data management issues and challenges,
- discuss and manipulate the important components of a data management framework,
- describe how to map issues with a data management framework.

**Ways & Means**

Interactive presentations and document analysis.

**Learning Assessment**

Knowledge assessment with multiple-choice questions.

**Prerequisites**

Degree holder in a technical field (ideally G &G), with basic geoscience knowledge.

**Expertise & Coordination**

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

<table>
<thead>
<tr>
<th>Module</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION TO DATA MANAGEMENT</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Introduction to information management.</td>
<td></td>
</tr>
<tr>
<td>Data types: definitions.</td>
<td></td>
</tr>
<tr>
<td>Common Data Management issues.</td>
<td></td>
</tr>
<tr>
<td>Geo-referenced data: geodesy, topometry, cartography and Geographic Information System (GIS).</td>
<td></td>
</tr>
<tr>
<td><strong>DATA MANAGEMENT METHODS</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Data Management best practices, business impact.</td>
<td></td>
</tr>
<tr>
<td>Overview of Data Management: definitions.</td>
<td></td>
</tr>
<tr>
<td>Data life-cycle: from inception to destruction (planning, implementation and control activities).</td>
<td></td>
</tr>
<tr>
<td><strong>THE VALUE OF DATA &amp; DATA MANAGEMENT</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Benefits of good Data Management.</td>
<td></td>
</tr>
<tr>
<td>Business case aspects and barriers.</td>
<td></td>
</tr>
<tr>
<td>Data governance: strategy, organization, policies and standards, projects and issues.</td>
<td></td>
</tr>
<tr>
<td>Data Management architecture: modeling, technology and tools.</td>
<td></td>
</tr>
<tr>
<td>Data Management framework, governance, architecture, security.</td>
<td></td>
</tr>
<tr>
<td>Difference between reference and Master Data Management.</td>
<td></td>
</tr>
<tr>
<td>Data quality management: definition and dimensions of data quality (accuracy, currency, coverage, relevance, accessibility and comparability).</td>
<td></td>
</tr>
<tr>
<td>Data quality tools and capabilities.</td>
<td></td>
</tr>
<tr>
<td><strong>GEOSCIENTIFIC DATA MANAGEMENT</strong></td>
<td>1.5 d</td>
</tr>
<tr>
<td>Seismic data.</td>
<td></td>
</tr>
<tr>
<td>Borehole data (drilling report, logs and cores).</td>
<td></td>
</tr>
<tr>
<td>Well data (production data, well test, workovers).</td>
<td></td>
</tr>
<tr>
<td>Fluid data: PVT tests and reports.</td>
<td></td>
</tr>
<tr>
<td><strong>PROJECT DATA MANAGEMENT</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Project data base construction.</td>
<td></td>
</tr>
<tr>
<td>Sharing projects:</td>
<td></td>
</tr>
<tr>
<td>Geomodeling.</td>
<td></td>
</tr>
<tr>
<td>Material balance model.</td>
<td></td>
</tr>
<tr>
<td>Reservoir simulation model.</td>
<td></td>
</tr>
<tr>
<td><strong>INTEGRATION MANAGEMENT SERVICE</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>How integration happens in the real world.</td>
<td></td>
</tr>
<tr>
<td>Data integration challenges.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: DMPETRO-EN-A Only available as an In-House course. Contact: ep.contact@ifptraining.com

www.ifptraining.com
Data Management Fundamentals (DAMA)
DAMA First Level

Level: AWARENESS

Purpose
This 5-day course addresses all the information management disciplines as defined in the DAMA body of knowledge (DMBoK). Taught by an industry recognized DAMA DMBoK (2.0) author and CDMP, this course provides a solid foundation across all of the disciplines across the complete Information management spectrum. By attending the course, delegates will get a firm grounding of the core Information Management concepts and illustrate their practical application with real examples of how Information architecture is applied.

Audience
Practitioners involved in Information management, data governance, master data management and data quality initiatives including: information managers, information architects, data architects, enterprise architects data managers, data governance managers, data quality managers, information quality practitioners, business analysts, executives, technology leaders, business technology partners.

Learning Objectives
Upon completion of the course, participants will be able to:
- different categories of challenges.
- appreciate concepts including lifecycle management, normalization, dimensional modeling and data virtualization and appreciate why they are important.
- understand the critical roles of master data management and data governance and how to effectively apply them.
- understand the different facets (dimensions) of data quality and explore a workable data quality framework.
- describe the major considerations for successful data governance and how it can be introduced in bite-sized pieces.
- understand the different types of data models and their applicability.
- attend the DAMA certification exam.

Ways & Means
Daily lecture, exercises, and case studies. DAMA certification exam.

Prerequisites
- Degree holder in a technical field.
- No prerequisites in Information management.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO DAMA
What is data management and why is it critical.
What are the different disciplines of data management?
DAMA & the DMBoK 2.0, and its relationship with other frameworks (TOGAF/COBIT…).
Overview of available professional certifications focusing on DAMA CDMP.

DATA GOVERNANCE
What is Data Governance and why it is important. A typical data governance reference model.
The main data governance roles: owner, steward, custodian.
The role of the Data Governance Office (DGO) and its relationship with the PMO.
What is the difference between Data Governance and IT Governance, and does it matter?
Overview of the Data Management implications of a selection of other regulations.
The key steps that organizations can take to prepare for compliance with current and future regulations.
How to get started with data governance and sustaining and building data governance.

DATA LIFECYCLE MANAGEMENT
Proactive planning for the management of data across its lifecycle.
Differences between data life cycle and a Systems Development Lifecycle (SDLC).
Data governance touch points throughout the data lifecycle.

METADATA MANAGEMENT
What is metadata and why is it important?
Types of metadata, their uses and their sources.
Metadata and business glossaries. What is the connection?
How metadata provides the essential glue for data governance and metadata standards.

DG MINI PROJECT
Starting the Data Governance Program, what you must get in place early. How to produce a realistic business case for DG linked to business objectives?

DOCUMENT RECORDS & CONTENT MANAGEMENT
Why document and records management is important.
Taxonomy vs. ontology… what’s the difference.
Legal and regulatory considerations impacting records and content management.

DATA MODELING BASICS
Types of data models, their use and how they interrelate.
The development and exploitation of data models, ranging from enterprise, through conceptual to logical, physical and dimensional.
Maturity assessment to consider the way in which models are utilized in the enterprise and their integration in the System Development Life Cycle (SDLC).
Data modeling and big data.
Why data modeling plays a critical part in data governance and BP case study.

DATA QUALITY MANAGEMENT
The different facets of data quality, and why validity is often confused with quality.
The policies, procedures, metrics, technology and resources for ensuring data quality.
A data quality reference model and how to apply it.
Why data quality management and data governance are interconnected and case studies.

DATA OPERATIONS MANAGEMENT
Core roles and considerations for data operations.
Good data operations practices.

DATA RISK & SECURITY
Identification of threats and the adoption of defenses to prevent unauthorized access, use or loss of data and particularly abuse of personal data.
Identification of risks (not just security) to data and its use.
Data management considerations for different regulations, e.g. 239.
The role of data governance in data security management.

MASTER & REFERENCE DATA MANAGEMENT
The differences between reference and master data.
The identification and management of master data across the enterprise.
Generic MDM architectures and their suitability in different cases.
How to incrementally implement MDM to align with business priorities.
Stalor (Equinor) case study.

DATA WAREHOUSING, BUSINESS INTELLIGENCE & DATA ANALYTICS
What is data warehousing and business intelligence and why do we need it.
The major data warehouse architectures (Inmon & Kimball).
Introduction to dimensional data modeling.
Why master data management fails without adequate data governance.
Data analytics and machine learning and data visualization.

DATA INTEGRATION & INTEROPERABILITY
What are the business (and technology) issues that data integration is seeking to address?
Data integration and data interoperability – What’s the difference?
Different styles of data integration and interoperability, their applicability and implications.
The approaches and guidelines for provision of data integration and access.

DAMA CERTIFICATION-FIRST LEVEL
Students will have the opportunity to sit the CDMP Data Quality specialist exam at the end of this course to attain DAMA Certified Data Quality Professional designation and a credit towards attainment of a full CDMP at Practitioner or Master Level.

Reference: DMFUND-EN-P Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruste-Malmaison</td>
<td>14 October</td>
<td>25 October</td>
<td>£3,890</td>
</tr>
</tbody>
</table>

5 days
This course can be adapted to virtual classroom mode

Introduction to Data Management for Operations

Course Content

INTRODUCTION
The value of a data asset.
The main data categories for the drilling (FP), construction, reservoir, production, maintenance and HAS discipline.
The data management function as seen by DAMA.

DATA GOVERNANCE
What is data governance, why it matters.
The asset life cycle/the data life cycle.
The data shareholder, role and responsibility (RACI).
The role of the data stewards, data manager, data scientist...

DATA ARCHITECTURE MANAGEMENT USING THE DATA RELATED TO THE WELL DESCRIPTION
What is a well (using the PDDM guideline), the importance of using a common vocabulary/semantic.
The CFHOIS IOGP data standard.
The energetic standards (PRODML, WITSML, RESQML).
The OSDU initiative.

DATA DEVELOPMENT
Develop and maintain logical and physical data models for the production data.

DATA OPERATION MANAGEMENT
The notion of SLA.
Cloud storage.
The notion of big data and data lake backups and archives.
Data visualization (incl. BI).
Data in a GIS.

DATA SECURITY MANAGEMENT
Manage users (role, privileges...), monitor users authentication.
The information confidentiality classification.
Data security audit, introduction to ISO 27001.

REFERENCE & MASTER DATA MANAGEMENT
Definition of both terms:
Reference data: used taxonomy, semantic definition of the drilling data (e.g.: API).
Master data: drilling data values.
Well data integration: the well UWI.

DATA WAREHOUSING
Descriptive (content description) and transactional data.
Use case based on the management of spare part using SAP-PM and SAP-MM

DOCUMENT & CONTENT MANAGEMENT
Unstructured data: e.g. the installation PIDs.
Implementing a Document Management Systems (EDMS).
Retention and disposition of document.

DATA QUALITY MANAGEMENT
The different aspects of “Data Quality”.
Make the data “trustable”.
Lean and 6-sigma methodologies.
Define data quality metrics, measure and control the data quality.
Data audit.

PROFESSIONAL DEVELOPMENT OF DATA MANAGERS
Data management as a recognized discipline.
How the oil companies digitalization journey impacts the data manager role.
Data managers in others industries.

TAKEAWAYS
10 key points about data management to remember.

Reference: DMOFE-EN-A  Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>6 September</td>
<td>8 September</td>
<td>€2,800</td>
</tr>
</tbody>
</table>
This course can be adapted to virtual classroom mode

Fundamentals of Industrial Data Science: Data Analysis & Visualization”
Baker Hughes’ Data Analytics & Management Training Course

Level: AWARENESS

Purpose
In the whole O&G industry, data is taking a more and more important role in all decision processes through technical models. Most junior engineers, however, are not data science experts. This training intends to highlight the importance of industrial data science and to introduce visualization and analysis processes, along with data-related storage and cybersecurity aspects.

Audience
The course is intended for newly hired graduates, with an engineering degree, starting their carrier in the O&G industry.

Learning Objectives
Upon completion of the course, participants will be able to:
- develop ability to visualize and interpret data to make effective business decisions,
- identify datasets limitations and understand the importance of obtaining context,
- learn about cloud technology and data security,
- learn about advanced manufacturing.

Ways & Means
Interactive lectures and exercises.

Prerequisites
Engineering degree, ideally with basic O&G knowledge.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO INDUSTRIAL DATA SCIENCE
Best practices in data science projects.
Role of data scientists, data engineers and process experts.
Interface with visualization.

DIGITAL THREAD
Digital thread introduction.
Process automation.

DATA & MODELING
Modeling process and frameworks.

DATA ANALYSIS & VISUALIZATION
Unbiased data.
Big data types.
Data analysis types (descriptive, diagnostic, predictive, prescriptive).
Time series, IoT.
Visualization and analytics.

CASE STUDY: VISUALIZATION OF ARTIFICIAL LIFT ESP DATA & LNG DATA

CLOUD TECHNOLOGY & CYBERSECURITY
Cloud service providers and services.
Cybersecurity fundamentals.

ADVANCED MANUFACTURING
Additive manufacturing, 3D printing.
Digital twin.
Digital factory.
Industrial robotics.
Examples of LNG datasets and artificial lift applications.

Reference: BHINDUS-EN-A  Only available as an In-House course.
Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode - Graduate Certificate

Data Management & Data Science for E&P Operations Certification

Level: AWARENESS

Purpose

Whatever the Oil & Gas discipline, data is now taking a more and more important role in all business decision processes. An efficient management of data is becoming crucial for E&P companies, as data volume is constantly increasing and reservoir optimization is key. Because of this high data volume, data analytics have progressively invaded the O&G industry and been applied to a wide range of E&P applications. The Data Management and Data Science for E&P Operations will provide a transverse understanding of how data shall be managed and how it may be used to create value.

Audience

This training has been designed for all Oil & Gas professionals who plan to take responsibilities in data management and be part of their company’s digital transformation.

Learning Objectives

Upon completion of the course, participants will be able to:
- go through the main data types used in the E&P domain,
- learn the main concepts of data management, as described by DAMA,
- be able to select and develop appropriate methods to organize data,
- understand cybersecurity challenges,
- understand E&P georeferenced data,
- learn about the machine learning applications in the E&P domain,
- discuss machine learning models validity.
The last two weeks of training will be dedicated to a final project, involving real-case data.

Ways & Means

Interactive lectures either as presential class or as virtual class, exercises or hands-on practice and a final 2-week project in IFP Training premises.

Learning Assessment

- Weekly knowledge assessment.
- Initial and final evaluation at the beginning and end of the program.
- Final project at the end to simulate operational situation to be presented to a jury.

Prerequisites

- Degree holder in a technical field with basic E&P knowledge or experience.
- No prerequisites in data management nor IT.

Why an IFP Training Certification?

- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Data Management & Data Science for E&P Operations Certification.
- Ready-to-use skills.

More info

Duration 50 days (40 days in virtual class + 10 days presential project).

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: DMDAEP-EN-A

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>11 October</td>
<td>17 December</td>
<td>€28,250</td>
</tr>
</tbody>
</table>

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com
Virtual Classroom
This course is available in face-to-face mode

**NEW** Data Management for E&P Operations

**Level:** AWARENESS

**Purpose**
Whatever the Oil & Gas discipline, data is taking a more and more important role in all business decision processes. Therefore, the role of the data manager, which was mainly seen as a data custodian, is now perceived as a major shareholder in all discipline. The purpose of this module is to train Oil & Gas technicians and engineers to understand all the aspects and underlying of value creation based on data.

**Audience**
Professionals from all O&G disciplines who plan to have responsibilities in the data management domain.

**Learning Objectives**
Upon completion of the course, participants will:
- learn the main concepts of data management,
- be able to elaborate a detailed data governance plan,
- be able to interact effectively with IT and software engineer to define the data management resources,
- be able to specify a GIS project, and understand what is Earth Modeling from a data point of view,
- understand the concepts for an efficient dataroom.

**Ways & Means**
Interactive lectures, case studies and exercises.

**Prerequisites**
- Degree holder in a technical field with basic E&P knowledge or experience.
- No prerequisites in data management nor IT.

**Expertise & Coordination**
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

**30 days**

**E&P DATA: VALUE & FORMAT**

**DATA MANAGEMENT FUNDAMENTALS**

**DATA PROTECTION & CYBERSECURITY**

**E&P DATA ARCHITECTURE & BIG DATA**

**VIRTUALIZATION & DATA TRANSFER/IoT**

**FUNDAMENTALS IN GEOGRAPHIC INFORMATION SYSTEMS**

**EARTH MODELING, DATA INTEGRATION & KNOWLEDGE**

**FROM DATA LAKES TO DIGITAL TWINS**

**DATA QUALITY MANAGEMENT**

**NATIONAL DATA REPOSITORIES & DATA ROOMS**

Reference: DMEP-EN-D

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>11 October</td>
<td>19 November</td>
<td>€16,950</td>
</tr>
</tbody>
</table>

Digitalization & Data Management
E&P Data: Value & Format

Course Content

**INTRODUCTION: O&G IS A DATA CENTRIC BUSINESS**

Data asset: Why data is a key asset for the oil and gas industry. Why it is a particular asset, which needs special management skills.

**GEOPHYSICAL & SEISMIC DATA**

What is seismic acquisition and processing from a data manager point of view: the main principles of seismic reflection. Land and marine acquisition. Various type of processing. Acquisition data format: the SEG-D format. Stacked data format: the SEG-Y format.

**WELL DATA**

Wells, wellbores and completion: The interest of a standard taxonomy, PPDM taxonomy as a case study. Measurement in the wells. Well logs and composites, LAS and DLIS format. Reading a log header in a PDF, a LAS or a JSON format. Other data related to wells: core measurements, geochemistry, Fluid analysis: Storing key information in unstructured formats.

**RESERVOIR DATA**

Reservoir data: type of reservoir data. The value of data integration.

**DATA FOR OPERATIONS**

Production monitoring: points of measurement, metering, real-time data. Importance for the asset. Construction and engineering: tags, PID and PLC. Maintenance and logistic: the use of the ERC for maintaining and inspecting an industrial asset.

**DATA LIFE CYCLE**

Data Life cycle and management.

**MINI-PROJECT**

Reading well logs and creating composites. Reading SEGY files. Listing equipment and equipment's characteristics from P&IDs.

Reference: DMFORMA-EN-D Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>11 October</td>
<td>15 October</td>
<td>€3,120</td>
</tr>
</tbody>
</table>

www.ifptraining.com
Virtual Classroom
This course is available in face-to-face mode

NEW Data Protection & Cybersecurity

Course Content

INTRODUCTION TO CYBER SECURITY
Importance of cybersecurity, cyber-attacks and lessons learned, cyber warfare, what are we trying to protect, are we successful?

SETTING UP AN INFORMATION SECURITY MANAGEMENT SYSTEM (ISMS)
Starting with ISMS: overview of key concepts based on ISO 27001, key artifacts. Introduction to risk management: purpose and specifics of risk management in an IT setting, qualitative vs. quantitative risk management. Principles of information security policies and procedures: different kinds of documents: policies, procedures, guidelines and standards, roles and objectives of policies & procedures, typical content and format. Workshop writing information security policies and procedures part I: group-based exercise in writing a brand-new information security policy on a chosen topic.

SECURING INDUSTRIAL SYSTEMS
Introduction into securing industrial systems: Overview of industrial systems such as SCADA and DCS and the impact on the ISMS. Practical concerns and considerations around industrial systems. Overview of the IEC 62443 standard: overview of the IEC 62443 standard which applies specifically for securing industrial systems.

SPECIAL TOPICS INFORMATION SECURITY
Cloud computing: Developments in cloud computing, applicability within industrial systems. IaaS, PaaS, SaaS. Setting up a Cyber Security Operations Center (SOC): benefits and challenges of a SOC, building and operating an industrial SOC. Summary and the way forward: Recap of the course. Keeping the momentum going, suggested practical next steps.

SETTING UP DATA SECURITY
Data security: best practices of securing the organization’s data, data breaches and their impact. Hands-on exercises based on real cases: Data breach incident management/data handling ethics.

Level: AWARENESS

Purpose
This course provides:
- an introduction into cyber security within the Oil & Gas sector: a comprehensive coverage of establishing and further maturing a cyber-security framework,
- overview of the specifics of securing industrial systems (SCADA, DCS, etc.),
- workshops and break-out sessions to apply the theory in case studies.

Audience
- IT staff and technical teams interested in cybersecurity,
- Engineers and technicians involved in data management and E&P data processing (G&G, national data base/reservoir engineering/prodution and field development),
- Data governance,
- Legal affairs,
- Human resources,
- Corporate risk management teams.

Learning Objectives
Upon completion of the course, participants will be able to:
- define the elements of an Information Security Management System (ISMS),
- understand the building blocks and their interaction of risk assessment in an IT environment,
- perform a high-level IT risk assessment,
- describe network security fundamentals and evaluate the security configuration of networks,
- identify the steps of establishing a Security Operations Center (SOC);
- describe the most common security attacks and their countermeasures,
- understand the elements of a successful IT resilience program,
- define the unique aspects of securing an industrial environment,
- understand the security consequences of Cloud computing and define mitigating measures.

Ways & Means
Daily lecture, exercises, and case studies.

Prerequisites
- Experience in O&G industry.
- No prerequisites in IT.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: DMCYBR-EN-D Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>15 October</td>
<td>19 October</td>
<td>€3,120</td>
</tr>
</tbody>
</table>

Digitalization & Data Management
E&P Data Architecture & Big Data

Level: AWARENESS

Purpose
The data architecture describes how data is structured. It is composed of policies, rules or standards that govern how data is stored and organized. The main existing architectures - SQL, graphs, NoSQL databases - will be presented and compared. As the O&G industry has been one of the pioneers in using massive data (big data), data architecture has now to evolve to handle big data.

Audience
Professionals from all O&G disciplines who plan to have responsibilities in the data management domain.

Learning Objectives
Upon completion of the course, participants will be able to:
- understand the various data bases architectures, with benefits/disadvantages,
- learn about architecture standards,
- learn how to change the data architecture,
- identify data architecture in their own company.

Ways & Means
Interactive lectures, case studies and exercises.

Prerequisites
Degree holder in a technical field with basic E&P knowledge or experience.

Course Content

INTRODUCTION TO DATA BASES ARCHITECTURE

TAXONOMY & ONTOLOGY, IMPORTANCE OF STANDARDIZATION
What is a well?
CFIHOS/JIP36 standardization project.

RELATIONAL DATABASES
ER diagrams.
SQL.

NoSQL DATABASES

GRAPH DATABASES
Cypher.

CONNECTION DATA TO BUSINESS
Data integration.
Data virtualization.
Data warehousing and BI tools.

Reference: DMARCHI-EN-D
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>2 November</td>
<td>3 November</td>
<td>€1,950</td>
</tr>
</tbody>
</table>

www.ifptraining.com
Virtual Classroom
This course is available in face-to-face mode

NEW Virtualization & Data Transfer/IoT

Level: AWARENESS

Purpose
Data virtualization is part of data management and enables retrieving data without requiring technical details about the data (e.g., physical location). Unlike the common ETL process, the data remains in place with real-time access, to minimize error risks. But, how to transfer it? Standards ensure data are usable by different users, in a rapid and reliable manner. Energistics has been developing standards for E&P data transmittal and is now delivering industry-endorsed upstream data transfer standards and data transfer protocols to reduce data latency.

Audience
Professionals from all O&G disciplines who plan to have responsibilities in the data management domain.

Learning Objectives
Upon completion of the course, participants will be able to:
- learn about data virtualization and its advantages,
- understand underlying technologies for energistics standards,
- understand the scope of WITSML, PRODML and RESQML features and functionality related to the data objects,
- understand the concept and functionality of ETP.

Ways & Means
Interactive lectures, case studies and exercises.

Prerequisites
Degree holder in a technical field with basic E&P knowledge or experience.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO DATA VIRTUALIZATION
Presentation.
Management of real-time data.
Benefits/drawbacks.

DATA STANDARD & ENERGISTICS FORMATS
WITSML.
PRODML.
RESQML.
The OSDU data platform initiative.

TRANSFER PROTOCOL (ETP)
The ETP.

Reference: DMVIRTU-EN-D
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>4 November</td>
<td>5 November</td>
<td>€1,950</td>
</tr>
</tbody>
</table>
Virtual Classroom
This course is available in face-to-face mode

NEW Fundamentals in Geographic Information Systems

Level: AWARENESS

Purpose
Geographic information systems are used in multiple processes today. The Fundamentals in Geographic Information Systems training aims at introducing the GIS objectives, features and applications.

Audience
Graduate from ALL technical disciplines.

Learning Objectives
Upon completion of the course, participants will:
▶ understand the concepts behind the use of GIS,
▶ understand the types of data that GIS supports, and how to manipulate them,
▶ analyzing and representing on map the data of interest,
▶ produce a quick map layout or export format to sharing.

Ways & Means
Interactive lectures and exercises.

Prerequisites
Degree holder in a technical field (G&G, IT, aerospace…).

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO GIS
Understand the components, goals, and reasons so many professionals use GIS.

GIS BASICS
Essential GIS concept and tools and data types; principle of cartographic geo-referencing.

DATA ANALYSIS
Selecting features; interactive selection; select by attributes; select by location; using the right tool of selection; basics concept of geo-processing.

USING SYMBOLOGY TO ANALYZE THE DATA
Map stiles; changing the appearance of the map to communicate the right information effectively (symbolizing vector data; symbolizing raster data).

DESIGNING YOUR MAP OF PRESENTATION
Essential GIS concept and tools and data types; principle of cartographic geo-referencing.

Reference: GISFUND-EN-D
Can be organized as an In-House course.
 Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>8 November</td>
<td>9 November</td>
<td>€1,950</td>
</tr>
</tbody>
</table>

Digitalization & Data Management

www.ifptraining.com
Virtual Classroom
This course is available in face-to-face mode

NEW Earth Modeling, Data Integration & Knowledge

Course Content

| 2 days |

GIS BENEFITS IN THE PETROLEUM INDUSTRY
Understand the benefits of the development of an Oil & Gas Exploration & Production (E&P) spatial data infrastructure.

EARTH MODELING IN THE PETROLEUM INDUSTRY
Methods used for capturing elevation data in the E&P industry; coordinate conversion; use of geo-processing tools.

CREATING SURFACES & 3D MODEL OF ANALYSIS
Create a 3D surface and view raster and vector data; create a hydrologically correct DEM and delineate surface drainage lines and catchment areas using the hydrology tools; produce a 3D sub-surface visualization of wells, top and bottom formation.

EXCHANGE STANDARDS
Exchange standards for reservoir characterization, earth and reservoir models.

Level: AWARENESS

Purpose
The Earth Modeling, Data Integration & Knowledge course intends to introduce the benefits of developing a GIS in O&G applications, and to present petroleum applications.

Audience
This training has been designed for all Oil & Gas technicians and engineers who plan to have responsibilities graduate from all technical disciplines.

Learning Objectives
Upon completion of the course, participants will:

- explore the benefits in applying Geographic Information Systems (GIS) in a petroleum workflow,
- integrate spatial and non-spatial data and integrate, manage and analyze data to produce information for decision-making,
- creating 3D model from data sources from an operating field,
- implement metadata in a petroleum focused spatial data infrastructure.

Ways & Means

- Participative lecturing.
- Case studies.
- Team work/mini-project.

Prerequisites
Degree holder in a technical field (G&G, IT, aerospace…).

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: GISAPPL-EN-D
Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>10 November</td>
<td>12 November</td>
<td>€1,950</td>
</tr>
</tbody>
</table>
Virtual Classroom
This course is available in face-to-face mode

NEW From Data Lakes to Digital Twins

Level: AWARENESS

Purpose
When correctly managed, big data offers lots of new opportunities to organize and easily access data in order to leverage efficient and cost-effective decision making. The objective of this 2-day training is to introduce both data storage solutions, which may scale up with the data, and also tools, like digital twins which may create a user-friendly interface between architecture and data visualization in O&G business.

Audience
This training has been designed for Oil and Gas professionals who need to have a detailed understanding of the underlying technologies, which make business digitalization possible.

Learning Objectives
At the end of the training, the trainees will be able to:
- understand the limitations of a purely structured approach for data management (e.g. relational databases when data scales up,
- understand what are the graph DB and NoSQL storage designs,
- understand the principle of data lake management,
- understand the ways to build data warehouse on hybrid and complex data environments,
- understand the ways digital twins make able a better way to pilot production installations.

Ways & Means
This course can be delivered using in-person lectures or virtual classrooms. Each training module contains lectures, hands-on practices and/or case studies.

Prerequisites
Degree holder in a technical field with basic E&P knowledge or experience.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION
Problem statement: Why big data force to fully review the data management architecture?

WHAT IS A DATA LAKE?
The RDBMS way and its limitations for big data.
How to scale up with data?
Data governance applied to data lakes.
Graph database.
Other NoSQL database.

DIGITAL TWINS
Problem to be solved, industry 4.0 concept, product life cycle management.
Digital twins main components, models ad IoT.
Various types of digital twins for various usages: DTP, DTI and DTA.
Data difficulties: selecting data, sensors and transmission rate.
Sharing information between partners.
Continuous learning.
Challenges still to be solved.

Reference: DIGTWIN-EN-D Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>15 November</td>
<td>16 November</td>
<td>€1,950</td>
</tr>
</tbody>
</table>

www.ifptraining.com
Virtual Classroom
This course is available in face-to-face mode

NEW National Data Repositories & Data Rooms

Level: AWARENESS

Purpose
Promoting subsurface assets in a very competitive market is a very challenging task. A good data collection, correctly managed over time, is the best instrument for authorities and national agencies not only to illustrate the attractiveness of their acreage but also to organize a transparent competition between potential licensees for the benefit of the nations.

Audience
This training has been designed for authorities technicians and engineers in charge of designing, implementing or reviewing a data governance in order to improve the attractiveness of subsurface data assets.

Learning Objectives
At the end of the training the trainees will be able to:
- design and implement a data governance for NDRs and related activities,
- elaborate an efficient mechanism to collect subsurface information from the operators and contractors,
- know the various strategies to store subsurface data online, near line and offline,
- know the rules to publish information in line with the data owner IP,
- organize attractive, efficient and securized data rooms.

Ways & Means
Interactive lectures, case studies and exercises.

Prerequisites
- Degree holder in a technical field with basic E&P knowledge.
- Experience in data management is welcome.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION
Data is an asset. Importance of data in the exploration and production business.
Data governance - Who is the data owner?
Petroleum project life cycle and data life cycle.
Summary of main geoscience data formats.
Role of the data rooms.

COLLECTING EXPLORATION & PRODUCTION DATA
Comparison of the data collection guidelines in various North Sea countries. Yellow book and blue book.
Automatizing data exchange, the PRODML standard.
OSDU – Open Subsurface Data Universe.

MANAGING PHYSICAL DATA: CORES, TAPES & PAPER ARCHIVES
Core storage and core digitalization.
Remastering seismic tapes.
Scanning paper archives. OCR.

FROM DOCUMENTS TO DATA
Structured and unstructured data.
Several style of data storage: relational, graph and NoSQL databases.
Metadata, pull and push data access.
Data mining, deterministic and stochastic methods.
Document and content management systems.

DATA QUALITY FOR DATA ROOMS
The lean data management approach.
The 6-sigma data management approach.
The data quality criteria.
A quantitative approach of the data quality management.

CYBER SECURITY - DATA SECURITY MANAGEMENT FOR DATA ROOMS
Our data are at risk!
Prevention strategy and tactics.
CRUDE matrix and confidentiality management.
Data retention management.

ORGANIZING EFFICIENT DATA ROOMS
The role of the data rooms.
Physical and virtual data room.
Data publication on the web, market place.

Reference: DATROOM-EN-0
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>18 November</td>
<td>19 November</td>
<td>€1,950</td>
</tr>
</tbody>
</table>
Data Science for E&P Operations

Level: AWARENESS

Purpose
The Data Science for E&P operations training will give an understanding of data analytics to all O&G professionals willing to understand how data science, and machine learning in particular, have become more and more common in the industry.

Audience
Professionals from all O&G disciplines who plan to have responsibilities in the data analytics domain.

Learning Objectives
Upon completion of the course, participants will:
- learn the main concepts of data science,
- understand the machine learning/artificial intelligence concepts,
- be able to build a basic python program,
- learn about ML applications for O&G industry,
- be able to interact with data scientists/ITs involved in ML applications.

Ways & Means
Interactive lectures, case studies and exercises.

Prerequisites
- Degree holder in a technical field with basic E&P knowledge or experience.
- No prerequisite in Data Management nor IT.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO DATA SCIENCE & ANALYTICS FOR O&G PROFESSIONALS

MACHINE LEARNING CONCEPTS

PYTHON SCRIPTING

TEXT ANALYSIS USING MACHINE LEARNING

OBJECT DETECTION

ML MODEL EVALUATION/VALIDATION

Location Start Date End Date Tuition Fees excl. VAT
Virtual Classroom 22 November 17 December €6,180

Reference: DMEP-EN-D Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

www.ifptraining.com
NEW

Introduction to Data Science & Analytics for O&G Professionals

Level: AWARENESS

Purpose
This course aims at introducing data science and analytics, which aims at extracting knowledge from raw data to build data-driven models. It will introduce the workflow involving data exploration, preprocessing and machine learning modeling.

Audience
This training has been designed for O&G professionals getting involved in Data Analytics and Machine Learning projects.

Learning Objectives
Upon completion of the course, participants will:
- understand the data science and analytics objectives,
- learn about statistical methods involved,
- understand the link between data science, analytics and machine learning,
- identify current applications of data science and analytics for O&G data.

Ways & Means
- Participative lecturing.
- Case studies.
- Team work/mini-project.

Prerequisites
Degree holder in a technical field with basic E&P knowledge or experience.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO DATA SCIENCE & ANALYTICS
Concept of data science.
Data analytics.

DIFFERENT LEVELS FOR DATA ANALYTICS
Descriptive.
Diagnostic.
Predictive.
Prescriptive.
Cognitive (AI).

DATA ANALYTICS PRINCIPLES
Data statistics (univariate, bivariate, distributions).
Data ranking (correlation matrix, principal component analysis, fuzzy logic).

DATA ANALYTICS WORKFLOW
Exploratory data analysis.
Data preprocessing.
Machine learning models.

SOME O&G APPLICATIONS

Reference: DABASIC-EN-D  Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>22 November</td>
<td>22 November</td>
<td>€970</td>
</tr>
</tbody>
</table>
Virtual Classroom
This course is available in face-to-face mode

NEW

Machine Learning Concepts

Level: AWARENESS

Purpose

Machine learning is a subfield of Artificial Intelligence that acts as a bridge between Data Science and Artificial Intelligence. Its objective is to understand the structure of data and to build data-driven models for further automate decision-making processes, in most technical domains including the O&G industry.

Audience

The course is intended for O&G professionals interested in machine learning and its applications to O&G.

Learning Objectives

Upon completion of the course, participants will be able to:
- understand the concept of machine learning,
- learn about the different types of machine learning, algorithms, techniques and models,
- identify the main programming languages used in machine learning,
- learn about some machine learning applications in the O&G industry.

Ways & Means

Interactive lectures and exercises.

Prerequisites

Degree holder in a technical field with basic E&P knowledge or experience.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO MACHINE LEARNING

MACHINE LEARNING METHODS

Supervised machine learning,
Unsupervised machine learning.

COMMON ALGORITHMIC APPROACHES

Decision tree, K nearest neighbors, deep learning.

PROGRAMMING LANGUAGES

Python, Java, R, C++.

EVALUATING MACHINE LEARNING MODELS

Quantify errors; testing and validation.

EXAMPLES OF MACHINE LEARNING APPLICATIONS IN O&G

Reference: MLBASIC-EN-D

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT

Virtual Classroom 23 November 25 November €2,900

Reference: MLBASIC-EN-D
Virtual Classroom
This course is available in face-to-face mode

NEW Python Scripting

Level: AWARENESS

Purpose
Python is a user-friendly programming language, which is commonly used in artificial intelligence projects and machine learning projects. It includes many modules for creating graphical user interfaces, connecting to relational databases..., which makes it one of the main software currently used in data science projects today.

Audience
Graduate from all technical disciplines.
Tailored to the non-programmer.

Learning Objectives
Upon completion of the course, participants will:
- acquire the basics for scripting in Python language,
- create scripts for GIS basic modeling

Ways & Means
- Participative lecturing.
- Case studies.
- Team work/mini-project.

Prerequisites
- Degree holder in a technical field with basic E&P knowledge or experience.
- No prerequisites in IT nor programming.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

1 day

INTRODUCTION TO PYTHON
Discover Python basic syntax (Python string syntax; comments, numbers, and variables rules and functions (Python rules; string functions) objects, properties and methods; looping; write to a file - Have scripts create a text file (writing to a text file; file workflow).

CREATE PYTHON SCRIPTING FOR GIS
Create a script tool for geoprocessing; document the tool.

MINI-PROJECT

Reference: DAPYTH-EN-D
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>26 November</td>
<td>26 November</td>
<td>€970</td>
</tr>
</tbody>
</table>
Text Analysis using Machine Learning

Level: AWARENESS

Purpose
In the Oil & Gas industry, like in other domains, most of the engineering knowledge and experience is saved in unstructured documents such as PDF files, MS Office files or just scans of paper reports. Extracting information from this file required a tremendous effort from domain experts and data officers since deterministic data mining tools have limited capabilities. Today some new machine learning systems proposes some new ways to extract more information from unstructured documents. This course will review the more common used algorithms in the domain of text analysis and is a good introduction to the domain of machine learning.

Audience
This training has been designed as a boot camp for geoscientists who have to use machine learning and/or text analysis tools to reach their business objectives. The notebook used in this course is designed for people having no or limited python experience, but some general knowledge of coding is required.

Learning Objectives
At the end of the training, the trainees will be able to:
- know the architecture of a ML system in the domain of text analysis,
- know the main algorithms used for text mining and text analysis,
- run a text classifier using a Colab notebook.

Ways & Means
This course can be delivered as a presential or virtual classroom. Each training module contains lectures, hands-on practices and/or case studies.

Prerequisites
- Degree holder in a technical field with basic E&P knowledge or experience.
- Basic coding understanding is appreciated.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: MLTXT-EN-D

Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>29 November</td>
<td>29 November</td>
<td>€970</td>
</tr>
</tbody>
</table>
Object Detection

Course Content

Day 1

INTRODUCTION
Problem statement.
Machine learning versus deep learning.

CLASSIFICATION USING A CNN ALGORITHM
Neural network and CNN.
Classifying hand written numbers using a CNN:
MNIST dataset.
Building a LeNet5 notebook.
Analyzing the benchmark, how to measure the performance of a model.
What does happen is the image dataset is more complex: classifying CIFAR-10 dataset.

Day 2

THE R-CNN FAMILY ALGORITHMS
R-CNN.
Fast R-CNN.
Faster R-CNN.

THE YOLO APPROACH
UNBOXING YOLO, TESTING IT ON A VIDEO
Training a YOLO architecture.
Performance.

Day 3

IMPROVING IMAGES WITH GAN - GENERATIVE ADVERSARIAL NETWORKS
How GAN works, discriminative and generative models.
Generator and discriminator models.
Improving object detection with GAN.
Application in seismic modeling.

FROM UNSUPERVISED TO SUPERVISED MODELS FOR SEISMIC INTERPRETATION
The issue with supervised CNN.
3 unsupervised classification of seismic data:
K-means clustering.
Agglomerative hierarchical clustering.
Kohonen self-organizing feature map (SOFM).
Supervised models for seismic interpretation, the state of the art.

Reference: DETECOB-EN-D  Can be organized as an In-House course.  Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>30 November</td>
<td>2 December</td>
<td>€2,900</td>
</tr>
</tbody>
</table>
NEW Evaluation/Validation of Machine Learning Models

Course Content

INTRODUCTION

WHAT IS SUPERVISED TRAINING IN THE AI DOMAIN?

BENCHMARKING

BENCHMARKING INTERPRETATION
F1 score. Other accuracy criterias. ROC and AUC. The case of regional detections.

EXPLAINABLE AI-XAI
Lime. Eli5. SHAP.

Audience

Oil and Gas engineers who have to interact with data scientist or who have to use trustable machine learning models to achieve their business objectives.

Learning Objectives

At the end of the training, the trainees will be able to:
- understand the supervised machine learning approach,
- understand the various strategies to test models,
- understand and measure the appropriate indicators used for model accuracy,
- understand methods to anticipate the model behavior.

Ways & Means

This course can be delivered using in-person lectures or virtual classrooms. Each training module contains lectures, hands-on practices and/or case studies.

Prerequisites

Degree holder in a technical field with basic E&P knowledge or experience.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: MLEVAL-EN-D - Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>3 December</td>
<td>3 December</td>
<td>€970</td>
</tr>
</tbody>
</table>

www.ifptraining.com
Data Management & Data Science Final Project

Level: AWARENESS

Course Content

Week 1

APPLIED DATA MANAGEMENT
Data reception.
Data Quality quantitative evaluation.

TEXT ANALYSIS: EXTRACTING INFORMATION FROM WELL REPORTS & LOGS
Selecting a training, a benchmarking and a blind test data set.
Labelling the training set.
Building information detection models.
Benchmarking the models and defining a strategy to improve them.
Improving the models.
Blind testing.
Exporting the detected data.

Week 2

INTERPRETING A 3D SEISMIC CUBE USING A SEMI-SUPERVISED MODEL
Loading a SEG file.
Automatic horizons interpretation.
Automatic faults interpretation.
Exporting faults and horizons.

FINAL PROJECT PRESENTATION

Audience
This training has been designed for O&G professionals who want to have a practical experience of data management and data analytics. This module is part of the IFP Training’s Data Management and Data Science for E&P operations graduate certification.

Learning Objectives
Upon completion of the module, participants will be able to:
► explore a set of PDF documents,
► receive and evaluate external data to be used in a project,
► train a model to extract information from PDF documents,
► benchmark the created models,
► export the information,
► load a 3D seismic data set,
► apply a semi supervised model to detect horizons and faults,
► export the results.

Ways & Means
Interactive workshops and final project with presentation.

Prerequisites
Degree holder in a technical field with basic E&P knowledge or experience, and basics in Data Management, Data Science and Python scripting.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: DMDAPRJ-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>6 December</td>
<td>17 December</td>
<td>€6,180</td>
</tr>
</tbody>
</table>

Digitalization & Data Management
Practical Data Quality Management - DAMA

Level: AWARENESS

Purpose
Information is at the heart of all organizations, akin to blood flowing through its arteries and veins. However, all too often Information is not professionally managed with the rigor and discipline that it demands. Nonetheless the implications of poorly managed information can be catastrophic, from ICO and other regulatory sanctions ultimately to business collapse. Professor Joe Peppard summed it up when he said, “The very existence of an organization can be threatened by poor data”. This course will provide the rationale why information management is critical and provide methods and practices for addressing key information management challenges.

Audience
This course is intended for personnel involved in Information management, data governance, master data management and/or data quality, existing and new data stewards, information managers, information quality practitioners, executives, technology leaders, business technology partners, business analysts, enterprise architects, information architects, and data architects.

Learning Objectives
To give participants a firm grounding in the basics of data quality management and to deep dive into the principles, processes and activities involved in creating a working data quality function. This 3-day class explores a framework for data quality management and how to get started with a data quality initiative, including the key steps for achieving and sustaining data quality success. This course is intended to provide you with the knowledge, methods and techniques required to analyze, mature and implement data quality solutions within your organization. Learning outcome form this course include:

► categories of data quality issues from real world case studies and their root causes,
► why does this matter – the drivers for data quality and how to link data quality to business priorities,
► the difference between “data quality” and “data quality management” and why it matters,
► the relationship between data quality management and other core information management disciplines particularly master data management, data modeling and data governance,
► the necessary steps for making this happen through a practical framework,
► who is involved in making data quality initiatives work,
► the major concepts that are fundamental to data quality management, such as a framework for Information quality, information life cycle, data quality dimensions, business impact techniques, root cause analysis techniques, etc.,
► where software tools and automation can play a part in a data quality initiative, and the key functional capabilities expected of data quality toolsets.

Prerequisites
Degree holder in a technical field with both E&P and data management knowledge or experience.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

Making the Case for Data Quality
How can we make the connection between data quality and business needs?
What does “data quality” mean in the context of business processes and can we define it?
What is data quality vs data quality management and why does it matter?
What happens when it goes wrong? We will examine many examples of data quality issues from real world cases and assess their implications and see how these could have been avoided.

Measuring Data Quality
What are the different facets (dimensions) of data quality?
What do each of these dimensions’ mean?
What are the pitfalls of looking at just one data quality dimension in isolation?
How can we evaluate data quality for the data quality dimensions and are these applicable to the problems being faced?
This is an essential step to provide the input for root cause analysis and remediation approaches.
4 different styles and approaches to reporting data quality will be discussed highlighting the benefit and applicability of each.

Assessing the Causes & Impact of Poor Data Quality
Continuing the data quality measurement framework, what is the relationship between data quality dimensions, data quality measures and data quality metrics.
What is their applicability and how many should we include in our data quality assessments?
What are the techniques to determine the impact of poor-quality data on the business?
What are the benefits of increasing data quality and the business impacts of poor data quality?
Root cause analysis: What really caused the problem? An approach for identifying and prioritizing the real causes of the data quality problems?
Techniques for root cause analysis including “5-whys” & “Fishbone”.
Developing targeted strategies and approaches for addressing the causes.

A Framework for Improving Data Quality
A data quality reference model & how to apply it.
Starting and sustaining a data quality initiative: the key steps for achieving data quality success, and the activities and structures that are required together with the necessary steps for creating the foundation for data quality.
What are the typical organization roles, responsibilities, organization structures and principles that should be in place to ensure successful data quality?
How can we put all of this together into a workable framework for establishing and sustaining data quality in your organization?
Now that you’ve made a start, how do you sustain data quality. How can we bake data quality (and other data considerations) into our “business as usual” activities to make it stick?

Automated Support for Improving Data Quality
What tooling & automated support exists for data quality initiatives?
What are the types and the applicability of software tools to support a data quality initiative?
What is a reference architecture model for data quality tools, and the common functions, capabilities, and the differences between them?
What items should we examine when selecting data quality tooling? An evaluation checklist will be discussed covering what to look out for.

Fitting Data Quality into an Overall Information Management Framework
What is the relationship between data quality, master data management, data governance & the other information disciplines?
What is the crucially important role of data models in a data quality initiative?
How is this governed? The essential part that data governance undertakes.
How do we measure the success of a data quality initiative & the pitfalls of tactical data cleaning where the data is corrected in situ?

Mini-Project

Reference: DMQUAL-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>17 May</td>
<td>21 May</td>
<td>€3,120</td>
</tr>
</tbody>
</table>

Digitalization & Data Management
### Data Base Set Up & Evaluation

#### Level: AWARENESS

#### Purpose

O&G professionals are getting more and more involved in data management. Setting up a fit-for-purpose database is often a challenge. Based on DAMA book of knowledge, the Data Base Set Up & Evaluation training aims at focusing on understanding data management needs and organizing an adequate database in a given O&G organization.

#### Audience

Data managers, information managers, technical managers, technologists, geoscientists, Reservoir Engineers, involved in organizing data bases or assessing them (e.g. data rooms).

#### Learning Objectives

Upon completion of the course, participants will be able to:
- set up a data governance plan within their organization,
- identify and select the most appropriate database architecture, depending on available data,
- define data security requirements,
- set up data quality criteria.

#### Ways & Means

Interactive lectures ended by a business case.

#### Prerequisites

Degree holder in a technical field with basic E&P knowledge.

#### Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

#### Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>O&amp;G DATA GOVERNANCE</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Data management, as per DAMA.</td>
<td></td>
</tr>
<tr>
<td>Data governance.</td>
<td></td>
</tr>
<tr>
<td>Responsibility sharing for efficient Data Management; RACI matrix.</td>
<td></td>
</tr>
<tr>
<td><strong>DATA ARCHITECTURE &amp; DATA OPERATIONS</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>ER diagrams, SQL, NoSQL, graph databases.</td>
<td></td>
</tr>
<tr>
<td><strong>PHP &amp; SQL</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Hands-on exercise on PHP and SQL.</td>
<td></td>
</tr>
<tr>
<td><strong>DATA INTEGRATION</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>OLAP and OLTP.</td>
<td></td>
</tr>
<tr>
<td>Data warehousing, ERP and BI products.</td>
<td></td>
</tr>
<tr>
<td>Data virtualization.</td>
<td></td>
</tr>
<tr>
<td><strong>DATA RETENTION &amp; SECURITY</strong></td>
<td>0.75 d</td>
</tr>
<tr>
<td>Back-up; archives.</td>
<td></td>
</tr>
<tr>
<td>Legal constraints: SOX, GDPR.</td>
<td></td>
</tr>
<tr>
<td>Common attacks and mitigations.</td>
<td></td>
</tr>
<tr>
<td>ISO 27001.</td>
<td></td>
</tr>
<tr>
<td><strong>DATA QUALITY</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>End users expectations.</td>
<td></td>
</tr>
<tr>
<td>Quality criteria.</td>
<td></td>
</tr>
<tr>
<td>Quantitative approach.</td>
<td></td>
</tr>
<tr>
<td><strong>DATA MANAGEMENT SKILLS</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Data Management jobs.</td>
<td></td>
</tr>
<tr>
<td>Skills assessment in PPDM and CDA.</td>
<td></td>
</tr>
<tr>
<td><strong>MINI-PROJECT</strong></td>
<td>1 d</td>
</tr>
</tbody>
</table>

Reference: DBASE-EN-D  
Can be organized as an In-House course.  
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>31 May</td>
<td>4 June</td>
<td>€3,120</td>
</tr>
</tbody>
</table>
Virtual Classroom
This course is available in face-to-face mode

NEW
Data Management Challenges for Managers

Level: AWARENESS

Purpose
In the whole O&G industry, data is taking a more and more important role in all business decision processes. Most managers, however, are not data management experts. The purpose of this course is to highlight how critical and valuable data is, and also to emphasize on the benefits of robust data management on business.

Audience
Management level.

Learning Objectives
Using concrete examples, the value of robust Data Management is made clear. Understanding which risks you are facing will then help you define efficient measures to drive down these risks to acceptable levels. We will address questions such as:
► why shall data be considered as an asset,
► why is data management critical for successful business,
► what are the benefits of robust data management,
► what are the technical solution options and their implications.

Ways & Means
Virtual classroom ended by a business case.

Prerequisites
► Management experience.
► No prerequisites in data management nor IT.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO DATA MANAGEMENT
What is data management and why is it critical.
What are the core disciplines of data management.
Why should the business be concerned with data management.
What are the benefits of robust data management.
What are the business issues when data management is not in place.

DATA QUALITY & MASTER DATA MANAGEMENT
What are the different facets of data quality.
Why validity is often confused with quality.
What are the real implications of “single view” of a data object (e.g. well, customer) and what needs to be established to make this a reality.
What are the technical solution options… and their implications.
Statoil (Equinor) case study.

BUSINESS DATA GLOSSARY
What are data models and why they are still critical.
The big mistakes made with big data and why data modeling is required.
Why data modeling plays a critical part in data governance and bp case study.
Metadata and business glossaries. What’s the connection and why it’s an essential component in a business.

CYBER DATA RISK & SECURITY
Identification of different types of threats.
Approaches and the adoption of defenses to prevent unauthorized access, use or loss of data and particularly abuse of personal data.
Identification of risks (not just security) to data and its use.
Data management considerations for different regulations, e.g. GDPR, BCBS239.
The role of data governance in data security management.

DATA CENTRICITY & GOVERNANCE
What do we mean by data centricity?
What must be put in place to become data centric?
Components of a great data strategy.
Establishing goals and gaining buy-in for a data strategy.
How to get started with data governance in bite sized chunks.

Reference: DMMNG-EN-D
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>25 May</td>
<td>26 May</td>
<td>€1,950</td>
</tr>
</tbody>
</table>
Virtual Classroom
This course is available in face-to-face mode

NEW Cybersecurity for O&G Professionals

Level: AWARENESS

Purpose
Cybersecurity is nowadays affecting every aspect of business. However, most O&G professionals do not have much IT experience. The course “Cybersecurity for O&G Professionals” aims at emphasizing the role of employees as first-line defenders of company information, and at recognizing most common attack tactics. The course will also give some keys to ensure protection of company computer at home and personal devices (e.g. mobile phones).

Audience
The course is intended for anyone who works with computers, regardless of previous IT experience.

Learning Objectives
Upon completion of the course, participants will be (more) aware of the important role that professionals play as a first-line defense against cyber attacks, and will be able to effectively defend themselves against possible attacks.

Ways & Means
Virtual classroom ended by a business case.

Prerequisites
► Degree holder in a technical field working in the E&P industry.
► No prerequisites in IT.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Introduction to Cybersecurity
Introduction to cybersecurity.
The role of employees as company data first-line defenders. Who is the weakest link? Are you?

Most Common Cyberattacks
Review of common attack tactics.
How to recognize them?
E.g. phishing, e-mail scams, WhatsApp abuses, modern attacks.

Protection
Risks of working from home.
Protecting personal devices such as mobile phones and tablets.
Protecting your privacy online.
Cyber hygiene.

Course Content

1 day

Reference: CYBROGP-EN-D
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>27 May</td>
<td>27 May</td>
<td>€970</td>
</tr>
</tbody>
</table>
Virtual Classroom
This course is available in face-to-face mode

NEW

Cybersecurity for Managers

Level: AWARENESS

Purpose

Cybersecurity is nowadays affecting every aspect of business. Most managers, however, are not IT experts and are often left at the mercy of the IT department. The course “Cybersecurity for Managers” aims to fill this gap by making you into a solid sparring partner for the IT department.

Audience

Management level.

Learning Objectives

Using concrete examples, the importance of cybersecurity in day-to-day business processes is made clear. Understanding which risks you are facing will then help you define efficient measures to drive down these risks to acceptable levels. Instead of passively relying on IT managers to handle cybersecurity, managers will get solutions to regain control over security and the required budget.

We will address questions such as:

► How much should I spend on cybersecurity, what is enough and what is too much?
► What are the essential questions I should ask my IT team?
► Which priorities should we be working on?
► How do I measure the results from the cyber team, are we getting value for money?

Ways & Means

Virtual classroom ended by a business case.

Prerequisites

► Management experience.
► No prerequisites in IT nor cybersecurity.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

MODULE 1

Introduction cybersecurity.
Why do hackers hack?
Overview of common cyber-attacks.

MODULE 2

Cyber security governance.
Management responsibilities.
How much security is enough?

MODULE 3

Taking action.
Asking the right questions.
Personal cyber hygiene.

Reference: CYBRMNG-EN-D
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Location | Start Date | End Date | Tuition Fees excl. VAT
---|---|---|---
Virtual Classroom | 28 May | 28 May | €970
Virtual Classroom
This course is available in face-to-face mode

# Introduction to Data Analytics & Machine Learning Techniques for Geosciences & Reservoir Engineering

**Level:** AWARENESS

## Purpose

This course provides an extensive and practical knowledge for applying data analytics in reservoir modeling and predicting the well performance; the data driven approach is used to understand the main factors affecting the reservoir performance, using the fuzzy logic to rank these parameters and build a predictive model to optimize the reservoir response. Emphasis will be put on the use of supervised and unsupervised neural networks algorithms.

## Audience

Reservoir engineers and geoscientist interested in data analytics, data driven reservoir modeling and machine learning methods for predicting reservoir performance.

## Learning Objectives

Upon completion of the course, participants will be able to:

- apply the basic statistical methods for better data analysis,
- apply clustering methods for data classification (facies logs modeling),
- understand the highly ranked parameters affecting the reservoir performance,
- build a predictive model using available machine learning methods,
- use the predictive model as a proxy model for predictions, uncertainty analysis and quantification.

## Ways & Means

Interactive lectures and exercises.

## Prerequisites

Degree holder in a technical field, with basic reservoir engineering and geoscience knowledge.

## Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

## Course Content

**INTRODUCTION TO DATA ANALYTICS**

- Principles of data analytics.
- Data statistics (univariate, bivariate, distributions).
- Data ranking (correlation matrix, principal component analysis, fuzzy logic).

0.5 d

**MACHINE LEARNING TECHNIQUES**

- Fundamentals of machine learning (supervised and unsupervised).
- Evaluating machine learning models.
- Machine learning workflow.

1 d

**PREDICTIVE MODEL & UNCERTAINTY QUANTIFICATION**

- Build a predictive model using machine learning techniques.
- Predictive model, quantify errors, testing and validation.
- Examples for predictive model in reservoir engineering.

1.5 d

### Course Content Details

- **INTRODUCTION TO DATA ANALYTICS**
  - Principles of data analytics.
  - Data statistics (univariate, bivariate, distributions).
  - Data ranking (correlation matrix, principal component analysis, fuzzy logic).

- **MACHINE LEARNING TECHNIQUES**
  - Fundamentals of machine learning (supervised and unsupervised).
  - Evaluating machine learning models.
  - Machine learning workflow.

- **PREDICTIVE MODEL & UNCERTAINTY QUANTIFICATION**
  - Build a predictive model using machine learning techniques.
  - Predictive model, quantify errors, testing and validation.
  - Examples for predictive model in reservoir engineering.

### Location Start Date End Date Tuition Fees excl. VAT

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>7 June</td>
<td>9 June</td>
<td>€2,900</td>
</tr>
</tbody>
</table>

Reference: MLRES-EN-D • Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com
Emerging Digital Technologies

Level: AWARENESS

Purpose

Emerging digital technologies drive the digital transformation through innovative digital business models. This training program presents and discusses the new emerging digital technologies such as data science, machine learning, deep learning, data analytics, artificial intelligence, big data, cloud computing, cybersecurity, IOT and blockchain. Participants will learn in depth about all the new emerging digital technologies, their relationships and overlaps that represent the backbone of the digital transformation in addition to several use cases of applications and workshops.

Audience

The course is intended for anyone, willing to be part of the digital transformation process.

Learning Objectives

Upon completion of the course, participants will be able to:

- understand the concept of digitalization, data science with its standard technical phases: retrieving & cleaning data, building models and outcomes interpretation and communication,
- learn about the machine learning, its algorithms, techniques and models,
- comprehend the values of using big data technologies in particular the large volume of data, variety of data and velocity of processing,
- understand artificial intelligence and deep learning technique,
- learn about cloud computing, IOT, smart cities and cybersecurity and blockchain,
- explore opportunities to apply digital technologies to your industry.

Ways & Means

Interactive lectures and exercises.

Prerequisites

Degree holder in a technical field.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

DATA SCIENCE, MACHINE LEARNING & BIG DATA ANALYTICS

- Concept of data science.
- Data analytics.

DEFINITION OF BIG DATA

ARTIFICIAL INTELLIGENCE

- AI activities and tasks.
- AI applications.
- Concept of AI, data analytics and techniques.

INTERNET OF THINGS (IOT)

- Consumer Internet & IOT

CLOUD COMPUTING & CYBERSECURITY

- Cloud computing
- Cybersecurity

BLOCKCHAIN TECHNOLOGIES

- Private blockchain.
- Blockchain and AI.
- Blockchain, IOT and AI.

Reference: DIGITEC-EN-D

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT

| Virtual Classroom | 14 June | 18 June | €3,120 |

www.ifptraining.com
This course can be adapted to virtual classroom mode

Competency Management in E&P

**Level:** KNOWLEDGE

**Purpose**
The purpose of this training is to enable participants to acquire the methodology and tools needed to implement an effective company competence management system which meets identified requirements.

**Audience**
HR managers, human resources staff, project managers tasked with skills management projects in Exploration & Production (E&P) – from implementing them and developing them to updating them.

**Learning Objectives**
On completion of the training course, participants will be able to:
- understand the concept of competence and how it can be applied across the company,
- assess the company’s needs,
- put forward an action plan and arrange for a competence management project to be implemented,
- create and use the tools needed for the initiative.

**Ways & Means**
- Project teams are put together at the start of the training course. A real or fictitious E&P project is then allocated to each team.
- This project team will be required to put into practice the concepts acquired during the training course, based on the case that they represent. Oral summaries will be delivered to the whole group for each production, giving rise to interactive question-and-answer sessions.

**Learning Assessment**
The assessment takes place during the different periods of group work. This includes 4 presentations/exercises during the week, the details of which are detailed below.

**Prerequisites**
6 months of professional experience within an Oil & Gas company or consultant.

**Expertise & Coordination**
IPF Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

### DEFINITION OF COMPETENCE MANAGEMENT SYSTEM
0.5 d
- Definition of the concept of competence.
- Governance and company’s strategy.
- Definition and principles of the competence and career planning methodology and the competence management.
- Benefits of competence management systems.
- Oral presentation: each project team discovers its practical case, substantiates it and then presents it to the rest of the group.

### ASSESS & FORMALIZE ONE’S COMPANY’S REQUIREMENTS
0.5 d
- Review of existing situation and findings.
- Definition of the framework, targeted aims, challenges, stakeholders and resources.
- Creation of a project team and development of an action plan, together with processes and methods used.
- Group work: based on the review of the existing situation, the “project team” must produce their action plan, factoring in the stated constraints. Each project team will then present their action plan to the group.

### CREATE THE NECESSARY SKILLS REFERENCE FRAMEWORKS & TOOLS
0.75 d
- Identify the technical support people.
- Win the support of the technical support people for the initiative.
- Methods for collecting information.
- Produce job descriptions.
- Draft the skills reference framework, corresponding to E&P activities.
- Graduate the skills levels.
- Review of reference documents and internal validation.
- Group work:
  - Identify information sources and stakeholders who can feed the reference frameworks.
  - Produce an extract of the skills list from the detailed job description.
  - Each project team details the difficulties encountered and the key success factors.

### ORGANIZE A COMPETENCE ASSESSMENT CAMPAIGN
0.75 d
- Key principles.
- Competence assessment methodologies.
- Scheduling and logistics.
- The assessor’s profile, a key party in the process.
- Analyzing and making use of the results.
- Simulation: using IFP Training’s simplified competence assessment tool, each project team will simulate a competence assessment campaign and will issue recommendations based on a typical mapping for E&P activities (geosciences, reservoir, production, field operations, drilling…). 

### IMPLEMENT A COMPLETE COMPETENCE MANAGEMENT SYSTEM
0.5 d
- The complete competence management cycle.
- The communication plan.
- Continuous improvement.
- Group work: each individual in the group will have to simulate arguments for having this initiative implemented in front of the other members of their group.

---

Reference: CMS-EN-A
Only available as an In-House course.
Contact: ep.contact@ifptraining.com

This course is also available in French: CMS-FR-A. Please contact us for more information.
Field/Site Trainers Accreditation

**Level:** KNOWLEDGE

**Purpose**

The purpose of this accreditation is to develop and validate the competence of site instructors tasked with developing, implementing and assessing practical training activities on site (on-job training), so as to ensure compliance with international standards.

**Audience**

Experienced operations personnel who have been promoted to a site training position, or at experienced site trainers looking to develop their pedagogical know-how.

**Learning Objectives**

Obtaining accreditation will validate the instructor’s competences in implementing practical training on-site:

- prepare an on-site activity schedule and coordinate on-site training activities with operations personnel,
- facilitate participants’ learning and memorizing through personal work,
- assess participants in their study of their assignment area and their practice of operator/technician job duties.

**Ways & Means**

- Training sequences simulations, which places candidates in training situations.
- Case studies for studying the trainees’ different learning phases.

**Learning Assessment**

An assessment is done at the end of the session which content is described in the agenda below.

**Prerequisites**

- Personnel with experience in the technical area in which they will serve as instructor.
- Prior experience in training or in passing on knowledge.
- Intermediary managerial role (supervisor type).

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

### Course Content

**PEDAGOGICAL METHODS PRESENTATION FOR TRAINING OPERATORS & TECHNICIANS**

 Operators’ and technicians’ training philosophies and objectives.
- Typical program and implementation. Assessment systems and certification criteria.

The various types of pedagogical activities which can be conducted on site:

- Theoretical courses and operations tutorials.
- Practical exercises at the operational site and presentation in front of the group.
- Technical training on site through mentoring (On-the-Job Orientation).
- Practice of job duties through mentoring (On-the-Job Training).

**TECHNICAL TRAINING TOOLS & METHODS**

Active pedagogy for adults.
- Pedagogical techniques and principles.
- Techniques for setting up group activities, exercises, hands-on tasks.
- Role play in front of the group.

**ORGANIZE TRAINING ACTIVITIES ON SITE**

Organization, supervision, coordination and reporting of on-site practical training: On-Job-Orientation (OJO) and On-Job Training (OJT).

Pedagogical know-how:

- Techniques for communication, questioning, listening, observing, reformulating, praising.
- Assessment techniques: evaluating trainees’ practical know-how, assessing their competence.

On-Job Training implementation; technical knowledge and know-how:

- How to develop a training sequence based on an actual situation on-site?
- Learning on-site during operations, detecting and using interesting learning opportunities.
- Encouraging information investigation methods.
- Identifying difficulties that the trainee experiences.

**ACCREDITATION ASSESSMENT**

Each candidate presents a training sequence to the group, putting into practice the methods they have learned during the week. They will also prepare the objectives off and instructions to a training activity to be delivered on site.

The group and the IFP Training expert will discuss the candidate’s strengths and weaknesses.

---

Reference: ACFIELD-EN-P

[Contact: ep.contact@ifptraining.com](mailto:ep.contact@ifptraining.com)

[This course is also available in French: ACFIELD-FR-P. Please contact us for more information.](mailto:ep.contact@ifptraining.com)
This course can be adapted to virtual classroom mode

Training Engineering in E&P

Level: KNOWLEDGE

Purpose
This course provides a comprehensive understanding of training engineering applied to E&P, along with methodology and tools.

Audience
Human resources professionals within the E&P industry, in charge of identifying the training needs, building the training plan and implementing it for an International or a National Oil Company.

Learning Objectives
Upon completion of the course, the participants will be able to:
- understand the training engineering phases and objectives,
- build the tools needed for each phase,
- have a systemic approach in training engineering applied to E&P,
- be proactive during the process, in order to better support the technical departments.

Ways & Means
Customized training to the E&P jobs, based on group works, practical exercises and real examples.

Learning Assessment
The assessment takes place during the different periods of group work. This includes 4 presentations/exercises during the week, the details of which are detailed below.

Prerequisites
6 months of professional experience within an Oil & Gas company or consultant firm.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

TRAINING ENGINEERING DEFINITION
Final objectives of the methodology within E&P activities.
Engineering of the HR general strategy: company values, policies, strategies, regulations.
Training engineering components.
Pedagogical engineering.
Protagonists, roles and expectations.

NEEDS ASSESSMENT
Performing training diagnosis:
- Synthesis of the past training assessments.
- Competency and career planning.
- Competency assessment campaigns (example: drilling team, 4 jobs).
Identify and compile the training needs:
- Vision of the Company’s executive management.
- Operational needs (example: gathering the training needs from the production sites).
- Training manager and HR team.
- External inputs: consulting agencies, training providers.
- Final beneficiaries, Company’s employees.
Exercise: create a tool for mapping training needs, useful for the training plan design.

TRAINING SYSTEM DESIGN
The tools for the training system design:
- Job descriptions (examples: reservoir engineer, driller, panel operator).
- Skill reference data, segmented per functional areas within E&P activities: integration paths, career paths (example: production engineer career path, production operator career path).
- Competence mapping.
- Training reference documents.
Build corporate references.
Exercise: build competence checklists from job descriptions and daily activities report.

BUILD & IMPLEMENT THE TRAINING PLAN
Definition of the objectives, the needs in competence and the duration of the plan.
Prioritize the training activities.
Build the training paths.
Identification of the budget.
Training design and pedagogical engineering:
- The different learning modes.
- Trainees’ availability and operational needs.
- Constitution of the pedagogical team.
- Approval of the training plan and internal communication.
- Organization of the training actions.
Follow-up actions and tools.
Exercises:
- Prioritize training actions from competence mapping.
- Construction of a training plan from the needs identification mapping, the competence mapping and the operational constraints.
- Organize a consultation to define the budget and select the training providers (internal or external).

TRAINING ASSESSMENT
Trainees’ assessment before, during and after the course completion.
Feedback from the trainer and the pedagogical team.
Feedback from the trainees and their management regarding the organization, the quality and content.
Ensuring that the knowledge/know-how acquired is enforced by the employees in their daily activities:
Managers’ involvement.
“Cold feedback”: after 6 months.
Results analysis and continuous quality-enhancement cycle.
Exercise: build a satisfaction questionnaire for the trainees to obtain useful information for further actions.

Reference: TRAINEN-EN-A
Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: TRAINEN-FR-A. Please contact us for more information.
Classroom Lecturers Accreditation

Level: KNOWLEDGE

Purpose

The purpose of this accreditation is to develop and validate the pedagogical know-how of classroom trainers tasked with creating, delivering and assessing technical training courses in the various disciplines associated with E&P, so as to ensure compliance with international standards.

Audience

This accreditation is aimed at professionals working in Exploration & Production who deliver, or who may be required to deliver, classroom training courses for basic or advanced technical training programs.

Learning Objectives

Obtaining the accreditation will validate the classroom trainer’s know-how in:

- coordinating classroom-based training courses,
- developing and implementing pedagogical activities,
- catalyzing the group’s enthusiasm and developing its positive attitude by implementing active pedagogical methods,
- developing and maintaining participants’ interest,
- facilitating understanding and knowledge acquisition,
- assessing the knowledge acquired and adapting the course delivery accordingly.

Ways & Means

Personalized coaching, role-play, active learning.

Learning Assessment

The program contains one evaluation for each part of the program, for a total of four, described in the agenda below.

Prerequisites

- Oil & Gas professional with 10 years’ experience in the technical area in which they will serve as instructor.
- 1 year prior experience as instructor.

More info

Minimum duration: 20 days.

* The content, the duration of each phase and the way in which the activities are run for this accreditation will be adapted to the client and to the initial profiles of the trainers to be accredited.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

Part 1 - PEDAGOGICAL ENGINEERING

Candidates follow a 1-week training on the principles and tools needed for delivering professional training programs to adults.

The purpose of this week is to enable candidates to acquire pedagogical methods, best practices and get into the right habits so they can apply them in the three following phases. This phase also serves as an opportunity for candidates to take a step back and take a look at the role of trainer.

Accreditation assessment: role-play.

Part 2 - ATTENDING A TRAINING WEEK DELIVERED BY AN IFP TRAINING EXPERT

This section provides candidates with the opportunity to analyze the way in which teaching is delivered and the techniques that the IFP Training expert uses, building on what they will have learnt from a theoretical perspective during the first week.

The theme of this week should correspond to the candidate’s area of expertise so that they can fully integrate the learning techniques and tools used.

Accreditation assessment: the candidate is asked to analyze the methods and dynamics they have seen during the training course.

Part 3 - DEVELOPING PEDAGOGICAL MATERIAL

This third section aims at developing the pedagogical material required for delivering a training course in the area of expertise of the candidate instructor. Training material development uses the pedagogical methods acquired during the first week and is inspired by the course delivery attended.

The IFP Training expert will provide continuous coaching so that complete, viable pedagogical documents are created by the end of part 3, reusing various pedagogical training activities suitable for adult learning (lessons, exercises, teamwork exercises, case studies…).

Accreditation assessment: candidates will be assessed on their ability to adapt and on the quality of the pedagogical material that they produce.

Part 4 - RUNNING A TRAINING PROGRAM

This section is made up of two phases:

An initial co-delivery phase with an IFP Training expert in real-life conditions. During this phase, candidates will have the opportunity to draw on the instructor’s management techniques and continually correct their own methods, through continuous coaching by the IFP training expert.

The second phase involves autonomously delivering part of the training course, in real-life conditions. The theme of the module must correspond to the candidate’s area of expertise so that they can focus on the pedagogical methods.

Accreditation assessment: assessment of the training performance.

Ref: ACCLASS-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: ACCLASS-FR-P. Please contact us for more information.

www.ifptraining.com
Subject Matter Experts Accreditation

Course Content

Part 1 - PEDAGOGICAL ENGINEERING
Candidates follow a 1-week training on the principles and tools needed for delivering professional training programs to adults.

The purpose of this week is to enable candidates to acquire pedagogical methods, best practices and get into the right habits so they can apply them in the three following phases. This phase also serves as an opportunity for candidates to take a step back and take a look at the role of trainer.

Accreditation assessment: role-play.

Part 2 - ATTENDING A TRAINING WEEK DELIVERED BY AN IFP TRAINING EXPERT

This section provides candidates with the opportunity to analyze the way in which teaching is delivered and the techniques that the IFP Training expert uses, building on what they will have looked at from a theoretical perspective during the first week.

The theme of this week should correspond to the candidate’s area of expertise so that they can fully integrate the learning techniques and tools used.

Accreditation assessment: The candidate is asked to analyze the methods and dynamics they have seen during the training course.

Part 3 - DEVELOPING PEDAGOGICAL MATERIAL & KNOWLEDGE TRANSFER
For this phase, the IFP Training’s expert identifies, together with the SME and her/his company, the topics, related to the SME’s area of expertise, for which pedagogical material is missing or is incomplete. Candidates will have to create pedagogical material necessary to the delivery of a complete training module. Training material development uses the pedagogical methods acquired during the first week and is inspired from the course delivery attended. The SME will be coached by the IFP Training expert throughout this phase so that complete, viable pedagogical documents are created by the end of part 3, reusing various pedagogical training activities suitable for adult learning (lessons, exercises, teamwork exercises, case studies...).

Once the material created, the SME should be able to transfer the training material she/he is responsible for to other trainers, to enable them to deliver the training at the same level of quality. This part will consist of a personalized coaching on communication methods and adaptation skills needed for the SME to transfer the pedagogical supports and methods to be applied.

A real-life situation is organized.

Accreditation assessment: candidates will be assessed on their ability to adapt and on the quality of the pedagogical material that they produce.

Part 4 - COMPETENCE MANAGEMENT FUNDAMENTALS
Within a company, the subject matter expert has to use her/his skills to build the skill data references corresponding to her/his area of expertise. Therefore, she/he will need to understand the objectives and methods of an effective competence management system, and be able to diagnose the need for her/his company.

To create effective tools, it is important that candidates have knowledge of the complete cycle of competence management and can link it to the methodology used in their structure.

This phase is not subject to an accreditation assessment, but it is essential to link the technical careers with the trainings to be implemented.

Part 5 - RUNNING A TRAINING PROGRAM
This section is made up of two phases.

An initial co-delivery phase with an IFP Training expert in real-life conditions. During this phase, candidates will have the opportunity to draw on the instructor’s management techniques and continually correct their own methods, using advice given to them by the expert.

The second phase involves autonomously running one of the course’s modules, in real-life conditions.

The theme of the module must correspond to the candidate’s area of expertise so that she/he can focus on the pedagogical methods.

Accreditation assessment: assessment of the training performance.

Level: KNOWLEDGE

Purpose

The purpose of this accreditation is to develop the pedagogical know-how of a SME, as well as her/his capacity to transfer her/his knowledge, in order to make her/his trainees benefit from the most from the SME’s advanced technical skills.

This accreditation program covers creating, delivering and assessing a technical training program in the SME area of expertise.

Audience

SMEs of the E&P industry, counting with a high technical expertise and who may be required to perform classroom training roles for advanced technical training programs.

Learning Objectives

Obtaining the accreditation will validate the SME’s expertise in:

- delivering technical training courses,
- creating pedagogical material, adapted to the training level, for her/his use or for others’,
- adapting and implementing pedagogical activities,
- catalyzing the group’s enthusiasm and developing its positive attitude by implementing active pedagogical methods,
- developing and maintaining participants’ interest,
- facilitating understanding and knowledge acquisition,
- assessing the knowledge acquired and adapting the course delivery accordingly,
- make use of her/his expertise to support the competence management process of her/his company.

Ways & Means

Personalized coaching, role-play, active learning.

Learning Assessment

The program contains one evaluation for part 1, 2, 3 and 5 of the program, for a total of four, described in the agenda.

Prerequisites

- Degree holder in a technical field, related to her/his current area of expertise.
- Professional renowned in her/his company, occupying her/his current job for 5 years at least.
- Associated to her/his company training department.

More info

Minimum duration: 25 days.

* The content, the duration of each phase and the way in which the activities are run for this accreditation will be adapted to the client and to the initial profiles of the trainers to be accredited.

Reference: ACSME-EN-P. Only available as an In-House course. Contact: ep.contact@ifptraining.com

This course is also available in French: ACSME-FR-P. Please contact us for more information.
This course can be adapted to virtual classroom mode

Communication & Behavioral Management

Level: KNOWLEDGE

Purpose

This training gives an in-depth understanding of the different aspects of presenting: physical space, body language, audience interaction.

Audience

Personnel that regularly deliver presentations and speak at public events.

Learning Objectives

During this module, the participants will learn fundamentals of oral communication techniques. Upon completion of this module, participants will be able to:

- hear and understand and hold the audience’s attention,
- develop fluency in expression and overcome stage fright.

Ways & Means

They will learn these techniques actively through role-play situations with group debrief and practical case studies. With their agreement, trainees can be videotaped during exercises.

Learning Assessment

The assessment takes place during the different periods of group work.

Prerequisites

Basic oral and written communication skills in English.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

OVERCOMING ONE’S FEAR & EXPRESSING ONESELF

1 d

Overcoming one’s fear.
Managing stage fright and using appropriate stress management strategies:
- Feeling comfortable in oral presentation.
- Develop assertiveness.

Oral communication situations:
- What are you scared about in oral communication situations?
- Minute speech introducing stress management technique in 3 points.

Expressing oneself:
- Grabbing attention.
- Organizing one’s speech and build a structured presentation.
- Using a visual aid.
- Making an effective and lively speech, using metaphors, examples…
- Expressing emotions, tuning voice and managing body gesture.
- Convincing the audience and being remembered.
- Self-analysis questionnaire: are you assertive?

Oral communication situations:
- Express emotions.
- Audience feedback.

ENGAGING IN DISCUSSION & DEBATES

1 d

Engaging in discussion & debates:
- Meeting the audience’s needs.
- Engage in discussion and Q&A session with the audience.
- Identifying key words.

Oral communication situations:
- BE the trainer: held a 15-minute presentation about oral presentation + 5-minute Q&A session.

Reference: COM-EN-A  Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: COM-FR-A. Please contact us for more information.

www.ifptraining.com

Offshore
Unconventional
Gas
HSE
Project Management
Surface Facilities Engineering
Field Operations
Production Engineering
Exploration
Reservoir & Field Development
Drilling & Completion Engineering
Reservoir & Field Development
Exploration
E&P Chain
E&P Chain
# Exploration

## General
- Introduction to Basin Exploration ................................................................. p. 75
- Hunting for Oil: Exploration & Upstream Overview ........................................ p. 76

## Methods & Tools
- Petroleum Geophysics .................................................................................. p. 77
- Seismic Reflection Fundamentals .................................................................. p. 78
- Petroleum Systems: Hydrocarbons from Source Rock to Reservoirs .......... p. 79
- Structural Geology, Basin Development & Associated Traps ....................... p. 80
- Well Logging & Qualitative Log Interpretation .............................................. p. 81
- 3D Seismic Interpretation Workshop ............................................................. p. 82
- Sedimentology & Sequence Stratigraphy ...................................................... p. 83
- Stratigraphic Modeling: Basin Architecture & Sediment Distribution .......... p. 84
- Basin Modeling: Thermicity, Maturation & Migration ................................. p. 85
- Wellsite Geology .......................................................................................... p. 86

## From Basin to Prospect Evaluation
- Basin Assessment & Modeling Certification ............................................... p. 87
- Play Assessment & Prospect Generation ....................................................... p. 88
- Exploration Blocks Management .................................................................. p. 89
Virtual Classroom
This course is available in face-to-face mode

Introduction to Basin Exploration

**Level:** AWARENESS

**Purpose**
This course provides a practical knowledge of petroleum exploration. It aims to develop required competencies for an effective participation in multidisciplinary project teams.

**Audience**
Non-geoscientific technicians interested in petroleum exploration techniques, young professionals in geosciences with limited experience in the E&P industry.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- understand exploration strategy and follow the standard exploration workflow,
- get familiar with most common exploration techniques, via a multidisciplinary approach and data integration,
- acquire requested competences for basin analysis in order to assess the hydrocarbon potential and identify potential plays and related prospects.

**Ways & Means**
- Short daily lectures followed by exercises and hands-on sessions.
- Both individual work (exercises) and team work (short case study).

**Learning Assessment**
Knowledge assessment with multiple choice questions and open explanatory questions.

**Prerequisites**
Experience in the E&P industry.

**Expertise & Coordination**
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BASIN EXPLORATION CHALLENGES, STRATEGY &amp; WORKFLOW</strong></td>
<td>1 day</td>
</tr>
</tbody>
</table>

**BASIN EXPLORATION METHODS & TOOLS**
Basin analysis:
- Geodynamics: earth deformation and basin structuration (extensional & compressional).
- Review of geological environments and related reservoir distribution.
- Sedimentary basins: sediment infill and associated traps (structural & stratigraphic).
  - **Hands-on practice on real examples.**
- Petroleum systems:
  - The petroleum trilogy: source rocks, reservoir rocks and seal rocks.
  - Source rock potential and maturity evaluation: hydrocarbon generation.
  - Structural evolution, hydrocarbon expulsion, migration and entrapment, relative timing of events.
  - **Hands-on practice on real examples.**
- Seismic interpretation:
  - Review of acquisition techniques.
  - Seismic interpretation: objectives and methodology.
  - Structural interpretation of basins in extensional and compressional contexts.
  - Stratigraphic interpretation of basin fill.
  - **Hands-on practice on real examples.**
- Well log analysis:
  - Wireline log acquisition and well log analysis.
  - Review of logging tools and recorded parameters.
  - “Quick-look” qualitative well-log interpretation.
  - **Hands-on practice on real examples.**

**EVALUATION OF BASIN PETROLEUM POTENTIAL** | 1 day |
Basin potential evaluation: tectono-stratigraphic framework, petroleum trilogy, entrapment, migration and timing.
- Play assessment and mapping for exploration opportunities. Sweet spots identification.
- Prospect definition and related geological risk analysis (“Prospect review card”).
- **Workshop on a case study.**

**Reference:** INFOBAS-EN-D

*Can be organized as an In-House course.*

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>25 October</td>
<td>29 October</td>
<td>€2,960</td>
</tr>
</tbody>
</table>

This course is also available in French: INFOBAS-FR-A. Please contact us for more information.
Hunting for Oil: Exploration & Upstream Overview
Serious Game Simulation Workshop

Level: SKILLED

Purpose
The success of an oil company depends on appropriate strategy, effective data interpretation and collaborative teamwork; this course has been designed to stimulate the participants’ desire for learning, and to capture their attention with an adequate blend of challenges, competition and collaboration, making the learning experience both enjoyable and educational, whatever their professional origin and background.

Audience
Geologists, geophysicists and reservoir engineers, with short experience, who need to acquire a full view of the exploration, development and production workflow, in particular those who will join in multidisciplinary or asset teams - but also petroleum engineers, support staff, and non-technical staff, high potentials in the Oil & Gas upstream industry whose activity (either commercial, legal, financial or marketing) is calling for interaction with NOCs or International Operators, including executive managers and government officials.

Learning Objectives
Upon completion of the course, participants will be able to:
- acquire a global vision of the upstream petroleum industry,
- evaluate reservoir characteristics and potential using adequate geophysical and geological information,
- understand how uncertainties inherent to data influence the capability to interpret them,
- draw field development plans by balancing development costs versus production rates, in order to maximize NPV.

Ways & Means
- The HFO course is based on a serious game and a simulation workshop.
- Trainees are ideally grouped in teams of 3. Each team acts as a virtual oil company that competes with the others: explore for economically viable volumes of hydrocarbons in a new area.
- The course is supported by the DALLAS™ software package, a dynamic training tool based on an innovative learning platform.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Degree in G&G or experience in the E&P industry.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>5 days</th>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION - EXPLORATION GEOLOGY</strong></td>
<td><strong>EXPLORATION GEOPHYSICS</strong></td>
</tr>
<tr>
<td><strong>HYDROCARBON TRAPS - OPERATIONS GEOLOGY</strong></td>
<td><strong>WELL COMPLETION - RESERVOIR ENGINEERING - PRODUCTION MONITORING</strong></td>
</tr>
<tr>
<td>Lecture: hydrocarbon genesis, migration, entrapment and timing; play assessment (concept and preservation). Workshop: wellsite geology (mud logging, wireline logging) and well monitoring; well data interpretation.</td>
<td>Lecture: well design and completion; enhanced recovery. Workshop: field appraisal strategy and development planning.</td>
</tr>
<tr>
<td><strong>RESERVE EVALUATION - INTRODUCTION TO RESERVOIR MODELING</strong></td>
<td></td>
</tr>
<tr>
<td>Lecture: understand the reservoir (sedimentological and structural modeling). Workshop: accumulation evaluation (mapping and volumetric calculation - OOIP); production monitoring. Conclusion: presentation of teams’ results; feedback discussion; wrap-up session.</td>
<td>The teams define and implement their strategy in order to deploy the best scenario and to win, through mutual complementary interaction. Both cash flow and production are taken into account for the final evaluation. A series of hands-on activities and exercises (maps, seismic sections, logs, fluid contacts, volumetrics, etc.) is proposed through sequential workshops to highlight key phases and illustrate lectures.</td>
</tr>
</tbody>
</table>

Reference: HFO-EN-P
Only available as an In-House course.
Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode

Petroleum Geophysics

Level: AWARENESS

Purpose

This course provides a comprehensive, practical understanding of most techniques used in petroleum geophysics. It aims to focus on seismic techniques applied to investigate both reservoir structure and petrophysical characteristics.

Audience

E&P professionals with no or limited experience in petroleum geophysics.

Learning Objectives

Upon completion of the course, participants will be able to:

- select the appropriate geophysical method to be used during various phases of petroleum Exploration & Production,
- gain an insight into seismic reflection and methodology: acquisition, processing and interpretation,
- acquire the fundamental principles of borehole seismic and reservoir geophysics.

Ways & Means

- Interactive presentations, exercises, document analysis and videos.
- 2 workshops on PC, using seismic processing and interpretation software tools.
- Software used during workshops: with courtesy of Schlumberger.

Learning Assessment

Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites

Experience in the E&P industry.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO PETROLEUM GEOPHYSICS

0.25 d

SEISMIC WAVE PROPAGATION & SIGNAL PROCESSING

0.75 d

Seismic waves, rock velocities and densities, Snell-Descartes law.
Reflection coefficients, acoustic impedance.
Seismic reflection principle. Seismic shot gathers.
Seismic signal vs. Seismic noises. Time domain vs. Frequency domain.
Time and space sampling.

SEISMIC ACQUISITION

2.5 d

2D and 3D seismic, land, marine, sea bottom seismic.
Seismic sources (explosive, vibroseis, airguns…).
Seismic receivers (geophones, MEMS, hydrophones…).
Streamers, OBC, nodes, shallow water, transition zone…

SEISMIC PROCESSING & IMAGING

2.5 d

Seismic processing workflows, post-stack versus pre-stack.
Enhance signal versus noise.
CMP/Bin, static corrections, dynamic corrections, velocity analysis.
Stack, post-stack migrations, pre-stack migrations (PSTM - PSDM).
Workshop: 2D Seismic Processing.

BOREHOLE SEISMIC

0.75 d

Theory and principles, synthetic seismogram and well-to-seismic tying.
Vertical Seismic Profile (VSP), Offset Seismic Profile (OSP), walkaway.
Seismic While Drilling (SWD).
Examples and applications.

SEISMIC INTERPRETATION: THEORY & PRACTICE

2 d

Principles and methodology, seismic interpretation pitfalls.
2D seismic interpretation practice (on paper).
Workshop: 3D Seismic Interpretation.

SEISMIC FOR RESERVOIR ANALYSIS

1 d

Seismic amplitude analysis, Direct Hydrocarbon Indicators (DHI), seismic attribute analysis.
HR - HQ - HD - Broadband seismic, 4D Seismic.
Multi-component seismic, P waves versus S waves.
AVO-AVA processing and analysis, seismic inversion.

GRAVIMETRY, MAGNETOMETRY & ELECTRO-MAGNETOMETRY

0.25 d

Gravimetry: theory and principles.
Magnetometry: theory and principles.
Electro-magnetometry: theory and principles.

SUMMARY, SYNTHESIS & WRAP-UP

Reference: GEOPHY-EN-A. Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT

Rueil-Malmaison 29 November 10 December €6,180

This course is also available in French: GEOPHY-FR-A. Please contact us for more information.
# Seismic Reflection Fundamentals

**Course Content**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEISMIC WAVES PROPAGATION &amp; SIGNAL PROCESSING</td>
<td>1 d</td>
</tr>
<tr>
<td>SEISMIC ACQUISITION</td>
<td>0.5 d</td>
</tr>
<tr>
<td>2D and 3D seismic, land, marine, sea bottom seismic. Seismic sources (explosive, vibroseis, air guns…). Seismic receivers (geophones, MEMS, hydrophones…). Streamer, OBC, nodes, shallow water, transition zone…</td>
<td></td>
</tr>
<tr>
<td>SEISMIC PROCESSING &amp; IMAGING</td>
<td>0.5 d</td>
</tr>
<tr>
<td>BOREHOLE SEISMIC</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Theory and principles, synthetic seismogram and well-to-seismic tying. Vertical Seismic Profile (VSP), Offset Seismic Profile (OSP), walkaway. Seismic While Drilling (SWD). Examples and applications.</td>
<td></td>
</tr>
<tr>
<td>SEISMIC INTERPRETATION</td>
<td>2 d</td>
</tr>
<tr>
<td>Principles and methodology, seismic interpretation pitfalls. Hands-on: 2D seismic interpretation (on paper).</td>
<td></td>
</tr>
<tr>
<td>SEISMIC FOR RESERVOIR ANALYSIS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Seismic amplitudes analysis, Direct Hydrocarbon Indicators (DHI), seismic attributes analysis. HR - HQ - HD - Broadband seismic, 4D seismic. Multi-component seismic, P waves vs S waves. AVO-AVA processing and analysis, seismic inversion.</td>
<td></td>
</tr>
</tbody>
</table>

**Summary, Synthesis & Wrap-Up**

Reference: SEISREF-EN-A  Only available as an In-House course. Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode

Petroleum Systems: Hydrocarbons from Source Rock to Reservoirs

Level: AWARENESS

Purpose
To gain a greater understanding of important geological processes in a petroleum basin, this course provides an understanding of various geochemical techniques, leading to sedimentary basins’ hydrocarbon potential evaluation and to the identification of hydrocarbon migration pathways.

Audience
Geologists, geophysicists or geochemists involved in petroleum potential evaluation or in reservoir management.

Learning Objectives
Upon completion of the course, participants will be able to:
- review the petroleum system concept and associated processes,
- get practical insights of basic analysis of geochemical data and reports,
- assess and analyze geochemical data in order to evaluate source rock potential and maturity.

Ways & Means
Lectures and hands-on activities: several exercises and case studies.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Degree in geology or geophysics, with fundamental knowledge in hydrocarbons evaluation.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO PETROLEUM SYSTEMS 1 d

SOURCE ROCKS: FORMATION & DISTRIBUTION 1 d
Formation of source rocks:
- Type of organic matter,
- Distribution of source rocks in space & time.

FROM SOURCE ROCK TO ACCUMULATION 1 d
Formation of Oil & Gas:
- Methods for evaluation of the source rocks,
- Modeling of hydrocarbon formation,
- Migration.

MOLECULAR FOSSILS, BIOMARKERS 1 d
Concept of “biomarker”:
- Analytical methods,
- Markers of origin and environments,
- Oil/source rock correlation,
- Maturity parameters,
- Oil spill survey.

ALTERATION IN RESERVOIRS 0.5 d

WORKSHOP ON A PETROLEUM SYSTEM 0.5 d

SUMMARY, SYNTHESIS & WRAP-UP
The petroleum system of South Atlantic Ocean.

Reference: GEOCHIM-EN-A
Only available as an In-House course.
Contact: ep.contact@ifptraining.com
Structural Geology, Basin Development & Associated Traps

Level: AWARENESS

Purpose
This course provides an in-depth knowledge of key elements which characterize the structural style of a sedimentary basin.

Audience
Petroleum exploration geoscientists, multidisciplinary team managers.

Learning Objectives
Upon completion of the course, participants will be able to:
- get familiar with both brittle and ductile deformations identification and analysis, in various types of sedimentary basins, at different scales and under different stress regimes: at lithosphere scale: plate tectonics and basin formation (rifts, passive margins, active margins, thrust belts); at basin scale: subsidence and inversion, structural traps (lifted blocks, horsts, shale and salt domes, folds), at field and reservoir scales: behavior of faults (seal or drain), fracturing, cap rock integrity, etc.
- be able to identify the specific structural style of a petroleum area, on outcrop pictures and on seismic profiles,
- be able to grasp issues linked to tectonic evolution versus petroleum system evolution (in different structural contexts).

Ways & Means
Interactive course: lectures illustrated by practical exercises and personal work.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
- Degree in G&G.
- No prerequisites in structural geology.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: STRUCT-EN-P Only available as an In-House course.
Contact: ep.contact@ifptraining.com

Course Content

PLATE TECTONICS & STRUCTURAL STYLES 1.5 d
Earth structure, global dynamics and time scales.
Structure of continental and oceanic lithospheres: thermicity, rheology, stress and strain.
Fundamentals of structural analysis:
- Extensional regimes: geodynamics and architecture of related basins (rift basins, passive margins).
- Compressional regimes: geodynamics and architecture of related basins (foreland basins, active margins, thrust belts).
- Intra-plat basins and tectonic inversion.

EXTENSIONAL & COMPRESSIONAL DEFORMATIONS - STRUCTURAL TRAPS 1.5 d
Structural traps in extensional context.
Structural traps in compressional context.
Wrench faulting and related traps.
Salt tectonics and related traps.
Relationship between tectonic and sedimentary processes.
Case study: the Arabian plate and margins, relations with petroleum systems.

EXPLORATION & DEVELOPMENT PROBLEMS ASSOCIATED WITH STRUCTURAL STYLES 1.5 d
Folding mechanisms and styles, impact on fractures distribution.
Conductive and sealing faults.
Migration pathways and petroleum systems timing.
Seal efficiency and time of residence of hydrocarbons in structural traps.

SUMMARY, SYNTHESIS & WRAP-UP 0.5 d
Virtual Classroom
This course is available in face-to-face mode

Well Logging & Qualitative Log Interpretation

Level: AWARENESS

Purpose
This course provides an overview of main logging tools and proposes an insight into fundamental well log interpretation for reservoir identification and characterization.

Audience
Geoscientists and other E&P technicians and engineers, interested in wireline log acquisition and well-log interpretation.

Learning Objectives
Upon completion of the course, participants will be able to:
- acquire the concepts of log interpretation (Archie formula, invasion),
- review mud logging, coring and wireline logging techniques,
- perform a quick-look interpretation to characterize reservoirs: fluid contacts, lithology, porosity, saturation.

Ways & Means
Interactive presentations and exercises to build a lithology and fluid column.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Degree or technical experience in E&P industry or in non-petroleum geology (hydrogeology, geotechnics, mining, geothermy...).

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

BASIC INTERPRETATION CONCEPTS & WIRELINE LOG RECORDING 1 d
Foundational concepts. Reservoir petrophysics (lithology, porosity, resistivity, saturation) and fluid properties. Environment of measurement (borehole, invasion profile) and related parameters. Fundamental equations (Archie formula) for log interpretation in clean formations. Mud logging, measurements during drilling, coring and wireline logging techniques. Applications. Well logs examples.

REVIEW OF LOG MEASUREMENTS & APPLICATIONS 1.25 d
Wireline logging operations and wireline logs. Logging-While-Drilling techniques and LWD logs. Well logs: header, calibration, parameters, repeat section, main log.
Wireline logging tools: principle and applications, limitations, calibration, environmental corrections and quality control:
- Caliper, gamma ray and GR spectrometry, Spontaneous Potential.
- Resistivity (induction, laterolog) and micro-resistivity measurements.
- Porosity and lithology measurements: nuclear (litho-density, neutron) and acoustic logging (sonic).

“QUICK-LOOK” INTERPRETATION 2.5 d
Qualitative well-log interpretation:
- Log responses in most common geological formations.
- Identification of reservoirs and fluid contacts (overlay technique: water- and oil-based mud cases).
- Hydrocarbon effect on density and neutron logs.
- Determination of water resistivity Rw (SP, Ratio, Rwav) formation resistivity (Rt, Rxo) and flushed zone diameter.
- Determination of lithology, porosity, water and hydrocarbon types and saturations.
- Cross-plot techniques with density, neutron, sonic and other logs (Pe, K, Th, etc.).
- Shale effects on logs: introduction to shaly and complex lithology formations.

PRESSURE MEASUREMENTS & FLUID SAMPLING 0.25 d
Pressure measurements and fluid sampling: operation and applications. Pressure analysis: determination of fluid contacts, fluid gradient and fluid density.

NMR, DIPMETER & BOREHOLE IMAGING TECHNIQUES 0.25 d
NMR log (Nuclear Magnetic Resonance): principle and applications. Dipmeter and borehole imaging tools: principle and applications.

Reference: LOGF-EN-D
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT
Virtual Classroom 27 September 1 October €2,960

This course is also available in French: LOGF-FR-A. Please contact us for more information.
3D Seismic Interpretation Workshop
Structural Model Construction & Trap Analysis

Level: SKILLED

Purpose
This course provides a practical understanding of 3-D seismic structural interpretation in order to identify prospect locations.

Audience
E&P professionals with previous experience in seismic interpretation.

Learning Objectives
Upon completion of the course, participants will be able to:
- gather data, create project and perform a 3D seismic interpretation,
- QC a seismic interpretation,
- use a velocity field to perform a time-to-depth conversion,
- identify and interpret structural prospects,
- generate horizons and fault deliverables for a geomodel.

Ways & Means
- Interactive presentations, exercises and document analysis.
- 80% of training duration is dedicated to workshop on PC, using a seismic interpretation software tool from the industry.
- Software used during workshops: with courtesy of Schlumberger.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Degree in G&G with fundamental knowledge in seismic wave propagation, acquisition and processing, as well as in structural geology.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

WHAT IS SEISMIC INTERPRETATION?

PETROLEUM GEOLOGY - STRUCTURAL CONTEXT

STRUCTURAL & STRATIGRAPHIC INTERPRETATION PRINCIPLES

SEISMIC WAVE PROPAGATION: ACOUSTIC IMPEDANCE, REFLECTION COEFFICIENTS

SEISMIC PROCESSING & THE EFFECTS ON INTERPRETATION

WAVELETS, POLARITY & PHASE - SEISMIC SPECTRUM - VERTICAL & LATERAL RESOLUTION

TIME-TO-DEPTH CONVERSION LAWS AT WELLS: CKS, VSP...

SYNTHETIC SEISMIC & WELL TYING PROCESS

TIME TO DEPTH CONVERSION BASICS

WORKSHOP - CASE STUDY (week 1)

WORKSHOP PRESENTATION & OBJECTIVES
Survey introduction - Geophysical context. Geology and petroleum system overview. Prospect objectives.

SEISMIC DATA ANALYSIS & QC

WELL-TO-SEISMIC TYING & HORIZONS IDENTIFICATION
Well data calibration to identify main geological markers and main reservoir layers. Synthetic seismogram calculation.

SEISMIC DATA PICKING & MAPPING - POTENTIAL TRAPS DETECTION
Structural interpretation (in time) of mains horizons key, horizons and faults picking (time picking: manual, guided, automatic, grid, and 3D picking), and correlation. Picking results QC and estimation of uncertainties. Volume and surface attributes calculation and analysis. Surfaces generation to produce a time model. Mapping.

WORKSHOP - CASE STUDY (week 2)

VELOCITY MODEL CONSTRUCTION & TIME-TO-DEPTH CONVERSION

POTENTIAL RESERVOIRS ANALYSIS
Reservoir picking and modeling. Surface attributes calculation and analysis. Interval attributes calculation and analysis.

STRUCTURAL PROSPECTS IDENTIFICATION & EVALUATION

SUMMARY, SYNTHESIS & WRAP-UP

Reference: SEIS3D-EN-P • Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>15 November</td>
<td>26 November</td>
<td>€6,180</td>
</tr>
</tbody>
</table>

This course is also available in French: SEIS3D-FR-P. Please contact us for more information.

Sedimentology & Sequence Stratigraphy

Course Content

STRATIGRAPHY - SEDIMENTOLOGY - DEPOSITIONAL ENVIRONMENTS  1 d
Review of basic concepts in stratigraphy and sedimentology.
Alluvial, fluvial, deltaic, shallow and deep marine facies models.
Facies classification and related petrophysical characteristics.

SEISMIC SEQUENCE STRATIGRAPHY AT BASIN SCALE  2.5 d
Historical concept of depositional sequences and system tracts.
Interpretation methodology both for clastics and carbonate facies.
Prediction of potential source rocks & reservoirs location.
Application to seismic interpretation.
State-of-art overview of sequence stratigraphy.

HIGH-RESOLUTION SEQUENCE STRATIGRAPHY AT RESERVOIR SCALE  1 d
Identification of genetic sequences.
Correlation by stacking patterns analysis.
Interpretation: exercises based on outcrop analogues and field studies.

OVERVIEW OF STRATIGRAPHIC MODELING  0.5 d
Interactive demo on Dionisos™ modeling software.

Level: SKILLED

Purpose
This course provides a practical, comprehensive understanding of new concepts and methods applied in stratigraphy, sedimentology and sequence stratigraphy analysis.

Audience
Geologists, geophysicists working in multidisciplinary-team dedicated to exploration.

Learning Objectives
Upon completion of the course, participants will be able to:
- review fundamentals of main depositional environments,
- understand and apply sequence stratigraphy concepts and methods,
- identify sequences on seismic lines, and interpret core and log data with regard to stratigraphy.

Ways & Means
Lectures, exercises, hands-on sessions on real case studies.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Good grasp on stratigraphy and sedimentology fundamentals, with a first experience in seismic interpretation.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: SEOSTRA-EN-P  Only available as an In-House course.
Contact: ep.contact@ifptraining.com

www.ifptraining.com
Stratigraphic Modeling: Basin Architecture & Sediment Distribution

Level: SKILLED

Purpose
This course provides an in-depth and practical understanding of stratigraphic modeling following a comprehensive workflow.

Audience
Junior exploration geoscientists, multidisciplinary-team managers.

Learning Objectives
Upon completion of the course, participants will be able to:
- grasp methodology of sequence stratigraphy and concepts of stratigraphic evolution,
- model stratigraphic evolution of a basin using the software program DionisosFlow™,
- predict reservoir distribution and geometry, and assess efficiently the stratigraphic architecture of a sedimentary basin.

Ways & Means
- Hands-on training sessions on workstation.
- Use of the software program DionisosFlow™ (maximum 2 participants per workstation).
- Exercises and reports to launch questions and discussions at the end of the course.
- Software used during workshops: with courtesy of Beicip-Franlab.

Learning Assessment
Knowledge assessment with multiple-choice questions.

Prerequisites
- Degree in G&G.
- No prerequisites in basin modeling.

Expertise & Coordination
IFP Training (permanent or contracted) expert in fractured reservoirs with a wide experience and whose competencies are kept up-to-date in industry projects.

Course Content

<table>
<thead>
<tr>
<th>5 days</th>
</tr>
</thead>
</table>

**SEQUENCE STRATIGRAPHY ANALYSIS**
1 d
Depositional system concepts. Walther’s law.
Well log data.
Seismic data.
Sequence stratigraphy analysis workflow.

**STRATIGRAPHIC PARAMETERS**
1 d
Presentation of allogenic parameters through the use of DionisosFlow™ software.
*Sensitivity analysis exercises with DionisosFlow™.*

**ACCOMMODATION & SHORELINE SHIFTS**
1 d
Accommodation concept.
Shoreline trajectories.
Subsidence. Sediment supply.
*Demo and exercises with DionisosFlow™.*

**SEISMIC & WELLS ANALYSIS**
1 d
Stratigraphic surfaces.
Systems tracts.
*Demo and exercises with DionisosFlow™.*

**MODELING LOOP**
1 d
Links between stratigraphic modeling and basin modeling.
Questions and discussion.
*Exercises with DionisosFlow™.*

Reference: DIONIS-EN-P  
Only available as an In-House course.  
Contact: ep.contact@ifptraining.com
Basin Modeling: Thermicity, Maturation & Migration

Course Content

SEDIMENTARY BASIN MODELING THROUGHOUT TIME 1 d
AM: lectures.
Basin types (rift, margin, foreland, etc.).
Subsidence versus time.
Compaction, backstripping.
PM: exercises, introduction to TemisFlow™ 1D module, subsidence curve calculation.

THERMAL HISTORY 1 d
AM: lectures.
Modes of heat propagation: conduction, convection and advection.
Transient thermal regimes and blanketing effects of sedimentary covers.
Calibration of heat flow for present and past thermal state.
PM: exercises with TemisFlow™ 1D module, influence of heat flow, surface temperature, conductivity.

MATURATION & EXPULSION 1 d
AM: lectures.
Source rock (kerogen type, Rock-Eval data...).
Kerogen cracking, kinetic parameters determination.
Secondary cracking.
Paleo-thermometers (organic matter, fission tracks, fluid inclusions...).
PM: exercises with TemisFlow™ 1D module, influence of kinetic parameters.

HYDROCARBONS MIGRATION - WORKSHOP 2 d
Session 1:
AM: lectures.
Migration principles.
Definition of lithologies in basin modeling.
Archimedes force, capillary pressure.
PM: introduction to TemisFlow™ 2D module, exercises in TemisFlow™ 2D module, influence of parameters.
Session 2:
AM: lectures.
Oil & Gas generation.
PVT and chemical composition.
Velocity of hydrocarbon migration.
PM: exercises with TemisFlow™ 2D module, influence of parameters.

Reference: TEMIS-EN-P  Only available as an In-House course.
Contact: ep.contact@ifptraining.com

Level: SKILLED

Purpose
This course provides an in-depth and practical understanding of thermal basin modeling in a comprehensive workflow, including modeling of oil maturation and hydrocarbon migration, and leading to the assessment of hydrocarbon potential of an exploration block or a prospect.

Audience
Junior petroleum exploration geoscientists, multidisciplinary-team managers.

Learning Objectives
Upon completion of the course, participants will be able to:
➤ understand source rock maturation and hydrocarbons generation,
➤ assess most significant basin modeling parameters for regional basin model construction (using the 1D module of TemisFlow™),
➤ understand hydrocarbon migration processes (using the 2D module of TemisFlow™) and evaluate the hydrocarbon potential of a given area.

Ways & Means
➤ Afternoon sessions are devoted to case studies based on non-proprietary data provided by IFP.
➤ Use of the software program TemisFlow™ (maximum 2 participants per workstation).
➤ By the end of each afternoon, participants generate short reports which are assessed the following day.
➤ Participants have the alternative of using their own data.
➤ Upon request, the course can make use of a company’s regional dataset, provided the latter is made available in advance.
➤ Software used during workshops: with courtesy of Beicip-Franlab.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
➤ Degree in G&G.
➤ No prerequisites in basin modeling.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.
This course can be adapted to virtual classroom mode

**Wellsite Geology**

Operations Geology & Geological Logging

<table>
<thead>
<tr>
<th>Level: AWARENESS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>This course provides a comprehensive understanding of how to monitor and use geological data acquired while drilling in order to characterize geological formations and reservoirs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geologists, technicians involved with geological wellsite control and/or supervision. Geoscientists using well geological reports.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of the course, participants will be able to:</td>
</tr>
<tr>
<td>► understand well-site geologist’s role, tasks and responsibilities,</td>
</tr>
<tr>
<td>► grasp various techniques applied in well-site geology and during coring operations,</td>
</tr>
<tr>
<td>► learn about the various aspects of operations geology and geological logging.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ways &amp; Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive presentations, applications on case studies, team work.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge assessment with multiple choice questions and open explanatory questions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree in geology.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expertise &amp; Coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.</td>
</tr>
</tbody>
</table>

## Course Content

<table>
<thead>
<tr>
<th>5 days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DRILLING PARAMETERS</strong></td>
</tr>
<tr>
<td>Quick review of mechanical parameters (WOH, WOB, RPM, ROP) &amp; hydraulic parameters (SPP, MFR, MPL, MWin &amp; out, etc.) monitored during drilling.</td>
</tr>
</tbody>
</table>

| **GEOLOGICAL PARAMETERS** | 1 d |
| Cuttings: sampling, cleaning, analysis, description, calcimetry, lag time, XRD, fluorescence. |
| Quality and representativeness of cuttings. |
| Hints on how to fill in the cutting description sheet: main minerals and accessory minerals. |
| Paleontological observations. |

| **HYDROCARBON GASES** | 1 d |
| Physics and chemistry of gases. |
| Detection and evaluation of gas shows while drilling. Chromatography. Type of dissolved gases in the mud. |
| Importance of gas control on quality of measurements. Gas while drilling. |

| **GEOLOGICAL LOGGING** | 1 d |
| Role of well site geologist: analysis and decision. |
| Depth control: depth, deviation surveys, (MD, TVD, TVDSS) and stratigraphic column. |
| Gathering geological and drilling information. |
| Geological log: header and track presentation; main software programs. |
| Drilling parameters for a geological log. |
| Calcimetry, gas, gain and losses. |
| Composite log: interpretation of geological observations and descriptions for the lithology. |
| Integration of other data: well tests results and logging information. |
| Supervision and quality control of logging operations. |
| Coring operations: core recovery, cleaning, splicing, description, fracture identification, sampling, photos. |
| Final report. |
| Case studies. |

### WORKSHOP SESSION: CASE STUDY

| 1.5 d |
| Quality control: quality control of mud logs in clastic and carbonate environments. |
| Hands-on: composite mud log construction from analyses and cuttings description. |
Course Content

Lectures, hands-on activities and case studies are distributed all along the program. Training content presents a clear operational orientation in order for participants to get familiar with specific techniques via an extensive exposure to simulations on real cases allowing them to anticipate the problems they will have to cope with later in their own projects.

Part 1: EXPLORATION BLOCK MANAGEMENT
Introduction to Basin Exploration
Play assessment: From basin analysis to exploration opportunities.
Prospect generation and evaluation: from single to multi-prospect portfolio.

Part 2: EXPLORATION TECHNIQUES & BASIN MODELING
Structural geology: impact on petroleum system development and maturity.
Well logging, qualitative and quantitative log interpretation.
3D seismic interpretation workshop (structural & stratigraphic).

Part 3: SEQUENCE STRATIGRAPHY & BASIN MODELING
Sedimentology and sequence stratigraphy workshop.
Stratigraphic modeling (basin architecture and sediment distribution).
Basin modeling (thermicity, maturation and migration).

Part 4: FINAL PROJECT WORKSHOP
Exploration for prospect generation workshop.

PROJECT REPORT DEFENSE & JURY
The training program ends with a project on a real case. Participants are involved in a simulated situation and their mission is to summarize, integrate and apply acquired knowledge. Each team will present final results of a project to a jury.
Play Assessment & Prospect Generation

Level: SKILLED

Purpose
This course provides a practical, comprehensive understanding of that part of the E&P value chain that deals with the technical evaluation of an exploration asset.

Audience
Geoscientists, technical or non-technical managers interested in prospect assessment.

Learning Objectives
Upon completion of the course, participants will be able to:
- understand prospect definition workflow and to estimate OHIP (Original Hydrocarbon In Place) estimation parameters,
- understand risks and uncertainties related to OHIP calculation methods and to use related results accordingly,
- review fundamental concepts of portfolio management and to learn how to define adapted exploration strategies.

Ways & Means
- Lectures and exercises.
- Hands-on sessions on real case studies.
- Discussion, teamwork experience feedback.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Degree in geology or geophysics, or equivalent experience, with basic knowledge in asset evaluation.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

FROM PROSPECT LEAD TO POTENTIAL FIELD
Presentation of exploration methods and strategies.
Basin petroleum potential assessment process. Key points of the exploration workflow.

PLAY ASSESSMENT
Data collection and QC.
Basin potential assessment.
Regional context. The petroleum trilogy.
Migration and entrapment processes.
Relative timing of events.

PROSPECT ANALYSIS & GENERATION
Source rock potential estimation.
Seismic and well data integration and interpretation.
Basin structural history.
Timing of hydrocarbon expulsion and migration.
OHIP calculation parameters. Determinist and stochastic assessment.
Estimation of risks and related uncertainties. Assessment consistency.
“Prospect review card”.
Case study on prospect generation.

RISK ANALYSIS
Identification and assessment of risks and uncertainties related to:
Geology (source rock, reservoir, seal, preservation).
Fluids (generation, maturation, migration, entrapment, timing).
Probability Of Success (POS). Transition to dynamics. Consequences for economics.
Case study.

WRAP UP & CONCLUSION

Reference: PLAY-EN-P.
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>21 June</td>
<td>25 June</td>
<td>€3,120</td>
</tr>
</tbody>
</table>

This course is also available in French: PLAY-FR-P. Please contact us for more information.
Exploration Blocks Management

Level: SKILLED

Purpose

This course provides:
- The knowledge and skills required to assess and move forward with play assessment scenarios in order to set up strategies for acreage management.
- A comprehensive and practical understanding of the part of the E&P value chain that deals with the technical evaluation of an exploration asset.
- The fiscal framework as well as the appreciation of risk that can be factored into the economics of an exploration project, and the impact on the decision-making process.

Audience

Non-geoscientific technicians interested in petroleum exploration techniques, young professionals in geosciences with limited experience of the related topics, trained (permanent or contracted) having a good expertise and/or experience of the contractual framework, and the State’s strategic goals at some point in time.

Learning Objectives

Upon completion of the course, participants will be able to:
- Understand prospect definition workflow and assess the parameters involved in basins’ hydrocarbon potential evaluation.
- Identify the link between petroleum systems, plays and prospects in order to assess a basin’s potential and to set up an adequate exploration strategy.
- Acquire a practical knowledge and the workflow for reducing exploration risk by predicting proven and unproven plays performance.
- Understand risks and uncertainties inherent to OHP (Original Hydrocarbon In Place) assessment and to follow through the decision process along the E&P chain.
- Review fundamental concepts of portfolio management and to use the results of assessment studies with the adequate caution.
- Define the right exploration strategies and comprehend risk behavior in petroleum exploration.
- Assess the value of a single prospect and the value of several independent (dependent) prospects.

Ways & Means

- Short daily lectures followed by exercises and hands-on sessions.
- Both individual work (exercises) and team work (short case study).

Learning Assessment

Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites

- E&P professionals.
- No experience required.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

WEEK 1

OPENING WORKSHOP: SETTING UP EXPLORATION BLOCK STRATEGY 2 d

By studying a “theoretical basin”, this opening workshop will walk participants through a 2-day brainstorming session on the pros and cons of various strategies and methodologies that could be considered for setting up, delineating and promoting exploration blocks in the most efficient manner, given the state of maturity of the areas under consideration, the economic terms of the contractual framework, and the State’s strategic goals at some point in time.

The participants will work in teams and face different technical and economic situations. With the guidance of an expert moderator, they will have to walk through the decision-making process, analyze risks, discuss options, present and defend opinions.

This workshop is intended as an eye-opener on all the fundamental technical and economic issues that will be touched upon or studied and analyzed in details throughout the rest of the training program; the final objective being to build up the skills required for managing and promoting the exploration for a development of the State’s Oil & Gas resources.

PLAY ASSESSMENT: FROM BASIN ANALYSIS TO EXPLORATION OPPORTUNITIES 3 d

Petroleum play (0.25 day)

What is a petroleum play? Play concept definition, need for defining a concept.

Petroleum system and basin analysis (1 day)


Workshops: basin potential assessment, regional context, petroleum trilogy.

Proven and unproven plays: basis of an exploration strategy (1.5 days)


Workshop on real case studies.

Play risk analysis and exploration opportunities (0.25 day)


WEEK 2

PROSPECT GENERATION & EVALUATION: FROM SINGLE TO MULTI-PROSPECT PORTFOLIOS 5 d

Prospect analysis and evaluation (2.5 days)


Identification and assessment of risks and uncertainties (1.5 days)


Deliverables for decision-making process (1 day)

“Prospect Identification Card”. Maps, parameters estimation, reserves values (Min/Mode/Max). Calculation of recoverable reserves. Prospect’s risked reserves. Preparation of virtual FDP and production profiles.

WEEK 3

PROSPECT/BLOCK VALUATION: EXPLORATION PROJECT ECONOMICS & DECISION ANALYSIS 5 d

E&P value chain and decision process (0.5 day)


Case study: oil field project cash flow analysis.

Exploration prospect valuation (1.5 days)


Exploration block valuation (1.5 days)


Overview of risk behavior in petroleum exploration (1.5 days)


Reference: BLOCK-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Reservoir Characterization & Modeling

Introduction to Reservoir Characterization ........................................... p. 91
Integrated Petrophysics for Reservoir Characterization & Modeling Certification ........................................... p. 92
Reservoir Characterization & Modeling Certification ................................. p. 93
Quantitative Well Log Analysis ................................................................ p. 94
Fundamentals of Facies Analysis & Rock-Typing ........................................ p. 95
Geological Modeling Workshop for Integrated Reservoir Studies ................. p. 96
Hydrocarbons Accumulations, Reserves Estimation, Risk Analysis & Uncertainties ...................................................... p. 97
Naturally-Fractured Reservoirs: Static & Dynamic Modeling ...................................................... p. 98
Petrophysical Properties: Core, Log & Test Data Integration for Reservoir Modeling ...................................................... p. 99
Upscaling: from Static to Dynamic Model ...................................................... p. 100
Borehole Imaging Interpretation Workshop with WellCad™ ...................................................... p. 101
Fracture & Fault Modeling Workshop with FracaFlow™ ...................................................... p. 102

Reservoir Engineering

Introduction to Reservoir Engineering ........................................... p. 115
Reservoir Fluid Properties - PVT ...................................................... p. 116
Drilling & Completion - Wellbore Interface & Well Productivity ...................................................... p. 117
Well Testing & Well Test Analysis ...................................................... p. 118
Drive Mechanisms - Enhanced Oil Recovery ...................................................... p. 119
Drive Mechanisms & EOR ...................................................... p. 120
Dynamic Reservoir Simulation ...................................................... p. 121
EOR Concepts & Applications ...................................................... p. 122
Miscible Gas EOR Certification ...................................................... p. 123
Chemical EOR Certification ...................................................... p. 124
Advanced Dynamic Reservoir Simulation ...................................................... p. 125
Reservoir Simulation Workshop Certification ...................................................... p. 126
Advanced Well Test Analysis Certification ...................................................... p. 127
PVT Modeling ...................................................... p. 128
Decline Curves Analysis ...................................................... p. 129
Introduction to Petrophysics ...................................................... p. 130

Reservoir Management

Reservoir Engineering Certification ...................................................... p. 131
Reservoir Management Workshop ...................................................... p. 132
Reservoir Management Foundation ...................................................... p. 133
Gas Reservoir Management ...................................................... p. 134
Reserves Evaluation - Risks & Uncertainties ...................................................... p. 135
Mature Fields - Subsurface Issues ...................................................... p. 136
IRM - Integrated Reservoir Management ...................................................... p. 137

Field Development

Introduction to Geothermal Energy Uses & Operations ...................................................... p. 139
Field Development Project & Uncertainties ...................................................... p. 139
FPSO Main Utilities Systems ...................................................... p. 140
Field Development Project ...................................................... p. 141
Virtual Classroom
This course is available in face-to-face mode

Introduction to Reservoir Characterization

**Level:** AWARENESS

**Purpose**
This course provides participants with an understanding of all types of data needed to build a reservoir model (seismic, geological, petrophysical and dynamic) and a clear understanding of the techniques related to reservoir modeling.

**Audience**
Geologists, geophysicists, petrophysicists, reservoir engineers or petroleum engineers involved in integrated reservoir studies.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- recognize the techniques and challenges related to reservoir modeling (focus on reservoir properties),
- build required competencies for reservoir geoscientists to analyze a specific dataset and construct a reliable static model.

**Ways & Means**
Interactive presentations, practical exercises and hands-on activities.

**Learning Assessment**
Knowledge assessment with multiple-choice questions.

**Prerequisites**
Degree in geology, geophysics or master in G&G, or equivalent experience.

**Expertise & Coordination**
IFP Training (permanent or contracted) expert in geomodeling with a wide experience and whose competencies are kept up-to-date in industry projects.

**Course Content**

<table>
<thead>
<tr>
<th>5 days</th>
<th>INTRODUCTION TO RESERVOIR CHARACTERIZATION</th>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reservoir characterization and modeling objectives.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Characterization and modeling workflows.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data types, representativeness and related uncertainty.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Challenges of data integration.</td>
<td></td>
</tr>
</tbody>
</table>

| 1.5 d | RESERVOIR ARCHITECTURE |
|       | Seismic interpretation method and pitfalls. Hands-on: case study. |
|       | Static and dynamic information integration. |

| 1.5 d | FACIES ANALYSIS - ROCK-TYPING |
|       | Litho-facies analysis (core description and upscaling methods). |
|       | Introduction to rock-typing: principle of electro-facies and petro-facies analyses. |
|       | Statistical analysis of sedimentological data (VPC analysis). |

| 1 d | PETROPHYSICS & ROCK PROPERTIES - RESERVOIR HETEROGENEITIES |
|     | Petrophysics: principles, reservoir parameters. |
|     | Heterogeneities: identification and inventory. |
|     | Wrap-up session. |

**Reference:** INFORCM-EN-D

Can be organized as an In-House course.

**Contact:** ep.contact@ifptraining.com

**Location**
Virtual Classroom

<table>
<thead>
<tr>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 September</td>
<td>24 September</td>
<td>€2,960</td>
</tr>
</tbody>
</table>

This course is also available in French: INFORCM-FR-A. Please contact us for more information.
Graduate Certificate
Integrated Petrophysics for Reservoir Characterization & Modeling Certification

Level: SKILLED

Purpose
This course provides a comprehensive, practical knowledge of rock properties used for reservoir characterization and modeling workflow, via hands-on activities and case studies using dedicated software for data analysis, data interpretation and reservoir modeling.

Audience
Geoscientists involved in multidisciplinary teams, willing to acquire practical knowledge in petrophysical data interpretation for reservoir studies.

Learning Objectives
Upon completion of the course, participants will be able to:
- Understand concepts, techniques and methods of rock properties applied to reservoir modeling.
- Characterize a fractured network on a field.
- Develop the skills to check the validity of structural interpretation on seismic through time using balancing and structural restoration.
- Apply the current borehole imaging tools and modern interpretation techniques.
- Apply the workflow to characterize and model the fractures network in a reservoir model (real case).

Ways & Means
- Hands-on activities and simulations on real cases.
- Emphasis on practical work to develop participants’ autonomy and appropriate decisions.
- Both personal and group work, team-building, group discussion in results and workflows.
- Software tools used in the petroleum industry.
- Software used during workshops: with courtesy of ALT, Beicip-Franlab, Geovariance, LithoTec, Schlumberger and Senergy.

Learning Assessment
- Knowledge assessment with multiple choice questions and open explanatory questions.
- Initial and final evaluations (at the beginning and end of the program) to assess participants’ learning curve.
- Final project at the end to simulate operational situation to be presented to a jury.

Prerequisites
Degree in technical field with petroleum geology and seismic interpretation experience.

Why an IFP Training Certification?
- An international recognition of your competences.
- A Graduate Certificate delivered.
- An expertise confirmed in Integrated Petrophysics for Reservoir Characterization & Modeling Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training experts in reservoir characterization and modeling, and fractured reservoirs with a wide technical experience.

Reference: PETRORE-EN-P
Only available as an In-House course.
Contact: ep.contact@ifptraining.com

Course Content

Lectures, hands-on activities and case studies are distributed in several modules of 1-2 weeks long. Training content presents a clear operational orientation in order for participants to get familiar with specific techniques via an extensive exposure to simulations on real cases allowing them to anticipate the problems they will have to cope with later in their own projects.

Part 1: RESERVOIR CHARACTERIZATION & MODELING

- Introduction to reservoir characterization.
- Geological modeling workshop for integrated reservoir studies.
- Reservoir petrophysics: conventional and special core analysis.
- Fundamentals of facies analysis & rock-typing.
- Petroleum geostatistics.
- Well logging and qualitative log interpretation.
- Core analysis for reservoir characterization.
- Seismic reservoir characterization AVO and inversion workshop.
- Quantitative well log analysis.

Part 2: FRACTURED RESERVOIR MODELING

- Naturally fractured reservoirs: static and dynamic modeling.
- Borehole imaging interpretation workshop with WellCAD™.
- Fracture and fault modeling workshop with FracaFlow™.

Part 3: FINAL PROJECT WORKSHOP

Final project. Hands-on workshop (teamwork).
Presentation and jury.
Graduate Certificate
Reservoir Characterization & Modeling Certification

Level: SKILLED

Purpose
This course provides a comprehensive, practical knowledge of reservoir characterization and modeling workflow, via hands-on activities and case studies with the aim of bridging the gap between static geological characterization and dynamic reservoir behavior.

Audience
Geoscientists, engineers newly hired or 2-3 years experienced, experienced technicians involved in multidisciplinary teams, willing to widen their knowledge and acquire practical know-how in geological modeling.

Learning Objectives
Upon completion of the course, participants will be able to:
- understand the analysis methods and techniques applied to reservoir modeling with related challenges,
- analyze and interpret a dataset and integrate it in order to elaborate a reliable static model,
- build a consistent geological static model with heterogeneities affecting fluid flow and production,
- assess the uncertainty and risks in order to reduce them and thus optimize investments.

Ways & Means
- Hands-on activities and simulations on real cases.
- Emphasis on practical work to develop participants’ autonomy and appropriate decisions.
- Both personal and group work, team-building, group discussion in results and workflows.
- Software tools used in the petroleum industry. Software used during workshops: with courtesy of Beicip-Franlab, Schlumberger.

Learning Assessment
- Knowledge assessment with multiple choice questions and open explanatory questions.
- Initial and final evaluation at the beginning and end of the program to assess participants’ learning curve.
- Final project at the end to simulate operational situation to be presented to a jury.

Prerequisites
Engineering or geoscience degree or equivalent professional experience, with basic knowledge in reservoir modeling.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Reservoir Characterization & Modeling Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training experts in Exploration with a wide technical experience.

Course Content
Lectures, hands-on activities and case studies are distributed in several modules of 1-2 weeks long. Training content presents a clear operational orientation in order for participants to get familiar with specific techniques via an extensive exposure to simulations on real cases allowing them to anticipate the problems they will have to cope with later in their own projects.

Part 1: RESERVOIR CHARACTERIZATION TOOLS (6 weeks)
Introduction to reservoir characterization. (1 week)
Well logging & qualitative log interpretation. (1 week)
Stratigraphy and sedimentology of siliciclastic reservoirs. (1 week)
Seismic interpretation and attributes analysis workshop: qualitative and quantitative methods. (1 week)
Petrophysical properties: core, log and test data integration for reservoir modeling. (1 week)
Fundamentals of facies analysis & rock-typing. (1 week)

Part 2: RESERVOIR MODELING & VOLUMETRICS (4 weeks)
Geological modeling workshop for integrated reservoir studies. (2 weeks)
Hydrocarbons accumulations, reserves estimation, risk analysis and uncertainties. (1 week)
Naturally-fractured reservoirs: static and dynamic modeling. (1 week)

Part 3: FINAL PROJECT WORKSHOP (2 weeks)
Final project. Hands-on workshop (team work). (2 weeks)
Presentation and jury.

Reference: RCM-EN-P
Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT
Rueil-Malmaison 20 September 10 December €32,380

This course is also available in French: RCM-FR-P. Please contact us for more information.
Quantitative Well Log Analysis

Level: SKILLED

Purpose
This course provides participants with some experience in qualitative log interpretation.

Audience
Geoscientists and technicians having an experience in qualitative log interpretation and willing to perform quantitative reservoir evaluation.

Learning Objectives
Upon completion of the course, participants will be able to:
- perform sound quality-control and environmental correction of logs, determine Rt, Rxo, Di,
- evaluate shale content of reservoirs, apply shale and hydrocarbon corrections,
- perform quantitative log interpretation in case of water and oil based mud, determine porosity, permeability, net sand, net reservoir and net pay characteristics.

Ways & Means
- Hand computations followed by petrophysical software sessions.
- Software used during workshops: with courtesy of Senergy.

Learning Assessment
Knowledge assessment with multiple choice questions.

Prerequisites
- Degree in G&G.
- Participants should know the principles and applications of common wireline logging tools and should know how to perform a quick look (lithology, porosity, Rw, Sw).

Expertise & Coordination
IFP Training (permanent or contracted) expert in petrophysics and quantitative log analysis with a wide experience and whose competencies are kept up-to-date in industry projects.

Course Content

PREPARATION FOR QUANTITATIVE LOG ANALYSIS
1 d
Petrophysical concepts and relationships.
Quality control of the data.
Determination of geological formations and reservoirs - Zonations.
Environmental corrections of logs. Determination of Rt, Rxo, Di.
Case studies (water and oil based muds).

INTERPRETATION OF CLEAN FORMATIONS
1 d
Determination of fluid contacts (WOC, GOC).
Determination of matrix and fluid parameters, Rw (SP, Ratio, Rwa).
Determination of lithology, porosity, fluid type, water and hydrocarbon saturations.
Cross plots techniques: N-D-S, Pe-RHOB, K-Th, etc.
Case studies.

QUANTITATIVE LOG INTERPRETATION OF SHALY FORMATIONS
(deterministic approach)
2.5 d
Influence of shale on logging tool response. Introduction to complex lithology - D-N cross-plot.
Determination of shale parameters, shale content Vsh and effective porosity.
Hydrocarbon effects on logs and hydrocarbon correction.
Determination of water and hydrocarbon saturations (various equations).
Comparison of porosity and permeability results to core data (PHI-K relationship and SCAL).
Determination of net sand, net reservoir and net pay thicknesses and associated characteristics (Vsh, H, Phie, So).
Case studies: integration & interpretation of pressure tests and NMR data, if available.
Cross-section between wells and comparison of interpretation results.

OTHER INTERPRETATION METHODS
0.5 d
Introduction to the multi-mineral model and general optimization method.
Case study.

Reference: LOGADV-EN-P  
This course is available in French: LOGADV-FR-P. Contact us for more information.

Can be organized as an In-House course.

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>20 September</td>
<td>24 September</td>
<td>€3,250</td>
</tr>
</tbody>
</table>

Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode

Fundamentals of Facies Analysis & Rock-Typing

**Level:** AWARENESS

**Purpose**
This course provides participants with an integrated approach to facies analysis and rock-typing combining logs, core description, and laboratory petrophysical data.

**Audience**
Geologists, geophysicists and reservoir engineers involved in integrated reservoir studies.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- Identify electrofacies from logs,
- Identify log signatures and facies association,
- Define rock-types with petrophysical data (logs and laboratory data),
- Define Petrofacies from various relationships like Reservoir Quality Index, Winland R35 for net pay determination and other poro-perm transforms.

**Ways & Means**
Interactive presentations, practical exercises and hands-on activities.

**Learning Assessment**
Knowledge assessment with multiple-choice questions.

**Prerequisites**
Degree in geology, geophysics or reservoir engineering, or equivalent experience.

**Expertise & Coordination**
IFP Training (permanent or contracted) expert in facies analysis and geostatistics with a wide technical experience and whose competencies are kept up-to-date in industry projects.

**Course Content**

**OVERVIEW ON ELECTROFACIES ANALYSIS & ROCK-TYPING**
1 d
Non-supervised approach and supervised approach for electrofacies analysis. Preliminary quality control of logs with hands-on. Integration of core description. From electrofacies to rock-types with hands-on.

**NON-SUPERVISED ANALYSIS**
1 d

**SUPERVISED ANALYSIS**
1 d

**ROCK-TYPES DETERMINATION**
2 d
Porosity and permeability modeling (hands-on). Rock quality index (ROI, FZI, etc.). Rock-typing with petrophysical data and capillary pressure curves; hands-on. Workflow for electrofacies to rock-type assignments.

**Reference:** ROCKYP-EN-A

Only available as an In-House course.

**Contact:** ep.contact@ifptraining.com

This course is also available in French: ROCKYP-FR-A. Please contact us for more information.
Geological Modeling Workshop for Integrated Reservoir Studies
The Objective is the Field – The Software is a Tool

<table>
<thead>
<tr>
<th>Level: AWARENESS</th>
</tr>
</thead>
</table>

**Purpose**
This course provides participants with an understanding of all data types needed to build a reservoir model (seismic, geological, petrophysical and dynamic) and a clear understanding of the techniques related to reservoir modeling.

**Audience**
Geologists, geophysicists, petrophysicists, reservoir engineers or petroleum engineers involved in integrated reservoir studies.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- recognize the techniques and challenges related to reservoir modeling (focus on reservoir properties),
- build required competencies for reservoir geoscientists to analyze a specific dataset and construct a reliable static model,
- apply the workflow for building a reservoir model using dedicated software,
- identify the uncertainties and assess them in order to reduce the risk and optimize the investments.

**Ways & Means**
- Interactive presentations and hands-on activities using software dedicated for reservoir modeling (EasyTrace™ and Petrel™).
- Software used during workshops: with courtesy of Beicip-Franlab and Schlumberger.

**Learning Assessment**
Knowledge assessment with multiple-choice questions.

**Prerequisites**
Degree in geology, geophysics or reservoir engineering, or equivalent experience.

**Expertise & Coordination**
IFP Training (permanent or contracted) expert in reservoir characterization and geological modeling with a wide experience and whose competencies are kept up-to-date in industry projects.

### Course Content

<table>
<thead>
<tr>
<th><strong>5 days</strong></th>
</tr>
</thead>
</table>

**BASIC PRINCIPLES - RESERVOIR CHARACTERIZATION WORKFLOW**
Introduction and objectives.
Case study: field presentation.

**PROJECT ORGANIZATION**
Project definition.
Data QC and summary table.
Data management.
Well data loading.
Manipulating scripts and Excel™ macros.

**STRUCTURAL MODELING**
Structural context.
Well correlation and stratigraphic data analysis.
Constraining static model with dynamic data.
Generating surfaces.
Picking horizons and faults on seismic.
Reservoir layering.
Structural modeling.
Mapping reservoir structures.
Modeling results QC.

**ROCK-TYPING & PROPERTY MODELING**
Scaling up logs. Comparison with rock-types.
Geostatistical tools.
Facies modeling. Rock-typing (EasyTrace™).
Petrophysical modeling.
Mapping result for QC: gross thickness, N-t-G, reservoir properties.

**VOLUME CALCULATION**
Volumetrics: quantification of accumulation for selected parameters.
Sensitivity study on parameters.
Key parameters determination for risk assessment.

**SUMMARY, SYNTHESIS & WRAP-UP**

Reference: GEOMOD-EN-P  
Only available as an In-House course.  
Contact: ep.contact@ifptraining.com

96
Hydrocarbons Accumulations, Reserves Estimation, Risk Analysis & Uncertainties

Level: SKILLED

Purpose
This course provides a practical understanding of hydrocarbon accumulations estimation and the methods to assess related uncertainties.

Audience
Geoscientists, petroleum and reservoir engineers interested or involved in hydrocarbon accumulations estimation.

Learning Objectives
Upon completion of the course, participants will be able to:
- define and discuss the difference between hydrocarbon accumulations and reserves,
- estimate hydrocarbon accumulations using the volumetric method,
- define the main concepts of risks and uncertainties and related main assessment techniques,
- apply both deterministic and probabilistic methods for estimating volumes in place and gain a thorough understanding of various uncertainties levels,
- define and discuss the difference between hydrocarbon accumulations and reserves,
- estimate hydrocarbon accumulations using the volumetric method,
- define the main concepts of risks and uncertainties and related main assessment techniques,
- apply both deterministic and probabilistic methods for estimating volumes in place and gain a thorough understanding of various uncertainties levels,
- define and discuss the difference between hydrocarbon accumulations and reserves,
- estimate hydrocarbon accumulations using the volumetric method,
- define the main concepts of risks and uncertainties and related main assessment techniques,
- apply both deterministic and probabilistic methods for estimating volumes in place and gain a thorough understanding of various uncertainties levels.

Ways & Means
- Interactive presentations and practical exercises
- Real case study using a complete data set and a spreadsheet for uncertainties assessment

Learning Assessment
Knowledge assessment with multiple-choice questions.

Prerequisites
Degree in geoscience, petroleum engineering or reservoir engineering, or equivalent experience, with basic knowledge in volume estimation.

Expertise & Coordination
IFP Training (permanent or contracted) geoscientist or reservoir engineer expert in hydrocarbon accumulations with a wide experience and whose competencies are kept up-to-date.

Reference: OOIP-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com

Course Content

HYDROCARBON ACCUMULATIONS & RESERVES 0.25 d
Definitions of accumulations and reserves.
Resources and reserves classification - PRMS.
Review of methods for estimating reserves: volumetrics, material balance, decline curves analysis, simulation models.

ESTIMATING HYDROCARBON ACCUMULATIONS - VOLUMETRIC METHOD 0.75 d
Overview of volumetric method.
Gross Rock Volume estimation from isobaths and/or geological models; contacts determination from logs and formation testing (RFT/MDT).
Porosity and Net-to-Gross estimation from logs; notion of cut off.
Saturation estimation from logs and cores.
Formation volume factor.
Exercises.

RISKS & UNCERTAINITIES 0.5 d
Definitions of risk and uncertainty.
Notion of probability and probability distribution.
Statistical description of data:
- Histograms and quantities.
- Theoretical models: population, samples, probability density functions.
- Common statistical distributions.

REAL CASE STUDY - WORKSHOP 3.5 d
Correlation of reservoir layers in order to visualize the reservoir units.
Qualitative log interpretation of several wells.
Evaluation of \( H, H', \phi \) and \( S_w \) on each well for each sub-reservoir unit.
Review of the available PVT studies (reports) and selection of the most reliable one to give the main characteristics of the reservoir fluids.
Calculation of the probable (P50) hydrocarbon volumes in place (calculation of rock volumes by using isobath maps).
Evaluation of the range of hydrocarbons in place (min & max) taking uncertainties into account with both deterministic and probabilistic methods (Monte-Carlo).
Synthesis and wrap-up.
Naturally-Fractured Reservoirs: Static & Dynamic Modeling
in collaboration with GoGeo Engineering

Level: SKILLED

Purpose
This course provides a clear and relevant workflow integrating geophysical, geological and engineering data to develop reservoir models for Naturally-Fractured Reservoirs (NFR). The course covers the geological aspects of natural fractures and their impact on the reservoir performance.

Audience
Geophysicists, geologists and reservoir engineers involved in integrated reservoir studies, geomodelers involved in fractured reservoirs looking for a full integration of all available data. Clastics, carbonates or shale play, the natural fractures will play a major role.

Learning Objectives
Upon completion of the course, participants will be able to:
- build a predictive 3D fracture model, constraining the model with the dynamic data,
- use neural network in order to recognize what controls the fractures density,
- identify sweet spots,
- generate porosity and permeability models for dynamic reservoir simulation,
- practice reservoir simulation and apply history matching techniques.

Ways & Means
- Short lectures alternating with hands-on practice on a real case study dataset, using a dedicated software tool for fractured reservoir modeling: FRACPREDICTOR™.
- Software used during workshops: with courtesy of GoGeo Engineering.

Learning Assessment
Knowledge assessment with multiple-choice questions.

Prerequisites
Degree in geology, geophysics or reservoir engineering, or equivalent experience.

Expertise & Coordination
IFP Training contracted expert in fractured reservoirs with a wide experience and whose competencies are kept up-to-date in industry projects. This course is proposed in collaboration with Go Geo Engineering.

Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION TO FRACTURED RESERVOIR</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Introduction.</td>
<td></td>
</tr>
<tr>
<td>Types of fracture and their effects.</td>
<td></td>
</tr>
<tr>
<td>Fractured anticlines and fractures on cores.</td>
<td></td>
</tr>
<tr>
<td>Fractures effect on reservoir quality.</td>
<td></td>
</tr>
<tr>
<td>MODELING FRACTURED RESERVOIRS TECHNIQUES</td>
<td>1 d</td>
</tr>
<tr>
<td>Discrete Fracture Network (DFN).</td>
<td></td>
</tr>
<tr>
<td>Continuous Fracture Model (CFM).</td>
<td></td>
</tr>
<tr>
<td>Fracture model calibration.</td>
<td></td>
</tr>
<tr>
<td>INTEGRATED WORKFLOW FOR MODELING NFR</td>
<td>1.5 d</td>
</tr>
<tr>
<td>Seismic attributes for fracture modeling.</td>
<td></td>
</tr>
<tr>
<td>3D application on the Tensleep data.</td>
<td></td>
</tr>
<tr>
<td>NATURALLY FRACTURED RESERVOIR ENGINEERING</td>
<td>2 d</td>
</tr>
<tr>
<td>Production problems.</td>
<td></td>
</tr>
<tr>
<td>Well testing in fractured reservoirs.</td>
<td></td>
</tr>
<tr>
<td>Reservoir simulation in fractured reservoirs.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: FRACMOD-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>15 November</td>
<td>19 November</td>
<td>€3,250</td>
</tr>
</tbody>
</table>

This course is also available in French: FRACMOD-FR-P. Please contact us for more information.
# Petrophysical Properties: Core, Log & Test Data Integration for Reservoir Modeling

## Level: SKILLED

### Purpose

This course provides a deep understanding of the methods used to measure reservoir petrophysical properties from cores, logs and well test data and, ultimately, correlate and integrate results for reservoir characterization and modeling.

### Audience

Petrophysicists, geologists, geophysicists and reservoir engineers.

### Learning Objectives

Upon completion of the course, participants will be able to:
- deduce reservoir properties from log interpretation and compare results to core measurements,
- define rock-types, determine electrofacies and derive K-Phi relationship,
- integrate cores, logs and well tests data for reservoir modeling.

### Ways & Means

Real case study with cores, logs and well test data.

### Learning Assessment

Knowledge assessment with multiple-choice questions.

### Prerequisites

Degree in geology, geophysics or reservoir engineering, or equivalent experience.

### Expertise & Coordination

IFP Training (permanent or contracted) expert in petrophysics with a wide experience and whose competencies are kept up-to-date in industry projects.

---

## Course Content

### RESERVOIR PROPERTIES FROM CONVENTIONAL & SPECIAL CORE ANALYSIS  
**1 d**

Core studies.
Structure and properties of porous materials: porosity, permeability, grain density.
Saturation, wettability, relative permeability and capillary pressure.
Electrical properties (m and n exponents).
*Real case study: petrophysical synthesis.*

### RESERVOIR PROPERTIES FROM LOG EVALUATION  
**2 d**

Seals, reservoirs and fluid characteristics.
Wireline logging operations and logs.
Determination of reservoir properties from log interpretation: lithology, porosity and water saturation (case study).
Quantitative log analysis.
Core - Log correlation and comparison of petrophysical results to core data.
*Permeability estimation from logs and core data.*
*Real case study.*

### ROCK-TYPING  
**0.75 d**

Introduction to rock-typing and bases of electro-facies analysis.
Electrofacies identification techniques: non-supervised and supervised approach.
Connection with both geological and reservoir models building process.
*Real case study: correlate, combine and integrate consistent information from logs, core description and petrophysics.*

### WELL TESTING  
**0.75 d**

Well test introduction and generalities.
Well test interpretation methods.
Examples and type curves.
*Real case study: well test interpretation and integration with petrophysics.*

### DATA INTEGRATION FOR RESERVOIR MODELING  
**0.5 d**

Introduction to integration for reservoir modeling.
Geological model review: structural model, stratigraphic model and petrophysical model.
Reservoir, geological and petrophysical synthesis.
Gridding and upscaling.

---

Reference: PETROD-EN-P  -  Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>22 November</td>
<td>26 November</td>
<td>€3,120</td>
</tr>
</tbody>
</table>

This course is also available in French: PETROD-FR-P. Please contact us for more information.
Upscaling: from Static to Dynamic Model

**Level:** SKILLED

**Purpose**

This course provides participants with a clear understanding of the techniques related to upscaling.

**Audience**

Geologists and reservoir engineers involved in integrated reservoir modeling.

**Learning Objectives**

Upon completion of the course, participants will be able to:

- recognize the techniques and challenges related to upscaling (properties, methods, validation),
- build required competencies to analyze reservoir heterogeneities in order to define the aggregation rate,
- apply the workflow for generating an upscaled grid using dedicated software Petrel™ and Eclipse™,
- validate the upscaled grid (static and dynamic models).

**Ways & Means**

- Interactive presentations, hands-on real case study using software dedicated for reservoir modeling: Petrel™ and Eclipse™.
- Software used during workshops: with courtesy of Schlumberger.

**Prerequisites**

Degree in geology or reservoir engineering, or equivalent experience, with basic knowledge in dynamic modeling.

**Expertise & Coordination**

IFP Training (permanent or contracted) expert in reservoir simulation with a wide experience and whose competencies are kept up-to-date in industry projects.

**Course Content**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION TO UPSCALING</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Objectives of upscaling.</td>
<td></td>
</tr>
<tr>
<td>Why upscaling?</td>
<td></td>
</tr>
<tr>
<td>Aggregation rate, up-layering, heterogeneities, geological features.</td>
<td></td>
</tr>
<tr>
<td>Properties to upscale: porosity, net-to-gross, rock-types, saturation, permeability.</td>
<td></td>
</tr>
<tr>
<td><strong>UPSCALING METHODS</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Algebraic methods: Cardwell and Parsons.</td>
<td></td>
</tr>
<tr>
<td>Numerical methods: flow based method.</td>
<td></td>
</tr>
<tr>
<td>Criteria to choose the upscaling method.</td>
<td></td>
</tr>
<tr>
<td><strong>VALIDATION</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Static validation: volumes, histograms.</td>
<td></td>
</tr>
<tr>
<td>Dynamic validation: volumes, simulation results on fine and coarse grids, well transmissivity.</td>
<td></td>
</tr>
<tr>
<td><strong>UPSCALING WORKSHOP: REAL CASE STUDY</strong></td>
<td>2 d</td>
</tr>
<tr>
<td>Geological model: heterogeneities.</td>
<td></td>
</tr>
<tr>
<td>Facies proportion curves analysis.</td>
<td></td>
</tr>
<tr>
<td>Up-layering definition: choice of the most appropriate up-layering.</td>
<td></td>
</tr>
<tr>
<td>Zone division and zone mapping.</td>
<td></td>
</tr>
<tr>
<td>Scale-up properties methodology: choice of the most appropriate method.</td>
<td></td>
</tr>
<tr>
<td>Volume calculation: static validation.</td>
<td></td>
</tr>
<tr>
<td>Dynamic validation: simulation and comparisons with the fine model.</td>
<td></td>
</tr>
<tr>
<td>Synthesis and wrap-up.</td>
<td></td>
</tr>
</tbody>
</table>

This course is also available in French: UPSCALE-FR-P. Please contact us for more information.

Reference: UPSCALE-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Borehole Imaging Interpretation Workshop with WellCad™

**Level: SKILLED**

**Purpose**

This course provides participants with an understanding of current borehole imaging tools and modern interpretation techniques.

**Audience**

Geoscientists and reservoir engineers involved in development of naturally fractured reservoirs.

**Learning Objectives**

Upon completion of the course, participants will be able to:

- acquire the fundamental principles of Borehole Image Interpretation,
- apply the methodology to approach the Borehole Image Interpretation,
- perform BHI data quality control,
- identify the fractures present in the images, by differentiating them from sedimentary and artificial features,
- characterize the interpreted fractures in terms of their position, morphology, type, kinematics, orientation and dip angle, using WellCAD™.

**Ways & Means**

- Interactive presentations, practical exercises and hands-on activities using software dedicated for BHI interpretation (WellCAD™).
- Software used during workshops: with courtesy of ALT.

**Learning Assessment**

Knowledge assessment with multiple-choice questions.

**Prerequisites**

- Degree in geology or reservoir engineering, or equivalent experience.
- Basic knowledge of fractured reservoirs.

**Expertise & Coordination**

IFP Training (permanent or contracted) expert in BHI interpretation and fractured reservoirs with a wide experience and whose competencies are kept up-to-date in industry projects.

**Course Content**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION TO BOREHOLE IMAGING LOG</td>
<td>0.5 d</td>
</tr>
</tbody>
</table>
| Introduction to borehole imaging log.  
Borehole image log acquisition technologies. |
| BOREHOLE IMAGE TOOLS & QUALITY CONTROL | 1 d |
| Understanding dip data integrating well trajectory.  
Fracture interpretation on borehole images.  
BHI fracture interpretation.  
Tools/resolution.  
BHI quality control (QC).  
Automatic and manual dip analysis. |
| BOREHOLE IMAGE INTERPRETATION SOFTWARE | 1 d |
| Introduction to WellCAD™ software.  
BHI fracture picking.  
Data loading.  
Fracture classification.  
Fracture statistics.  
BHI reporting. |
| BOREHOLE IMAGE INTERPRETATION: CASE STUDY | 2.5 d |
| Introduction and data loading.  
Structural dip and structural zonation.  
Recognition of zone boundaries - Unconformities, faults.  
Fracture/fault characterization from image log data.  
Conductive/resistive vs. open/close fracture.  
Borehole bias.  
In-situ stress determination from borehole breakout and induced fractures.  
Bedding recognition vs. faulted areas.  
Bed thickness analysis. |

**SUMMARY, SYNTHESIS & WRAP-UP**

Reference: BHI-EN-P  
Only available as an In-House course.  
This course is also available in French: BHI-FR-P. Please contact us for more information.
Fracture & Fault Modeling Workshop with FracaFlow™

**Level:** SKILLED

**Purpose**

This course provides participants with proficient skills for the modeling using a software dedicated to fractured reservoir characterization and modeling.

**Audience**

Geoscientists and reservoir engineers involved in development of naturally fractured reservoirs.

**Learning Objectives**

Upon completion of the course, participants will be able to apply the workflow to characterize and model the fracture network in a reservoir model.

**Ways & Means**

- Interactive presentations, practical exercises and hands-on activities using FracaFlow™.
- Software used during workshops: with courtesy of Beicip-Franlab.

**Learning Assessment**

Knowledge assessment with multiple-choice questions.

**Prerequisites**

- Degree in geology or reservoir engineering, or equivalent experience.
- Basic knowledge of fractured reservoirs.

**Expertise & Coordination**

IFP Training (permanent or contracted) expert in fractured reservoirs with a wide experience and whose competencies are kept up-to-date in industry projects.

---

### Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION &amp; DATA IMPORT (“NF” case study)</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Theoretical notions about fractured reservoirs.</td>
<td></td>
</tr>
<tr>
<td>Overview of OpenFlow™ platform.</td>
<td></td>
</tr>
<tr>
<td>Study creation, settings, 1D-2D-3D views.</td>
<td></td>
</tr>
<tr>
<td>Data import: reservoir grid, horizons, faults, wells and related data.</td>
<td></td>
</tr>
<tr>
<td><strong>FRACTURED &amp; FAULT CHARACTERIZATION (“NF” case study)</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Fracture analysis at wells: orientation, dispersion, sets creation.</td>
<td></td>
</tr>
<tr>
<td>Fracture density computation.</td>
<td></td>
</tr>
<tr>
<td>Fault analysis: length, spatial distribution, sets creation, attribute maps.</td>
<td></td>
</tr>
<tr>
<td><strong>MODELING, CALIBRATION, EQUIVALENT PARAMETERS COMPUTATION (“NF” case study)</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Fracture and fault modeling/DFN generation:</td>
<td></td>
</tr>
<tr>
<td>Diffuse fractures and faults.</td>
<td></td>
</tr>
<tr>
<td>Quality control.</td>
<td></td>
</tr>
<tr>
<td>Equivalent parameters computation: full field analytical upscaling.</td>
<td></td>
</tr>
<tr>
<td>Calibration with KH data.</td>
<td></td>
</tr>
<tr>
<td>Dynamic simulations: flowmeter, well test simulation.</td>
<td></td>
</tr>
<tr>
<td><strong>DATA IMPORT, DYNAMIC &amp; GEOLOGICAL ANALYSES (“MEMBER” case study)</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Data import.</td>
<td></td>
</tr>
<tr>
<td>Dynamic analyses.</td>
<td></td>
</tr>
<tr>
<td>Mud loss, flowmeter, well test, production data.</td>
<td></td>
</tr>
<tr>
<td>Fracture analysis, fault analysis.</td>
<td></td>
</tr>
<tr>
<td><strong>MODELING, EQUIVALENT PARAMETERS COMPUTATION ANALYSES (“MEMBER” case study)</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Fracture and fault modeling/DFN generation.</td>
<td></td>
</tr>
<tr>
<td>Diffuse fractures and sub-seismic faults.</td>
<td></td>
</tr>
<tr>
<td>Quality control.</td>
<td></td>
</tr>
<tr>
<td>Equivalent parameters computation for fracture network (Phi Block size, Kx, Ky, Kz).</td>
<td></td>
</tr>
<tr>
<td>Local analytical upscaling.</td>
<td></td>
</tr>
<tr>
<td>Full field analytical upscaling.</td>
<td></td>
</tr>
</tbody>
</table>

---

Reference: FRACA-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: FRACA-FR-P. Please contact us for more information.
# Tight Reservoir Petrophysics

## Purpose
This course provides knowledge and understanding of the petrophysical aspects of tight reservoirs.

## Audience
Experienced geoscientists and reservoir engineers involved in multidisciplinary teams, willing to widen their knowledge in tight reservoir petrophysics.

## Learning Objectives
Upon completion of the course, participants will be able to:

- Characterize tight reservoir lithology and mineralogy, porosity, water saturation, permeability, capillary and relative permeability, quantify the Total Organic Content (TOC) and calculate Hydrocarbons In Place (HIP),
- Understand and use the log core data in tight reservoirs,
- Understand and characterize tight reservoir mineralogy and lithology,
- Apply the principles of tight reservoir petrophysics,
- Understand the use of petrophysical properties tight reservoir in the characterization and modeling workflow.

## Ways & Means

- Interactive courses and exercises.
- Videos and examples with the most known unconventional reservoirs in the world.
- Hands-on practice using a real case studies data set (Oil & Gas).

## Learning Assessment
Knowledge assessment with multiple-choice questions.

## Prerequisites
Degree in geology, geophysics or reservoir engineering, or equivalent experience, with basic knowledge in petrophysics.

## Expertise & Coordination
IFP Training (permanent or contracted) expert in petrophysics with a wide experience and whose competencies are kept up-to-date in industry projects.

## Course Content

### PETROPHYSICS IN TIGHT RESERVOIRS
1 day
- Basic of tight reservoir.
- Tight reservoirs in the world.
- Overview of petrophysical properties in tight reservoir.
- Log and core data.
- Petrophysical model in tight reservoirs.
- Petrophysical properties in static and dynamic models.

### MINERALOGY & LITHOLOGY
1 day
- Mineralogy of tight reservoirs.
- Mineralogy from logging measurements and core data.
- Lithology corrections.
- Shale volume in tight reservoirs.
- Examples from several tight plays in the word.
- Lithofacies determination from log data and mineralogy.

### PETROPHYSICAL PROPERTIES CALCULATION IN TIGHT RESERVOIRS
2 days
- Porosity calculation in tight reservoirs.
- Total Organic Content (TOC) in tight reservoirs.
- Water saturation evaluation.
- Hydrocarbons in place.
- Sweet spots determination.
- Permeability and relative permeability.
- Capillary pressure.

### TIGHT RESERVOIR PETROPHYSICS WORKSHOP
1 day
- Examples from several tight plays in the world.
- Hands-on application: 3 different datasets of tight reservoirs (Oil & Gas).

---

Reference: TIGHTPE-EN-P - Only available as an In-House course.
Contact: ep.contact@ifptraining.com

www.ifptraining.com
## Course Content

<table>
<thead>
<tr>
<th>Date</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 d</td>
<td>INTRODUCTION TO UNCONVENTIONAL RESOURCES</td>
</tr>
<tr>
<td>2 d</td>
<td>TIGHT RESERVOIRS AT THE BASIN SCALE</td>
</tr>
<tr>
<td>2.5 d</td>
<td>TIGHT RESERVOIR CHARACTERIZATION</td>
</tr>
<tr>
<td>2.5 d</td>
<td>GEOLOGIC MODELING FOR TIGHT RESERVOIRS</td>
</tr>
<tr>
<td>2 d</td>
<td>WORKSHOP: INTEGRATED WORKFLOW FOR MODELING TIGHT RESERVOIRS</td>
</tr>
</tbody>
</table>

### Prerequisites
Degree in geoscience or reservoir engineering, with basic knowledge in tight reservoirs.

### Reference
TIGHT-EN-P

*Only available as an In-House course.*
Purpose
This course develops an integrated approach to rock-type determination combining raw logs, interpreted logs from petrophysical evaluation, core description, and laboratory petrophysical data (routine core analysis and special core analysis). It details the quality control and processing which are necessary before the integration of such data. Interpretation techniques allowing a consistent integration of these different sources of data are developed based on probabilistic classification schemes. Various means to ensure the consistency between lithofacies and petrophysical rock-types incorporating SCAL data are discussed. Alternative approaches for rock-type determination based on specific porosity/permeability models are also presented. Eventually it is shown how the full rock-typing scheme is validated through the modeling of initial water saturation.

Audience
Experienced geoscientists and reservoir engineers involved in multidisciplinary teams, willing to widen their knowledge in reservoir characterization.

Learning Objectives
Upon completion of the course, participants will be able to:
- understand the meaning of rock-types and their contribution to reservoir modeling,
- recognize log signatures (electrofacies) and tie them to core facies,
- learn various porosity-permeability models and their use in rock-typing,
- define rock-types with petrophysical data (logs and laboratory data),
- perform initial water saturation modeling as a QC of rock-types.

Ways & Means
- The course content will be developed on real case studies.
- Hands-on activities are planned on all major topics.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Basic knowledge in geology.

Why an IFP Training Certification?
- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Advanced Facies Analysis & Rock-Typing Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training (permanent or contracted) expert in facies analysis and geostatistics with a wide technical experience and whose competencies are kept up-to-date in industry projects.
Course Content

WHAT IS AVO PRINCIPLES?

RELATIONSHIP BETWEEN BRIGHT SPOTS & AVO

EXPECTED ANOMALIES PER ENVIRONMENTS/DEPTHS

WHERE & WHEN USING AVO?

WORKSHOP (real case study data)
Gather requirements for AVO: preconditioning techniques.
Computing angles, wavelet extraction, well-calibration.
Well logs QC.
Feasibility study: AVO anomalies at wells, petro-elastics.
Generating synthetic AVO gathers: porosity/fluid substitution.
Computing AVO parameters using real seismic.
Validation of the results.
AVO interpretation and QC.

CONCLUSIONS & WRAP-UP

Reference: AVO-EN-P
Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Geological Characterization & Modeling - Integrated Workshop Certification

Level: KNOWLEDGE

Purpose

This course provides a comprehensive, practical knowledge of reservoir characterization & modeling workflow, via hands-on activities and case studies with the aim of bridging the gap between static geological characterization and reservoir dynamic behavior.

Audience

Experienced geoscientists and reservoir engineers involved in multidisciplinary teams, willing to widen their knowledge in reservoir characterization and modeling.

Learning Objectives

Upon completion of the course, participants will be able to:

► provide a clear understanding of techniques and challenges related to reservoir modeling (focus on reservoir properties),
► build required competencies for analyzing datasets and constructing reliable static model,
► emphasize reservoir modeling main goal: reduce subsurface uncertainties (reduce risk and optimize investments).

Ways & Means

► Interactive lectures, videos, practical exercises and hands-on activities with the aim of producing a reservoir model using dedicated software for rock-typing (EasyTrace™) and geomodeling (Petrel™).
► Software used during workshops: with courtesy of Beicip-Franlab and Schlumberger.

Learning Assessment

Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites

Experience in geoscience or reservoir engineering, with basic knowledge in reservoir characterization.

Expertise & Coordination

IFP Training (permanent or contracted) expert in geomodeling with a wide experience and whose competencies are kept up-to-date in industry projects.

Course Content

10 days

WEEK 1: RESERVOIR CHARACTERIZATION

INTRODUCTION TO RESERVOIR CHARACTERIZATION 1 d
Reservoir characterization and modeling objectives.
Characterization and modeling workflows.
Data types, representativeness and related uncertainty.
Challenges of data integration.

RESERVOIR ARCHITECTURE 1.5 d
Seismic interpretation method and pitfalls. Hands-on: case study.
Static and dynamic information integration.

FACIES ANALYSIS - ROCK-TYPING 1.5 d
Litho-facies analysis (core description and upscaling methods).
Introduction to rock-typing: principle of electro-facies and petro-facies analyses.
Statistical analysis of sedimentological data (VPC analysis).

PETROPHYSICS & ROCK PROPERTIES - RESERVOIR HETEROGENEITIES 1 d
Petrophysics: principles, reservoir parameters.
Petrophysical parameter modeling (water injection simulation).
Heterogeneities: identification and inventory.
Wrap-up session.

WEEK 2: RESERVOIR MODELING (workshop on case study)

BASIC PRINCIPLES - RESERVOIR CHARACTERIZATION WORKFLOW 0.5 d
Introduction and objectives.
Case study: field presentation.

PROJECT ORGANIZATION 0.5 d
Project definition.
Data QC and summary table.
Data management.
Well data loading.
Manipulating scripts and Excel™ macros.

STRUCTURAL MODELING 1.5 d
Structural context.
Well correlation and stratigraphic data analysis.
Constraining static model with dynamic data.
Generating surfaces.
Picking horizons and faults on seismic.
Reservoir layering.
Structural modeling.
Mapping reservoir structures.
Modeling results QC.

ROCK-TYPING & PROPERTY MODELING 1.5 d
Scaling up logs. Comparison with rock-types.
Geostatistical tools.
Facies modeling. Rock-typing (EasyTrace™).
Petrophysical modeling.
Mapping result for QC: gross thickness, N-t-G, reservoir properties.

VOLUME CALCULATION 1 d
Volumetrics: quantification of accumulation for selected parameters.
Sensitivity study on parameters.
Key parameters determination for risk assessment.
Final wrap up.

Reference: IRCM-EN-P
Only available as an In-House course.

Contact: ep.contact@ifptraining.com
# Pre-Stack Inversion

**Course Content**

<table>
<thead>
<tr>
<th>WHAT IS SEISMIC INVERSION? PRINCIPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEISMIC IMPEDANCES (P &amp; S), POISSON &amp; LAMÉ PARAMETERS</td>
</tr>
<tr>
<td>DATA FOR SEISMIC INVERSION</td>
</tr>
<tr>
<td>SEISMIC SPECTRUM &amp; RESOLUTION</td>
</tr>
<tr>
<td>PRE-STACK INVERSION TYPES &amp; ALGORITHMS</td>
</tr>
<tr>
<td>WHY, WHERE &amp; WHEN USING PRE-STACK SEISMIC INVERSION?</td>
</tr>
</tbody>
</table>

## WHAT IS SEISMIC INVERSION? PRINCIPLES

- Principles of seismic inversion.

## SEISMIC IMPEDANCES (P & S), POISSON & LAMÉ PARAMETERS

- Impedance analysis.
- Parameters calculation.

## DATA FOR SEISMIC INVERSION

- Data preparation.
- Pre-stack data.

## SEISMIC SPECTRUM & RESOLUTION

- Spectrum analysis.
- Resolution properties.

## PRE-STACK INVERSION TYPES & ALGORITHMS

- Different inversion methods.
- Algorithm selection.

## WHY, WHERE & WHEN USING PRE-STACK SEISMIC INVERSION?

- Application scenarios.
- Decision criteria.

## WORKSHOP USING REAL DATA CASE STUDY

- Real dataset analysis.
- Practical exercises.

## Data requirements, QC and preparation for seismic Inversion.

- Preliminary feasibility study.
- Wavelet generation.
- Well-to-seismic calibration.
- Initial modeling.
- Inversion parameters and final inversion.
- Validation and deliverables.
- Clues for Interpretation of pre-stack inversion.

## CONCLUSIONS & WRAP-UP

- Summary of key points.
- Future implications.

---

**Reference:** PRESTAC-EN-P

*Only available as an In-House course.*

Contact: ep.contact@ifptraining.com
Post-Stack Inversion

Level: KNOWLEDGE

Purpose
Theoretical and practical understanding and know-how to perform seismic inversion on seismic data. Real case-studies are used, both on carbonate and clastic environments. More common workflows will be explained and tested, as well as inversion results QC’s. Basic knowledge about Seismic Inversion will be delivered along the training.

Audience
Geophysicists and other geoscientists willing to master post-stack Inversion techniques.

Learning Objectives
Upon completion of the course, participants will be able to:
- Understand the purpose of Seismic Inversion,
- How to prepare the data before performing seismic inversion,
- Perform a seismic Inversion and QC the results,
- Supervise a Seismic Inversion study.

Ways & Means
- Interactive presentations, exercises and document analysis.
- 80% of training duration is dedicated to workshop on PC, using a seismic interpretation software tool from the industry. Real datasets will be used for the workshop.

Prerequisites
Degree or experience in geophysics, with basic seismic background knowledge.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

WHAT IS SEISMIC INVERSION? PRINCIPLES

SEISMIC IMPEDANCES

DATA FOR SEISMIC INVERSION

SEISMIC SPECTRUM & RESOLUTION

POST-STACK INVERSION TYPES & ALGORITHMS

WHY, WHERE & WHEN USING SEISMIC INVERSION?

WORKSHOP (real case study data)

CONCLUSIONS & WRAP-UP

Reference: POSTAC-EN-P  Only available as an In-House course. Contact: ep.contact@ifptraining.com
Static Model Construction: Field Constraints & Integration with Subsurface Data
Organized in collaboration with Cambridge Carbonate Ltd

Level: KNOWLEDGE

Purpose

The Jurassic outcrops of Eastern Paris Basin are exceptional quality analogues for several producing oil fields, especially regarding sequence stratigraphy features and typical carbonate platforms architecture. Recent diagenetic and petrophysical investigation performed on selected outcrops and in equivalent subsurface provide a unique opportunity of proposing an updated, complete and integrated overview of shallow marine carbonates.

Audience

Geologists, geophysicists, petrophysicists and reservoir engineers. Fundamentals of carbonate sedimentology may be a useful prerequisite, but a quick reminder can be organized in the field.

Learning Objectives

Upon completion of the course, participants will be able to:

- review the constraints to the static model in the field,
- integrate outcrop observation with subsurface data: sedimentary architectures,
- show the distribution and evolution of petrophysical properties through diagenesis.

A geological and petrophysical static model was performed over a large area centered on the main zone of interest, along an extended stratigraphic interval (Bajocian to Kimmeridgian).

Ways & Means

Outcrop sections (quarries), cores, well logs, thin section photographs, RCA data, NMR logs.

Learning Assessment

Knowledge assessment with multiple-choice questions.

Prerequisites

Degree in geology, geophysics or reservoir engineering, with basic knowledge in sedimentology.

More info

Fees include accommodation and transportation on field trip location.

Expertise & Coordination

IFP Training contracted expert in carbonates with a wide experience and whose competencies are kept up-to-date in industry projects. This course is proposed in collaboration with Cambridge Carbonate Ltd.

Course Content

DAY 1
AM: Meeting point on field trip location.
PM: Presentation of the stratigraphic succession and of the aims of the trip.
Early Bajocian platform: 1 quarry (out of 2 possible) with illustration of coral bioconstructions and inter-bioherms sedimentation. Integration with 3D seismic observations. Quick reminder on basics of carbonate sedimentology on site if required.

DAY 2
AM: Late Bajocian flooding (flooding of the Early Bajocian carbonate platform) and subsequent establishment of Bathonian platform; discussion about forcing parameters on carbonate platform growths and demises. One type section in a quarry.
PM: Bathonian platform outcrops (3) in distal (offshore), shoal (Oolid shoal) and proximal environments; introduction to the local petrophysics (porosity, permeability, NMR, MICP...) and reservoir problematic. First integration and discussion of the 3D geological and reservoir model (input, controls on facies and poro-perm distribution in the Middle Jurassic carbonates).

DAY 3
Visit of the Andra Underground Research Laboratory (to be confirmed) + core store with examples of subsurface equivalent of what has been and will be observed on outcrops AND/OR outcrops illustrating the return of carbonate sedimentation after the Callovian-Oxfordian marls, and the establishment of the Oxfordian platform; discussion about forcing parameters on carbonate platform growths and demises.

DAY 4
Visit of quarries (2 or 3) to illustrate the evolution of the Oxfordian/Kimmeridgian platform evolution; discussion about the evolution of the architecture of the platform, and regarding the distribution of depositional environments distribution.
Introduction to the local petrophysics (porosity, permeability, NMR, MICP...) and reservoir problematic. Second integration and discussion of the 3D geological and reservoir model (input, controls on facies and poro-perm distribution in the Upper Jurassic carbonates).

DAY 5
AM: Optional quarry and/or local gastronomy specialties.
PM: Travel back to Paris.

Reference: CARBFT-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Fundamentals of Reservoir Geology

Level: SKILLED

Purpose
This course provides an in-depth understanding of reservoir geology, covering concepts as well as data reviewing and modeling.

Audience
Newly-hired and 2- to 3-year experienced reservoir engineers willing to deepen their knowledge in reservoir fluid properties and PVT modeling. Is also intended for geoscientists, petroleum engineers and production engineers moving towards reservoir engineering.

Learning Objectives
Upon completion of the course, participants will be able to:
- discuss main concepts of reservoir geology, especially petrophysical concepts, used in the description of reservoirs and the way the corresponding rock properties are measured from cores,
- access to rock properties from log interpretation and compare to core measurements,
- define petro-facies, electro-facies and rock-types,
- integrate cores, logs and well tests data for reservoir modeling,
- apply the workflow for building a reservoir static model using dedicated software,
- identify and assess the uncertainties within the geomodeling workflow.

Ways & Means
- Interactive lectures, exercises.
- Hands-on practice using software dedicated to reservoir modeling (PETREL™ and EasyTrace™).
- Software used during workshops: courtesy of Beicip-Franlab and Schlumberger.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
E&P professionals, with basic knowledge in reservoir characterization.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>INTRODUCTION TO RESERVOIR CHARACTERIZATION</th>
<th>5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to reservoir characterization:</td>
<td></td>
</tr>
<tr>
<td>Reservoir characterization and modeling objectives.</td>
<td></td>
</tr>
<tr>
<td>Reservoir characterization and modeling workflows.</td>
<td></td>
</tr>
<tr>
<td>Data and related uncertainty.</td>
<td></td>
</tr>
<tr>
<td>Data integration.</td>
<td></td>
</tr>
<tr>
<td>Reservoir architecture:</td>
<td></td>
</tr>
<tr>
<td>Seismic interpretation and pitfalls.</td>
<td></td>
</tr>
<tr>
<td>Well log analysis.</td>
<td></td>
</tr>
<tr>
<td>Facies analysis.</td>
<td></td>
</tr>
<tr>
<td>Rock-typing.</td>
<td></td>
</tr>
<tr>
<td>Petrophysics and rock properties.</td>
<td></td>
</tr>
<tr>
<td>Reservoir heterogeneities.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PETROPHYSICS - RESERVOIR PROPERTIES FROM CORES &amp; Logs EVALUATION</th>
<th>5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservoir properties from conventional and special core analysis:</td>
<td></td>
</tr>
<tr>
<td>Coring.</td>
<td></td>
</tr>
<tr>
<td>Porosity; definition and measurements (effective and total porosity); pore size distribution by NMR and mercury injection.</td>
<td></td>
</tr>
<tr>
<td>Single-phase permeability: definition and measurements; liquid and gas permeability, Klinkenberg correction; permeability correlation.</td>
<td></td>
</tr>
<tr>
<td>Capillary pressure: definition and measurements (porous plates and centrifuge/interpretation, local saturation); from lab to reservoir: Pc to determine reservoir initial saturations and transition zones.</td>
<td></td>
</tr>
<tr>
<td>Wettability: definition and measurements (Amott index, USBM index); influence of wettability on Pc.</td>
<td></td>
</tr>
<tr>
<td>Electric measurements. Formation factor and Resistivity Index (RI).</td>
<td></td>
</tr>
<tr>
<td>Multi-phase permeability: Darcy’s law for two-phase flows core analysis; relative permeabilities: steady-state, unsteady-state, interpretations, synthesis.</td>
<td></td>
</tr>
<tr>
<td>Influence of wettability on the relative permeabilities.</td>
<td></td>
</tr>
<tr>
<td>Petrophysical rock-typing, Leverett J functions.</td>
<td></td>
</tr>
<tr>
<td>Reservoir properties from log evaluation:</td>
<td></td>
</tr>
<tr>
<td>Wireline logging operations and logs.</td>
<td></td>
</tr>
<tr>
<td>Open-hole log quick-look interpretation methodology.</td>
<td></td>
</tr>
<tr>
<td>Determination of reservoir properties from log interpretation (non-reservoir and reservoir zones, porosity, contacts, Archie’s law and saturations).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RESERVOIR MODELING WORKSHOP</th>
<th>5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic principles: introduction and objectives.</td>
<td></td>
</tr>
<tr>
<td>Case study: field presentation and data discussion.</td>
<td></td>
</tr>
<tr>
<td>Project definition:</td>
<td></td>
</tr>
<tr>
<td>Data QC and summary table.</td>
<td></td>
</tr>
<tr>
<td>Interpolation and basic reservoir modeling.</td>
<td></td>
</tr>
<tr>
<td>Structural framework:</td>
<td></td>
</tr>
<tr>
<td>Structural context.</td>
<td></td>
</tr>
<tr>
<td>Time depth conversion.</td>
<td></td>
</tr>
<tr>
<td>Surfaces modeling and quality control.</td>
<td></td>
</tr>
<tr>
<td>Fault modeling and regions.</td>
<td></td>
</tr>
<tr>
<td>Well correlation and stratigraphic data analysis.</td>
<td></td>
</tr>
<tr>
<td>Grid building; grid zones and layering; geo-cellular grid validation.</td>
<td></td>
</tr>
<tr>
<td>Rock-type and facies modeling:</td>
<td></td>
</tr>
<tr>
<td>Basic of geostatistics.</td>
<td></td>
</tr>
<tr>
<td>Rock-typing.</td>
<td></td>
</tr>
<tr>
<td>Data analysis and facies modeling.</td>
<td></td>
</tr>
<tr>
<td>Property modeling:</td>
<td></td>
</tr>
<tr>
<td>Petrophysical modeling.</td>
<td></td>
</tr>
<tr>
<td>Seismic drivers in reservoir modeling.</td>
<td></td>
</tr>
<tr>
<td>Geological model analysis: N-t-G, porosity, permeability and water saturation.</td>
<td></td>
</tr>
<tr>
<td>Volumetric, upscaling and uncertainty:</td>
<td></td>
</tr>
<tr>
<td>Hydrocarbon volume calculation.</td>
<td></td>
</tr>
<tr>
<td>Structure and properties upscaling.</td>
<td></td>
</tr>
<tr>
<td>Quantification of uncertainty. Sensitivity analysis and ranking of models.</td>
<td></td>
</tr>
<tr>
<td>Inputs for reservoir simulators.</td>
<td></td>
</tr>
<tr>
<td>Summary, synthesis and wrap-up.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: RESGEOL-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
Core Analysis for Reservoir Characterization

Course Content

5 days

CORING & CORE ANALYSIS

0.5 d
Introduction.
Business value of core analysis demonstrated on real life examples.
Necessary quality procedures at the start of a measurement program.
Coring methods (conventional vs. pressure coring, decompression during tripping).
Core preservation.
Core cleaning.
Representative wettability (fresh vs. restored state).
Conventional and Special Core Analysis (SCAL).

GENERALITIES ON TWO-PHASE FLOW PROPERTIES

0.5 d
Darcy’s law for two phases, relative permeability.
Capillary pressure.
Wettability (Amott and USBM methods).
Impact of wettability on relative permeability and capillary pressure.
Basics of JBN analysis for the UnSteady-State experiment.
Effect of capillary pressure demonstrated by hands-on simulation, using the SCORES SCAL simulator.

CONVENTIONAL CORE ANALYSIS

1 d
Porosity definition and measurement.
Permeability (absolute) definition and measurements.
Formation factor and Resistivity Index definition and measurement.
Mercury injection (MICP) for reservoir saturation height function and pore size distribution.
Recent developments in MICP showing important problems in MICP for low permeability rock when assessing transition zones.

SPECIAL CORE ANALYSIS (SCAL), MEASUREMENTS OF SCAL PROPERTIES

1 d
Overview of measurement methods and data interpretation for relative permeability and capillary pressure.
Steady-state technique, in-situ saturation monitoring.
Unsteady-state technique, in-situ saturation monitoring.
Multi-speed centrifuge technique.
Single-speed centrifuge technique.
Porous plate technique.
Analysis of centrifuge data using Hassler-Brunner, Forbes methods.
Analysis of centrifuge data using Hagoort method.
Effect of relative permeability on capillary pressure measurement demonstrated by hands-on simulations using the SCORES SCAL simulator.

QUALITY CONTROL OF AVAILABLE DATA

1 d
Sample selection using X-ray CT for homogeneity assessment.
Representative wettability, special considerations for transition zones.
Recognizing unusual features.

AVERAGING PETROPHYSICAL PROPERTIES

0.5 d
Saturation height function assessment.
Leverett-J function.
Initial water saturation.
Rock-typing.
Gridding for reservoir simulation.

DESIGN OF SCAL PROGRAM

0.5 d
Establish SCAL program objective.
Understanding of strength and weaknesses of each SCAL method.
Need for imbibition capillary pressure to interpret relative permeability data.

Reference: CONSCAL-EN-P  Only available as an In-House course.  Contact: ep.contact@ifptraining.com
Special Core Analysis

Level: SKILLED

Purpose
This course provides a comprehensive and practical understanding of methods, procedures and issues related to evaluation of special rock properties such as relative permeability and capillary pressure at laboratory and all considerations before their application in reservoir simulation.

Audience
Geoscientists, petrophysicists, reservoir engineers, petroleum engineers and other E&P professionals willing to deepen their knowledge in special core analysis.

Learning Objectives
Upon completion of the course, participants will be able to:
- discuss the business impact of Special Core Analysis (SCAL) measurements using state-of-the-art laboratory and data interpretation techniques.
- design a SCAL measurement program.
- assess the quality of SCAL reports.
- implement SCAL data into reservoir simulation studies.

Ways & Means
- Highly interactive course alternating theory, exercises and field cases.
- Use of the SCAL (Special Core Analysis) license free simulator SCORES.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Degree in geology, petroleum engineering or reservoir engineering, or equivalent experience, with basic knowledge in conventional and special core analysis.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and experience of Core Analysis, trained to adult teaching methods, and whose competences are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION</strong></td>
</tr>
<tr>
<td><strong>STEADY-STATE TECHNIQUE</strong></td>
</tr>
<tr>
<td><strong>CORE PLUG PREPARATION &amp; UNSTEADY-STATE TECHNIQUE</strong></td>
</tr>
<tr>
<td><strong>CENTRIFUGE TECHNIQUE &amp; SCAL DATA QUALITY ASSESSMENT</strong></td>
</tr>
<tr>
<td><strong>POROUS PLATE TECHNIQUE, SCAL FOR GAS FLOODING EXPERIMENTS, STRENGTHS &amp; WEAKNESSES OF EACH SCAL TECHNIQUE</strong></td>
</tr>
<tr>
<td><strong>SCAL FOR EOR &amp; SCAL MASTER MEASUREMENT PROGRAM</strong></td>
</tr>
<tr>
<td>SCAL for EOR: Introduction into EOR techniques in the field. Understanding scope for EOR. Issues and design of SCAL experiments for low salinity flooding, Microbial EOR, CO₂, EOR, Thermal EOR, Chemical EOR, EOR in fractured reservoirs. Plenary discussion on the design of a best practice master measurement program: At the end of this discussion, a comprehensive handout will be distributed that serves as a Master SCAL measurement program for future use in the office.</td>
</tr>
</tbody>
</table>

Reference: SCAL-EN-P Only available as an In-House course. Contact: ep.contact@ifptraining.com www.ifptraining.com
Geomechanics for Geoscientists

**Level:** SKILLED

**Purpose**
This training course aims to ensure the understanding of geomechanics-related phenomena that affect reservoir exploitation management and safety such as compaction/subsidence, reservoir cover layer fracturing, fault activation, and to be aware of the techniques used in the petroleum industry to mitigate these phenomena.

**Audience**
Geoscientists (reservoir engineers, geologists, geophysicists).

**Learning Objectives**
Upon completion of the course, participants will be able to:
- acquire the basic geomechanical knowledge useful for reservoir applications,
- understand the connection between stress, pressure and temperature both in the reservoir and in the cover layers at the origin of compaction, fracturing and fault activation,
- know the workflow and the data needed to build a geomechanical model first at the well scale and then at the reservoir scale,
- interpret model results to assess compaction/subsidence, the maximum injection pressure, fault integrity.

**Ways & Means**
Application exercises adapted to reservoir exploitation situations.

**Learning Assessment**
Acquired knowledge will be assessed through studies based on real cases. In each study, participants will have to analyze the situation to provide a diagnosis and possible solutions.

**Prerequisites**
Degree in geosciences or drilling, or equivalent experience.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**
5 days

**INTRODUCTION TO GEOMECHANICS IN THE PETROLEUM INDUSTRY** 0.25 d
Review of all the applications of geomechanics in the reservoir and drilling fields illustrated with real cases.

**THEORETICAL BASES USEFUL FOR RESERVOIR APPLICATIONS** 2 d
Stresses, deformations, yield.
Connection between stress, pressure and temperature.
Rock tensile failure.
Rock shearing failure.
Fault activation criterion.
Laboratory measurements of tensile and rupture properties.
Measurements of pore compressibility.
Geomechanical model of wells (formation pressure, stress and mechanical properties) and calibration from laboratory measurements and logs and well tests, particularly the leak-off test, induced fractures and oval shapes.

**IMPACT OF GEOMECHANICS ON RESERVOIR SAFETY & MANAGEMENT** 2 d
Workflow of the building of a coupled reservoir and geomechanical model.
Arching effect.
Compaction and subsidence calculations and assessment of the related risks.
Determination of the maximum injection pressure and the storage capacity in a reservoir.
Methods of monitoring of reservoir cover layer integrity.

**APPLICATION** 0.75 d
Exercise based on one or several real cases gathering the major issues of reservoir geomechanics. Knowledge assessment.

Reference: GEMG-EN-P  Only available as an In-House course. Contact: ep.contact@ifptraining.com
Virtual Classroom
This course is available in face-to-face mode

Introduction to Reservoir Engineering

Level: AWARENESS

Purpose
This course provides a general understanding of main Geosciences & Reservoir Engineering concepts and data used in multidisciplinary Oil & Gas fields development projects and the way these data and concepts are integrated.

Audience
Technicians, engineers, managers and Oil & Gas industry staff facing day-to-day Geosciences and Reservoir Engineering concerns.

Learning Objectives
Upon completion of the course, participants will be able to:
- describe the main steps of Oil & Gas fields exploration and development workflow,
- describe petroleum systems, reservoir rocks and the corresponding fundamental properties as well as the related techniques to get relevant information (core analysis, logs, well testing),
- describe reservoir fluids and the corresponding fundamental properties,
- describe main reservoir production mechanisms and the related expected performance,
- describe the concepts of resources and reserves and the related concepts of risks and uncertainties and economical evaluation.

Ways & Means
- E&P and Reservoir Engineering workflow interactive presentation.
- Interactive lectures, exercises and short movies.
- Dynamic reservoir simulator overview.

Prerequisites
- E&P professionals.
- No experience required.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

E&P & RESERVOIR ENGINEERING WORKFLOW 0.25 d
Introduction to E&P and reservoir engineering workflow through interactive work.

FUNDAMENTALS OF RESERVOIR CHARACTERIZATION 1.25 d
Petroleum geology:
- Type of rocks.
- Hydrocarbon genesis.
- Petroleum systems.
Rock properties and petrophysics:
- Cores and coring operations.
- Porosity, permeability, saturations.
- Capillary pressure, wettability, relative permeability.
Well log interpretation:
- Logging operations and log environment (borehole, invasion profile).
- Fundamental equations for log interpretation in clean formations.
- Main open-hole logs. Quick-look qualitative interpretation technique.
Reservoir fluids properties (oil, gas, water):
- Fluids composition (hydrocarbons).
- Thermodynamics equilibrium. Phase envelope.
- Main PVT parameters: FVF, Rs, GOR, etc.

FUNDAMENTALS OF RESERVOIR ENGINEERING 2 d
Well testing and well test analysis:
- Well and reservoir performance and the need for testing.
- Darcy’s law, diffusivity equation and typical flow regimes.
- Productivity index, radius of investigation.
- Well test interpretation: pressure curves analysis, pressure derivative.
Drive mechanisms:
- Primary recovery: oil reservoirs (natural depletion, natural water drive) and gas reservoirs.
- Secondary recovery: water flooding, gas injection.
- EOR: miscible gas injection, chemical flooding, thermal flooding.

FUNDAMENTALS OF RESERVOIR SIMULATION 0.5 d
Principles and objective of reservoir simulation:
- Reservoir simulation models - Building the models.
- Reservoir simulators - Black-oil, compositional, thermal, chemical, etc.
Reservoir simulation workflow.
- Data review. History match. Production forecast.
Introduction to a reservoir simulator:
- Data set review. Grid. Petrophysical data. PVT data. Wells and production constraints.
- Analyzing some simulation results on various reservoir models.

RESERVES DEFINITION & CLASSIFICATION 0.5 d
Reserves and resources:
- Economics criteria.
- Risks and uncertainties.
- Reserves and resources definition and classification.
- Oil & Gas reserves. Some figures.

Reference: INFORES-EN-D
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Location | Start Date | End Date | Tuition Fees excl. VAT
---|---|---|---
Virtual Classroom | 22 November | 26 November | €2,960

This course is also available in French: INFORES-FR-A. Please contact us for more information.
Reservoir Fluid Properties - PVT
Reservoir Fluids Properties - Oil & Gas

Course Content

**FUNDAMENTALS OF THERMODYNAMICS**  
1.5 d

- Petroleum fluids genesis.
- Chemical composition of petroleum fluids:
  - Hydrocarbon families.
- Compositional presentation of reservoir fluids.
- Thermodynamics of petroleum fluids:
  - Pure component, binary mixture, multi-component systems. Phase behavior.
  - Hydrocarbon fluids: under saturated oil, saturated oil, dry gas, wet gas, retrograde gas. Phase envelope.
- Measurements:
  - Sampling: bottom hole and surface sampling; representativity and validity of sampling; analysis; PVT studies (Oil & Gas condensate).

**PROPERTIES OF HYDROCARBON FLUIDS**  
2.5 d

- Thermodynamics: mixture equilibrium, fluids classification.
- Liquid-vapor equilibrium:
  - Real equilibrium, thermodynamics potential, fugacity.
  - Saturation pressure, formation volume factor, density, compressibility, viscosity.
- Equation of state:
  - Peng-Robinson, Soave-Redlich-Kwong.
- Liquid-vapor calculation.
- Analytical representation: properties of light and heavy cuts.
- Fluid modeling: PVT matching.
- Fluid synthesis: gravity segregation, field cases, miscibility.
- Downstream data: data for reservoir simulator and process.

**PVT MODELING**  
1 d

- Matching a PVT model to experimental data using a PVT EOS package.

Ways & Means

- Interactive lectures and exercises.
- Analyzing a real PVT report.
- Hands-on practices using state-of-the-art EOS package for PVT matching.

Learning Assessment

Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites

E&P professionals, with basic knowledge in PVT.

Expertise & Coordination

IPF Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: PVT-EN-P  
Can be organized as an In-House course.  
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>11 October</td>
<td>15 October</td>
<td>€3,250</td>
</tr>
</tbody>
</table>

This course is also available in French: PVT-FR-P. Please contact us for more information.
Drilling & Completion -
Wellbore Interface & Well Productivity

Course Content

5 days

FUNDAMENTALS OF DRILLING
1.25 d

FUNDAMENTALS OF COMPLETION
0.75 d
Completion: operations involved, main phases. Main factors influencing completion design. Completion configurations: fundamental requirements, main configurations.

WELL PRODUCTIVITY (Part 1)
1 d
Fundamentals: overall approach of the well flow capacity. Inflow (study of the bottom-hole pressure from the upstream side):
- Main parameters, Productivity Index (PI), global skin and flow efficiency. Outflow (study of the bottom-hole pressure from the downstream side):
- Case of oil wells and case of gas wells. Analysis of inflow and outflow performance curves, need for artificial lift.

RESERVOIR-WELLBORE INTERFACE IMPLEMENTATION
(excluding “wellbore treatments”) 1 d
Specific aspects linked to drilling and cementing the pay zone. Perforating: main techniques, key parameters for productivity. Specific case of horizontal drains.

WELL PRODUCTIVITY (Part 2)
1 d
Additional information about Productivity Index (PI):
- Productivity Index and flow regime. Inflow performance below bubble point pressure (IPR).
- Additional information about skin:
  Components of completion skin. Damage skin estimation.

Ways & Means
Interactive lectures and exercises.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
- Degree in reservoir engineering or petroleum engineering.
- No experience required.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.
Well Testing & Well Test Analysis

Level: SKILLED

Purpose
This course provides a comprehensive and practical understanding about performing set-up, design and analysis of well tests.

Audience
Newly-hired and 2- to 3-year experienced reservoir engineers willing to deepen their knowledge in well test analysis; geoscientists, petroleum engineers and production engineers moving towards reservoir engineering.

Learning Objectives
Upon completion of the course, participants will be able to:
- discuss the theory of well test analysis,
- identify main flow regimes and models,
- carry out simple well test analysis,
- define or recommend a well test design.

Ways & Means
Interactive lectures and exercises.
Hands-on practice based on synthetic and real data using hand and spreadsheet calculations and SAPHIR™ dedicated industrial software.
Software used during workshops: with courtesy of Kappa Engineering.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Degree in reservoir engineering or petroleum engineering.
No experience required.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO WELL TESTING, BASIC EQUATIONS & METHODS
Objective of well testing.
Practical well test operations: types of tests, equipment, safety and environmental issues.
Definitions and typical flow regimes: radial flow, fractured reservoirs, limited reservoirs and closed reservoirs.
Productivity Index (PI), radius of investigation.
Darcy’s law and the diffusivity equation.
Time superposition, multirate testing.
Space superposition, boundary effect.
Pressure curves analysis.
Pressure derivative curves analysis.

WELLBORE CONDITIONS
Wellbore storage and skin effects.
Infinite and finite conductivity vertical fracture.
Well in partial penetration.
Horizontal well.
Skin factors, geometrical skin and well deliverability.

RESERVOIR HETEROGENEITIES
Double porosity models: pseudo-steady state and transient state models.
Double permeability models.
Composite reservoir models.

BOUNDARY MODELS
One sealing fault model.
Two parallel sealing faults model/two intersecting sealing faults model.
Closed system model and reservoir limits testing.
Constant pressure boundary model.

TEST DESIGN - HANDS-ON SESSION
Rate history definition.
Time and pressure error.
Interpretation procedure.
From the initial diagnosis to the final consistency check of the results.
Reporting and presentation of results.
Examples of test response.

GAS WELLS: REVIEW & APPLICATIONS
Hypothesis for gas wells testing. Darcy and non-Darcy flow.
Pseudo-pressure and inertial effects.
Gas wells deliverability:
Absolute open flow potential.
Houpert method.
Back pressure tests. Isochronal tests. Modified isochronal tests.

Reference: WTA-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>25 October</td>
<td>29 October</td>
<td>€3,250</td>
</tr>
</tbody>
</table>

This course is also available in French: WTA-FR-P. Please contact us for more information.
Drive Mechanisms - Enhanced Oil Recovery

Material Balance

Course Content

DRIVE MECHANISMS - PRIMARY RECOVERY 2 d
Oil reservoirs:
- Undersaturated oil expansion.
- Solution gas drive.
- Gas gap drive.
- Natural water drive.
- Analytical aquifer models.
- Hurst & Van Everdingen model.
- Carter-Tracy model.
Gas reservoirs with and without aquifer.
Material balance:
- Principles and equations.
- Generalized Material Balance.
- Drive Index.
- Campbell and Cole plots.
Application: estimating recovery factors from material balance, checking aquifer and gas cap size, checking accumulation estimate…

DRIVE MECHANISMS - SECONDARY RECOVERY 2 d
Reminders about multiphase flow in the reservoir: wettability, capillarity, relative permeability.
Water and non-miscible gas injection:
- Principles.
- Sources of fluid, well injectivity, injectors pattern.
- Expected performance of water and gas injection.
Multiphase flow stability and influence of Mobility Ratio.
- Diffusive flow:
  - Buckley-Leverett frontal displacement theory.
  - Welge method.
Sweep efficiency:
- Microscopic efficiency & influence of Capillary Number.
- Areal efficiency and influence of Mobility Ratio.
- Vertical efficiency and influence of permeability vertical heterogeneity.

PRACTICAL MATERIAL BALANCE 2 d
Practical exercises on synthetic and real field case data using MBAL™ software:
- PVT and reservoir parameters history match.
- Production forecast.

ENHANCED OIL RECOVERY 2 d
Principles and mechanisms of main EOR methods:
- Chemical flooding.
- Miscible gas injection.
- Thermal flooding.
EOR projects:
- Screening criteria.
- Economics.
Application - Field cases.

Ways & Means
- Interactive lectures and exercises.
- Real field case studies.
- Hands-on practices using dedicated industrial software for PVT matching, history matching and production forecast through material balance.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Degree in reservoir engineering or petroleum engineering, with basic knowledge in drive mechanisms.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.
Virtual Classroom
This course is available in face-to-face mode

**NEW** Drive Mechanisms & EOR

---

**Level:** AWARENESS

**Purpose**
This course provides an in-depth understanding of reservoir drive mechanisms and Enhanced Oil Recovery (EOR) methods and corresponding recovery performances.

**Audience**
Newly-hired and 2- to 3-year experienced reservoir engineers willing to deepen their knowledge in drive mechanisms and Enhanced Oil Recovery methods; geoscientists, petroleum engineers and production engineers moving towards reservoir engineering.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- Discuss the natural mechanisms of production of oil and gas reservoirs and their corresponding expected performance,
- Discuss the mechanisms of secondary recovery through water injection and non-miscible gas injection and their related expected performance,
- List the main Enhanced Oil Recovery methods and discuss their mechanisms and corresponding expected performance,
- Describe typical EOR projects workflow and related screening criteria.

**Ways & Means**
Interactive lectures and exercises.

**Prerequisites**
Degree in geoscience or reservoir engineering.

**Expertise & Coordination**
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

<table>
<thead>
<tr>
<th>Drive Mechanisms - Primary Recovery</th>
<th>2 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil reservoirs:</td>
<td></td>
</tr>
<tr>
<td>Undersaturated oil expansion.</td>
<td></td>
</tr>
<tr>
<td>Solution gas drive.</td>
<td></td>
</tr>
<tr>
<td>Gas gap drive.</td>
<td></td>
</tr>
<tr>
<td>Natural water drive.</td>
<td></td>
</tr>
<tr>
<td>Introduction to analytical aquifer models.</td>
<td></td>
</tr>
<tr>
<td>Steady-state models - Small Pot model.</td>
<td></td>
</tr>
<tr>
<td>Transient models - Hurst &amp; Van Everdingen model and Carter-Tracy model.</td>
<td></td>
</tr>
<tr>
<td>Gas reservoirs with and without aquifer.</td>
<td></td>
</tr>
<tr>
<td>Material Balance:</td>
<td></td>
</tr>
<tr>
<td>Principles and equations.</td>
<td></td>
</tr>
<tr>
<td>Generalized Material Balance.</td>
<td></td>
</tr>
<tr>
<td>Drive Index.</td>
<td></td>
</tr>
<tr>
<td>Campbell and Cole plots.</td>
<td></td>
</tr>
<tr>
<td>Application: estimating recovery factors from material balance, checking aquifer and gas cap size, checking accumulation estimate...</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drive Mechanisms - Secondary Recovery</th>
<th>1.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reminders about multiphase flow in the reservoir: wettability, capillarity, relative permeability.</td>
<td></td>
</tr>
<tr>
<td>Water and non-miscible gas injection:</td>
<td></td>
</tr>
<tr>
<td>Principles.</td>
<td></td>
</tr>
<tr>
<td>Sources of fluid, well injectivity, injectors pattern.</td>
<td></td>
</tr>
<tr>
<td>Expected performance of water and gas injection.</td>
<td></td>
</tr>
<tr>
<td>Sweep efficiency:</td>
<td></td>
</tr>
<tr>
<td>Microscopic efficiency &amp; influence of Capillary Number.</td>
<td></td>
</tr>
<tr>
<td>Areal efficiency and influence of Mobility Ratio.</td>
<td></td>
</tr>
<tr>
<td>Vertical efficiency and influence of permeability vertical heterogeneity.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enhanced Oil Recovery</th>
<th>0.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles and mechanisms of main EOR methods:</td>
<td></td>
</tr>
<tr>
<td>Chemical flooding.</td>
<td></td>
</tr>
<tr>
<td>Miscible gas injection.</td>
<td></td>
</tr>
<tr>
<td>Thermal flooding.</td>
<td></td>
</tr>
<tr>
<td>EOR projects:</td>
<td></td>
</tr>
<tr>
<td>Screening criteria &amp; economics.</td>
<td></td>
</tr>
<tr>
<td>Application - Field cases review.</td>
<td></td>
</tr>
</tbody>
</table>

---

### Reference: DRIVE-EN-D
Can be organized as an In-House course.

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>17 May</td>
<td>20 May</td>
<td>€2,880</td>
</tr>
</tbody>
</table>

Contact: ep.contact@ifptraining.com
Dynamic Reservoir Simulation

**Level:** SKILLED

**Purpose**
This course provides a comprehensive and practical understanding of dynamic reservoir simulation, covering principles and concepts as well as data reviewing and formatting.

**Audience**
Newly-hired and 2- to 3-year experienced reservoir engineers willing to deepen their knowledge in reservoir fluid properties and PVT modeling. It is also intended for geoscientists, petroleum engineers and production engineers moving towards reservoir engineering.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- discuss the fundamental concepts of dynamic reservoir simulation,
- build a simple reservoir simulation model (including data gathering and data QC),
- carry out a simple reservoir simulation study (including taking into account technical and economical constraints, basic history matching and production forecasting) using a black-oil model.

**Ways & Means**
- Interactive lectures and exercises.
- Hands-on practice using state-of-the-art industrial software packages: ECLIPSE™, PETREL-RE™ or PumaFlow™ reservoir simulator.
- Black oil reservoir simulation including the manipulation of all kind of reservoir data (geological, petrophysical, PVT, well data, production history).
- Software used during workshops: with courtesy of Schlumberger.

**Learning Assessment**
- Knowledge assessment with multiple choice questions and open explanatory questions.
- Assessment from results obtained on hands-on exercises using the simulator.

**Prerequisites**
Reservoir engineering degree or equivalent experience within the petroleum industry.

**Expertise & Coordination**
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

**INTRODUCTION TO DYNAMIC RESERVOIR SIMULATION**
0.5 d
Physical aspects and fundamental laws. Mathematical and numerical aspects (diffusivity equation, transport equation, equations of state...).
Types of reservoir simulation models: black oil, compositional, thermal, chemical and double porosity model.

**INTRODUCTION TO THE SIMULATOR**
0.5 d
Simulation software presentation.
Practical exercise (building a model from A to Z).

**SPACE & TIME DISCRETIZATION**
1 d
Various types of grids (Cartesian grid, radial grid, corner point grid, etc.), related properties and key elements to take into account.
Time step management and main events to take into account.
Practical exercise using the simulator.

**PETROPHYSICS**
1 d
Data review and petrophysical upscaling.
Practical exercise using the simulator.

**FLUIDS**
1 d
Data review and formalisms used by the simulator.
Use of black oil data set and integration of lab experiments results (constant composition expansion, constant volume depletion).
Practical exercise using the simulator.

**INITIAL STATE**
1 d
Data review and formalisms used by the simulator (equilibrium regions).
Identification of fluids in place per region.
Practical exercise using the simulator.

**AQUIFERS REPRESENTATION**
1 d
Formalisms used by the simulator (gridded or analytical aquifers).
Review of different possibilities (bottom, edge, transient, steady state, semi steady state) and Hurst & Van Everdingen tables.
Practical exercise using the simulator.

**FLOW REPRESENTATION**
1 d
Formalisms used by the simulator (transmissivity multipliers, end point scaling of capillary pressures and relative permeability).
Identification of production mechanisms and material balance analysis.
Practical exercise using the simulator.

**WELLS REPRESENTATION**
1 d
Formalisms used by the simulator (wells trajectory, perforations...).
Introduction to well performance:
Inflow performance and numerical PI, outflow performance and VFP tables.
Practical exercise using the simulator software.

**PRODUCTION FORECAST**
2 d
Objectives and methodology.
Integration of well representation and production constraints.
Estimation of future productions linked to different scenarios and identification of remaining uncertainties.
Practical exercise using the simulator.

---

**Reference:** DSIMRES-EN-P
- Can be organized as an In-House course.

**Contact:** ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>22 November</td>
<td>3 December</td>
<td>€6,180</td>
</tr>
</tbody>
</table>

- This course is also available in French: DSIMRES-FR-P. Please contact us for more information.

www.ifptraining.com
EOR Concepts & Applications

Level: KNOWLEDGE

Purpose
This course provides a detailed understanding of Enhanced Oil Recovery (EOR) methods and mechanisms together with information about EOR projects workflow and decision-making, especially screening criteria.

Audience
Reservoir engineers, petroleum engineers and assets managers involved in EOR projects.

Learning Objectives
Upon completion of the course, participants will be able to:
- discuss recovery expectations from reservoirs under primary, secondary and EOR methods,
- discuss main Enhanced Oil Recovery (EOR) methods and corresponding mechanisms for improving recovery factor,
- apply screening criteria used for decision making on EOR projects,
- plan and apply main EOR methods using empirical, analytical and simulation tools.

Ways & Means
- Interactive lectures and exercises.
- Field case studies.
- Chemical and Miscible Gas EOR simulation using dedicated industrial software.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Basic knowledge in reservoir engineering, oil reservoirs drive mechanisms and reservoir simulation.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

FUNDAMENTALS OF OIL RESERVOIRS DRIVE MECHANISMS
Review of primary and secondary recovery drive mechanisms:
- Natural depletion of undersaturated oil reservoir.
- Solution gas drive.
- Natural water drive.
- Water and gas injection.

Principle and mechanisms of main EOR methods:
- Chemical flooding.
- Miscible gas injection.
- Thermal flooding.

EOR - CHEMICAL METHODS (surfactant, polymer, alkaline)
Principles and mechanisms of chemical EOR.
Selection criteria.
Recovery targets and why they are seldom met.
Chemicals. Characteristics and properties.
Preformed Particle Gel (PPG).
Colloidal Dispersion Gels (CDG).
Design considerations.
Simulation of chemical flooding. Application to ASP flooding.
Case studies.

EOR - MISCIBLE GAS INJECTION METHODS (CO₂, N₂, HC)
Principles and mechanisms of miscible gas EOR.
Minimum Miscibility Pressure (MMP).
Hydrocarbon miscible displacement:
- First contact miscible process.
- Condensing gas drive.
- Vaporizing gas drive.
Selection criteria.
Laboratory experiments.
Simulation of miscible gas injection. Application to CO₂ injection.
Case studies.

EOR - THERMAL METHODS (SAGD, H&P, in-situ combustion)
Principles and mechanisms of thermal EOR.
Selection criteria.
Steam flooding production prediction.
Case studies.

EOR IMPLEMENTATION
EOR project planning workflow.
Pilot design.
EOR monitoring.
Case studies.

Reference: EOR-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>27 September</td>
<td>1 October</td>
<td>€3,250</td>
</tr>
</tbody>
</table>
Advanced Certificate

Miscible Gas EOR Certification

Purpose

This course provides an in-depth understanding of Miscible Gas Enhanced Oil Recovery (EOR) methods, the corresponding displacement mechanisms and expected performance. It also provides information about miscible gas EOR projects workflow based on the presentation of screening criteria and field cases.

Audience

Reservoir engineers and petroleum engineers involved in miscible gas EOR projects.

Learning Objectives

Upon completion of the course, participants will be able to:
1. discuss the recovery expectations from reservoirs under primary, secondary and EOR methods,
2. discuss the mechanisms of various miscible gas EOR methods and related screening criteria,
3. list gas used in miscible gas EOR and compare the way they affect oil recovery,
4. design and apply miscible gas EOR methods by using empirical, analytical and simulation tools and evaluate their performance.

Ways & Means

- Interactive lectures and exercises.
- Field case studies.
- Miscible gas EOR simulation using dedicated software.
- Software used during workshops: with courtesy of Schlumberger.

Learning Assessment

Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites

Basic knowledge in reservoir engineering, oil reservoirs drive mechanisms and reservoir simulation.

Why an IFP Training Certification?

- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Miscible Gas EOR Certification.
- Ready-to-use skills.

Course Content

REMINDERS OF OIL RESERVOIR DRIVE MECHANISMS 0.5 d

Review of primary and secondary recovery drive mechanisms:
- Natural depletion of undersaturated oil reservoir.
- Solution gas drive.
- Natural water drive.
- Water and gas injection.

Principle and mechanisms of main EOR methods:
- Chemical flooding.
- Miscible gas flooding.
- Thermal flooding.

DISPLACEMENT THEORY & FRACTIONAL FLOW 0.5 d

Factors affecting oil recovery.
- Mobility ratio and sweep efficiency.
- Fractional flow theory.
- Oil recovery calculation in homogeneous and stratified reservoirs.

PHASE BEHAVIOR & FLUID PROPERTIES 1 d

Fundamentals of fluids properties. Phase envelope.
- Fluid properties affected by miscible gas injection.
- Ternary diagrams.

MISCIBLE GAS INJECTION METHODS (CO\textsubscript{2}, N\textsubscript{2}, hydrocarbons) 3 d

Principles and mechanisms of miscible gas EOR.
- Minimum Miscibility Pressure (MMP).
- Displacement mechanism.
- First contact miscibility.
- Condensing drive.
- Vaporizing drive.
- Screening criteria.
- Laboratory experiments.
- Miscible gas EOR design & workflow.
- Miscible CO\textsubscript{2} flooding.
- Miscible hydrocarbon flooding.
- Simulation and performance evaluation of miscible gas flooding.
- Case studies.

Reference: EOR-G-EN-P Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
Advanced Certificate
Chemical EOR Certification

Level: SKILLED

Purpose
This course provides an in-depth understanding of Chemical Enhanced Oil Recovery (EOR) methods, the corresponding displacement mechanisms and expected performance. It also provides information about Chemical EOR projects workflow based on the presentation of screening criteria and field cases.

Audience
Reservoir engineers and petroleum engineers involved in Chemical EOR projects.

Learning Objectives
Upon completion of the course, participants will be able to:
- discuss the recovery expectations from reservoirs under primary, secondary and EOR methods,
- discuss the mechanisms of various chemical EOR methods and related screening criteria,
- list the types of chemicals used in chemical EOR and compare the way they affect oil recovery,
- design and apply chemical EOR methods by using empirical, analytical and simulation tools and evaluate their performance.

Ways & Means
- Interactive lectures and exercises.
- Field case studies.
- Chemical EOR simulation using dedicated industrial software.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Basic knowledge in reservoir engineering, oil reservoirs drive mechanisms and reservoir simulation.

Why an IFP Training Certification?
- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Chemical EOR Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

REMINDERS OF OIL RESERVOIR DRIVE MECHANISMS 0.5 d
Review of primary and secondary recovery drive mechanisms:
- Natural depletion of undersaturated oil reservoir.
- Solution gas drive.
- Natural water drive.
- Water and gas injection.
Principle and mechanisms of main EOR methods:
- Chemical flooding.
- Miscible gas flooding.
- Thermal flooding.

DISPLACEMENT THEORY & FRACTIONAL FLOW 0.5 d
Factors affecting oil recovery.
Mobility ratio and sweep efficiency.
Fractional flow theory.
Oil recovery calculation in homogeneous and stratified reservoirs.

POLYMER FLOODING 1 d
Polymer flooding and classical types of polymers.
Polymer properties and behavior: rheology, viscosity, non-Newtonian effects...
Adsorption and retention mechanisms.
Selection criteria.
Design of polymer flooding.
Preformed Particle Gel (PPG).
Colloidal Dispersion Gels (CDG).
Simulation of polymer flooding.
Case studies.

SURFACTANT FLOODING 1 d
Surfactant flooding and classical types of surfactants.
Surfactant characteristics: molecular structure, critical micelle concentration (CMC)...
Surfactant, water and oil behavior.
Selection criteria and tests.
Simulation of surfactant flooding.
Case studies.

ALKALINE FLOODING 0.5 d
Alkaline flooding and classical types of alkaline.
Displacement mechanisms in alkaline flooding.
Alkaline consumption.
Selection criteria and tests.
Simulation of alkaline flooding.
Case studies.

ALKALINE-SURFACANT-POLYMER FLOODING (ASP) 1 d
Displacement mechanisms in ASP flooding.
Experimental design and calculation of appropriate injection pore volumes.

SMART WATER INJECTION 0.5 d
Definition and principles of smart water method.
Smart water injection design and workflow.
Case studies.

Reference: EOR-C-EN-P  Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Advanced Dynamic Reservoir Simulation

Course Content

**Purpose**

This course provides deep insight into some advanced dynamic reservoir simulation features including gridding, aquifers and wells representation, compositional simulation and assisted history matching.

**Audience**

Reservoir engineers and petroleum engineers willing to deepen their knowledge in dynamic reservoir simulation.

**Learning Objectives**

Upon completion of the course, participants will be able to:

- apply the fundamental concepts of dynamic reservoir simulation,
- carry out local grid refinement,
- model complex wells,
- perform compositional simulation,
- discuss and carry out assisted history matching.

**Ways & Means**

- Interactive lectures and exercises.
- Hands-on practice using state-of-the-art software packages: ECLIPSE™, PETREL-RE™ or PumaFlow™ reservoir simulator.

**Learning Assessment**

- Knowledge assessment with multiple choice questions and open explanatory questions.
- Assessment from results obtained on hands-on exercises using the simulator.

**Prerequisites**

Reservoir engineering degree or experience, with basic dynamic reservoir simulation knowledge.

**Expertise & Coordination**

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

- **FUNDAMENTALS OF DYNAMIC RESERVOIR SIMULATION**
  
  Physical aspects and basic laws.
  Mathematical and numerical aspects (diffusivity, transport and general equations).
  Review of basic rock and fluid properties for input into dynamic reservoir simulation models.

- **GRIDDING & LOCAL GRID REFINEMENT**
  
  Review of main types of grids (Cartesian grid, radial grid, corner point grid, etc.) and related properties.
  Gridding and Local Grid Refinement - Principles and application.
  Convergence problems within Local Grid Refinement.
  Practical exercise using the simulator.

- **WELL PERFORMANCE**
  
  Formalisms used by the simulator:
  - Inflow performance and numerical PI.
  - Outflow performance and VFP tables.
  Practical exercise using the simulation software.

- **COMPOSITIONAL SIMULATION**
  
  Components and composition - Black Oil vs. compositional models:
  - Lumping and de-lumping.
  - Compositional EOS - Ternary diagram.
  - Gas modeling in compositional models.
  Practical exercise using the simulator.

- **HISTORY MATCHING & ASSISTED HISTORY MATCHING**
  
  Objectives and methodology.
  Production data and identification of data to match.
  Production mechanisms and identification of matching parameters.
  History matching strategies (pressure, saturation, early and late times) and uncertainty reduction.
  Principles of assisted history matching:
  - Experimental design.
  - Response surface.
  - Objective function and optimization.
  Practical exercise using the simulator.

Reference: SIMRADV-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
Advanced Certificate
Reservoir Simulation Workshop Certification

Level: SKILLED

Purpose
This course provides an in-depth practical understanding of dynamic reservoir simulation, covering principles of simulation as well as data reviewing and formatting, with an immediate application to a full field development project using real field case data.

Audience
Experienced geoscientists, reservoir engineers, petroleum engineers and production engineers willing to deepen their knowledge and get a practical insight in black-oil dynamic reservoir simulation.

Learning Objectives
Upon completion of the course, participants will be able to:
- discuss the fundamental concepts of dynamic reservoir simulation,
- build a simple reservoir simulation model (including data gathering, data QC) from real data set,
- carry out a simple reservoir simulation study (including basic history matching and production forecast) from a real field case black-oil simulation model,
- discuss, explain and justify decision making in optimizing a simple field development project taking into account uncertainties and economics.

Ways & Means
- Highly interactive training by industry’s specialist lecturers.
- Intensive 10-days training alternating courses on black-oil dynamic reservoir simulation using simple and didactic data sets and a teamwork workshop focused on optimizing an oil field development project investigating various production scheme.
- Dedicated industrial software.

Learning Assessment
- Knowledge assessment with multiple choice questions and open explanatory questions will be organized at the end of first unit.
- Assessment from results obtained on hands-on exercises using the simulator.
- A final integrated teamwork workshop will end the training and each team will defend its results in front of a jury composed of IFP Training trainers.

Prerequisites
Basic knowledge in reservoir engineering.

Why an IFP Training Certification?
- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Reservoir Simulation Workshop Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content
10 days

Part 1: RESERVOIR SIMULATION COURSE
5 d

Introduction to reservoir simulation:
- Physical aspects & basic laws.
- Mathematical & numerical aspects (difusivity, transport & general equations).
- Types of reservoir simulation models: black oil, compositional, thermal, chemical and double porosity model.

Introduction to the simulator (ECLIPSE™):
- Simulation software presentation.
- Practical exercise (building a model from A to Z).

Space & time discretization:
- Grid properties (Cartesian grid, radial grid, corner point grid, etc.) & key elements to take into account.
- Time step management & main events to take into account.

Petrophysics:
- Data review & petrophysical upscaling.
- Fluids:
  - Data review & formalisms used by the simulator.
  - Use of black oil data set & integration of lab experiments (constant composition expansion, constant volume depletion).

Initial state:
- Data review & formalisms used by the simulator (equilibration regions).
- Identification of fluids in place per region.

Aquifers representation and modeling:
- Formalisms used by the simulator (gridded or analytical aquifers).

Review of different possibilities (bottom, edge, transient, steady state, semi steady state) & Hurst & Van Everdingen tables.

Flow representation:
- Formalisms used by the simulator (transmissivity multipliers, end point scaling of capillary pressures & relative permeability).
- Identification of production mechanisms & material balance analysis.

Wells representation:
- Formalisms used by the simulator (inflow performance & numerical PI, outflow performance & VFP tables).

Practical exercise using the simulation software.

Production forecast:
- Objectives & methodology.
- Integration of well representation & production constraints.
- Estimation of future productions linked to different scenarios and identification of remaining uncertainties.
- Identification of recommended scenario and conclusions.

Part 2: FIELD DEVELOPMENT PROJECT WORKSHOP
5 d

Field case presentation and critical analysis of the dataset:
- PV data.
- Kr-Pc data.
- Accumulation.

Analysis of various production schemes:
- Natural depletion down to bubble point, below bubble point, down to maintained optimum pressure.
- Water injection.

History matching:
- Matching field pressure, wells pressure, water-cut and GOR.
- Select the matching parameters and related range.
- Decide on the level of acceptability of the history match.

Production forecast:
- Using the selected previously matched dataset, perform a development study.
- Investigate natural depletion and water injection (and possibly WAG): optimize recovery adding producers, injectors, finding out their optimal location.
- Recommend an FDP based on relevant economic calculations (NPV, IRR, Profitability Index, etc.).

Reference: RESSIMU-EN-P
- Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Advanced Certificate

Advanced Well Test Analysis Certification

Course Content

**OVERVIEW OF WELL TEST ANALYSIS**
1 d

**HETEROGENEOUS RESERVOIRS TESTING**
0.5 d

**GAS WELLS TESTING**
0.5 d

**STIMULATED WELL TESTING**
0.5 d

**INJECTION WELL TESTING**
0.5 d
Secondary recovery and EOR processes. Oil and water banks. Mobility. Injection and fall off testing. Interpretation models. Water and steam front determination. Average Injection Pressure determination. Field cases examples.

**GAS SHALE RESERVOIRS TESTING**
0.5 d

**WELL TEST DESIGN**
0.5 d
Test design methodology according to reservoir evaluation objectives. Common test string configurations. DST and rig less testing. Elaboration of testing program and contingencies: Real time vs. memory data acquisition. Pressure gauges: resolution, specifications and acquired pressure data quality control. Offshore well testing. Reservoir and well candidates for test design. Field case examples.

**WORKSHOP**
1 d
Interpretation of real data acquired in fields of interest by using state of the art software: Both analytical and numerical methods will be applied. Test design scenarios for both homogeneous and heterogeneous reservoirs including the expected boundary conditions according to the geological model.

Reference: WTAADV-EN-P
Only available as an In-House course.

Contact: ep.contact@ifptraining.com

Level: SKILLED

Purpose
This course provides an extensive and practical knowledge in well test design and analysis aimed at evaluating well productivity and reservoir parameters in the best technical and economical way. It will deal with data acquired from various well completions, homogeneous and heterogeneous reservoirs, gas shale reservoir, as well as testing various production fluids, oil, gas, heavy Oil & Gas condensate.

Audience
Reservoir engineers and petroleum engineers willing to deepen their knowledge in Well Test Analysis.

Learning Objectives
Upon completion of the course, participants will be able to:
- describe practical and advanced Well Test Analysis methods and their applications,
- discuss application of results derived from Well Test Analysis in geosciences and reservoir engineering, especially integration of Well Test Analysis results within geological and geophysical models,
- perform design and analysis of pressure data acquired in wells completed in heterogeneous reservoirs,
- perform design and analysis of pressure data acquired in water, polymers or steam injector wells,
- discuss benefits and limitations of Well Test Analysis applied to non-conventional reservoirs.

Ways & Means
- Interactive courses and exercises.
- Hands-on practice using state-of-the-art software (SAPHIR™).
- Workshop using real field case data.
- Software used during workshops: with courtesy of Kappa Engineering.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Basic well test analysis knowledge.

Why an IFP Training Certification?
- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Advanced Well Test Analysis Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a high expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.
PVT Modeling

Level: KNOWLEDGE

Purpose
This course provides an extensive and practical understanding for analyzing PVT reports, handling data and defining PVT models for use in compositional and black oil simulations.

Audience
Reservoir engineers and petroleum engineers willing to acquire advanced knowledge about PVT modeling.

Learning Objectives
Upon completion of the course, participants will be able to:
- analyze PVT reports and discuss and handle PVT data,
- build a PVT model in order to represent fluid behavior with respect to available and validated PVT data,
- match a PVT model.

Ways & Means
- Interactive courses and exercises.
- Hands-on practices using dedicated modeling software BEST™ or PVT™ or PVTFlow™.
- Mini-project.
- Software used during workshops:
  with courtesy of Beicip-Franlab and Schlumberger.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Basic knowledge in PVT (fluids properties, measurement techniques and data, thermodynamics and classical correlation).

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a high expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

FLUID PROPERTIES & THERMODYNAMIC MODELING
2 d
Fluid properties:
- PVT properties of pure components and mixtures.
- Functions and variables.
- Properties of reservoir fluids.
Introduction to PVT modeling software.
Thermodynamic models and equilibrium:
- Functions and variables.
- EOS and algorithms.
- Component properties and lumping.
- Liquid-vapor thermodynamic equilibrium.

RESERVOIR, FIELD CASES & PROJECT
3 d
Measurements:
- Sampling.
- Analysis.
- Standardization of data.
- PVT experiments.
- Gas injection specific data.
Fluid modeling:
- PVT compositional modeling.
- Matching of experimental data.
- Physical consistency.
- Gravitational segregation.
- Miscibility.
Field cases:
- Compartmentalization.
- Non-classical GOR profile.
- Reservoir stripping.
Data for reservoir simulation:
- Compositional.
- Black oil (standard, extended).
Project and exercises:
- From the PVT Report do the PVT model.
- Quality check of the data.
- Oil fitting.
- Gas fitting.
- Discussions and conclusions.

Reference: PVTMOD-EN-P
Only available as an In-House course.

Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode
Decline Curves Analysis

**Level:** SKILLED

**Purpose**
This course provides an extensive and practical knowledge for analyzing production data using Decline Curve Analysis techniques, both classical and modern in order to make production forecast and reserve estimation.

**Audience**
Reservoir engineers and petroleum engineers who are responsible for making production forecasts using decline curve analysis.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- apply the fundamental concepts of decline curve analysis and Arps decline curves analysis for reserves evaluation during boundary dominated flow regime,
- identify the typical flow regimes using a diagnostic plots, estimate the fluid in place,
- apply the developed analytical models to match the observed rate, forecast future well performance,
- perform a sensitivity analysis by identifying the possible range of parameters.

**Ways & Means**
- Interactive lectures and exercises.
- Dedicated industrial software package.

**Learning Assessment**
Knowledge assessment with multiple choice questions and open explanatory questions.

**Prerequisites**
Basic reservoir engineering knowledge (especially reservoir drive mechanisms).

**Expertise & Coordination**
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

**INTRODUCTION TO PRODUCTION ANALYSIS**
Principles of production analysis - Reminders about flow regimes.
Traditional methods.
Modern production analysis.
0.5 d

**TRADITIONAL DECLINE CURVE ANALYSIS**
Exponential decline.
Hyperbolic decline.
Harmonic decline.
Recent development in decline curve analysis.
Examples.
1 d

**FLOW REGIMES IDENTIFICATION**
Diagnostic plots.
Flowing material balance.
Examples.
0.5 d

**RATE TRANSIENT ANALYTICAL MODELS**
Vertical model.
Fracture model.
Horizontal multifractured well.
1 d

**WORKFLOW FOR THE ANALYSIS OF RESERVOIR PRODUCTION DATA**
Diagnostic, modeling and forecasting:
- Oil well case study.
- Gas well case study.
1.5 d

**UNCERTAINTY QUANTIFICATION IN RATE TRANSIENT ANALYSIS**
Range of uncertain parameters.
Sensitivity analysis.
P1, P2, P3.
0.5 d

Reference: DCA-EN-A
Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Virtual Classroom
This course is available in face-to-face mode

NEW
Introduction to Petrophysics

Level: AWARENESS

Purpose
This course provides an in-depth understanding of petrophysics, covering concepts as well as data measurements and analysis and insight into modeling.

Audience
This course is intended for newly hired and 2- to 3-year experienced reservoir engineers willing to deepen their knowledge in reservoir rock properties and petrophysics. It is also intended for geoscientists, petroleum engineers and production engineers moving towards reservoir engineering.

Learning Objectives
Upon completion of the course, participants will be able to:
- discuss main concepts of petrophysics used in the description of reservoir rock properties,
- describe and discuss the way the corresponding rock properties are accessed from cores,
- perform basic quick-look log interpretation and discuss the corresponding rock properties by respect to core analysis.

Ways & Means
Interactive lectures and hands-on exercises.

Prerequisites
Degree in geoscience or reservoir engineering.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

RESERVOIR PROPERTIES FROM CORE ANALYSIS
2.5 d
Introduction to coring.
Porosity; definitions and measurements (effective and total porosity).
Monophasic permeability:
- Darcy’s law and definition of permeability.
Capillary pressure:
- Definition and measurement.
- From lab to reservoir: capillary pressure and initial fluid saturations in the reservoir.
Wettability:
- Definition and measurement (Amott index, USBM index).
- Influence of wettability on capillary pressure.
Effective and relative permeability:
- Darcy’s law for diphasic flows; definition of effective and relative permeability.
- Influence of wettability on the relative permeabilities.
Special core analysis and relative permeability measurements.

RESERVOIR PROPERTIES FROM LOG EVALUATION - QUICK-LOOK INTERPRETATION
2.5 d
Introduction to wireline logging operations and logs.
Open-hole log quick-look interpretation methodology.
Determination of reservoir properties from log interpretation (non-reservoir and reservoir zones, porosity, contacts, Archie’s law and saturations).

Reference: PETROF-EN-D
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>7 June</td>
<td>11 June</td>
<td>€2,960</td>
</tr>
</tbody>
</table>

130
Graduate Certificate

Reservoir Engineering Certification

Purpose

This course provides a comprehensive practical knowledge of fundamental concepts of Reservoir Engineering, through hands-on activities, case studies and projects.

Audience

This course is intended for newly hired or 2-3 years experienced reservoir engineers, for geoscientists, petroleum engineers and production engineers.

Learning Objectives

Upon completion of the course, participants will be able to:

- describe reservoirs characterization and modeling workflow,
- discuss fluids properties and describe the PVT modeling process,
- discuss principles of well testing and well test interpretation,
- discuss the mechanisms of primary recovery and secondary recovery and their performance,
- list main Enhanced Oil Recovery methods and discuss mechanisms and performance,
- discuss fundamentals of reservoir management and describe reservoir monitoring techniques,
- define the concepts of resources, reserves and corresponding classification, integrating risks and uncertainties,
- discuss fundamentals of dynamic reservoir simulation, and build a simple black-oil reservoir simulation study.

Ways & Means

- Numerous hands-on and workshop on real data sets.
- Individual and teamwork to develop autonomy and ability of decisions.
- Final teamwork workshop on optimizing an oil field development project integrating real laboratory data, field data and simulation model.

Software used during workshops: with courtesy of Beicip-Franlab, Kappa Engineering and Schlumberger.

Learning Assessment

- Weekly evaluation.
- Initial and final assessment at the beginning and end of program.
- A final project at the end of the program with defense of results in front of a jury.

Prerequisites

Degree in geosciences or equivalent experience.

Why an IFP Training Certification?

- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Reservoir Engineering Certification.
- Ready-to-use skills.

Expertise & Coordination

IFP Training trainers having a good expertise and experience.

Course Content

Part 1: FUNDAMENTALS OF RESERVOIR GEOLOGY

15 d
Introduction to reservoir characterization.
Petrophysics - Reservoir properties from cores & logs evaluation.
Reservoir modeling workshop.

Part 2: FLUIDS, WELLBORE INTERFACE & WELL PRODUCTIVITY, WELL TESTING

15 d
Reservoir fluid properties.
Drilling and completion - Wellbore interface and well productivity.
Well testing and well test analysis.

Part 3: RESERVOIR DRIVE MECHANISMS & RESERVOIR MANAGEMENT

14 d
Drive mechanisms - Enhanced Oil Recovery.
Reservoir management.

Part 4: RESERVOIR SIMULATION & FINAL DEVELOPMENT PROJECT WORKSHOP

20 d
Dynamic reservoir simulation.
Final teamwork workshop - 2 weeks of hands-on workshop focused on optimizing an oil field development project integrating real laboratory data, field data and simulation model.

Reference: RESENG-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT
Rueil-Malmaison 20 September 17 December £35,490

This course is also available in French: RESENG-FR-P. Please contact us for more information.

www.ifptraining.com
Reservoir Management Workshop

Course Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION TO RESERVOIR MANAGEMENT</td>
<td>0.25 d</td>
</tr>
<tr>
<td>DECISION MAKING PROCESS &amp; BUSINESS ASPECTS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>RESOURCES &amp; RESERVES DEFINITIONS &amp; CLASSIFICATION</td>
<td>0.25 d</td>
</tr>
<tr>
<td>RESERVOIR CHARACTERIZATION &amp; ACCUMULATIONS EVALUATION</td>
<td>0.75 d</td>
</tr>
<tr>
<td>RESERVES EVALUATION</td>
<td>0.75 d</td>
</tr>
<tr>
<td>DATA ACQUISITION &amp; RESERVOIR MONITORING FOR IOR/EOR</td>
<td>0.5 d</td>
</tr>
<tr>
<td>RISKS &amp; UNCERTAINTIES</td>
<td>0.75 d</td>
</tr>
<tr>
<td>WORKSHOP - CASE STUDY</td>
<td>1.25 d</td>
</tr>
</tbody>
</table>

Level: SKILLED

Purpose

This course provides a comprehensive overview of various techniques used in the management of an asset, throughout its lifecycle, from discovery to end of production.

Audience

Geoscientists, reservoir engineers, petroleum engineers, asset managers and economists involved in reservoir management and production optimization related activities.

Learning Objectives

Upon completion of the course, participants will be able to:
- discuss main concepts of Reservoir Management from geology to hydrocarbon recovery and export point,
- include each Reservoir Management component within the field development workflow and discuss the importance of timing and cost/benefit analysis,
- describe and discuss decision making process of field development projects and related economical criteria,
- define and discuss concepts of resources and reserves and their related classification and describe Petroleum Resources Management System (PRMS),
- discuss main resources and reserves evaluation techniques,
- describe main reservoirs monitoring techniques allowing to apply IOR/EOR methods and increase recovery,
- discuss main concepts of risks and uncertainties and their integration into reserves evaluation.

Ways & Means

- Interactive lectures and exercises.
- Field case study workshop.

Learning Assessment

Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites

Experienced professionals from E&P industry, with basic knowledge in reservoir management.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: RMNGT-EN-P

This course can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT

Rueil-Malmaison 15 November 19 November €3,120

This course is also available in French: RMNGT-FR-P. Please contact us for more information.
Reservoir Management Foundation

Virtual Classroom
This course is available in face-to-face mode

**Course Content**

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION TO RESERVOIR MANAGEMENT</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Objective of reservoir management.</td>
<td></td>
</tr>
<tr>
<td>Field development projects: an integrated effort.</td>
<td></td>
</tr>
<tr>
<td><strong>DECISION MAKING PROCESS &amp; BUSINESS ASPECTS</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Decision making process of field development projects.</td>
<td></td>
</tr>
<tr>
<td>Fundamentals of petroleum economics and economic criteria (NPV, IRR…).</td>
<td></td>
</tr>
<tr>
<td><strong>RESOURCES &amp; RESERVES DEFINITIONS &amp; CLASSIFICATION</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>SPE-PRMS definitions and guidelines.</td>
<td></td>
</tr>
<tr>
<td>SEC definitions and guidelines.</td>
<td></td>
</tr>
<tr>
<td><strong>RESERVOIR CHARACTERIZATION &amp; ACCUMULATIONS EVALUATION</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Data gathering, data base, quality control.</td>
<td></td>
</tr>
<tr>
<td>Reservoir characterization and geomodeling workflow.</td>
<td></td>
</tr>
<tr>
<td>Evaluation of Oil &amp; Gas accumulations.</td>
<td></td>
</tr>
<tr>
<td><strong>RESERVES EVALUATION</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Review of Oil &amp; Gas reservoirs production mechanisms and related expected recovery factors.</td>
<td></td>
</tr>
<tr>
<td>Review of methods for estimating recovery:</td>
<td></td>
</tr>
<tr>
<td>Analogs.</td>
<td></td>
</tr>
<tr>
<td>Material balance.</td>
<td></td>
</tr>
<tr>
<td>Decline curves analysis.</td>
<td></td>
</tr>
<tr>
<td>Dynamic reservoir simulation.</td>
<td></td>
</tr>
<tr>
<td><strong>DATA ACQUISITION &amp; RESERVOIR MONITORING FOR IOR/EOR</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>IOR/EOR definitions, facilities, planning and costs.</td>
<td></td>
</tr>
<tr>
<td>Cased hole logging (saturation logging, production logging…).</td>
<td></td>
</tr>
<tr>
<td>4D Seismic.</td>
<td></td>
</tr>
<tr>
<td><strong>RISKS &amp; UNCERTAINTIES</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Introduction to risks and uncertainties:</td>
<td></td>
</tr>
<tr>
<td>Definitions. Notions of probability and of probability density function.</td>
<td></td>
</tr>
<tr>
<td>Decision trees.</td>
<td></td>
</tr>
<tr>
<td>Sources of uncertainties:</td>
<td></td>
</tr>
<tr>
<td>Structural uncertainties.</td>
<td></td>
</tr>
<tr>
<td>Geological uncertainties.</td>
<td></td>
</tr>
<tr>
<td>Reservoir uncertainties.</td>
<td></td>
</tr>
<tr>
<td>Uncertainty assessment techniques:</td>
<td></td>
</tr>
<tr>
<td>Monte-Carlo simulation.</td>
<td></td>
</tr>
<tr>
<td>Experimental design and response surface methodology.</td>
<td></td>
</tr>
</tbody>
</table>

**Ways & Means**
Interactive lectures and exercises.

**Prerequisites**
Degree in geoscience or reservoir engineering.

**Expertise & Coordination**
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: RMNGTF-EN-D
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Classroom</td>
<td>14 June</td>
<td>17 June</td>
<td>€2,880</td>
</tr>
</tbody>
</table>

www.ifptraining.com
**Gas Reservoir Management**

**Level:** SKILLED

**Purpose**
This course provides an extensive and practical knowledge about optimizing gas & gas condensate reservoirs development and management.

**Audience**
Reservoir engineers, petroleum engineers, field development engineers and production engineers involved in gas and gas condensate reservoirs development and management.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- describe PVT modeling of gas and gas condensates,
- apply classic methods to estimate gas and gas condensates accumulations and recovery included material balance and decline curves analysis,
- perform basic gas well testing and determine deliverability,
- apply decline curve analysis and rate transient analysis for estimating initial gas in place and ultimate estimates reserves,
- apply basic reservoir management methods for optimizing with gas reservoirs performance and dealing with water influx and condensate banking phenomena.

**Ways & Means**
Interactive lectures and exercises.

**Prerequisites**
Degree in geology or reservoir engineering, with experience in reservoir management.

**Expertise & Coordination**
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAS RESERVOIR FLUID PROPERTIES</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Gas reservoir fluid properties: dry gas, wet gas and gas condensate:</td>
<td></td>
</tr>
<tr>
<td>PVT modeling of gas and gas condensates.</td>
<td></td>
</tr>
<tr>
<td>Experimental data for gas and gas condensates.</td>
<td></td>
</tr>
<tr>
<td>PVT sampling procedure.</td>
<td></td>
</tr>
<tr>
<td>Condensate banking.</td>
<td></td>
</tr>
<tr>
<td><strong>GAS MATERIAL BALANCE</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Gas reservoirs and wells modeling through material balance methods: dry gas, wet gas, gas condensates.</td>
<td></td>
</tr>
<tr>
<td>Estimate of initial gas in place through material balance methods.</td>
<td></td>
</tr>
<tr>
<td><strong>GAS WELL TESTING</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Gas reservoirs fluid flow and well testing - Non Darcy flow.</td>
<td></td>
</tr>
<tr>
<td>Gas wells deliverability and AOFP.</td>
<td></td>
</tr>
<tr>
<td>Flow after flow tests, drawdown and buildup tests.</td>
<td></td>
</tr>
<tr>
<td><strong>GAS RESERVOIR PERFORMANCE FORECAST</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Decline curve analysis and rate transient analysis:</td>
<td></td>
</tr>
<tr>
<td>Determining IGIP.</td>
<td></td>
</tr>
<tr>
<td>Determining gas reservoir performance and UER forecast.</td>
<td></td>
</tr>
<tr>
<td><strong>GAS RESERVOIR MANAGEMENT</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Optimizing gas reservoir performance:</td>
<td></td>
</tr>
<tr>
<td>Water influx.</td>
<td></td>
</tr>
<tr>
<td>Gas condensates reservoir and condensate banking - Cycling.</td>
<td></td>
</tr>
<tr>
<td>Well performance aspects.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: GASRMGT-EN-A  Only available as an In-House course.  Contact: ep.contact@ifptraining.com
Virtual Classroom
This course is available in face-to-face mode

Reserves Evaluation - Risks & Uncertainties

Level: SKILLED

Purpose
This course provides a comprehensive and practical understanding of methods of evaluation and classification of hydrocarbons resources and reserves (PRMS, SEC) and related issues, especially risks and uncertainties and how to assess/mitigate these risks and uncertainties.

Audience
Geoscientists, reservoir engineers, asset managers, economists, government representatives interested or involved in resources and reserves estimation and reporting, as well as related risks & uncertainties assessment.

Learning Objectives
Upon completion of the course, participants will be able to:
- describe E&P field development projects workflow and related decision making process,
- define concepts of resources and reserves and describe the Petroleum Resources Management System (PRMS) and Securities and Exchange Commission (SEC) system,
- discuss and apply main petroleum economical criteria affecting reserves evaluation,
- discuss principles of reservoir characterization and engineering,
- perform simple resources and reserves estimate,
- discuss concepts of risks and uncertainties,
- identify main sources of risks and uncertainties and discuss methods about integrating risks and uncertainties into resources and reserves evaluation: structural uncertainties, geological uncertainties, dynamic uncertainties, geostochastic modeling, etc.

Ways & Means
Interactive courses and exercises.

Prerequisites
Basic knowledge in reservoir characterization and reservoir engineering.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of reserves evaluation and risk and uncertainties assessment, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION TO FIELD DEVELOPMENT PROJECTS</td>
<td>1 d</td>
</tr>
<tr>
<td>RESERVOIR CHARACTERIZATION &amp; ACCUMULATIONS EVALUATION</td>
<td>1 d</td>
</tr>
<tr>
<td>RESERVES EVALUATION</td>
<td>1 d</td>
</tr>
<tr>
<td>RISKS &amp; UNCERTAINTIES</td>
<td>2 d</td>
</tr>
</tbody>
</table>

Ways & Means
Interactive courses and exercises.

References:
RISKUN-EN-D
Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

Location
Start Date
End Date
Tuition Fees excl. VAT
Virtual Classroom
4 October
9 October
€2,960
This course can be adapted to virtual classroom mode

**Mature Fields - Subsurface Issues**

**Level:** AWARENESS

**Purpose**
This course provides a comprehensive and practical understanding of methods and issues related to the reevaluation of mature hydrocarbons fields (brown fields) in order to optimize the production and increase the reserves.

**Audience**
Geoscientists, reservoir engineers, petroleum engineers and asset managers involved in managing and optimizing mature fields.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- discuss and apply the principles of reservoir management; learning how to conserve the reservoir energy, implementing the proven strategies, applying the energy (advanced) technologies for field development,
- discuss and apply the economical criteria and procedure for selecting a development plan.

**Ways & Means**
Interactive courses and exercises.
Various case studies allowing to apply the principles of reservoir management.

**Prerequisites**
Experience in the E&P industry, with basic knowledge in reserve estimation.

**Expertise & Coordination**
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRINCIPLES OF RESERVOIR MANAGEMENT</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Introduction to field redevelopment study.</td>
<td></td>
</tr>
<tr>
<td>Reserves evaluation.</td>
<td></td>
</tr>
<tr>
<td>Understanding the reservoir production energy.</td>
<td></td>
</tr>
<tr>
<td>Development using proven strategies.</td>
<td></td>
</tr>
<tr>
<td>Reservoir monitoring and data acquisition.</td>
<td></td>
</tr>
<tr>
<td>Application of improved recovery techniques.</td>
<td></td>
</tr>
<tr>
<td>Exercises.</td>
<td></td>
</tr>
<tr>
<td><strong>RESERVES ESTIMATIONS, PROBLEMS IDENTIFICATION</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Performance analysis and criteria for performance analysis methods.</td>
<td></td>
</tr>
<tr>
<td>Identifying shut-in or low PI's wells.</td>
<td></td>
</tr>
<tr>
<td>Analyzing the surface gathering network and identifying the main bottlenecks.</td>
<td></td>
</tr>
<tr>
<td>Defining a monitoring plan.</td>
<td></td>
</tr>
<tr>
<td>Improved Oil Recovery (IOR) techniques.</td>
<td></td>
</tr>
<tr>
<td>Enhanced Oil Recovery (EOR) techniques.</td>
<td></td>
</tr>
<tr>
<td>Exercises.</td>
<td></td>
</tr>
<tr>
<td><strong>PRINCIPLES OF RESERVOIR MANAGEMENT PRINCIPLES - CASE STUDIES</strong></td>
<td>2 d</td>
</tr>
<tr>
<td>Case study n°1: Development of a reservoir with excessive gas production.</td>
<td></td>
</tr>
<tr>
<td>Case study n°2: Development of tight oil reservoirs (improved techniques).</td>
<td></td>
</tr>
<tr>
<td>Case study n°3: Development of a mature field (proven strategies).</td>
<td></td>
</tr>
<tr>
<td><strong>PROJECT ECONOMICS &amp; RISK EVALUATION</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Fundamentals of petroleum economics.</td>
<td></td>
</tr>
<tr>
<td>Economic evaluation criteria.</td>
<td></td>
</tr>
<tr>
<td>Uncertainty analysis and quantification.</td>
<td></td>
</tr>
<tr>
<td>Risk analysis and management.</td>
<td></td>
</tr>
<tr>
<td>Exercises.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: MATFILD-EN-A

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: MATFILD-FR-A. Please contact us for more information.
IRM - Integrated Reservoir Management

Course Content

RESERVOIR ENGINEERING & FIELD DEVELOPMENT FUNDAMENTALS (IFP Training)  
Production geology.
Petrophysics: rock properties (porosity, saturation, permeability) and their interactions with fluids.
Well logging and well log interpretation.
Fluid properties: PVT oil, gas and water.
Wellbore interface and wellbore treatment. Well performance.
Well testing and well test analysis.
Drive mechanisms:
- Primary recovery: natural depletion of Oil & Gas fields related performance.
- Secondary recovery: immiscible water and gas injection in oil fields and related performance.
- Enhanced Oil Recovery: miscible gas injection, chemical flooding or thermal process.
Reserves evaluation and classification.
Risks and uncertainties assessment.
Development project & planning, Decision making process.
E&P economics & contracts. Economical criteria.

FIELD CASE STUDY (Imperial College)  
Development and application of a reservoir simulation model for reservoir management, including up scaling, history matching, and reservoir performance prediction, field development planning and simple economic analysis.
UK field development project.
Field trip to the Wessex basin.
Group-based computer-aided exercise covering the development and monitoring of a large oil field.
Data analysis, development of a reservoir simulation model, including upscaling and history matching.
Application of model to identify an optimum field development plan with simple economic evaluation.

RESERVOIR MANAGEMENT FUNDAMENTALS & FIELD CASE STUDIES (IFP Training)  
Production logging.
Time-lapse seismic.
Decline curve analysis.
Special case of unconventional reservoirs.
Condensate gas reservoir development:
- Reminders about gas reservoirs.
- Reservoir performance modeling and optimization.
- Well performance.
- Integrated production modeling and optimization using IPM™ suite industrial software.
Offshore oil reservoir development:
- Estimate of accumulation.
- Drive mechanisms identification and assessment.
- Optimization of wells location while taking into account technical and economic constraints (production flowrates, workover, platform/subsea wells, surface fluids treatment/management etc.).
- Optimization of injection flowrates and cycling periods (option).
- Uncertainties assessment.
- Conclusions and FDP recommendation.

Ways & Means

- Highly interactive course with actual case studies.
- Animation by E&P senior experienced lecturers.
- A field trip in Wessex (England) followed by two weeks course in Imperial College (London) focused on field development optimization.
- A condensate gas reservoir integrated project focused on integrated production management and related tools.
- A final project focused on an FDP optimization including uncertainties assessment with a presentation to a jury.
- Software used during workshops: with courtesy of Beicip-Franlab, Kappa Engineering and Schlumberger.

Prerequisites

Degree in geoscience, reservoir engineering, petroleum engineering or E&P project management.

More info

Accommodation and transportation costs are not included in the fee. Logistics can be organized by IFP training. A specific brochure for this program is available on request.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: RM-EN-P. Only available as an In-House course.
Contact: ep.contact@ifptraining.com

www.ifptraining.com
Course Content

Part I: INTRODUCTION TO GEOTHERMAL ENERGY

EARTH, AN ACTIVE PLANET
Earth structure and tectonics.
Thermal regime of the Earth.

HEAT FLUX & GEOTHERMAL GRADIENT
Theoretical considerations on heat transport and storage in rocks.
The geothermal gradient.

RESERVOIR TYPES & USES
Dry rocks, porous and fractured reservoirs.
Geothermal single wells and doublets.
Geothermal heat exchanger.

DIFFERENT KINDS OF RESOURCES
Low temperature.
High temperature.

APPLICATIONS OF GEOTHERMAL ENERGY
Direct use of heat.
Power generation.

Part II: FROM EXPLORATION TO PRODUCTION

EXPLORATION
Exploration techniques.
Identification of potential reservoirs and geothermal resources.

DRILLING A WELL
Specifics of geothermal well planning.
Drilling issues: well stability and drilling fluid cooling.
Drilling risks: steam, gases, and seismic events.
Well stimulation.

EVALUATION
While drilling: mud-logging and temperatures.
After drilling: well evaluation and testing.

OPERATION HAZARDS
Geological.
Environmental.
Technical.

PRODUCTION
Geothermal plants and networks.
Pros and cons of geothermal energy.
Field Development Project & Uncertainties

Course Content

ECONOMIC EVALUATION OF FIELD DEVELOPMENT PROJECTS
1 d
Field development projects decision making process.
Projects economics: methods and criteria.
Oil tax legislation.
Types of petroleum contracts: concession, production sharing.

FIELD DEVELOPMENT PROJECT - CASE STUDY
4 d
From discovery to development of an oil field: methodology from a real field case.
Geological context and discovery.
Appraisal phase (field evaluation after each appraisal well):
Evaluation of reservoir properties.
Wells correlation.
Estimation of accumulation.
Development phase:
Setting up various scenarios from identified drive mechanisms.
Estimation of reserves, plateau and production profile.
Surface/subsurface integration.
Economical evaluation of scenarios: CAPEX, OPEX, NPV, IRR, etc.
Field development and uncertainties:
Why quantifying uncertainties in reservoir studies?
Overview of the response surface methodology and experimental design approach.
Identification of the most influential uncertain parameters. Consequences on field evaluation and production forecasts.

Ways & Means
Interactive lectures and exercises.
Field case study with real data set.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Basic knowledge in geosciences and reservoir engineering.

Reference: FDP-EN-P
Only available as an In-House course.
Contact: ep.contact@ifptraining.com
This course is also available in French: FDP-FR-P. Please contact us for more information.

Audience
Geoscientists, reservoir engineers, petroleum engineers, asset managers and economists willing to deepen their knowledge in field development project and uncertainties management.

Learning Objectives
Upon completion of the course, participants will be able to:
- discuss and apply best practices of Oil & Gas fields development projects,
- discuss and apply methods and criteria for economic evaluation of development projects,
- discuss main concepts and tools of risks and uncertainties assessment, included experimental design and response surface methodology.

Ways & Means
- Interactive lectures and exercises.
- Field case study with real data set.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Basic knowledge in geosciences and reservoir engineering.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.
**Course Content**

Each presentation of an utility system includes the following content: objectives, production generation, description, control systems, networks and users, critical situations.

### UTILITIES PRESENTATION

<table>
<thead>
<tr>
<th>Utility System</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIR PRODUCTION</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Heating &amp; Cooling System</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Utilities Related to Safety</td>
<td>1.25 d</td>
</tr>
<tr>
<td>BALLAST</td>
<td>0.25 d</td>
</tr>
<tr>
<td>ENERGY FOR TURBINES, ENGINES, ASSISTANCE BOATS, HELICOPTERS</td>
<td>0.75 d</td>
</tr>
<tr>
<td>CHEMICAL PRODUCTS SYSTEM</td>
<td>0.5 d</td>
</tr>
<tr>
<td>SEA WATER USES</td>
<td>0.5 d</td>
</tr>
<tr>
<td>DRAINS SYSTEMS</td>
<td>1 d</td>
</tr>
</tbody>
</table>

### Prerequisites

2 months experience in Oil & Gas industry.

### Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Reference:** F-UTIL-EN-A  
Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Field Development Project
Scheme Selection - Design - Schedule - Project Profitability

Level: KNOWLEDGE

Purpose
This course provides the knowledge, methodology and tools to orchestrate work and integrate contributions of engineers from all disciplines working in a project team with the purpose of devising field development schemes.

Audience
Engineers from all upstream Oil & Gas disciplines: reservoir, drilling and well completion, treatment facilities, cost estimation, design…

Learning Objectives
Upon completion of the course, participants will be able to:
▶ consolidate the fundamentals to lead a field development study,
▶ acquire world class methodology in Oil & Gas field development,
▶ assess and assemble contributions of all technical disciplines involved in mapping out a field development scheme,
▶ outline the design of flow-lines, processing facilities and export facilities,
▶ make an efficient contribution to field development multidisciplinary project teams.

Ways & Means
▶ Intensive 10-day work on a full field development project, with deliverables presented to a jury in a plenary session.
▶ Coaching throughout the training by industry experts for a highly interactive learning experience.
▶ Several teamwork sessions with practical exercises.
▶ Use of several professional software programs for designing facilities and sizing equipment.

Learning Assessment
Oral presentation in front of a jury at the end of the program.

Prerequisites
Engineer diploma or equivalent experience in the Oil & Gas industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content
15 days

FUNDAMENTALS OF RESERVOIR, DRILLING & COMPLETION
0.5 d

WELL EFFLUENTS BEHAVIOR - NEED FOR EFFLUENT FIELD PROCESSING
0.5 d

CRUDE OIL TREATMENT
0.5 d

PRODUCTION & INJECTION WATER TREATMENT
0.5 d

GAS PROCESSING & CONDITIONING
0.5 d

SIMULATION OF OIL & GAS FIELD TREATMENT
1 d

CASE OF OFFSHORE DEVELOPMENTS - FLOW ASSURANCE
0.25 d

SAFETY & ENVIRONMENT
0.25 d

PROJECT MANAGEMENT
0.5 d

PETROLEUM ECONOMICS
0.5 d

FIELD DEVELOPMENT PROJECT (teamwork project with experienced coach)
10 d

Deliverables:
Data collection and analysis. Identification of the technically feasible scenarios. Selection of the optimum scenario.
Design of flow-lines and study of flow assurance issues.
Design of surface processing facilities: Process Flow Diagram (PFD), operating conditions, main control loops…
Design of export pipelines and estimation of floating storage capacities.
Estimation of power requirements and consequently the fuel gas balance.
Topside layout, minimizing hazards.
Tentative schedule for the project. Cost estimation and project profitability analysis.
Contracting policy. Local content policy.

Jury: presentation of the results and comments with members of the Jury.

PEDAGOGICAL METHODOLOGY
Team work exercise, in order to promote an efficient collaborative work.
Continuous coaching by industry experts, for a highly interactive learning.
Use of several industrial-proven software for the design of the installations and the sizing of the equipment.

Reference: FDEV-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>18 October</td>
<td>5 November</td>
<td>€9,840</td>
</tr>
</tbody>
</table>

This course is also available in French: FDEV-FR-P. Please contact us for more information.
Drilling & Completion Engineering

- General Drilling & Completion
  - Well Operations & Completion Engineering Certification ........................................ p. 143
  - Supervisor Training on Drilling Simulator ................................................................. p. 144
  - Drilling Fundamentals ................................................................................................. p. 145
  - Well Completion & Servicing ...................................................................................... p. 146
  - Drilling & Completion Engineering Certification ....................................................... p. 147
  - Drilling Engineering ..................................................................................................... p. 148
  - Completion Engineering .............................................................................................. p. 149
  - DeepWater Drilling and Completion Certification ....................................................... p. 150

- Drilling
  - Practical Aspects of Well Construction & Planning .................................................. p. 151
  - Geological Field Trip for Drillers ................................................................................ p. 152
  - Fundamentals of Drilling & Completion ..................................................................... p. 153
  - Well Architecture & Equipment .................................................................................. p. 154
  - Bit & Drill String & Fishing while Drilling ................................................................... p. 155
  - Rig, BOP’s & Well Control Equipment ....................................................................... p. 156
  - Data Acquisition during Drilling Operations .............................................................. p. 157
  - HSE in Drilling Operations ............................................................................................ p. 158
  - Directional & Horizontal Drilling Certification ............................................................ p. 159
  - Geomechanics for Drillers ......................................................................................... p. 160
  - Underbalanced & Managed Pressure Drilling: Applications, Design & Operations .... p. 161
  - Geosteering ................................................................................................................. p. 162
  - Deepwater Drilling & Development Certification ....................................................... p. 163
  - Wellhead & Blowout Preventers .................................................................................. p. 164
  - Stuck Pipe Prevention .................................................................................................. p. 165
  - HPHT Drilling Design & Operations ............................................................................. p. 166

- Fluids
  - Drilling Fluids ............................................................................................................... p. 167
  - Cementing Practices .................................................................................................... p. 168
  - Advanced Cementing Practices .................................................................................. p. 169

- Completion & Well Operations
  - Wellhead Selection & Maintenance .......................................................................... p. 170
  - Well Productivity & Reservoir - Wellbore Interface .................................................... p. 171
  - Well Test Operation ...................................................................................................... p. 172
  - Well-Completion Equipment & Procedures for Flowing Wells .................................... p. 173
  - Tubing Movement & Forces ........................................................................................ p. 174
  - Wellbore Treatments .................................................................................................... p. 175
  - Matrix Acidizing .......................................................................................................... p. 176
  - Basic Hydraulic Fracturing ......................................................................................... p. 177
  - Artificial Lift & Well Intervention Fundamentals ......................................................... p. 178
  - Artificial Lift: Gas Lift ................................................................................................... p. 179
  - Artificial Lift: Pumping ................................................................................................. p. 180
  - Coiled Tubing & Nitrogen Operations in Completion & Workover ........................... p. 181
  - Well Equipment & Operation for Production Engineer ............................................. p. 182
  - Well Servicing & Workover ....................................................................................... p. 183
  - Well Performance ........................................................................................................ p. 184
  - Advanced Well Performance ....................................................................................... p. 185
  - Well Integrity ............................................................................................................... p. 186
  - Well Production Integrity ............................................................................................. p. 187
  - Well Production Integrity Management ........................................................................ p. 188
  - Well Performance Engineering Certification ............................................................. p. 189
  - Well Integrity Engineering Certification ...................................................................... p. 190

- Well Control
  - Well Control - Level 2 ................................................................................................. p. 191
  - Well Control - Level 3 or 4 ......................................................................................... p. 192
  - Well Intervention & Pressure Control - Level 2 ......................................................... p. 193
  - Enhanced Well Control - Level 4 ................................................................................ p. 194
  - Well Intervention & Pressure Control - Level 3 or 4 ................................................... p. 195
  - Stripping ....................................................................................................................... p. 196
Graduate Certificate
Well Operations & Completion Engineering Certification

Level: KNOWLEDGE

Purpose
This course provides an in-depth, practical understanding of completion techniques, operations, equipment and procedures.

Audience
Young engineers and supervisors involved in drilling and completion, well production and operations.

Learning Objectives
Upon completion of the course, participants will be able to:
- assist in completion operations on site; and, with some experience, manage those operations,
- define a completion program, and, with some on-site experience, design and implement such a program,
- pass the IWCF “Well Intervention and Pressure Control” certification.

Ways & Means
- Equipment and cutaway tools display.
- Exercises, role-playing sessions and case studies.
- Summary notes prepared and presented by the participants.
- 5-day completion project, ending with a presentation to a jury.
- Knowledge assessment on a weekly basis.

Learning Assessment
Quiz and presentation of the project to a jury.

Prerequisites
Holders of a Bachelor’s degree or equivalent, young-hire junior engineers or people willing move from drilling to completion.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Well Operations & Completion Engineering Certification.
- Ready-to-use skills.

Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FUNDAMENTALS OF DRILLING &amp; COMPLETION</td>
<td>5 d</td>
</tr>
<tr>
<td>2</td>
<td>WELL PRODUCTIVITY &amp; RESERVOIR - WELLBORE INTERFACE</td>
<td>5 d</td>
</tr>
<tr>
<td>3</td>
<td>WELL COMPLETION EQUIPMENT &amp; PROCEDURES FOR FLOWING WELLS</td>
<td>5 d</td>
</tr>
<tr>
<td>4</td>
<td>WELLBORE TREATMENTS</td>
<td>5 d</td>
</tr>
<tr>
<td>5</td>
<td>ARTIFICIAL LIFT &amp; WELL INTERVENTION FUNDAMENTALS</td>
<td>5 d</td>
</tr>
<tr>
<td>6</td>
<td>COILED TUBING &amp; NITROGEN OPERATIONS IN COMPLETION &amp; WORKOVER</td>
<td>5 d</td>
</tr>
<tr>
<td>7</td>
<td>WELL INTERVENTION &amp; PRESSURE CONTROL</td>
<td>5 d</td>
</tr>
<tr>
<td>8</td>
<td>PROJECT ON COMPLETION PROGRAM</td>
<td>5 d</td>
</tr>
</tbody>
</table>

Completion design.
Tubing calculations.
Fluids design.
Chronology of operations.
Presentation to a jury.

This course is also available in French: INTP-FR-P. Please contact us for more information.

Reference: INTP-EN-P - Only available as an In-House course.

ep.contact@ifptraining.com

This course is also available in French: INTP-FR-P. Please contact us for more information.
Supervisor Training on Drilling Simulator

Course Content

<table>
<thead>
<tr>
<th>COMMON OBJECTIVES FOR ALL EXERCISES</th>
<th>5 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reminders of the good practice and the company rules (if any).</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Work on the simulators with various situations.</td>
<td></td>
</tr>
<tr>
<td>Analyze the situations.</td>
<td></td>
</tr>
<tr>
<td>Prepare the instructions.</td>
<td></td>
</tr>
<tr>
<td>Manage the prejob/safety meetings.</td>
<td></td>
</tr>
<tr>
<td>Follow the ongoing operations.</td>
<td></td>
</tr>
<tr>
<td>Detect potential problems.</td>
<td></td>
</tr>
<tr>
<td>React properly.</td>
<td></td>
</tr>
<tr>
<td>Adapt the program if needed.</td>
<td></td>
</tr>
</tbody>
</table>

| TRIPPING | 0.5 d |
| Work on the simulators with various situations, prepare the program for the trip or wiper trip in a vertical and deviated well, follow the ongoing operations, drags, torque, swabbing, back reaming, pump out of hole, detect potential problems. |  |

| CASING OPERATION | 0.5 d |
| Work with various situations, prepare the program to run the casing in the hole, follow the ongoing operations, filling up the casing, drags, surging, detect potential problems, and react properly. |  |

| CEMENTING OPERATION | 0.5 d |
| Prepare the program for the cementing job in various situations, follow the ongoing operations, regular cement job, kick while cementing, losses and detect potential problems if any, react property and adapt the program if needed. |  |

| LOT & ELOT | 0.5 d |
| Prepare the program for the integrity test of the formation, follow the ongoing operations, FIT, LOT, ELOT, detect potential problems, react properly and adapt the program if needed. |  |

| CIRCULATION, HOLE CLEANING | 0.5 d |
| Work on the simulators with various hole cleaning issues, prepare the program, follow the ongoing operations, PW, SOW, FRW, ECD, SPP, detect potential problems of hole cleaning, react properly and adapt the program if needed by changing or adjusting hydraulic parameters. |  |

| LOSSES | 0.5 d |
| Analyze the situation, follow the ongoing operations, drilling, RIH, circulation, detect potential problems of losses (partial or total losses), react properly, adapt the program if needed. |  |

| STUCK PIPE | 0.5 d |
| Work on the simulators with various stuck pipe situations, follow the ongoing operation, drilling, POOH, jarring, detect potential problems (key seat, differential pressure sticking, packoff), react properly and free the string. |  |

| WELL CONTROL IN HORIZONTAL WELL | 0.5 d |
| Manage the operations to kill a well with a kick in a horizontal profile. |  |

| SHALLOW GAS | 0.5 d |
| Work on the simulators with various situations leading to a shallow gas kick, prepare the program to anticipate the problem, follow the ongoing operation, drilling of the top hole, pilot hole, detect potential problems, kick while drilling, kick during pipe connection, kick while POOH, react properly with dynamic killing procedure and diverter use. |  |

| WELL CONTROL WITH CP>MAASP | 0.5 d |
| Kick exceeding kick tolerance, manage the killing operation, follow the ongoing operation, kick circulation, detect potential problems when CP close to MAASP, react properly avoiding fracture of the formation if possible and managing the BHP. |  |

Remark: this list is not complete and various other scenarios are available and can be created at the request of the client.

Reference: FOSIM-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: FOSIM-FR-P. Please contact us for more information.
Drilling Fundamentals

Purpose
This intensive course provides a comprehensive overview of drilling and completion techniques and operations.

Audience
This course is dedicated for all the professionals interested but not involved in drilling operations for Oil & Gas, geothermal and storage wells (i.e. geologists, geophysicists, reservoir engineers, completion, production and process staff, platform designers, economists, etc.).

Learning Objectives
Upon completion of the course, participants will be able to:
- recognize the vocabulary specific to drilling,
- identify and describe drilling operations and equipment used,
- identify the different professionals involved in drilling and learn about their roles and responsibilities.

Ways & Means
- Videos and animations.
- Exercises.
- Visit to a drilling site*.
  * When the course is delivered in Rueil-Malmaison, practical illustration is provided by video.

Learning Assessment
Continuous evaluation: exercises and oral questions.

Prerequisites
Basic technical knowledge in the Oil & Gas industry.

More info
Refer to the following complementary courses which might be of interest:
“Introduction to Reservoir Engineering”, “Well Completion & Servicing”, “Oil & Gas Field Processing”.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

ORGANIZATION OF DRILLING OPERATIONS
Drilling principles.
Cost, duration of a drilling job.
Different people involved, types of contracts.
Safety.
0.5 d

DRILLING PRINCIPLES - EQUIPMENT
Different types of bits.
Drilling string.
Drilling rig:
- Hoisting function and equipment.
- Pumping function and equipment.
- Rotating function and equipment.
- Power function.
- Safety function and equipment.
Mud and solid treatment.
1.25 d

WELL ARCHITECTURE
Reservoir notions.
Functions of different casings.
Parameters to be taken into account to determine well architecture.
Examples of architectures.
0.5 d

SPECIAL OPERATIONS
Cementing operations.
Wellhead.
Directional drilling.
Well control.
Fishing jobs.
Wireline logging, well test (DST).
1.25 d

DRILLING ON A SIMULATOR (Pau)
Use of a well control simulator to show the drilling operations (tripping, drilling, running of casings).
0.25 d

OFFSHORE DRILLING OPERATIONS
Different types of rigs.
Problems related to their use.
0.25 d

WELL COMPLETION
Reservoir-wellbore interface.
Equipment for flowing wells.
Well intervention.
0.25 d

TECHNOLOGIES IN USE FOR ENERGETIC TRANSITION
Geothermal wells.
Underground storage wells.
Hybrid-powered rig equipped with battery Energy Storage System (ESS) to reduce emissions.
Utilization of production associated gas to power gas turbine to reduce the carbon footprint.
Environmental technology (i.e. oilfield waste disposal and decommissioning of offshore oil and gas installations).
0.25 d

VISIT OF A DRILLING SITE*
0.5 d

Reference: INFOR-EN-P
Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT
Pau 20 September 24 September €3,690
Rueil-Malmaison 18 October 22 October €3,690

This course is also available in French: INFOR-FR-P. Please contact us for more information.
This course can be adapted to virtual classroom mode

Well Completion & Servicing

**Level:** AWARENESS

**Purpose**
This course provides a comprehensive overview of completion and well intervention operations.

**Audience**
Engineers and technicians, from operating or service companies, interested but not involved in well completion or servicing: geologists, geophysicists, reservoir engineers, drillers, production and process staff, platform designers, economists, etc.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- recognize the connection between reservoir and completion,
- distinguish between the main configurations and techniques of completion,
- review advantages and issues of various techniques,
- communicate efficiently with Oil & Gas service companies and equipment suppliers.

**Ways & Means**
- Well control on a simulator.
- Equipment and cutaway tools display.
- Exercises, role-playing sessions, project and case studies.
- Summary notes prepared and presented by the participants.

**Learning Assessment**
Discussion of the summary notes prepared and presented by the participants.

**Prerequisites**
Basic technical knowledge in the Oil & Gas industry.

**More info**
Kindly refer to the following complementary courses which might be of interest:
- “Introduction to Reservoir Engineering”
- “Drilling Fundamentals”, and “Oil & Gas Field Processing”.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

### Course Content

**NECESSARY FUNDAMENTALS OF RESERVOIR ENGINEERING FOR COMPLETION** 0.75 d
- Introduction: area concerned by completion, main steps.
- Geological trap, rock properties.
- Fluid behavior.
- Reservoir characterization, well testing.
- Recovery mechanisms.

**NECESSARY FUNDAMENTALS OF DRILLING FOR COMPLETION** 0.25 d
- Drilling and casing program, casing cementing.
- Wellhead and safety equipment (BOP).

**INTRODUCTION TO COMPLETION** 0.5 d
- Concerned area, main steps (for memory).
- Main factors influencing completion design.
- Completion configurations: requirement, main configurations.

**WELL PRODUCTIVITY & RESERVOIR-WELLBORE INTERFACE (Part 1)** 0.75 d
- Overall approach of the well flow capacity:
  - Inflow and outflow performance.
  - Need for artificial lift.
- Drilling (and casing) of the pay zone: specific aspects.
- Problems linked to restoring the cement job.
- Perforating: principle, main methods.

**EQUIPMENT OF NATURALLY FLOWING WELLS** 1 d
- Functions to be carried out and corresponding pieces of equipment, main configurations of production string(s).
- Technology and handling of main pieces of equipment: production wellhead, tubing, packer, downhole devices, subsurface safety valve.
- Running in hole procedure.
- Present trends: full-bore…, intelligent completion.

**RESERVOIR-WELLBORE INTERFACE (Part 2)** 0.5 d
- Stimulation: acidizing, hydraulic fracturing.
- Sand control.
- Horizontal drain specificity: interest, reservoir-wellbore interface.

**ARTIFICIAL LIFT** 0.5 d
- Sucker rod pumping and electrical submersible pumping: principle, main components, factor to consider for design, operating problems.
- Continuous gas lift: principle, factors to consider for design, unloading, operating problems.
- Field of application.

**WELL SERVICING & WORKOVER** 0.5 d
- Main jobs: measurement, maintenance, workover.
- Operations on live wells: wireline, coiled tubing, snubbing.
- Operations on killed wells: workover.

**KNOWLEDGE ASSESSMENT** 0.25 d

---

Reference: INPF-EN-A  
Can be organized as an In-House course.  
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>29 November</td>
<td>3 December</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: INPF-FR-A. Please contact us for more information.
Graduate Certificate
Drilling & Completion Engineering Certification

Level: KNOWLEDGE

Purpose
This course provides an in-depth, practical understanding of drilling and completion techniques, operations, equipment and procedures.

Audience
Young technicians, engineers involved in drilling and completion, supervisors, tool pushers, involved in water, geothermal or oil/gas drilling operations.

Learning Objectives
Upon completion of the course, participants will be able to:
- assist in drilling/completions operations on site and, with some experience, manage those operations,
- define a drilling/completion program and, with some on-site experience, design and implement such a program,
- pass the IWCF “Combined Surface/Subsurface BOP Stack” test.

Ways & Means
- Drilling simulator.
- Well control on a simulator.
- Equipment and cutaway tools display.
- Exercises, role-playing sessions and case studies.
- Summary notes prepared and presented by the participants.
- 10-day drilling/completion project, ending with a presentation to a jury.
- Site visits.
- Knowledge assessment on a weekly basis.

Learning Assessment
Quiz at the end of each week, final project presentation to a jury.

Prerequisites
Holders of a Bachelor’s degree or equivalent, young-hire junior engineers or candidates going through the procedure to become a manager in his/her company.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Drilling & Completion Engineering Certification.
- Ready-to-use skills.

More info
This training program is made up of two complementary training programs: “Drilling Engineering” and “Completion Engineering”. The training includes several modules; each one can be attended independently.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: FOPP-EN-P  Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>25 January</td>
<td>11 June</td>
<td>£50,420</td>
</tr>
</tbody>
</table>

This course is also available in French: FOPP-FR-P. Please contact us for more information.

Course Content 98 days

Module 1 - GEOLOGICAL FIELD TRIP FOR DRILLERS 5 d
Module 2 - FUNDAMENTALS OF DRILLING & COMPLETION 5 d
Module 3 - WELL PRODUCTIVITY & RESERVOIR - WELBORE INTERFACE 5 d
Module 4 - WELL COMPLETION EQUIPMENT & PROCEDURES FOR FLOWING WELLS 5 d
Module 5 - WELBORE TREATMENTS 5 d
Module 6 - ARTIFICIAL LIFT & WELL INTERVENTION FUNDAMENTALS 5 d
Module 7 - WELL ARCHITECTURE & EQUIPMENT 5 d
Module 8 - DRILLING FLUIDS 5 d
Module 9 - CEMENTING PRACTICES 5 d
Module 10 - BIT, DRILL STRING & FISHING WHILE DRILLING 5 d
Module 11 - DIRECTIONAL & HORIZONTAL DRILLING CERTIFICATION 5 d
Module 12 - RIG & BOP’S & WELL CONTROL EQUIPMENT 5 d
Module 13 - WELL TEST OPERATION 5 d
Module 14 - DATA ACQUISITION DURING DRILLING OPERATIONS 5 d
Module 15 - WELL CONTROL 5 d
Module 16 - DEEPWATER DRILLING & DEVELOPMENT CERTIFICATION 5 d
Module 17 - SUPERVISOR TRAINING ON DRILLING SIMULATOR 3 d
Module 18 - HSE IN DRILLING OPERATIONS 5 d
Module 19 - DRILLING & COMPLETION PROJECT 10 d

Well architecture.
Completion design.
Casing and tubing calculations.
Fluids and cementing design.
Chronology of operations.
Presentation to a jury.
Drilling Engineering

Level: KNOWLEDGE

Purpose
This course provides an in-depth, practical understanding of drilling techniques, operations, equipment and procedures.

Audience
Young technicians, engineers involved in drilling and completion, supervisors, tool pushers, involved in water, geothermal or oil/gas drilling operations.

Learning Objectives
Upon completion of the course, participants will be able to:
- assist in drilling operations on site, and, with some experience, manage those operations,
- define a drilling program; and, with some on-site experience, design and implement such a program,
- pass the IWCF “Combined Surface/ Subsurface BOP Stack” test.

Ways & Means
- Drilling simulator.
- Well control on a simulator.
- Equipment and cutaway tools display.
- Exercises, role-playing sessions, and case studies.
- Summary notes prepared and presented by the participants.
- 10-day drilling project, ending with a presentation to a jury.
- Site visits.
- Knowledge assessment on a weekly basis.
- Upon successful completion of a knowledge test, the IWCF “Well Control” Certificate is delivered.

Learning Assessment
Quiz at the end of each week, final project presentation to a jury.

Prerequisites
Engineering degree or equivalent experience within the petroleum industry.

More info
The training includes several modules; each one can be attended independently.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

- Module 1 - GEOLOGICAL FIELD TRIP FOR DRILLERS
- Module 2 - FUNDAMENTALS OF DRILLING & COMPLETION
- Module 3 - WELL PRODUCTIVITY & RESERVOIR - WELLBORE INTERFACE
- Module 7 - WELL ARCHITECTURE & EQUIPMENT
- Module 8 - DRILLING FLUIDS
- Module 9 - CEMENTING PRACTICES
- Module 10 - BIT, DRILL STRING & FISHING WHILE DRILLING
- Module 11 - DIRECTIONAL & HORIZONTAL DRILLING CERTIFICATION
- Module 12 - RIG & BOP’S & WELL CONTROL EQUIPMENT
- Module 13 - WELL TEST OPERATION
- Module 14 - DATA ACQUISITION DURING DRILLING OPERATIONS
- Module 15 - WELL CONTROL
- Module 16 - DEEPWATER DRILLING & DEVELOPMENT CERTIFICATION
- Module 17 - SUPERVISOR TRAINING ON DRILLING SIMULATOR
- Module 18 - HSE IN DRILLING OPERATIONS
- Module 19 - DRILLING PROGRAM

Well architecture.
Casing calculations.
Fluids and cementing design.
Chronology of operations.
Presentation to a jury.

Reference: FOFPF-EN-P
Can be organized as an In-House course.

Location
Start Date
End Date
Tuition Fees excl. VAT

Pau
25 January
12 February
€42,840

Pau
8 March
11 June
€42,840

This course is also available in French: FOFPF-FR-P. Please contact us for more information.
Completion Engineering

Level: KNOWLEDGE

Purpose

This course provides an in-depth, practical understanding of completion techniques, operations, equipment and procedures.

Audience

Young engineers involved in drilling and completion, supervisors, tool pushers.

Learning Objectives

Upon completion of the course, participants will be able to:
- assist in completion operations on site and, with some experience, manage those operations,
- define a completion program and, with some on-site experience, design and implement such program,
- pass the IWCF “Combined Surface/Subsurface BOP Stack” test.

Ways & Means

- Well control on a simulator.
- Equipment and cutaway tools display.
- Exercises, role-playing sessions and case studies.
- Summary notes prepared and presented by the participants.
- 10-day completion project, ending with a presentation to a jury.
- Knowledge assessment on a weekly basis.
- Upon successful completion of a knowledge test, the IWCF “Well Control” Certificate is delivered.

Learning Assessment

Quiz at the end of each week, final project presentation of project to a jury.

Prerequisites

Engineering degree or equivalent experience within the petroleum industry.

More info

The training includes several modules; each one can be attended independently.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>GEOLOGICAL FIELD TRIP FOR DRILLERS</td>
<td>5 d</td>
</tr>
<tr>
<td>Module 2</td>
<td>FUNDAMENTALS OF DRILLING &amp; COMPLETION</td>
<td>5 d</td>
</tr>
<tr>
<td>Module 3</td>
<td>WELL PRODUCTIVITY &amp; RESERVOIR - WELLBORE INTERFACE</td>
<td>5 d</td>
</tr>
<tr>
<td>Module 4</td>
<td>WELL COMPLETION EQUIPMENT &amp; PROCEDURES FOR FLOWING WELLS</td>
<td>5 d</td>
</tr>
<tr>
<td>Module 5</td>
<td>WELLBORE TREATMENTS</td>
<td>5 d</td>
</tr>
<tr>
<td>Module 6</td>
<td>ARTIFICIAL LIFT &amp; WELL INTERVENTION FUNDAMENTALS</td>
<td>5 d</td>
</tr>
<tr>
<td>Module 15</td>
<td>WELL CONTROL</td>
<td>5 d</td>
</tr>
<tr>
<td>Module 16</td>
<td>DEEPWATER DRILLING &amp; DEVELOPMENT CERTIFICATION</td>
<td>5 d</td>
</tr>
<tr>
<td>Module 17</td>
<td>SUPERVISOR TRAINING ON DRILLING SIMULATOR</td>
<td>3 d</td>
</tr>
<tr>
<td>Module 18</td>
<td>HSE IN DRILLING OPERATIONS</td>
<td>5 d</td>
</tr>
<tr>
<td>Module 19</td>
<td>DRILLING &amp; COMPLETION PROJECT</td>
<td>10 d</td>
</tr>
</tbody>
</table>

Completion design.
Tubing calculations.
Fluids design.
Chronology of operations.
Presentation to a jury.

Reference: FOFPC-EN-P

This course is also available in French: FOFPC-FR-P. Please contact us for more information.

Can be organized as an In-House course.

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>25 January</td>
<td>5 March</td>
<td>€30,890</td>
</tr>
<tr>
<td>Pau</td>
<td>26 April</td>
<td>11 June</td>
<td>€30,890</td>
</tr>
</tbody>
</table>

Contact: ep.contact@ifptraining.com

www.ifptraining.com
General Drilling & Completion

Advanced Certificate
DeepWater Drilling & Completion Certification

Level: EXPERT

Purpose
This course provides in-depth technical knowledge of deepwater drilling including the practical understanding of offshore drilling techniques, operations, equipment and well control procedures.

Audience
Operator: drilling managers, engineers, supervisors.
Contractor: rig managers, tool pushers and drillers.

Learning Objectives
Upon completion of this course, the participants will:
- get an advanced theoretical and practical knowledge about deepwater drilling,
- know about equipment specific to offshore and deepwater drilling and completion operations,
- understand the process of a subsea development.

Ways & Means
- Highly interactive training with industry specialists lecturers.
- Videos, animations and exercises.
- Application to a real case (project) for the participants in the “Deepwater Drilling & Completion” certification training course.
- Several simulation exercises using the drilling simulators.
- Knowledge assessment on regular basis.

Learning Assessment
Exercises, quiz, written exams, simulator.

Prerequisites
- Engineering degree or equivalent professional experience within the petroleum industry.
- The certification is for professionals who already understand basic drilling principles, standards and practices.

Why an IFP Training Certification?
- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in DeepWater Drilling and Completion Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

HSE & MAINTENANCE
Bridging document and drilling contractor safety management system.
Rig P&ID’s, hazardous area plans, station bills, fire/life saving plan, class/flag status reports…
Rig critical equipment that have an impact on the safety, rig operation and the environment.
Update of maintenance system history and stock level of critical spare parts.
Standards used in the drilling industry (e.g. API) and their implications for drilling equipment (i.e. annual 3rd party inspections and audits…).
Rig acceptance documentation and Well Control Equipment Certification (i.e. CoC’s).

5 d

MARINE
Deepwater Metocean environments.
Type of MODU’s rigs (moored vs dynamically positioned rigs).
Nautical basics.
Navigation and station keeping.
Stability and ballast control.

5 d

DEEPWATER DRILLING
Deepwater geology and geoscience.
Deepwater pressure management.
Key and essential differences of deepwater.
Deepwater well planning and design.
Operating: key aspects of deepwater planning and project implementation.
Technology application:
- Compensation and tension systems in deepwater.
- Drilling riser string, subsea bop stack, associated operating equipment and specific optional equipment (i.e. riser gas handler, bop pressure intensifiers).
- Subsea wellheads.
- Subsea cementing jobs.
- Hydrates.
Managed Pressure Drilling (MPD) and Dual Gradient Drilling (DGD), HPHT
Operating limitations including positioning alerts (i.e. green, green advisory, yellow and red), emergency disconnections, “wait on weather” situations and simultaneous operations (SIMOPS).

15 d

SUBSEA WELL CONTROL IN DEEPWATER ENVIRONMENT
Pressure analysis and kick control.
Subsea well control.
Particular cases: incidents during circulation, shallow gas, volumetric method, maas, deviated well, kick during running of casing or during cement jobs, unshearable periods.
Subsea well control equipment: diverter, riser string, LMRP & BOP stack, BOP HPU, MGS, choke manifold and associated lines.

5 d

OFFSHORE WELL COMPLETION
Functions to be carried out and corresponding equipment:
- Production string(s) configurations (conventional or tubing less, single or multi-zones).
- Subsea completion and workover risers.
- Subsea BOP.
- Production wellhead: tubing head spool and Christmas tree (components, design).
- Subsea X-mass trees.
- Subsurface safety valve (subsurface controlled, surface controlled).
- Tubing and connections (main characteristics, criteria of choice).
- Packers and accessories (drillable or permanent, retrievable).
- Bottom-hole devices (landing nipples, circulating devices…).
- Tubing string design (fundamentals of tubing movement and forces):
  - Point to be verified.
  - Packer permitting free motion (tubing movement, tension on the tubing hanger).
  - Packer permitting no motion (packer to tubing force, tension on the tubing hanger).
Subsea completion present trends.

5 d

DEEPWATER PROJECT
HSE and waste management.
Deepwater well architecture and its associated barriers related to geological hazards.
Well profile, anti-collision study and casing design.
Chronology of operations, BOP and well control procedures, drilling sequence review.
Fluids and cementing design.
Bit program, BHA strategy, surveying program and logging.
Drilling equipment specifications for deepwater vessel selection and “fitness for purpose”.
Well testing and completion.
Well intervention and stimulation.
Well suspension and abandonment.
Authorization For Expenditure (AFE) guidelines for time and budget estimations.
Presentation to a jury.

10 d

Reference: DWE-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Practical Aspects of Well Construction & Planning

Course Content

WELL OBJECTIVES & INPUTS TO THE DRILLING PROGRAM 0.25 d
Typical objectives and inputs to an exploration or a development well program.
Pore and frac pressure evaluation.
Criteria to consider for the well design.

CASING DESIGN: SHOE POSITIONING 0.5 d
Swab and surge considerations, kick tolerance, hypothesis selection.
Selection of mud weights, additional constraints, exercises with different hypothesis.

CASING DESIGN: CASING SELECTION 1.5 d
Physical and mechanical properties of casings and casing connections.
Casing string calculation, selection.

WELLHEAD DESIGN & SELECTION 0.25 d
Different wellheads in onshore and offshore environments.
Wellhead and BOP selection.

BITS PROGRAM 0.75 d
Different types of bits, bit selection: bit records, cost per foot, bit hydraulics.
Exercises.

DRILL STRING, COMPONENTS & SELECTION 0.75 d
Drill string components.
Characteristics and limit of use.
BHA and drill pipe selection.
Exercises.

MUD & CEMENT PROGRAM 1.5 d
Drilling fluid types and characteristics, mechanical treatment equipment.
Selection of mud program according to the well construction criteria.
Cementing technology and procedures, cement and slurry design.
Cementing program, cementing quality control.
Exercises.

FORMATION EVALUATION PROGRAM 0.5 d
Open hole logging tools (GR, resistivity, density, neutron, sonic).
Quick look exercise.

DEViated WELLS DESIGN: DIRECTIONAL DRILLING METHODS & TECHNOLOGY 1 d
Directional drilling tools and technology, directional program.
Trajectory planning coordinates systems.
Trajectory calculation methods, uncertainty evaluation, anti-collision.
Drill string selection.

RIG SELECTION 0.5 d
Main drilling rig functions.
Types of rigs, rig selection criteria.

STUCK PIPE 0.5 d
Bores, causes of stuck pipes and first actions.
Warning signs and method to free pipes, preventive measures.

WELL COMPLETION 1.25 d
Different ways to complete the well.
Sand control, stimulation.
Tubing, packer, safety valve selection.
Well intervention: wireline, coiled tubing, snubbing, workover.

TECHNOLOGIES IN USE FOR ENERGETIC TRANSITION 0.5 d
Geothermal wells and their thermal cyclic, casing strength at high temperature, corrosion resistance.
Underground storage well architecture guidelines for liquid, gaseous hydrocarbons, hydrogen and compressed air, as well as for aquifer and depleted reservoir storage facilities.
Expandable casing to reduce the amount of energy needed to drill the bore.

TIME ESTIMATE & PROVISOional PROGRESS CURVE 0.25 d
Typical rig times required for the different operations, contingencies.
Progression curve.
Cost estimation according to the environment (type of well, rigs).

Reference: PAWPCE-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com
Geological Field Trip for Drillers

Level: AWARENESS

Purpose
This course provides a practical understanding of petroleum systems, useful for integrating geological constraints and rock properties in drilling strategies which ultimately improve drilling models and reduce risk.

Audience
Non-geologists and drilling professionals with no experience in petroleum geology.

Learning Objectives
Upon completion of the course, participants will be able to:
► review main components of a petroleum system,
► learn about most common facies rocks and their physical properties,
► grasp the scope and fundamentals of the petroleum trilogy,
► analyze deformations and constraints, identify potential traps,
► deduce implications for drilling campaigns,
► understand the importance of reservoir engineering,
► become familiar with unconventional resources and their extraction techniques.

Ways & Means
Training includes classroom course with theoretical exercises and field trip observations in the Lacq gas province (Aspe valley - Pau, South-West of France) and on the Basque coast (Saint-Jean-de-Luz, Biarritz, Bidart - South-West of France).

Learning Assessment
Quiz.

Prerequisites
► Course “Well Architecture & Equipment”, or equivalent practical experience, is highly recommended.
► Have a good level in mathematics.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO PETROLEUM GEOLOGY 2.5 d
Basin and sedimentary rocks - Petroleum system:
- Sedimentary basin - Definitions, structure and terminology.
- Sedimentary rocks - Description and main facies - Comparison clastic versus carbonates - Sedimentary process.
- Petroleum system - Source rock, reservoir rock and seal rock - Trapping and migration process.
- Reservoir engineering: seismic, modeling, accumulations and reserves, effluent behavior, enhanced recovery (EOR), introduction to non-conventional resources and their extraction techniques.

Exercises: interpretation of geological cross section; identification of the petroleum components, petroleum system building; identification of potential prospects and implementation of exploration wells; analysis of limitations and drilling constraints.

FIELD TRIP IN THE PYRENEAN LACQ FIELD (active margin basin) 2.5 d
Presentation of the Lacq Basin. Relations with the Pyrenean structure:
- Structural overview of the Pyrenean chain. Geomorphology and structural context.
- Lacq basin: a petroleum system in the Jurassic, lower cretaceous carbonate domain. Source, reservoir and seal rocks.
- Structure of the reservoir, trapping and potential hydrocarbon migration.

Sedimentary study of the upper cretaceous clastic formation:
- The turbidites of St-Jean-de-Luz.
- Detail of the sedimentary complex. Observation of the clastic deposits. Analysis of the deposit unit in a turbidite system observation and relationship with carbonate series of the Lacq field.
- Comparison with turbidites facies of Gan (South of Pau) - Notion of lateral facies variation.

Synthesis and conclusions:
- Structural context of the Lacq gas field: an example of active margin basin in foothills domain.
- Elements of the petroleum system of the Lacq gas field: an example of petroleum system in carbonate domain.
- The upper cretaceous turbidite system: interest of this facies analysis to understand the Pyrenean structure.
- Field observation of the turbidite series structure: interest and consequences for drilling purpose.

Reference: FTFP-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>25 January</td>
<td>29 January</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: FTFP-FR-P. Please contact us for more information.
Fundamentals of Drilling & Completion

Level: KNOWLEDGE

Purpose
This course covers an overview of fundamental knowledge in drilling and completion, and the various pressure in the well. It also provides the fundamentals knowledge in order to follow the intensive training program “Drilling & Completion Engineering”.

Audience
Young engineers involved in drilling and completion, supervisors and tool pushers.

Learning Objectives
Upon completion of the course, participants will be able to:
- describe the basic notions about hydrostatic and hydrodynamic,
- carry out well pressures calculations,
- explain the fundamentals of drilling techniques,
- assess uncertainties with regard to pressure measured while drilling,
- explain the reaction of gaseous with regard of gaseous influx encountered while drilling.

Ways & Means
- Exercises, case study.
- Interactive animations and videos.

Learning Assessment
Quiz.

Prerequisites
Basic technical knowledge in the Oil & Gas industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0.5 d    | INITIAL TEST  
General knowledge about drilling and completion. |
| 1 d      | CAUSES OVERBURDEN PRESSURE, PORE PRESSURE, FRAC PRESSURE  
Definitions. Causes of abnormal pore pressure. Detection of abnormal pore pressure. Determination of frac pressure, LOT. |
| 1 d      | DRILLING FUNDAMENTALS  
| 2 d      | HYDRODYNAMICS APPLIED TO WELL  
Hydrostatic pressure, pressure losses. Relation between static and circulating well pressures. |
| 0.5 d    | KNOWLEDGE ASSESSMENT |

Reference: BACFP-EN-P  
Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

Location | Start Date | End Date | Tuition Fees excl. VAT
--- | --- | --- | ---
Pau  
1 February | 5 February | €3,690

This course is also available in French: BACFP-FR-P. Please contact us for more information.
Well Architecture & Equipment

Course Content

**DRILLING & CASING PROGRAM**

Role of casings. Parameters to be considered to determine well architecture:
- Well type.
- Pore and frac pressures.
- Completion, lithology.
Different types of casings:
- Surface.
- Intermediate.
- Production.

**WELLHEAD**

Different elements.
- Wellhead assembly sequences.

**CHARACTERISTICS OF CASINGS**

Geometric, physical and mechanical properties of the pipes, the connections.
- Use of Drilling Data Handbook.

**SHOE POSITIONING**

Hypotheses to be considered, casing point - Kick tolerance.
- Casing point - Kick tolerance.
- Examples and exercises.

**CASING STRING CALCULATION**

Principles and assumptions to remember for the different strings.
- Stress cases study:
  - Collapse.
  - Burst.
  - Tension.
  - Triaxial study.
  - Safety factors.
- Casing selection: examples and exercises.

**TECHNOLOGIES IN USE FOR ENERGETIC TRANSITION**

Geothermal wells and their thermal cyclic, casing strength at high temperature, corrosion resistance.
- Underground storage well architecture guidelines for liquid, gaseous hydrocarbons, compressed air, hydrogen as well as for aquifer and depleted reservoir storage facilities.
- Expandable casing to reduce the amount of energy needed to drill the bore.

**KNOWLEDGE ASSESSMENT**

Practical and written exercises.

---

Reference: ARCHI-EN-P. Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>8 March</td>
<td>12 March</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: ARCHI-FR-P. Please contact us for more information.
Bit & Drill String & Fishing while Drilling

Level: KNOWLEDGE

Purpose
This course provides an in-depth theoretical and practical knowledge of drilling bit, drill string and fishing techniques with its specific equipment.

Audience
Young engineers and supervisors, toolpushers with some experience in drilling.

Learning Objectives
Upon completion of the course, participants will be able to:
- acquire the basic knowledge on the drilling bit and the drill stem,
- carry out basic calculations on the drill stem,
- choose a drill stem,
- use the different elements of the drill stem,
- learn about main techniques and equipment used to solve a fishing problem while drilling.

Ways & Means
- Course material (PPT, video).
- Individual and group exercises.
- Visit of VAREL Europe manufacturer.
- Instructor with a valuable experience in drilling operations.
- Application to a real case (project) for the participants in the “Drilling and Completion Engineering” training course.

Learning Assessment
Tests.

Prerequisites
To be familiar with and understand basic geomechanics, drilling operations, well placement and drilling fluids basics.

More info
The course schedule will be adapted to cover all the content.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

BIT
2 d
- Bit different types and classification.
- Bit use and drilling parameters.
- Dull grading.
- Bit nozzle selection.
- Bit selection.
- Visit of a Varel manufacturing unit.

DRILL STRING
1.75 d
- Distribution of stresses in the drill stem, neutral point.
- Drill pipes: characteristics, limits of use, combination of stresses, buckling.
- Drill collars: characteristics, profile, threading, choice of diameter.
- Auxiliary equipment: Kelly, heavy weight drill pipes, stabilizers.
- Drill string selection: first approach.
- Margin of overpull, equiresistant drill string, necessary length of DC.

FISHING WHILE DRILLING
1 d
- Different problems found during drilling.
- Causes for sticking.
- Principles of the solutions to sticking.
- Fishing equipment lost in the well, main tools used.
- Avoiding sticking and losses of equipment in the wells.

KNOWLEDGE ASSESSMENT
0.25 d

Reference: OUTGARN-EN-P
Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>29 March</td>
<td>2 April</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: OUTGARN-FR-P. Please contact us for more information.
Rig, BOP’s & Well Control Equipment

Level: KNOWLEDGE

Purpose
This course provides a thorough, practical knowledge of rigs, BOP’s and well control equipment.

Audience
This training is intended for technicians, engineers, manufacturers of control equipment, needing a technical introduction in the field of drilling/wells.

Learning Objectives
Upon completion of the course, participants will be able to:
- acquire a good knowledge of drilling rigs and BOPs,
- learn about the use and limits of different pieces of equipment,
- select capacities and types of rig equipment,
- select BOPs, hydraulic units and auxiliary equipment.

Ways & Means
- Exercises.
- Application to a real case (project) for participants in the “Drilling & Completion Engineering” training course.

Learning Assessment
Quiz.

Prerequisites
Basic knowledge in drilling operations.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

RIG
Description of the main functions:
- Safety
- Hoisting.
- Pumping.
- Rotating.
- Power.
Limits of use.

Equipment selection through exercises:
- Choosing the drawworks, the drilling line, drilling line work.
- Choosing the pumps as per the drilling program.

BOPS & WELL CONTROL EQUIPMENT

BOP:
- Functions.
- Different types: ram BOP, annular BOP, inside BOP.
- Technical field characteristics.

Auxiliary equipment:
- Accumulation and closing unit.
- Choke manifold, chokes.
- Mud gas separator, vacuum degasser.

Equipment working test and pressure test.
- API rules.
- Exercises on BOP closing unit sizing.

KNOWLEDGE ASSESSMENT

Reference: BOP-EN-P

Can be organized as an In-House course.

Location Start Date End Date Tuition Fees excl. VAT
Pau 12 April 16 April £3,690

This course is also available in French: BOP-FR-P. Please contact us for more information.
Data Acquisition during Drilling Operations

Course Content

MUD LOGGING

2 d
- Tasks of various professionals at the drilling site.
- Main documents carried out.
- Cuttings (sampling, cleaning and analysis).
- Mechanical parameters (WOH, WOB, RPM, Torque, ROP) & hydraulic parameters (SPP, Flows, Pits and mud characteristics). Physical principles of sensors used on well site.
- Detection and evaluation of Oil & Gas shows while drilling.
- Detection of abnormal pressures.
- Detection of drilling problems: kicks, losses, stucking…
- Carry out a section of geological log.
- Case studies.

WELL LOGGING & LOGGING WHILE DRILLING

2 d
- Definition of basic concepts used in log interpretation.
- Wireline logging:
  - Well site setup and log records operation.
  - Main logging tools and applications (caliper, GR, SP, resistivity, nuclear, acoustic).
  - Quick-look interpretation: reservoir identification and characterization (lithology, porosity, fluid types, saturation).
  - Case study.
- Logging while drilling:
  - Main LWD sensors and measurements (directional, resistivity, nuclear, acoustic, pressure…).
  - Applications for directional drilling, geosteering, formation evaluation, predictive pressure.
  - Pressure measurement concepts.
  - Different techniques for sampling with wireline and LWD tools.
  - Prevention actions to handle sampling operations.

CORING OPERATIONS

0.5 d
- Data collected with coring.
- Conventional coring operation.
- Cores bits and drilling strings for coring operations.
- Advanced coring techniques: turbo-coring, soft formations coring, gel coring.
- Oriented coring system.
- Sidewall coring.
- Storage and handling process for cores during surface recovery: cores cutting, preliminary well site analysis, storing of cores.

KNOWLEDGE ASSESSMENT

0.5 d
HSE in Drilling Operations

Level: KNOWLEDGE

Purpose
This course provides a thorough understanding of risks associated to drilling operations and to reinforce the HSE culture of the workplace environment.

Audience
This course is dedicated for all the professionals interested to get deeper knowledge in HSE related to drilling operations for Oil & Gas, geothermal and storage wells (i.e. drilling and completion engineers and technicians, mud engineers, supervisors, drilling contractor personnel).

Learning Objectives
Upon completion of the course, participants will be able to:
- ensure high HSE standard during drilling operations,
- identify specific hazards, their associated risks during drilling operations and to define prevention and mitigation measures to reduce risks,
- identify the certificates necessary to ensure the suitability of equipment and personnel,
- understand and apply typical HSE management practices on site (prevention, protection, emergency planning).

Ways & Means
- Several applications and illustrations.
- Several case studies and teamwork sessions.

Learning Assessment
Quiz.

Prerequisites
Significant experience in drilling operations.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content 5 days

<table>
<thead>
<tr>
<th>GENERAL RISKS ASSOCIATED TO DRILLING OPERATIONS</th>
<th>0.75 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of flammability:</td>
<td></td>
</tr>
<tr>
<td>Explosive atmospheres (ATEX): flammable products, explosive limits and flash point.</td>
<td></td>
</tr>
<tr>
<td>Ignition sources: naked flame, auto-ignition temperature, sparks and static electricity…</td>
<td></td>
</tr>
<tr>
<td>Risks associated with chemical products/toxic gas (H₂S).</td>
<td></td>
</tr>
<tr>
<td>Health and hygiene risks. Medical fitness to work certificates.</td>
<td></td>
</tr>
<tr>
<td>Electrical risks. Area classification requirements. Certificates.</td>
<td></td>
</tr>
<tr>
<td>Personal Protective Equipment (PPE).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RISKS ASSOCIATED WITH RIG EQUIPMENT</th>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to risks associated to derrick, rig floor, stabbing board, derrick board and crown block. Certificates.</td>
<td></td>
</tr>
<tr>
<td>Risk of dropped objects.</td>
<td></td>
</tr>
<tr>
<td>Works at height.</td>
<td></td>
</tr>
<tr>
<td>Introduction to risks associated to draw works, top drive, travelling block, winches and pipe handling system. Certificates.</td>
<td></td>
</tr>
<tr>
<td>HSE management of lifting and rigging operations.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RISKS ASSOCIATED WITH DRILLING FLUIDS PROCESSING &amp; CEMENTING OPERATIONS</th>
<th>0.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risks associated to mud preparation, mud tanks and mud pumps.</td>
<td></td>
</tr>
<tr>
<td>Confined space entry procedure.</td>
<td></td>
</tr>
<tr>
<td>Risks associated to cuttings treatment units: shakers, degasser, desander, centrifuge…</td>
<td></td>
</tr>
<tr>
<td>Risks associated to cementing units and cementing operations.</td>
<td></td>
</tr>
<tr>
<td>HSE management of pressurized equipment.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HSE MANAGEMENT OF WELL CONTROL EQUIPMENT</th>
<th>0.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenarios associated to well control and main impacts. Examples of catastrophic events.</td>
<td></td>
</tr>
<tr>
<td>Description and action of well control equipment.</td>
<td></td>
</tr>
<tr>
<td>Testing requirements: functional and pressure tests.</td>
<td></td>
</tr>
<tr>
<td>Inspection and certification of equipment and personnel with responsibilities in well control scenarios.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RISKS ASSOCIATED WITH SUPPORT FACILITIES</th>
<th>0.25 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine rooms, power generation and air compressors.</td>
<td></td>
</tr>
<tr>
<td>Risks at workshops: hand tools, compressed gas bottles.</td>
<td></td>
</tr>
<tr>
<td>HSE management of storage areas.</td>
<td></td>
</tr>
<tr>
<td>Introduction to HSE in logistics: materials and personnel transportation requirements.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAFETY ENGINEERING APPLIED TO DRILLING OPERATIONS</th>
<th>0.25 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>General layout of drilling activities: safety distances.</td>
<td></td>
</tr>
<tr>
<td>Fire &amp; gas detection systems: certificate and testing requirements.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RISKS IN WELL INTERVENTION OPERATIONS</th>
<th>0.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to common well intervention equipment. Main risks.</td>
<td></td>
</tr>
<tr>
<td>Well control equipment in well intervention.</td>
<td></td>
</tr>
<tr>
<td>Risks in perforation and well abandonment.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ORGANIZATIONAL FRAMEWORK</th>
<th>0.75 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to HSE management system.</td>
<td></td>
</tr>
<tr>
<td>HSE management of contractors:</td>
<td></td>
</tr>
<tr>
<td>HSE evaluation of contractor selection.</td>
<td></td>
</tr>
<tr>
<td>Objectives and development of HSE Bridging Document: case study.</td>
<td></td>
</tr>
<tr>
<td>Emergency response planning:</td>
<td></td>
</tr>
<tr>
<td>Main elements and resources: blow out contingency plan, environmental contingency plan and medevac plan.</td>
<td></td>
</tr>
<tr>
<td>Clinic requirements.</td>
<td></td>
</tr>
<tr>
<td>Risks associated to simultaneous operations with production and construction activities.</td>
<td></td>
</tr>
<tr>
<td>Management of change procedure.</td>
<td></td>
</tr>
<tr>
<td>Undesired event reporting.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ENVIRONMENTAL MANAGEMENT &amp; ENERGETIC TRANSITION OF DRILLING OPERATIONS</th>
<th>0.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to environmental impacts of drilling operations.</td>
<td></td>
</tr>
<tr>
<td>Environmental impact assessment and environmental management plan.</td>
<td></td>
</tr>
<tr>
<td>Waste management practices and control for drilling operations.</td>
<td></td>
</tr>
<tr>
<td>Well testing environmental impacts.</td>
<td></td>
</tr>
<tr>
<td>Decommissioning of offshore Oil &amp; Gas Installations.</td>
<td></td>
</tr>
<tr>
<td>Low carbon technologies to reduce flare emissions, eliminate venting, and pinpoint fugitive leaks.</td>
<td></td>
</tr>
<tr>
<td>Hybrid-powered rig equipped with battery energy storage system (ESS) to reduce emissions.</td>
<td></td>
</tr>
<tr>
<td>Utilization of production associated gas to power gas turbine to reduce the carbon footprint.</td>
<td></td>
</tr>
<tr>
<td>Utilization and storage (CCUS) technology to capture carbon dioxide released by industrial sources and, for instance, bury it deep underground.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: HSEFOR-EN-P — Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>3 May</td>
<td>7 May</td>
<td>£3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: HSEFOR-FR-P. Please contact us for more information.
Advanced Certificate

Directional & Horizontal Drilling Certification

Successful Preparation & Drilling of a Directional Well

Level: SKILLED

Purpose

This certifying training aims to provide the necessary knowledge to plan and carry out a directional drilling (geothermal, water, storage, oil, gas).

Audience

This certification is intended for technicians, site managers, supervisors, superintendents and engineers who will be involved in geothermal, water, storage or oil drilling operations.

Learning Objectives

Upon completion of the course, participants will be able to:

- know about the equipment needed for directional drilling,
- design a directional well,
- calculate the trajectory of a deviated well in 2D,
- design the drill stem, with regard to a well’s profile, in order to reach a target.

Ways & Means

- Exercises.
- Application to a real case (project) for participants in the “Drilling & Completion Engineering” training course.

Learning Assessment

Training exercises, writing of an Excel spreadsheet, written exam.

Prerequisites

Holders of a Bachelor’s degree or equivalent, young-hire junior engineers or candidates going through the procedure to become a manager in his/her company.

Why an IFP Training Certification?

- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Directional & Horizontal Drilling Certification.
- Ready-to-use skills.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>4 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERALITIES</td>
<td>1 d</td>
</tr>
<tr>
<td>Applications, terms and definitions.</td>
<td></td>
</tr>
<tr>
<td>Well profiles, coordinates’ system.</td>
<td></td>
</tr>
<tr>
<td>Trajectory control.</td>
<td></td>
</tr>
<tr>
<td>Uncertainty calculation, anti-collision.</td>
<td></td>
</tr>
<tr>
<td>DIRECTIONAL DRILLING EQUIPMENT</td>
<td>0.75 d</td>
</tr>
<tr>
<td>Specific drilling equipment: downhole motors, rotary steerable system.</td>
<td></td>
</tr>
<tr>
<td>Measuring equipment: MWD, LWD, GWD.</td>
<td></td>
</tr>
<tr>
<td>DRILLING ENGINEERING</td>
<td>2.25 d</td>
</tr>
<tr>
<td>Well planning.</td>
<td></td>
</tr>
<tr>
<td>Limits of use of a drill string: buckling.</td>
<td></td>
</tr>
<tr>
<td>Drill string design.</td>
<td></td>
</tr>
<tr>
<td>Torque and drag calculation.</td>
<td></td>
</tr>
<tr>
<td>Drilling fluids and cementing program.</td>
<td></td>
</tr>
<tr>
<td>Logging.</td>
<td></td>
</tr>
<tr>
<td>Geosteering drilling.</td>
<td></td>
</tr>
<tr>
<td>Well control.</td>
<td></td>
</tr>
<tr>
<td>HORIZONTAL &amp; ERD</td>
<td>0.25 d</td>
</tr>
<tr>
<td>ERD, multilateral and short radius.</td>
<td></td>
</tr>
<tr>
<td>CASE STUDIES</td>
<td>0.5 d</td>
</tr>
<tr>
<td>KNOWLEDGE ASSESSMENT</td>
<td>0.25 d</td>
</tr>
</tbody>
</table>

Reference: FDTDH-EN-P

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT

| Pau | 6 April | 9 April | €3,690 |

This course is also available in French: FDTDH-FR-P. Please contact us for more information.
Geomechanics for Drillers

Course Content 3 days

INTRODUCTION TO GEOMECHANICS IN THE PETROLEUM INDUSTRY 0.25 d
Review of all the applications of geomechanics in the reservoir and drilling fields illustrated with real cases.

THEORETICAL BASES USEFUL FOR DRILLING APPLICATIONS 2 d
Stresses, deformations, elasticity.
Connection between stress, pressure and temperature.
Rock tensile failure.
Rock shearing failure.
Laboratory measurements of tensile and rupture properties.
Geomechanical model of wells (formation pressure, stresses and mechanical properties) and calibration from laboratory measurements and data and well tests.
Different types of pressure tests in drilling, in particular the leak-off test.

STRESSES & RUPTURE MECHANISMS AROUND THE WELL 2 d
Radial, axial and tangential stresses.
Shearing failure conditions and calculation of the minimum mud weight.
Conditions of tensile failure and fracture propagation and calculation of the maximum mud weight.
Impact of the well path.
Impact of reservoir production of infill drilling in already producing reservoirs.

APPLICATION 0.75 d
Exercise based on one or several real cases gathering the major issues of reservoir geomechanics.
Knowledge assessment.

Ways & Means
Application exercises adapted to drilling situations.

Learning Assessment
Acquired knowledge will be assessed through studies based on real cases. In each study, participants will have to analyze the situation to provide a diagnosis and possible solutions.

Prerequisites
Basic drilling knowledge as well basic geological ones.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: GEOM-EN-P. Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: GEOM-FR-P. Please contact us for more information.
Underbalanced & Managed Pressure Drilling: Applications, Design & Operations

Level: SKILLED

Purpose
This course provides a comprehensive and practical knowledge of non-conventional techniques used in advanced drilling and completion processes to enhance drilling performance and oil recovery.

Audience
Drilling and mud engineers, superintendents and supervisors, and all professionals involved in well planning and operation.

Learning Objectives
Upon completion of the course, participants will be able to:
- deal with issues of narrow pore/fracture pressure gradient windows, lost circulation, abnormal pressures, kick/loss situations,
- drill wells in depleted reservoirs,
- acquire basic concepts of managed and underbalanced pressure drilling,
- review various managed pressure drilling methods and equipment,
- identify typical situations calling for managed pressure drilling and assess potential benefit,
- review typical applications, equipment and operation of underbalanced drilling.

Ways & Means
Several case studies and examples are discussed.

Learning Assessment
Exercises, quiz, written exam.

Prerequisites
- Understanding the conventional drilling operations.
- Well architecture and casing design knowledge.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASIC PRINCIPLES OF MANAGED PRESSURE DRILLING</td>
<td>1 day</td>
</tr>
<tr>
<td>History, objectives and definitions. Occurrence and implications of narrow pore and fracture pressures windows on well design and well control. Dynamic factors affecting bottom hole pressure. Mathematics and examples.</td>
<td></td>
</tr>
<tr>
<td>MUD CAP DRILLING</td>
<td>0.5 day</td>
</tr>
<tr>
<td>History of mud cap drilling. Pressurized and floating mud cap. Mud cap operation.</td>
<td></td>
</tr>
<tr>
<td>MANAGED PRESSURE DRILLING EQUIPMENT</td>
<td>0.5 day</td>
</tr>
<tr>
<td>MANAGED PRESSURE DRILLING USING PRESSURE AS PRIMARY CONTROL</td>
<td>1 day</td>
</tr>
<tr>
<td>Introduction, open and closed back pressure systems. Automated back pressure system technology. Continuous circulating system technology.</td>
<td></td>
</tr>
<tr>
<td>MANAGED PRESSURE DRILLING USING FLOW AS PRIMARY CONTROL</td>
<td>1 day</td>
</tr>
<tr>
<td>UNDERBALANCED DRILLING</td>
<td>0.5 day</td>
</tr>
<tr>
<td>Underbalanced drilling objectives and applications. Underbalanced drilling equipment and operations.</td>
<td></td>
</tr>
<tr>
<td>CONCLUSION</td>
<td>0.5 day</td>
</tr>
</tbody>
</table>

Reference: UBD-EN-P Only available as an In-House course.
Contact: ep.contact@ifptraining.com

www.ifptraining.com
Geosteering

Level: KNOWLEDGE

Purpose
This course provides unique opportunity to independently support the geosteering of horizontal wells in the conditions of real-time drilling, using an interactive simulator.

Audience
Geologists, reservoir engineers, drilling coordinators and supervisors, petrophysicists and geosteerers.

Learning Objectives
Upon completion of the course, participants will be able to:
- gain knowledge of the fundamentals of telemetry, measurements and logging while drilling and directional drilling technologies,
- become aware of the criteria for selecting the minimum required logging data set before a geosteering job,
- get acquainted with errors and uncertainties in the drilling of horizontal wells, related both to geology and to the limitations of telemetry and logging tools, and the methods of calculating the well trajectory,
- master the modern geosteering methods,
- become familiar with the basics of interpreting azimuthal logs,
- gain experience in modeling various geosteering scenarios before starting drilling for the risk management purposes,
- get real-time geosteering experience on-the-job.

Ways & Means
- Geosteering requires practice, and this is inevitably associated with making mistakes and wrong decisions. The price of making a wrong decision on a real well can vary from a few hours of non-productive time to a million-dollar sidetrack or a million barrels of oil that can never be extracted. These factors make learning on a real horizontal well an extremely expensive training ground.
- Participants will master the necessary knowledge to build a preliminary simulation and develop a strategy for drilling a horizontal well.
- Using a unique interactive simulator, participants will independently follow the drilling of at least three horizontal wells, while learning how to independently make timely and technically correct trajectory corrections.

Learning Assessment
Practice on geosteering simulator, debriefing, evaluating of effective length of the well after geosteering.

Prerequisites
Basic geology, directional drilling and well logging knowledge are advised.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: GEOST-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT
Rueil-Malmaison 29 November 1 December €3,690

Course Content

<table>
<thead>
<tr>
<th>3 days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basics of Telemetry, Measurement While Drilling (MWD) &amp; Directional Drilling Technologies</strong> 0.25 d</td>
</tr>
<tr>
<td>Drilling technology with motor and RSS. Logging and Measurements While Drilling (LWD/MWD). Telemetry and surveys. Errors and uncertainties while drilling.</td>
</tr>
</tbody>
</table>

**Geosteering Using Non-Azimuthal Data (Theory)** 0.25 d
Method of matching synthetic curves with actual LWD. Benefits and limitations of synthetic curves method.

**Practicum - Preparation of Pre-Job Geosteering Model; Geosteering of Well #1 in Real Time** 0.5 d
Loading and analysis of initial data, choosing drilling strategies, risk analysis. Geosteering of the training well #1 on the geosteering simulator in real time. Making geosteering recommendations based on matching with trajectory adjustments. Working with WITS and WITSML protocols. Updating the 3D structural geological model based on geosteering results. Presentation of the final geosteering model.

**Geosteering Using Azimuthal Data (Theory)**

**Practice - Geosteering of Well #2 Using Azimuthal Data** 0.5 d
Geosteering of well #2 on the geosteering simulator. Interpretation of the borehole images in real time. Uncertainty analysis using azimuthal data. Presentation of the final geosteering model.

**Geosteering with Distance to Boundary Technologies (Theory)** 0.5 d
Measurement principles of the distance to boundary technologies. Ultra-deep reservoir mapping technologies. Resistivity inversion in geosteering.

**Practice - Geosteering of Well #3** 0.5 d
Geosteering of well #3 in the geosteering simulator in a complex reservoir.

**Geosteering "Debriefing"** 0.5 d
The major mistakes in geosteering. Geosteering tips and tricks.
Advanced Certificate
Deepwater Drilling & Development Certification

Level: SKILLED

Purpose
This course provides an in-depth, practical understanding of offshore drilling techniques, operations, equipment and procedures.

Audience
Operator: drilling managers, engineers, supervisors.
Contractor: rig managers, tool pushers and drillers.
Other professionals involved or interested in deepwater drilling & development.

Learning Objectives
Upon completion of the course, participants will:
- know about different offshore rigs,
- know about equipment specific to offshore drilling operations,
- understand the process of a subsea development.

Ways & Means
- Videos, animations.
- Exercises.
- Application to a real case (project) for the participants in the “Drilling & Completion Engineering” training course.

Learning Assessment
Exercises, quiz, written exam.

Prerequisites
Holders of a Bachelor’s degree or equivalent or young-hire junior engineers.

Why an IFP Training Certification?
- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Deepwater Drilling & Development Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

OFFSHORE SPECIFICITIES
3 d
- Offshore rig description: jack up, anchored and dynamic positioning floating platforms.
- Limits of use of the rigs.
- Specific equipment for floating platforms.
- Mud line suspension.
- Subsea well head and equipment.
- BOP, BOP closing unit, risers, positioning.
- Subsea Xmas tree and equipment:
  - General overview.
  - Different types: vertical, horizontal.
  - Comparison.
  - Running procedures.
  - Examples.

SUBSEA FIELD DEVELOPMENT
1.25 d
- Chronology of operations with the different types of rigs.
- Typical subsea development schematic:
  - Tie back.
  - Deepwater stand-alone development.
  - Subsea field layout.
  - Production control system.
- Well architecture for deep-water well:
  - Typical drilling.
  - Casing programs.

TECHNOLOGIES IN USE FOR ENERGETIC TRANSITION
0.25 d
- Hybrid-powered rig equipped with battery Energy Storage System (ESS) to reduce emissions.
- Carbon emissions initiatives at offshore oil and gas installations by enabling access to clean power from shore or wind farm. Jet trenchers for power cables.
- Utilization of production associated gas to power gas turbine to reduce the carbon footprint vs. flaring or venting emissions.
- Expandable casing to reduce the amount of energy needed to drill the bore.

KNOWLEDGE ASSESSMENT
0.5 d

Reference: OFDW-EN-P. Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>25 May</td>
<td>28 May</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: OFDW-FR-P. Please contact us for more information.
Wellhead & Blowout Preventers

Course Content

3 days

ONSHORE WELLHEAD & BLOWOUT PREVENTERS

1.5 d

Onshore wellhead:
- Functions, principles and technology.
- Setting procedure.
- Evolution of the wellhead according to drilling phase.

Blowout preventers:
- Function and different types.
- Characteristics and technology.

AUXILIARY EQUIPMENT

1 d

Closing and accumulation hydraulic unit.
Choke manifold, chokes, valves...
Mud gas separator.

SUBSEA EQUIPMENT

0.5 d

Wellhead, BOPs.
Risers.
Subsea BOP closing system.
API rules.

Level: SKILLED

Purpose

This training aims to deepen knowledge and detail wellhead equipment (geothermal, water, storage, oil, gas) as well as their use.

Audience

This training is intended for the personnel of operators, contractors and service companies who will be involved in geothermal, water, storage or oil/gas drilling operations, wishing to improve their knowledge of the wellhead equipment necessary for the execution of a drilling program.

Learning Objectives

Upon completion of the course, participants will be able to:

- choose the equipment (wellhead, BOP, ancillary equipment) to design a well,
- detect operating problems,
- check the equipment used.

Ways & Means

Videos and animations showing how equipment works.

Learning Assessment

Quiz, written exam.

Prerequisites

- Participants must have a good understanding of the well architecture and construction and be familiar with the essential equipment needed to drill a well.
- A general training on drilling operations is recommended.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.
Stuck Pipe Prevention

Level: SKILLED

Purpose

The aim of this training is to increase employee awareness of the impact and negative effects of a stuck pipe incident and to provide the knowledge necessary for good prevention but also to have the skills to intervene, supervise and properly plan stuck pipe operations in a well.

Audience

This training is for all personnel involved in drilling or workover operations: engineers, supervisors, driller, assistant driller and operators involved in the execution, supervision or planning of operations on water, geothermal or oil/gas wells.

Learning Objectives

- At the end of this training, participants will be able to:
  - understand all the consequences of a stuck pipe incident,
  - implement the preventive measures,
  - recognize and analyze warning signs of a potential stuck pipe incident,
  - take the correct actions according to the stuck pipe situation,
  - recognize the effectiveness of good communication and team spirit.

Ways & Means

- Course material (PPT, video).
- Individual and group exercises.
- Instructor with a valuable experience in drilling operations.

Learning Assessment

Assessment test (quiz and calculations).

Prerequisites

Basic knowledge in drilling operations, drill bit, drill string as well as basic mathematic skills.

Expertise & Coordination

Instructor(s) IFP Training (permanent or contracted) with a good expertise and/or experience in this topic, trained in adult teaching methods and maintained in competencies.

Course Content

<table>
<thead>
<tr>
<th>CONSEQUENCES OF STUCK PIPE INCIDENT</th>
<th>0.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts.</td>
<td></td>
</tr>
<tr>
<td>Statistics.</td>
<td></td>
</tr>
<tr>
<td>Causes.</td>
<td></td>
</tr>
<tr>
<td>Basic rules.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STUCK PIPE MECHANISMS</th>
<th>1.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differential sticking.</td>
<td></td>
</tr>
<tr>
<td>Solids induced pack off.</td>
<td></td>
</tr>
<tr>
<td>Mechanical and wellbore geometry.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DRILL STRING, MUD &amp; HOLE CLEANING</th>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics and limits of the drill string.</td>
<td></td>
</tr>
<tr>
<td>Margin of over-pull.</td>
<td></td>
</tr>
<tr>
<td>Roles and characteristics of the drilling mud.</td>
<td></td>
</tr>
<tr>
<td>Solids control equipment.</td>
<td></td>
</tr>
<tr>
<td>Hole cleaning.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>METHODS TO FREE THE DRILL STRING</th>
<th>0.75 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>First actions for the driller.</td>
<td></td>
</tr>
<tr>
<td>Use of drilling jars.</td>
<td></td>
</tr>
<tr>
<td>Reduction of the differential pressure.</td>
<td></td>
</tr>
<tr>
<td>Use of lubricant pills.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PREVENTIVE MEASURES</th>
<th>0.25 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listen to the hole.</td>
<td></td>
</tr>
<tr>
<td>Good drilling practices while drilling and tripping.</td>
<td></td>
</tr>
<tr>
<td>Teamwork and monitoring.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FISHING EQUIPMENT</th>
<th>0.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description, function and correct use of fishing equipment.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HISTORY CASES</th>
<th>0.25 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify stuck pipe mechanisms and analyze the causes.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FINAL TEST</th>
<th>0.25 d</th>
</tr>
</thead>
</table>

Reference: STUCKP-EN-P • Only available as an In-House course.
Contact: ep.contact@ifptraining.com
**Course Content**

**GENERALITIES**
Applications, terms and definitions.
PPFG aspects of HPHT reservoirs (effect of depletion, geomechanics).
Well architecture specificities of HPHT wells.

**BASIC DESIGN ENGINEERING**
Casing design specific to HPHT (thermal simulations/introduction to limit-state and reliability based design/survival loads).
OCTG choice (material grade, SSC, qualification).
OCTG connector choice (test and qualification).
Well equipment (liner, wellheads, casing hangers...).
Annulus management systems (N2 cushion, burst discs, crushable foams...).
Subsea HPHT specificities (wellhead fatigue, X-Mas tree choice, APB).

**ADVANCED HPHT WELL ENGINEERING**
Casing wear (modeling, measurement, remedial).
Wellhead growth (modeling and impacts, heat island effect).
Fluids & cement aspects of HT environments.
Kick tolerance modeling (dispersed modeling w/drill bench or equivalent, limitations of single bubble in HPHT).
Hydraulic modeling in HPHT operations.
Logging (current HT limitations on MWD tooling).
Introduction to MPD.
In-field drilling (depletion and stress caging...).

**OPERATIONAL PREPARATION**
Rig inspection program for HPHT operations.
Equipment specific to HPHT (mud coolers, kick assembly, early-kick-detection...).
Hydrates (formation mechanisms, prevention).
HPHT checklists.
HPHT procedures (pit management and discipline, breaking circulation, connections, flow checks, tripping procedures, pump out of hole).
HPHT coring and wireline logging.

**OPERATIONAL EXECUTION**
ECD management.
Wellbore breathing (breathing vs. kick, loss-gain scenarios, supercharging mechanisms, fracture...).
Well control aspects.
(EL)OT/FIT in HPHT.
Mud weight management.
Fingerprinting (dummy) connections, swab & surge, compressibility test, drain back/flow volume...).
Case studies (HPHT train wrecks, database analysis of exploration and development wells).

---

Reference: HPHT-EN-P Only available as an In-House course.
Contact: ep.contact@ifptraining.com
Drilling Fluids

Level: KNOWLEDGE

Purpose
This course provides a comprehensive understanding of drilling fluids characteristics.

Audience
Drilling and completion professionals involved in drilling and engineering in water, geothermal or oil/gas drilling operations.

Learning Objectives
Upon completion of the course, participants will be able to:
- acquire a thorough knowledge of drilling fluids and rheology,
- learn how to choose the right equipment for solid removal,
- learn how to communicate efficiently with a drilling fluid specialist.

Ways & Means
- Exercises.
- Application to a real case (project) for participants in the “Drilling & Completion Engineering” training course.

Learning Assessment
Quiz.

Prerequisites
Basic knowledge in drilling operations.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUNCTIONS OF DRILLING FLUIDS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>PHYSICAL &amp; CHEMICAL CHARACTERISTICS</td>
<td>1.5 d</td>
</tr>
<tr>
<td>Specific gravity.</td>
<td></td>
</tr>
<tr>
<td>Rheology.</td>
<td></td>
</tr>
<tr>
<td>Filtration.</td>
<td></td>
</tr>
<tr>
<td>Alkalinity.</td>
<td></td>
</tr>
<tr>
<td>Chloride.</td>
<td></td>
</tr>
<tr>
<td>Hardness.</td>
<td></td>
</tr>
<tr>
<td>TYPES OF FLUIDS</td>
<td>1 d</td>
</tr>
<tr>
<td>Water base mud.</td>
<td></td>
</tr>
<tr>
<td>Oil base mud.</td>
<td></td>
</tr>
<tr>
<td>SHALE INHIBITION</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Types of shale.</td>
<td></td>
</tr>
<tr>
<td>Chemical and physical inhibition.</td>
<td></td>
</tr>
<tr>
<td>MECHANICAL &amp; WASTE TREATMENT</td>
<td>0.75 d</td>
</tr>
<tr>
<td>Function.</td>
<td></td>
</tr>
<tr>
<td>Selection of equipment and layout.</td>
<td></td>
</tr>
<tr>
<td>Separation ranges.</td>
<td></td>
</tr>
<tr>
<td>Overall efficiency.</td>
<td></td>
</tr>
<tr>
<td>Waste treatment: Solidification.</td>
<td></td>
</tr>
<tr>
<td>Reinjection.</td>
<td></td>
</tr>
<tr>
<td>Desorption.</td>
<td></td>
</tr>
<tr>
<td>TROUBLESHOOTING</td>
<td>0.75 d</td>
</tr>
<tr>
<td>Losses:</td>
<td></td>
</tr>
<tr>
<td>Detection.</td>
<td></td>
</tr>
<tr>
<td>Analysis and decision chart.</td>
<td></td>
</tr>
<tr>
<td>Treatment.</td>
<td></td>
</tr>
<tr>
<td>Hole cleaning: Vertical well.</td>
<td></td>
</tr>
<tr>
<td>Deviated and horizontal wells.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: FLU-EN-P. Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>15 March</td>
<td>19 March</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: FLU-FR-P. Please contact us for more information.

www.ifptraining.com
Cementing Practices

Level: KNOWLEDGE

Purpose
This course provides the knowledge and skills needed to design a cementing program.

Audience
Engineers, supervisors and lab professionals involved or interested in cementing in water, geothermal or oil/gas drilling operations.

Learning Objectives
Upon completion of the course, participants will be able to:
- master the vocabulary specific to cementing,
- understand and use primary cementing techniques and procedures,
- select cement and necessary additives,
- calculate major parameters in a cementing operation,
- assess the quality of a cementing job.

Ways & Means
- Exercises, videos.
- Application to a real case.
- Visit of a laboratory.
- Application to a real case (project) for participants in the “Drilling & Completion Engineering” training course.

Learning Assessment
Quiz.

Prerequisites
Basic knowledge in drilling operations and well architecture.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>TECHNIQUES &amp; JOB PROCEDURES</th>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary cementing.</td>
<td></td>
</tr>
<tr>
<td>Cement job design.</td>
<td></td>
</tr>
<tr>
<td>Job planning and preparation.</td>
<td></td>
</tr>
<tr>
<td>Casing running.</td>
<td></td>
</tr>
<tr>
<td>Cementing job.</td>
<td></td>
</tr>
<tr>
<td>Cementing calculations.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CEMENT &amp; SLURRIES</th>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement, cement with environmental impact reduction (CO2)</td>
<td></td>
</tr>
<tr>
<td>Special slurries and additives.</td>
<td></td>
</tr>
<tr>
<td>Formulation and laboratory tests.</td>
<td></td>
</tr>
<tr>
<td>Rheology of mud and slurries.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPECIAL CASES</th>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multistage cement job.</td>
<td></td>
</tr>
<tr>
<td>Liner.</td>
<td></td>
</tr>
<tr>
<td>Cement plugs.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CEMENTING EQUIPMENT</th>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumps.</td>
<td></td>
</tr>
<tr>
<td>Mixers.</td>
<td></td>
</tr>
<tr>
<td>Cementing head.</td>
<td></td>
</tr>
<tr>
<td>Cement plugs.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EVALUATION OF THE CEMENTING JOB</th>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles and interpretation of the cement logs:</td>
<td></td>
</tr>
<tr>
<td>Thermometry.</td>
<td></td>
</tr>
<tr>
<td>Sonic (CBL - VDL).</td>
<td></td>
</tr>
<tr>
<td>Ultrasonic (USIT).</td>
<td></td>
</tr>
<tr>
<td>Log analysis on a real case.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: CIM1-EN-P
Can be organized as an In-House course.

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>22 March</td>
<td>26 March</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: CIM1-FR-P. Please contact us for more information.
Advanced Cementing Practices

Level: SKILLED

Purpose
This course aims to deepen the understanding and develop the skills needed to design efficiently a cementing program.

Audience
Engineers, supervisors and lab professionals involved or interested in cementing in water, geothermal or oil/gas drilling operations.

Learning Objectives
Upon completion of the course, participants will be able to:
- acquire a detailed knowledge of the different cementing techniques,
- address special cases: liner, highly deviated wells, gas zones,
- design a full cementing program for a real typical case,
- assess the quality of a cementing job.

Ways & Means
- Exercises.
- Teamwork on a project.

Learning Assessment
Quiz.

Prerequisites
Course "Cementing Practices", or equivalent practical experience, is highly recommended.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

TECHNIQUES & JOB PROCEDURES
Cementing program.
Job planning and preparation:
- Casing running.
- Selection of the fluids and flows.
- Cementing calculations.
- Primary, surface, multistage, liner cementing.
- Cement plugs.

CEMENT & SLURRIES
Cement chemistry, cement with environmental impact reduction (CO₂).
Special slurries and additives.
Formulation and laboratory tests.
Rheology.
Displacement in eccentered annulus.
Salt zone and temperature problems.

SPECIAL CASES
Gas zone cementing.
Deviated and horizontal wells cementing.
Remedial techniques.
CO₂ environment (CO₂ resistant cement).

CEMENTING PROJECT
Design of a whole well cementing job.

EVALUATION OF THE CEMENTING JOB
Principles and interpretation of the cement logs:
- Thermometry.
- Sonic (CBL - VDL).
- Ultrasonic (USIT).
Logs analysis on a real case.
Wellhead Selection & Maintenance

Level: KNOWLEDGE

Purpose
This course provides the required comprehensive knowledge and skills for wellhead selection, implementation procedures and maintenance.

Audience
Completion, well servicing, workover or production engineers and supervisors, with client or service companies, familiar with well control and well integrity operations.

Learning Objectives
Upon completion of the course, participants will be able to:
- select the wellhead according to operational conditions,
- select the corresponding components of the wellhead,
- write and supervise maintenance and testing procedures on wellhead.

Ways & Means
- Numerous exercises.
- Numerous videos and animations.
- Case studies.

Learning Assessment
Quiz.

Prerequisites
Knowledge of well integrity, completion and/or production engineering.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Content</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION: DOWNHOLE EQUIPMENT</td>
<td>0.25</td>
</tr>
<tr>
<td>Well construction. Casing. Completion equipment: tubing, SCSSV, SSD, ICV…</td>
<td></td>
</tr>
<tr>
<td>WELLHEAD COMPONENTS</td>
<td>0.5</td>
</tr>
<tr>
<td>Casing head, casing spool, casing hanger, packoff flange. Tubing head, tubing hanger, tubing head adapter. Seals.</td>
<td></td>
</tr>
<tr>
<td>X-MAS TREE (specifications)</td>
<td>1.25</td>
</tr>
<tr>
<td>X-mas tree (natural flowing wells). Gas well X-mas tree, requirement for materials. X-mas tree equipment and selection (MV, SSV, SV, WV, choke).</td>
<td></td>
</tr>
<tr>
<td>WELLHEAD MONITORING &amp; MAINTENANCE</td>
<td>1.75</td>
</tr>
<tr>
<td>WELL INTEGRITY DURING OPERATIONS</td>
<td>0.5</td>
</tr>
<tr>
<td>During: well start up, steady state, well intervention. Shut-in the well and handover.</td>
<td></td>
</tr>
<tr>
<td>TODAY’S SUCCESSFUL TECHNICIAN</td>
<td>0.5</td>
</tr>
<tr>
<td>HSE goal and leadership. Role and responsibilities over the various operational life of the well. Handover and reporting best practices.</td>
<td></td>
</tr>
<tr>
<td>KNOWLEDGE ASSESSMENT</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Reference: WHMAINT-EN-P | Only available as an In-House course. Contact: ep.contact@ifptraining.com

This course is also available in French: WHMAINT-FR-P. Please contact us for more information.
Well Productivity & Reservoir - Wellbore Interface

Level: KNOWLEDGE

Purpose

This course provides the knowledge and skills needed to optimize the reservoir-wellbore interface and well productivity.

Audience

Young engineers involved in drilling/completion, supervisors in charge of drilling pay zone, and production professionals concerned with well productivity.

Learning Objectives

Upon completion of the course, participants will be able to:

- select a reservoir-wellbore interface adapted to the conditions encountered in the reservoir,
- detect problems holding down productivity and select adequate solutions.

Ways & Means

- Numerous exercises on the influence of key parameters.
- Numerous animations and videos.
- Summary notes prepared and presented by the participants.
- Application to a real case (project) for the participants in the “Drilling & Completion Engineering” training course.

Learning Assessment

Quiz.

Prerequisites

Basics of drilling, completion operations, well performance and/or production engineering.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>5 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>NECESSARY FUNDAMENTALS OF RESERVOIR ENGINEERING FOR COMPLETION</td>
</tr>
<tr>
<td>Main parameters about the rock-fluid couple: porosity, permeability, saturation.</td>
</tr>
<tr>
<td>Means of reservoir knowledge: core, logging, well test.</td>
</tr>
<tr>
<td>PVT study: PV diagram, PT diagram, terminology (bubble point, dew point, $R_s$, $B_o$, $B_g$, GOR, WOR...).</td>
</tr>
<tr>
<td>Drainage mechanisms: primary, secondary and enhanced recovery.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETION FUNDAMENTALS</td>
</tr>
<tr>
<td>Completion: operations involved, main phases.</td>
</tr>
<tr>
<td>Main factors influencing completion design.</td>
</tr>
<tr>
<td>Completion configurations: fundamental requirements, main configurations.</td>
</tr>
<tr>
<td>Main completions of gas storage wells and Geothermal wells</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>WELL PRODUCTIVITY (Part 1)</td>
</tr>
<tr>
<td>Fundamentals: overall approach of the well flow capacity:</td>
</tr>
<tr>
<td>Inflow (study of the bottom hole pressure from the upstream side): main parameters, Productivity Index (PI), global skin and flow efficiency.</td>
</tr>
<tr>
<td>Outflow (study of the bottom hole pressure from the downstream side): case of oil wells and case of gas wells.</td>
</tr>
<tr>
<td>Analysis of inflow and outflow performance curves, need for artificial lift.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESERVOIR WELLBORE INTERFACE IMPLEMENTATION (excluding “Wellbore treatments”)</td>
</tr>
<tr>
<td>Specific aspects linked to drilling and cementing the pay zone.</td>
</tr>
<tr>
<td>Perforating: main techniques, key parameters for productivity.</td>
</tr>
<tr>
<td>Specific case of horizontal drains.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>WELL PRODUCTIVITY (Part 2)</td>
</tr>
<tr>
<td>Additional information about PI:</td>
</tr>
<tr>
<td>Productivity index and flow regime.</td>
</tr>
<tr>
<td>Inflow performance below bubble point pressure (IPR).</td>
</tr>
<tr>
<td>Additional information about skin:</td>
</tr>
<tr>
<td>Components of completion skin.</td>
</tr>
<tr>
<td>Damage skin estimation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNOWLEDGE ASSESSMENT</td>
</tr>
</tbody>
</table>

Reference: PPLCT-EN-P. Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>8 February</td>
<td>12 February</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: PPLCT-FR-P. Please contact us for more information.
This course can be adapted to virtual classroom mode

Well Test Operation

Level: SKILLED

Purpose
This course provides the required comprehensive knowledge and skills for implementing well tests.

Audience
Drilling and production engineers, supervisors involved in well test operation, reservoir engineers.

Learning Objectives
Upon completion of the course, participants will be able to:
- select the required well test equipment,
- design an operational well test program with regard to the reservoir engineer’s requirements,
- supervise the well test operation.

Ways & Means
- Several practical examples and case studies.
- Numerous videos and animations.

Learning Assessment
Quiz.

Prerequisites
Basics in well operations.

More info
This course can be delivered in French, with documentation in English. The course schedule will be adapted to cover all the content.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

WELL TESTING FUNDAMENTALS
Principle and objectives of well testing.
Basic data for predevelopment studies.
Fundamentals of fluid flow in porous media.

DRILL STEM TEST, PERFORATION & WELL TESTING EQUIPMENT REVIEW
Principle of DST operation.
Principle of perforation operation:
- Perforation methodology.
- Equipment selection versus well configuration and objectives.
- Perforation tools demo (movie).
DST string versus rig types:
- Principle of DST String versus well testing objectives.
- Composition of different DST strings.
Principle of DST String:
- DST String type composition review.
- DST tools demo (movie).
Well testing operation and surface set up:
- Surface equipment and set up.
- Well testing sequences of operation.
- Surface well testing equipment.
- Well testing HSE concept.
- Data acquisition.
- Sampling.
- Well testing calculations.

PROGRAM IMPLEMENTATION, ORGANIZATION & RESPONSIBILITIES,
WELL ABANDONMENT, DST IN SUBSEA ENVIRONMENT
DST operations and well test program implementation:
- Standard procedures reviews versus DST string type.
- Running in hole the DST string.
- Brine selection and weight.
- Selection of the $\Delta P$ on the formation.
- Operation instructions review.
- Sampling.
- Cases studies.
Organization on board of the rig, roles and responsibility:
- Safety instructions.
- Contingency plan.
Well abandonment after DST operation:
- Well killing operation.
- Well abandonment and safety concerns.
Principle of DST operation in subsea environment:
- Deep water DST operations subsea equipment.
- Deep water DST operations.
- Deep water DST operations equipment impact: wax deposition, paraffin, hydrates.
- Deep water operations contingency plan.
- DST tools demo (movie).

KNOWLEDGE ASSESSMENT

Reference: WELTEST-EN-A
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>26 April</td>
<td>30 April</td>
<td>€3,690</td>
</tr>
</tbody>
</table>
Well-Completion Equipment & Procedures for Flowing Wells

Level: SKILLED

Purpose
This course provides the knowledge and skills needed to choose and operate completion equipment for flowing wells.

Audience
Drilling or production engineers, supervisors involved in completion for oil & gas wells and gas storage wells.

Learning Objectives
Upon completion of the course, participants will be able to:
- assess which equipment is required in a conventional case,
- design the corresponding completion procedure,
- work on complex completion issues with specialists.

Ways & Means
- Equipment and cutaway tools display in Pau.
- For in-house courses held elsewhere, in as much as a completion shop is made available, a visit will be organized to the said shop.
- Summary notes prepared and presented by the participants.
- Application to a real case (project) for the participants in the “Drilling & Completion Engineering” training course.

Learning Assessment
Quiz.

Prerequisites
Basic knowledge of drilling and completion operations or production engineering.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

WELL-COMPLETION EQUIPMENT 1.5 d
Functions to be carried out and corresponding equipment.
Production string(s) configurations (conventional or tubing less, single or multi-zones).
Production wellhead: tubing head spool and Christmas tree (components, design).
Tubing and connections (main characteristics, criteria of choice).
Packers and accessories (drillable or permanent, retrievable).
Bottom hole devices (landing nipples, circulating devices…) and relevant wireline equipment.
Subsurface safety valve (subsurface controlled, surface controlled).
Equipment of gas storage wells.

FUNDAMENTALS OF TUBING MOVEMENT & FORCES 1 d
Point to be verified.
Packer permitting free motion (tubing movement, tension on the tubing hanger).
Packer permitting no motion (packer to tubing force, tension on the tubing hanger).

WELL-COMPLETION PREPARATION & IMPLEMENTATION 1.5 d
Preparing for operations.
Safety recommendations during completion operations.
Standard running-in and start-up steps:
- Case of a packer set directly with the tubing string.
- Case of a packer set prior to the running-in of the tubing string.
Operating recommendations.

ADVANCED COMPLETION 0.75 d
Tubing less completion.
Intelligent completion.
Multilateral completion.
Deep water completion.
Single trip multizones gravel pack system.

KNOWLEDGE ASSESSMENT 0.25 d

Reference: EQTP-EN-P Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>15 February</td>
<td>19 February</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: EQTP-FR-P. Please contact us for more information.
Tubing Movement & Forces

**Level:** SKILLED

**Purpose**
This course provides a thorough understanding of tubing movement and forces.

**Audience**
Completion engineers or technicians.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- analyze data and decide which element(s) or parameter(s) of a completion equipment must be modified to solve problems related to tubing movement,
- write a completion program taking tubing behavior into account,
- analyze correctly a tubing behavior-related problem encountered during operation and provide an adequate solution.

**Ways & Means**
- Exercises and a large case study.
- Numerous animation and videos.

**Learning Assessment**
Quiz.

**Prerequisites**
Knowledge of well completion equipment, well operations and/or well intervention.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

**3 days**

**GENERAL PRINCIPLES**
- Presentation of the problem.
- Parameters to be verified (worst place and case) and possible cures.
- Reference state and present states of the well, various conventions.
- Calculation principle.
- Computation of temperature and pressure changes.

**CASE OF A DOWNHOLE BINDING DEVICE PERMITTING FREE TUBING MOVEMENT**
- Temperature effect.
- Ballooning effect.
- Piston effects (not including buckling).
- Effect of the friction resulting from the fluid flow.
- Buckling effect:
  - Awareness to the key parameters.
  - Buckling criteria.
  - Location of the neutral point and determination of the movement resulting from buckling.
- Global effect: movement of the sliding binding device, tension force at the wellhead...

**CASE OF A DOWNHOLE BINDING DEVICE PERMITTING NO TUBING MOVEMENT**
- Calculation principle.
- Estimation of $f_{	ext{buck}}$.
- Determination of $f_{	ext{buck}}$ taking buckling into account.

**CASE STUDY**

**KNOWLEDGE ASSESSMENT**

---

Reference: TUBMF-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: TUBMF-FR-P. Please contact us for more information.
Wellbore Treatments

Course Content

INTRODUCTION TO WELLBORE TREATMENTS 1 d
Fundamental reminders on Productivity Index (PI), the skin effect and flow efficiency, the different components of the skin.
Productivity issues: cause of low productivity, nature and origins of well damage, location of problems and possible solutions.
Damage due to fluids: mechanisms, prevention.

MATRIX TREATMENT: ACIDIZING… 1 d
Aims; how it works.
Carbonate rocks and sandstones; inner characteristics, reactivity to injected fluids.
Choosing the acids and the additives.
Choosing the wells to be treated.
Design: preparation, checks and guidelines during the operation, after the acidizing (flow back…), possible cause of failure, coiled tubing…

HYDRAULIC FRACTURING 1 d
Aims and principles; candidate wells.
Frac fluids and fracture propping.
Calculation models and frac impact on PI.
Design: program, frac evaluation.
Other cases: pre-frac, minifrac, acid frac.

SAND CONTROL 1 d
Basics: consequences of sand, prediction of sand, sand analysis.
Sand control techniques; case of mechanical processes (determining the gravel and the screens…). Design: cased hole gravel packing, openhole gravel packing, preparing the gravel pack, various methods, guidelines.

WATER OR GAS SHUT-OFF & DEPOSITS 0.75 d
Origin of the problems.
Remedial.
Debate around several examples.
Case study.

KNOWLEDGE ASSESSMENT 0.25 d

Prerequisites
Knowledge in well operations, well performance or stimulation techniques.

Ways & Means
Animations - Exercises.
Visit of a rock mechanics and reservoir-wellbore interface laboratory.
Application to a real case (project) for the participants in the “Drilling & Completion Engineering” training course.

Learning Assessment
Quiz.

Audience
Drilling or completion engineers, supervisors, lab or production professionals, non-specialists in wellbore treatment.

Level: KNOWLEDGE
Purpose
This course provides knowledge and skills needed to examine well damage issues and take appropriate actions.

Learning Objectives
Upon completion of the course, participants will be able to:
► identify the nature and the origins of well damage,
► choose the adequate stimulation method,
► learn how to deal with sand production and water coning.

More info
Kindly refer to the following complementary courses which might be of interest: “Matrix Acidizing” and “Basic Hydraulic Fracturing”.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: TRAIT-EN-P Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Location Start Date End Date Tuition Fees excl. VAT
Pau 22 February 26 February €3,690

This course is also available in French: TRAIT-FR-P. Please contact us for more information.

www.ifptraining.com
Matrix Acidizing

**Level:** SKILLED

**Purpose**
This course provides knowledge and skills needed to identify well damage issues in sandstone and carbonate reservoirs, and design acidizing programs.

**Audience**
Drilling or completion engineers, supervisors, lab or production professionals, non-specialists in wellbore treatment.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- identify the nature and the origins of well damage,
- design an acidizing program,
- select the additives needed,
- set up the acid treatment program.

**Ways & Means**
- Exercises - Teamwork.
- Visit of a reservoir-wellbore interface laboratory (if available).

**Learning Assessment**
Quiz.

**Prerequisites**
Kindly refer to the following complementary course which might be of interest: “Wellbore Treatments”.

**More info**
Kindly refer to the following complementary course which might be of interest: “Wellbore Treatments”.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

### Course Content

**INTRODUCTION TO RESERVOIR TREATMENTS** 0.5 d
Fundamental reminders on the Productivity Index (PI), the skin effect and flow efficiency, the different components of the skin.

**FORMATION DAMAGE** 1 d
Productivity issues: cause of low productivity, nature and origins of the damage, location of the problems and possible solutions.
Scale deposition: scale control and prevention.

**MATRIX TREATMENT: ACIDIZING CARBONATES** 1 d
Aims; how it works.
Sandstones: inner characteristics, reactivity to injected fluids.
Laboratory studies.
Exercises.

**MATRIX TREATMENT: ACIDIZING SANDSTONES** 1 d
Aims; how it works.
Sandstones: inner characteristics, reactivity to injected fluids.
Choosing the acids.

**ACIDIZING ADDITIVES** 0.5 d
Review of the different additives (corrosion inhibitor, iron complexing agents, surfactants, solvents, etc.).
Selection of the additives.

**MATRIX TREATMENT DESIGN** 0.75 d
Candidate selection.
Matrix design methodology.
Diversions.
Treatment evaluation.
Other associated processes (water shut-off…).
Causes of failure in matrix acidizing.
Case study.

**KNOWLEDGE ASSESSMENT** 0.25 d

---

Reference: ACID-EN-P  Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: ACID-FR-P. Please contact us for more information.
Basic Hydraulic Fracturing

Course Content

INTRODUCTION TO HYDRAULIC FRACTURING
Productivity index, skin effect, flow efficiency. Damage in the formation and in the pack. Candidate selection.

DESCRIPTION OF THE PROCESS

FRACTURING FLUIDS, PROPPANTS & FRACTURE CONDUCTIVITY
Types of fracturing fluids. Types of proppants. Fluid and proppant selection.

INPUT & FRACTURE DESIGN

EQUIPMENT & PLACEMENT TECHNIQUES
Surface pumping equipment. Placement techniques in vertical and horizontal wells. Planning and executing operation.

FLOW BACK, FRACTURE MAPPING & POST-JOB ANALYSIS

CONCLUSION, ASSESSMENT & FEEDBACK

Legend:
- 5 days
- 0.5 d
- 1 d
- 0.75 d

Ways & Means
Numerous videos and animations. Practical exercises.

Learning Assessment
Quiz.

Prerequisites
Basics in well completion, well operations and/or production engineering.

More info
Kindly refer to the following complementary course “Wellbore treatments”.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: FRAC-EN-P
Contact: ep.contact@ifptraining.com

www.ifptraining.com
Artificial Lift & Well Intervention Fundamentals

Course Content

<table>
<thead>
<tr>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 d</td>
<td><strong>ARTIFICIAL LIFT BY CONTINUOUS GAS LIFT</strong>&lt;br&gt;Continuous gas lift: principle, well unloading, operating procedure and troubleshooting, field of application.</td>
</tr>
<tr>
<td>1 d</td>
<td><strong>ARTIFICIAL LIFT BY PUMPING</strong>&lt;br&gt;Sucker rod pumping, Electrical Submersible centrifugal Pumping (ESP): principle, specific completion equipment, operating procedure and troubleshooting, field of application.</td>
</tr>
<tr>
<td>1 d</td>
<td><strong>TYPES &amp; MEANS OF INTERVENTION ON PRODUCING WELLS</strong>&lt;br&gt;Mains types of intervention: measurement, maintenance, workover.&lt;br&gt;Main means (wireline unit, coiled tubing unit, snubbing unit, workover rig): principles, area of application.</td>
</tr>
<tr>
<td>0.5 d</td>
<td><strong>GENERAL PROCEDURE OF A WORKOVER</strong>&lt;br&gt;Main operation steps: chronology, more tricky operations from a safety point of view, main operations.&lt;br&gt;Case of depleted reservoirs: losses and formation damage, kick-off after the workover.</td>
</tr>
<tr>
<td>0.75 d</td>
<td><strong>WELL KILLING PROCEDURE FOR A PRODUCING WELL</strong>&lt;br&gt;Killing the well by circulation: area of application, basis procedures (direct or reverse circulation), elaboration of the forward-looking pumping diagram.&lt;br&gt;Killing by squeeze: area of application, basis procedure, elaboration of the operating program, case where the injectivity test is unsatisfactory, squeeze and bleed-off method.&lt;br&gt;Final killing phase: observing the well, operations to run after packer “unsetting”.</td>
</tr>
<tr>
<td>0.5 d</td>
<td><strong>CASE STUDY: WORKOVER PROGRAM</strong>&lt;br&gt;</td>
</tr>
</tbody>
</table>
Artificial Lift: Gas Lift

Level: SKILLED

Purpose
This course provides a comprehensive, practical knowledge of gas lift concepts, operations, equipment and potential problems.

Audience
E&P professionals involved in operating wells using gas lift.

Learning Objectives
Upon completion of the course, participants will be able to:
► perform a gas lift design,
► analyze gas lift operating conditions,
► improve well performance.

Ways & Means
► Practical exercises to grasp physical phenomena.
► Numerous animations and videos.

Learning Assessment
Quiz.

Prerequisites
Basics in production engineering, well operations or well performance.

More info
Kindly refer to the following complementary course which might be of interest: “Artificial Lift: Pumping”.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

FLOWING GRADIENTS - TUBING PERFORMANCE CURVES 1 d
Well representation and nodal analysis.
Inflow: Productivity Index (PI) and Inflow Performance Relationship (IPR) techniques.
Outflow: vertical flowing pressure gradient curves in diphasic flow and Tubing Performance Curve (TPC).

INTRODUCING GAS LIFT SYSTEMS 1 d
Principle and active parameters.
Characteristics and advantages.
Operating parameters determination: gas injection depth, pressure and rate.
Determination of the absolute maximum flow rate versus GLR (Gas-Liquid Ratio). Optimization with time.

GAS Lift DOWN HOLE EQUIPMENT 0.5 d
Valve mechanics and characteristics.
IPO/Casing-operated gas lift valves.
PPO/Tubing-operated gas lift valves.
Conventional and Side Pocket Mandrel (SPM).
Miscellaneous valves and equipment.

CONTINUOUS GAS LIFT DOWN HOLE EQUIPMENT DESIGN 1 d
Side pocket mandrel spacing and valve selection.
Manual (graphical) design.
Standard completion designs and other possibilities (dual completion, macaroni/coiled tubing).

CONTINUOUS GAS Lift OPERATION 1 d
Well surface equipment.
Unloading procedure.
Operating recommendations.
Surveillance and troubleshooting.

INTRODUCTION TO PROSPER™ 0.25 d
Overview of well performance software tool and methods.
PROSPER™ methodology for gas lift design and troubleshooting, manual application.

KNOWLEDGE ASSESSMENT 0.25 d

Reference: GLIFT-EN-P
This course is also available in French: GLIFT-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com

www.ifptraining.com

Artificial Lift: Pumping

Level: SKILLED

Purpose
This course provides a comprehensive, practical knowledge of rod and centrifugal pumping concepts, design, operations and potential problems.

Audience
E&P professionals involved in operating wells using sucker rod or centrifugal pumping.

Learning Objectives
Upon completion of the course, participants will be able to:
▲ select the most-suited pumping method,
▲ analyze operating conditions,
▲ improve well performance and manage equipment lifetime.

Ways & Means
► Exercises on equipment calculation.
► Numerous animations and videos.

Learning Assessment
Quiz.

Prerequisites
Basics in well performance and completion, production engineering and/or artificial lift systems.

More info
Kindly refer to the following complementary course which might be of interest: “Artificial Lift: Gas Lift”.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

WHY ARTIFICIAL LIFT?
Main parameters relative to reservoir and well performance curve: inflow and outflow. Need for artificial lift. 0.5 d

SUCKER ROD PUMPING
Principle, field of application, crucial parameters. Main specific equipment: surface Pumping Units (PU), downhole pumps, rodstring. Operating procedures and troubleshooting. Example of rodstring load calculation. 1.5 d

ELECTRICAL SUBMERSIBLE CENTRIFUGAL PUMPING (ESP)
Principle, field of application. Main specific pieces of equipment: pump, seal section/protector, electric motor selection, Variable Speed Drive (VSD) interaction. Operating procedures and troubleshooting (including PROSPER™ methodology). Example of design:
Base case: oil “without problems”.
Specific cases: gassy oil well, ESP with VSD. 2.25 d

OTHER METHODS & PROCESS SELECTION
Overview of other methods (hydraulic pumps, jet pumps, Progressive Cavity Pumps [PCP]): principle, fields of operation. Artificial lift methods comparison, benefits and limitations. 0.5 d

KNOWLEDGE ASSESSMENT
0.25 d

Reference: APOMP-EN-P  Only available as an In-House course.
This course is also available in French: APOMP-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com
Coiled Tubing & Nitrogen Operations in Completion & Workover

### Level: SKILLED

#### Purpose
This course provides a comprehensive, practical knowledge of coiled tubing equipment and operations on a producing well.

#### Audience
Engineers, supervisors, technicians from operating or service companies, involved in completion, workover and stimulation.

#### Learning Objectives
Upon completion of the course, participants will be able to:
- Learn about coiled tubing applications in completion and workover,
- Design coiled tubing programs (wellbore treatment, logging, cementing, lifting and drilling).

#### Ways & Means
Exercises - Animations.

#### Learning Assessment
Quiz.

#### Prerequisites
Basic knowledge of well completion and well intervention.

#### Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

### Course Content 5 days

<table>
<thead>
<tr>
<th>Module</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BASIC DATA</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Importance of nitrogen in stimulation and workover.</td>
<td></td>
</tr>
<tr>
<td>Importance of coiled tubing in completion and workover.</td>
<td></td>
</tr>
<tr>
<td><strong>NITROGEN - NITRIFIED ACID - FOAMED ACID</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Nitrogen (properties, basic formula for design).</td>
<td></td>
</tr>
<tr>
<td>Specifications for nitrogen storage and pumping equipment.</td>
<td></td>
</tr>
<tr>
<td>Two-phase fluids and foams (properties, chart and tables for design, difference between foam and two phase fluids), diverting effect of foamed fluid.</td>
<td></td>
</tr>
<tr>
<td>Stimulation methodology, flow back procedure.</td>
<td></td>
</tr>
<tr>
<td><strong>COILED TUBING EQUIPMENT</strong> (technology, dimension, weight)</td>
<td>0.75 d</td>
</tr>
<tr>
<td>Main components: reel, injector, BOP and related equipment.</td>
<td></td>
</tr>
<tr>
<td>Auxiliary equipment: crane, pumping equipment, etc.</td>
<td></td>
</tr>
<tr>
<td>Downhole tools: connectors, safety equipment, circulating tools, downhole motor, fishing tools, inflatable packers, etc.</td>
<td></td>
</tr>
<tr>
<td>Guide for safe equipment rig-up.</td>
<td></td>
</tr>
<tr>
<td><strong>PIPE CHARACTERISTICS &amp; BEHAVIOR</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Geometric and mechanical properties: geometry, metallurgy, performance, characteristic curve.</td>
<td></td>
</tr>
<tr>
<td>Tubing behavior (at surface, in hole): fatigue, buckling, tension and pressure limits (tubing force analysis, model for operation design).</td>
<td></td>
</tr>
<tr>
<td>Measuring and recording of operating parameters.</td>
<td></td>
</tr>
<tr>
<td><strong>COILED TUBING APPLICATIONS</strong></td>
<td>2 d</td>
</tr>
<tr>
<td>Kick off with nitrogen, underbalance perforating.</td>
<td></td>
</tr>
<tr>
<td>Well clean out (fill removal, wax and hydrate removal).</td>
<td></td>
</tr>
<tr>
<td>Sand control.</td>
<td></td>
</tr>
<tr>
<td>Matrix treatment: acid, solvent.</td>
<td></td>
</tr>
<tr>
<td>Other applications: CT assisted DST, conveyed tool operations in high deviated well, use as producing, gas lift or chemical injection string, fishing, underreaming, drilling.</td>
<td></td>
</tr>
<tr>
<td>Statistics, economy, areas for future development.</td>
<td></td>
</tr>
<tr>
<td><strong>CEMENTING OPERATIONS WITH NITROGEN OR COILED TUBING</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Foamed cement: definition, use (primary cementing, squeeze).</td>
<td></td>
</tr>
<tr>
<td>Cementing through coiled tubing: cement plug, squeeze (squeeze slurry characteristics, job design, key-points).</td>
<td></td>
</tr>
</tbody>
</table>

This course is also available in French: CTA-FR-P. Please contact us for more information.

Reference: CTA-EN-P  
Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
This course can be adapted to virtual classroom mode

**Well Equipment & Operation for Production Engineer**

Drilling - Completion - Artificial Lift - Well Interventions

---

**Level:** KNOWLEDGE

**Purpose**

This course provides a comprehensive knowledge of well operations: from drilling, completion and artificial lift techniques and equipment to well intervention operations.

**Audience**

Production engineers and other professionals interested in well operations.

**Learning Objectives**

Upon completion of the course, participants will be able to:

- Grasp fundamentals of drilling techniques,
- Draw the architecture of a typical well completion and explain the technology of the equipment used,
- Understand operating principle and technology of artificial lift pumps,
- Comprehend operating principle, monitoring and technology of gas lift systems,
- Review main well servicing and workover operations (objectives, principles, equipment...).

**Ways & Means**

- Highly interactive training by industry specialist lecturers.
- Several applications and illustrations.

**Learning Assessment**

Assessment by test at the end of the course.

**Prerequisites**

Basics of production engineering and/or well operations.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

- **FUNDAMENTALS OF DRILLING**
  1 day
  - Drilling and casing program: function of the different casings, how to determine the drilling and casing program.
  - Principle of drilling: different types of bits, drilling string, hoisting and pumping functions and material, mud and solid treatments, wellheads.
  - Drilling methods and special operations: drilling parameters, turbo drilling, coring and logging, casing and cementing operations, directional drilling, well control, fishing jobs.
  - Offshore drilling operations: different types of rigs, specific offshore problems.

- **FUNDAMENTALS OF COMPLETION OF NORMALLY FLOWING WELLS**
  1 day
  - Operations involved in well completion.
  - Main factors influencing a completion design.
  - Connecting the pay-zone to the borehole: open hole and cased hole, drilling and casing of the pay zone, evaluating and restoring the cement job, perforating.
  - Equipment of naturally flowing wells: functions to be carried out and corresponding pieces of equipment, technology and handling of the main pieces of equipment (production wellhead, tubing, packer, downhole services, subsurface safety valve).

- **WELL PRODUCTIVITY - NEED FOR ARTIFICIAL LIFT**
  0.25 day
  - Overall approach of the well flow capacity: inflow and outflow performances.
  - Need for artificial lift.
  - Main artificial lift techniques.

- **ARTIFICIAL LIFT BY PUMPING**
  0.75 day
  - Techniques to be covered:
    - Sucker Rod Pumps.
    - Electrical Submersible Pumps (ESP).
    - Progressing Cavity Pumps (PCP)...
    - Jet pumps.
  - For each of these techniques, the following points will be highlighted: principle, technology of the involved pieces of equipment, operating procedure and troubleshooting, installation design, applications, advantages and drawbacks.
  - How to improve performances and run-life duration?

- **ARTIFICIAL LIFT BY CONTINUOUS GAS LIFT**
  1 day
  - Operating principle.
  - Specific completion equipment.
  - Factors to consider for design.
  - Unloading, operating problems and selection criteria.

- **WELL SERVICING & WORKOVER - WELL INTERVENTION**
  1 day
  - Main jobs: measurement, maintenance, stimulation, workover.
  - Operations on killed wells (workover).
  - Operations on live wells (well intervention): wireline, coiled tubing, snubbing.

---

Reference: TPP-EN-A

Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>18 October</td>
<td>22 October</td>
<td>€3,690</td>
</tr>
</tbody>
</table>

This course is also available in French: TPP-FR-A. Please contact us for more information.
## Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TYPES &amp; MEANS OF INTERVENTION ON PRODUCING WELLS</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Mains types of intervention: measurement, maintenance, workover.</td>
<td></td>
</tr>
<tr>
<td>Introduction to main means (wireline unit, coiled tubing unit, snubbing unit, workover rig): principles, area of application.</td>
<td></td>
</tr>
<tr>
<td><strong>GENERAL PROCEDURE OF A WORKOVER</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Main operation steps: chronology, more tricky operations from a safety point of view, main operations.</td>
<td></td>
</tr>
<tr>
<td>Case of depleted reservoirs: losses and formation damage, kick-off after the workover.</td>
<td></td>
</tr>
<tr>
<td><strong>WELL KILLING PROCEDURE FOR A PRODUCING WELL</strong></td>
<td>1.25 d</td>
</tr>
<tr>
<td>Killing the well by circulation: area of application, basis procedures (direct or reverse circulation), elaboration of the forward-looking pumping diagram.</td>
<td></td>
</tr>
<tr>
<td>Killing by squeeze: area of application, basis procedure, elaboration of the operating program, case where the injectivity test is unsatisfactory, squeeze and bleed-off method.</td>
<td></td>
</tr>
<tr>
<td>Final killing phase: observing the well, operations to run after packer “unsettling”.</td>
<td></td>
</tr>
<tr>
<td><strong>WELL OPERATIONS ON PRODUCING WELLS</strong></td>
<td>2 d</td>
</tr>
<tr>
<td>Wireline operations: principle and area of application, surface equipment, wireline tool string, WL tools, fishing tools, safety during operations.</td>
<td></td>
</tr>
<tr>
<td>Coiled tubing operations: principle and area of application, surface equipment, CT downhole equipment, CT safety and operating considerations.</td>
<td></td>
</tr>
<tr>
<td><strong>CASE STUDY: WORKOVER PROGRAM</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td><strong>KNOWLEDGE ASSESSMENT</strong></td>
<td>0.25 d</td>
</tr>
</tbody>
</table>

---

**Prerequisites**
Basics of well completion, well operations and/or well intervention.

**More info**
This course can be delivered in French, with documentation in English.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.
# Well Performance

## Purpose
This course provides a comprehensive understanding of well lift optimization.

## Audience
- E&P technical staff involved in well operations.
- Reservoir engineers involved in field studies with productivity and artificial lift issues.
- Development engineers involved in conceptual design with well architecture and artificial lift.

## Learning Objectives
Upon completion of the course, participants will be able to:
- Select the relevant reservoir characteristics and fluid properties related to well performance modeling.
- Design artificial lift and select the adequate method.
- Optimize well performance.
- Analyze the impact of well completion and equipment on well performance.
- Analyze the operation process.

## Learning Assessment
Quiz.

## Prerequisites
Knowledge in reservoir, completion or production engineering.

## More info
This course can be delivered in French, with documentation in English.

## Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

## Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PVT &amp; RESERVOIR FUNDAMENTALS</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Oil &amp; Gas PVT properties: bubble point, B_p, R_p, GOR, solids…</td>
<td></td>
</tr>
<tr>
<td>Reservoir rock and fluids: porosity, permeability, saturation, relative permeability.</td>
<td></td>
</tr>
<tr>
<td>Reservoir behavior types.</td>
<td></td>
</tr>
<tr>
<td><strong>RESERVOIR-WELLBORE INTERFACE FUNDAMENTALS</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Pay zone drilling, completion (open hole, cased hole), perforating.</td>
<td></td>
</tr>
<tr>
<td>Wellbore treatment: sand control, stimulations (acidizing, hydraulic fracturing).</td>
<td></td>
</tr>
<tr>
<td><strong>INFLOW PERFORMANCE</strong></td>
<td>0.75 d</td>
</tr>
<tr>
<td>Flow in the reservoir: Productivity Index (PI), empirical Inflow Performance Relationship (IPR), horizontal wells.</td>
<td></td>
</tr>
<tr>
<td>Back pressure equation for gas wells.</td>
<td></td>
</tr>
<tr>
<td>Global skin: formation damage, perforation, partial penetration, deviation.</td>
<td></td>
</tr>
<tr>
<td>Applications - Exercises.</td>
<td></td>
</tr>
<tr>
<td><strong>OUTFLOW PERFORMANCE</strong></td>
<td>0.75 d</td>
</tr>
<tr>
<td>Flow in the wellbore: pressure gradient and Vertical Lift Performance (VLP) curves.</td>
<td></td>
</tr>
<tr>
<td>GLR, tubing head pressure, tubing ID impact.</td>
<td></td>
</tr>
<tr>
<td>Monophasic vs. polyphasic flow: minimum flowrate/well loading.</td>
<td></td>
</tr>
<tr>
<td>Applications - Exercises.</td>
<td></td>
</tr>
<tr>
<td><strong>WELL PERFORMANCE</strong></td>
<td>0.75 d</td>
</tr>
<tr>
<td>Well deliverability nodal analysis: inflow/outflow.</td>
<td></td>
</tr>
<tr>
<td>Well performance modeling, prediction and analysis vs. reservoir pressure, PI, GLR, BSW, tubing ID.</td>
<td></td>
</tr>
<tr>
<td>Applications - Exercises.</td>
<td></td>
</tr>
<tr>
<td><strong>ARTIFICIAL LIFT</strong></td>
<td>1.5 d</td>
</tr>
<tr>
<td>Gas lift: fundamentals, unloading procedure, surveillance and troubleshooting.</td>
<td></td>
</tr>
<tr>
<td>Electrical Submersible Pump (ESP): components, design, problems.</td>
<td></td>
</tr>
<tr>
<td>Rod pumping and jet pumps fundamentals.</td>
<td></td>
</tr>
<tr>
<td>Comparison of the artificial lift methods.</td>
<td></td>
</tr>
<tr>
<td><strong>INTRODUCTION TO PROSPER™</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Overview of well performance software tool and methods.</td>
<td></td>
</tr>
<tr>
<td>PROSPER™ methodology for gas lift design and troubleshooting, manual application.</td>
<td></td>
</tr>
<tr>
<td>PROSPER™ methodology for ESP troubleshooting.</td>
<td></td>
</tr>
<tr>
<td><strong>KNOWLEDGE ASSESSMENT</strong></td>
<td>0.25 d</td>
</tr>
</tbody>
</table>

---

Reference: WPERF-EN-A  Only available as an In-House course.  Contact: ep.contact@ifptraining.com
Advanced Well Performance

Level: SKILLED

Purpose
This course provides the practical, comprehensive understanding and skills needed to master well performance and make significant contributions to field productivity studies and well performance monitoring.

Audience
Reservoir, well performance or production engineers and technicians.

Learning Objectives
Upon completion of the course, participants will be able to:
- select the adequate reservoir, fluid, near-wellbore zone, well completion and facilities characteristics related to well performance design,
- select the remediation/stimulation and artificial lift methods,
- model, forecast, assess, troubleshoot and optimize well performance.

Ways & Means
- Use of the software program PROSPER™ (training license provided for the duration of the course).
- Short lectures alternating with hands-on sessions.
- Course ends with a 2-day integrated case study.

Learning Assessment
Presentation and discussion of the results of design (integrated case study).

Prerequisites
Knowledge in reservoir, completion or production engineering.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

WEEK 1

INTRODUCTION TO PRODUCTION SYSTEM
0.5 d
Introduction to well performance nodal analysis: inflow/outflow.
Overview of PROSPER™ software workflow:
PROSPER™: building initial well system file.

PVT DATA/PVT MODELING
0.5 d
Oil & Gas PVT properties: bubble point, Bg, Rg, GOR, solids…
PROSPER™: building PVT model.

RESERVOIR PROPERTIES & RESERVOIR-WELLBORE INTERFACE
0.5 d
Reservoir rock & fluids: porosity, permeability, saturation, relative permeability, scales.
Reservoir behavior type.
Pay zone drilling, completion (open hole, cased hole), perforating.
Wellbore treatment: sand control, stimulations (acidizing, hydraulic fracturing).

INFLOW PERFORMANCE/IPR MODELING
1.5 d
Flow in the reservoir: Productivity Index (PI), empirical Inflow Performance Relationship (IPR).
Back pressure equation for gas wells.
Global skin: formation damage, perforation, partial penetration, deviation:
PROSPER™: IPR modeling exercise.
Horizontal drains:
PROSPER™: horizontal drain modeling.

WELLBORE FLOW, OUTFLOW PERFORMANCE/VLP MODELING
1 d
Flow in the wellbore: pressure gradient and Vertical Lift Performance (VLP) curves.
GLR, tubing head pressure, tubing ID impacts.
Monophasic vs. polyphasic flow: minimum flow rate/well loading:
PROSPER™: tubing correlations, VLP modeling.
Choke performance.

WELL PERFORMANCE
1 d
Well deliverability nodal analysis: inflow x outflow:
PROSPER™: IPR + VLP natural flow well performance modeling.
Sensitivity study: prediction and analysis vs. reservoir pressure, PI, GLR, BSW, tubing ID.

WEEK 2

ARTIFICIAL LIFT
2.5 d
Gas lift: fundamentals, unloading procedure, surveillance and troubleshooting:
PROSPER™: gas lift design, prediction, analysis and diagnosis.
Electrical Submersible Pump (ESP): components, design, problems:
PROSPER™: ESP design, prediction, analysis and diagnosis.
Rod pumping and jet pumps fundamentals.
Comparison of the artificial lift methods.

PROSPER™ CASE STUDY
2 d
Application of PROSPER™ to a comprehensive case study, from PVT modeling and matching, IPR + VLP building and matching, to natural flow performance, gas lift and ESP design/performance prediction.

KNOWLEDGE ASSESSMENT
0.5 d

Reference: WPERF2-EN-P  Only available as an In-House course.
Contact: ep.contact@ifptraining.com

www.ifptraining.com
# Well Integrity

**Level:** SKILLED

## Purpose

This course provides an introduction to the fundamentals of Well Integrity. It covers the notions of well barrier envelopes and well barrier elements from design until abandonment of a well and their validation. The course will describe how to proactively monitor and manage well integrity through dedicated tools, structures, organizations and techniques. Reference industry standards as well as Plug and Abandonment principles are also presented. Various real cases and calculations will be used to illustrate the concept and engineering aspect of well integrity.

## Audience

Drilling, completion and production engineers and technicians.

## Learning Objectives

Upon completion of the course, participants will be able to:

- recognize the importance and the concepts of well integrity,
- understand the notion of well barriers and the importance of well monitoring,
- identify critical elements,
- explain typical failures and their mitigations,
- understand the well integrity structure to ensure sound management of well integrity.

## Ways & Means

- Videos and animations showing how equipment work.
- Practical exercises and knowledge assessment.

## Prerequisites

Knowledge of well completion equipment, well operations, well intervention and/or HSE engineering.

## Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

## Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>WELL INTEGRITY &amp; WELL LIFE CYCLE</td>
<td>1 d</td>
</tr>
<tr>
<td>Course objective. What is well integrity, why is it so important. Well life cycle: from cradle to grave, build and safeguard. Typical well architecture, well barrier, well barrier elements, safety critical elements.</td>
<td></td>
</tr>
<tr>
<td>WELL BARRIER, LEAKS, STANDARDS</td>
<td>1 d</td>
</tr>
<tr>
<td>OPERATIONAL PHASE &amp; MONITORING</td>
<td>1 d</td>
</tr>
<tr>
<td>WELL INTEGRITY ORGANIZATION</td>
<td>1 d</td>
</tr>
<tr>
<td>P&amp;A &amp; DECOMMISSIONING</td>
<td>1 d</td>
</tr>
<tr>
<td>Temporary abandonment and permanent abandonment. Fundamentals and techniques. Real case study.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: WELINT-EN-P  Only available as an In-House course.  Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode

Well Production Integrity

**Level: SKILLED**

**Purpose**
This course provides skills in well integrity concepts: “how to keep hydrocarbons in the pipe” by designing, operating and maintaining well equipment to ensure safe containment of all wellbore fluids over the lifetime of a well.

**Audience**
Drilling, completion and production engineers and technicians.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- recognize the importance and the concepts of well integrity,
- assess the link between well integrity and other key strategic operations,
- review, focus and design well integrity assurance,
- appreciate the role of the production technician with regard to well integrity.

**Ways & Means**
- Videos and animations showing how equipment work.
- Practical exercises and knowledge assessment.

**Learning Assessment**
Practical workshop.

**Prerequisites**
Knowledge in well completion, operations, well intervention and/or HSE engineering.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

### Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WELL INTEGRITY DESIGN</strong></td>
<td>0.25 d</td>
</tr>
</tbody>
</table>

| **WELL INTEGRITY OPERATIONS** | 0.25 d |

| **OPERATIONS: YOUR ROLE** | 0.25 d |
| Monitor well equipment. Perform well equipment tests. Ensure safety equipment is operational. Remember you are the first line of defense against well integrity failures. |

| **WELL INTEGRITY MAINTENANCE** | 0.25 d |

| **MAINTENANCE: YOUR ROLE** | 0.25 d |
| Perform maintenance tasks as assigned by location. Prepare the well for maintenance and well intervention activities. Reinstate the well after maintenance and well intervention activities. |

| **INTEGRITY MANAGEMENT** | 0.25 d |
| Operations on the wellstock. Develop a more complete understanding of the well below the surface. Understand the independence of all well components. |

| **TODAY’S SUCCESSFUL PRODUCTION TECHNICIAN** | 0.25 d |
| HSE goals. Design decisions made for the well and the relevance of those decisions to their operations. Ways that all surface and subsurface well components work together. Instruments: how the downhole conditions are reflected in the surface. Handovers: strict adherence to site-specific procedures and/or practices. Risks: daily tasks that bring increased risks to well integrity and proactive mitigation of those risks. Problems: deeper knowledge of the well to anticipate problems turn into large scale well integrity incidents. |

| **KNOWLEDGE ASSESSMENT (workshop)** | 0.25 d |

---

Reference: WPINT-EN-A. Only available as an In-House course. Contact: ep.contact@ifptraining.com

This course is also available in French: WPINT-FR-A. Please contact us for more information.

www.ifptraining.com
Well Production Integrity Management

Level: SKILLED

Purpose
To deepen knowledge of well integrity management and develop the skills for designing, operating and maintaining well equipment with the ultimate objective of ensuring a permanent, safe containment of all wellbore fluids.

Audience
Drilling, completion and production engineers and supervisors.

Learning Objectives
Upon completion of the course, participants will be able to:
- recognize the technical, operational and organizational solutions applied to well integrity management,
- design the process of well integrity management,
- review well integrity within the framework of all strategic operations,
- focus, maintain and design of well integrity assurance,
- recognize the role of production supervisor’s duties with regard to well integrity.

Learning Assessment
Quiz.

Prerequisites
Knowledge of well completion equipment, well operations, well intervention and/or HSE engineering.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>WELL INTEGRITY MANAGEMENT: DEFINITION &amp; CHALLENGES</th>
<th>0.25 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction.</td>
<td></td>
</tr>
<tr>
<td>Assets.</td>
<td></td>
</tr>
<tr>
<td>Organization and people.</td>
<td></td>
</tr>
<tr>
<td>Wi Direction.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WELL INTEGRITY DESIGN</th>
<th>1.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well construction/completion: casing, tubing, cement, produced fluids.</td>
<td></td>
</tr>
<tr>
<td>Well barriers: definition, requirement and design.</td>
<td></td>
</tr>
<tr>
<td>Wellhead and tree equipment: valves, seals, accessories.</td>
<td></td>
</tr>
<tr>
<td>Safety valves: downhole, surface.</td>
<td></td>
</tr>
<tr>
<td>Well integrity standards.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WELL INTEGRITY OPERATIONS</th>
<th>2 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow assurance (corrosion, sand &amp; deposits).</td>
<td></td>
</tr>
<tr>
<td>Safety critical equipment/barriers.</td>
<td></td>
</tr>
<tr>
<td>Monitor and manage a pressure:</td>
<td></td>
</tr>
<tr>
<td>Role and responsibilities.</td>
<td></td>
</tr>
<tr>
<td>Monitor/perform well equipment test.</td>
<td></td>
</tr>
<tr>
<td>Ensure safety critical equipment are operational.</td>
<td></td>
</tr>
<tr>
<td>Report any abnormal operating condition.</td>
<td></td>
</tr>
<tr>
<td>Your role over the various operational life of the well.</td>
<td></td>
</tr>
<tr>
<td>Well integrity maintenance:</td>
<td></td>
</tr>
<tr>
<td>Downhole/well equipment maintenance.</td>
<td></td>
</tr>
<tr>
<td>Surface equipment maintenance.</td>
<td></td>
</tr>
<tr>
<td>Plan &amp; execute maintenance. Well reinstatement.</td>
<td></td>
</tr>
<tr>
<td>Your role as a part of well integrity team:</td>
<td></td>
</tr>
<tr>
<td>Perform routine maintenance (site specific requirement).</td>
<td></td>
</tr>
<tr>
<td>Prepare well for maintenance/well intervention operation.</td>
<td></td>
</tr>
<tr>
<td>Restart well after maintenance operation.</td>
<td></td>
</tr>
<tr>
<td>Today’s successful well integrity team:</td>
<td></td>
</tr>
<tr>
<td>HSE goal and leadership.</td>
<td></td>
</tr>
<tr>
<td>Understand site specific well design decision/equipment.</td>
<td></td>
</tr>
<tr>
<td>Handover and reporting best practices.</td>
<td></td>
</tr>
<tr>
<td>Major incident prevention by implementing WIM awareness.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WELL INTEGRITY MANAGEMENT (WIM)</th>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction, concepts and definitions.</td>
<td></td>
</tr>
<tr>
<td>WIM key activities.</td>
<td></td>
</tr>
<tr>
<td>Minimum integrity requirements vs. well life cycle/phases.</td>
<td></td>
</tr>
<tr>
<td>Annulus pressure management.</td>
<td></td>
</tr>
<tr>
<td>Data management.</td>
<td></td>
</tr>
<tr>
<td>Well integrity review.</td>
<td></td>
</tr>
<tr>
<td>Well integrity performance management.</td>
<td></td>
</tr>
</tbody>
</table>

KNOWLEDGE ASSESSMENT

0.25 d

Reference: WELINTM-EN-P  Only available as an In-House course. Contact: ep.contact@ifptraining.com
Graduate Certificate
Well Performance Engineering Certification

Course Content

RESERVOIR FLUID PROPERTIES - PVT

WELL TESTING & WELL TEST ANALYSIS
Purpose of well testing, practical well test operations: types of tests, equipment, safety and environmental issues. Definitions and typical flow regimes: radial flow, fractured reservoirs, limited reservoirs and closed reservoirs. Productivity index, radius of investigation. Basic equations and methods: Darcy’s law and the diffusivity equation, time superposition, multirate testing, space superposition, boundary effect, pressure curves analysis, pressure derivative analysis. Wellbore conditions, Boundary models, test design. Hands-on session…

DRIVE MECHANISMS

MATERIAL BALANCE & DECLINE CURVE ANALYSIS
Material balance: material balance equations for the various drive mechanisms “Drive Index”, Practical exercises on synthetic and real field case data using MBAL™ software: PVT and reservoir parameters history match, production forecast. Decline curve analysis: fundamentals of decline curve analysis, Arps equation, decline exponent, Exponential, Harmonic and Hyperbolic Declines, Application and limitation of decline curve analysis. Type curve matching and case studies.

WELL PERFORMANCE
Well performance design for naturally flowing well: inflow/outflow theory and practice, well completion equipment and design optimization. Artificial Lift (AL) methods design and practice: AL methods and corresponding equipment and performance, ESP and gas lift design. Gas well and water injection well performance design. Case study: well performance project design.

Level: KNOWLEDGE
Purpose
This course provides in-depth technical knowledge in well performance engineering in order to hold rapidly and very effectively, the position of field engineer, design engineer, or project engineer.

Audience
Engineers (particularly recently graduated engineers or engineers in conversion) looking to acquire in-depth knowledge and best practices of Oil & Gas production.

Learning Objectives
Upon completion of this course the participants will be able to:
► discuss main principles of thermodynamics applied to reservoir engineering studies,
► build a PVT model for reservoir simulation and carry out a well test interpretation,
► identity main flow regimes and define or recommend a well test design,
► explain the natural, secondary and EOR mechanisms of production of Oil & Gas reservoirs and discuss their related performance,
► perform simple material balance calculations for matching reservoir parameters/forecast recovery for a real case and consequently reserve definition,
► estimate the ultimate reservoir recovery by decline curve analysis,
► select the relevant reservoir characteristics and fluid properties related to well performance modeling,
► design artificial lift, select the adequate method and optimize well performance,
► analyze the impact of well completion and equipment on well performance, analyze the operation process.

Ways & Means
► Highly interactive training with industry specialist lecturers.
► Multiple teamwork sessions and industrial case studies.
► Numerous simulation exercises using corresponding software (MBAL™, PROSPER™ & QAP™).
► Knowledge assessment on a weekly basis.

Learning Assessment
Quiz.

Prerequisites
Engineering degree or equivalent professional experience within the petroleum industry.

Why an IFP Training Certification?
► An international recognition of your competencies.
► A Graduate Certificate delivered.
► An expertise confirmed in Well Performance Engineering Certification.
► Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: WPERFE-EN-P. Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
Graduate Certificate
Well Integrity Engineering Certification

Level: KNOWLEDGE

Purpose
This course provides in-depth technical knowledge of well integrity design, management and maintenance in order to hold rapidly and very effectively, the position of field engineer, design engineer or project engineer.

Audience
Engineers (particularly recently graduated engineers or engineers in conversion) looking to acquire in-depth knowledge and best practices of Oil & Gas production.

Learning Objectives
Upon completion of this course, the participants will be able to:
- calculate different casing strings applying well integrity roles,
- select the right position of casing shoes to safely drill the well,
- select the casings as per the constraints encountered while drilling in order to maintain the well integrity,
- design primary cementing techniques and procedures and select cement and necessary additives,
- assess the quality of a cementing job and which equipment is required in a conventional case,
- design the corresponding completion safe procedures calculate tubing movement and forces,
- work on complex completion issues with specialists and select the wellhead according to operational conditions,
- write and supervise maintenance and testing procedures on wellhead,
- recognize the technical, operational and organizational solutions applied to well integrity management,
- design the process of well integrity management and review well integrity within the framework of all strategic operations.

Ways & Means
- Highly interactive training with industry specialist lecturers,
- Multiple teamwork sessions and industrial case studies.
- Numerous simulation exercises using corresponding software PipeSim™.
- Knowledge assessment on a weekly basis.

Learning Assessment
Quiz.

Prerequisites
Engineering degree or equivalent professional experience within the petroleum industry.

Why an IFP Training Certification?
- An international recognition of your competencies,
- A Graduate Certificate delivered,
- An expertise confirmed in Well Integrity Engineering Certification,
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content 35 days

CASING DESIGN & APPLICABLE STANDARDS 5 d
Drilling and casing program, wellhead, characteristics of casing.
Shoe positioning: hypotheses to be considered, casing point. Kick tolerance, casing point. Kick tolerance & well integrity.
Casing String Calculation: principles and assumptions, stress cases study (collapse, burst, tension, triaxial study, safety factors).
Casing selection.

CEMENTING: PRIMARY & REMEDIAL, QUALITY CONTROL OF CEMENT 5 d
Techniques and job procedures: primary cementing, cement job design, job planning and preparation, casing running, cementing job, cementing calculations.
Cement and slurries: cement, special slurries and additives, formulation and laboratory tests, rheology of mud and slurries.
Cement equipment: pumps, mixers, cementing head, cement plugs.
Cement job evaluation: principles and interpretation of the cement logs, thermometry, Sonic (CBL - VDL), Ultrasonic (USIT), log analysis on a real case.

WELL COMPLETION EQUIPMENT, DESIGN, ACCEPTANCE CRITERIA 5 d
Well completion equipment: functions to be carried out and corresponding equipment.
Production string(s) configurations (conventional or tubing less, single or multi-zones).
Production wellhead, tubing & connections, packers and accessories, bottom hole devices and relevant wireline equipment.
Subsurface safety valve (subsurface controlled, surface controlled).
Calculation of tubing movement and forces.
Well completion preparation and Implementation.

WELL INTEGRITY MANAGEMENT 5 d
Well integrity management system: introduction, assets, organization and people, WI Direction.
Well integrity design and standards; well construction/completion: casing, tubing, cement, produced fluids.
Well barriers: definition, requirement & design. Wellhead and tree equipment: valves, seals, accessories, Safety valves: downhole, surface.
Minimum integrity requirements vs. well life cycle/phases, annulus pressure management, well integrity review.

WELL HEAD INTEGRITY & MAINTENANCE 5 d
X-mas tree specifications: X-mas tree (natural flowing wells), gas well X-mas tree, requirement for materials, X-mas tree equipment and selection (MV, SSV, SV, WV, choke).
Wellhead monitoring and maintenance: Wellhead installation procedures, Wellhead protection during well intervention (pre-job and post job), Surface equipment monitoring maintenance, function tests, pressure test, plan & execute maintenance. Well reinstatement.
Role and responsibilities over the various operational life of the well.

FLOW ASSURANCE 5 d
Flow patterns, main considerations.
Simulation using PipeSim™: naturally flowing wells, artificial lift, skin effect.
Deposits and sand production monitoring and maintenance.
Corrosion monitoring and maintenance.

WELL SURVEILLANCE & DATA MANAGEMENT 5 d
Production reporting, production allocation and well performance monitoring.
Decline curve analysis, water and GOR control diagnostics…
Identification of a low well productivity, diagnostic, solutions implementation at the field level.
Field surveillance: field production monitoring, reserves tracking, field performance.

Reference: WELINTE-EN-P  Only available as an In-House course.
Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode.

**Well Control - Level 2**

IWCF Certification: Introduction “Combined Surface/Subsea BOP” - Certified IWCF training center

<table>
<thead>
<tr>
<th>Level: AWARENESS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>This introductory course is intended to raise participants’ awareness on the problems and consequences of a blowout, to enable them also to understand the causes of a kick and the well control methods.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course is for personnel who have had no training in well control or for young recruits who will be involved in water, geothermal or oil/gas drilling operations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the end of this training, participants will be able to:</td>
</tr>
<tr>
<td>understand the impact and consequences of a blowout,</td>
</tr>
<tr>
<td>identify the causes of a kick,</td>
</tr>
<tr>
<td>know the equipment to secure the well after a kick,</td>
</tr>
<tr>
<td>have knowledge of the well control methods,</td>
</tr>
<tr>
<td>to be certified IWCF Level 2.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ways &amp; Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching material (PPT, PDF, Word).</td>
</tr>
<tr>
<td>Exercise book.</td>
</tr>
<tr>
<td>Simulator demonstration (if available): kick while drilling and circulation of this influx.</td>
</tr>
<tr>
<td>IWCF certified instructor.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>IWCF Level 2 examination tests.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic technical knowledge of the petroleum industry.</td>
</tr>
<tr>
<td>A minimum period of 10 days is prescribed by IWCF before any registration.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>More info</th>
</tr>
</thead>
<tbody>
<tr>
<td>The level 2 course is recommended for a first IWCF certification.</td>
</tr>
<tr>
<td>The validity of Level 2 certificate is 5 years.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expertise &amp; Coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor(s) IFP Training (permanent or contracted) with a good expertise and/or experience in this topic, trained in adult teaching methods and maintained in competencies.</td>
</tr>
</tbody>
</table>

---

**Course Content**

<table>
<thead>
<tr>
<th>5 days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRESSURES IN THE WELL</strong></td>
</tr>
<tr>
<td>Hydrostatic pressure, pressure losses, gas law.</td>
</tr>
<tr>
<td>Circulation with the well open and with the well shut in.</td>
</tr>
<tr>
<td>Relationships between pressures in the well.</td>
</tr>
<tr>
<td><em>0.75 d</em></td>
</tr>
</tbody>
</table>

| **PORE PRESSURE & FRACTURE PRESSURE** |
| Overburden pressure. |
| LOT and FIT. |
| Pore pressure and frac pressure. |
| *0.25 d* |

| **KICK DETECTION** |
| Impact and consequences of a kick. |
| Causes and signs of a kick, well shut-in methods and shut in pressures. |
| Kick drills, trip sheet, kill sheet. |
| *1 d* |

| **INTRODUCTION TO WELL CONTROL METHODS** |
| Principles and procedures. |
| Drillers, wait and weight, volumetric methods. |
| *0.5 d* |

| **WELL CONTROL EQUIPMENT** |
| Barriers’ principle (Norsok standards). |
| BOP stack and BOP control unit. |
| Choke-manifold, mud-gas separator, etc. |
| Function test, pressure test, inflow test. |
| *1 d* |

| **SUBSEA EQUIPMENT** |
| Specific equipment of subsea BOP. |
| Problems related to floating rigs. |
| *0.5 d* |

| **SIMULATOR** |
| Layout of the well control equipment used on rig floor. |
| Demonstration: kick while drilling and circulation of this kick. |
| *0.5 d* |

| **IWCF CERTIFICATION** |
| Test on principles and procedures. |
| Test on well control equipment. |
| *0.5 d* |

---

Reference: FPE2-EN-A

*Only available as an In-House course.*

Contact: ep.contact@ifptraining.com

This course is also available in French: FPE2-FR-A. Please contact us for more information.

www.ifptraining.com

---
This course can be adapted to virtual classroom mode

Well Control - Level 3 or 4
IWCF certification: “Combined Surface/Subsea BOP” - Certified IWCF training center

Level: SKILLED

Purpose
This training is intended to raise the participants’ awareness on the problems and consequences of a blow out and to enable them to understand the causes of a kick and also to control a kick correctly with a good knowledge of well control methods.

Audience
This training is for all the personnel involved in water, geothermal or oil/gas drilling operations linked to the detection of a kick and well control methods (drilling engineers, mud engineers, supervisors, tool pushers, drillers, assistant drillers, etc.)

Learning Objectives
► At the end of this training, participants will be able to:
  ► identify and calculate the different pressures in a well,
  ► understand the causes of the kicks,
  ► recognize/analyze the signs of a kick to shut in the well with the minimum volume of gain,
  ► know the well control methods and demonstrate the ability to shut in the well (driller) and killing the well (supervisor),
  ► detect possible incidents during the well control and react correctly,
  ► to be certified IWCF Level 3 or 4 on well control.

Ways & Means
► Course material (PPT, PDF, Word).
► Exercise book.
► Practice on simulator.
► Certified IWCF instructor.

Learning Assessment
► IWCF Level 3 or 4 examination tests.
► Practical assessment on simulator at driller or supervisor level.

Prerequisites
► The certification Level 2 is recommended for a first IWCF certification.
► A period of 10 days minimum is prescribed by IWCF before any registration.

More info
Validity of Level 3 or 4 certificate is 2 years.

Reference: FPE3-4-EN-A  Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>8 March</td>
<td>12 March</td>
<td>€2,490</td>
</tr>
<tr>
<td>Pau</td>
<td>17 May</td>
<td>21 May</td>
<td>€2,490</td>
</tr>
<tr>
<td>Pau</td>
<td>13 September</td>
<td>17 September</td>
<td>€2,490</td>
</tr>
</tbody>
</table>

This course is also available in French: FPE3-4-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

Well Intervention & Pressure Control - Level 2
IWCF Certification: “Well Intervention & Pressure Control” - Certified IWCF training center

Level: KNOWLEDGE

Purpose

The aim of this training is to raise the awareness of the negative impact and effect of a well control incident and to provide the required comprehensive knowledge and skills to carry out well intervention operations.

Audience

This course is for personnel who have had no training in well control or for young recruits who will be involved with well intervention operations: wire-line, coiled tubing, snubbing, workover.

Learning Objectives

At the end of this training, participants will be able to:
- understand the impact and consequences of a blowout,
- know the safety barrier principles,
- understand the behavior of a producing well,
- learn the various tools used during well interventions and workovers,
- be aware of the methods used to control well pressure,
- learn procedures and equipment used in wireline, coiled tubing, snubbing, workover,
- to be certified IWCF Level 2.

Ways & Means

- Course material (PPT, PDF).
- Exercise book.
- Certified IWCF instructor.

Learning Assessment

IWCF Level 2 examination tests.

Prerequisites

- Basic technical knowledge of the petroleum industry.
- A minimum period of 10 days is prescribed by IWCF before any registration.

More info

The level 2 course is recommended for a first IWCF certification.
The validity of Level 2 certificate is 5 years.

Expertise & Coordination

Instructor(s) IFP Training (permanent or contracted) with a good expertise and/or experience in this topic, trained in adult teaching methods and maintained in competencies.

Course Content

5 days

BASIC PRINCIPLES & WELL FUNDAMENTALS 0.5 d
Type of well effluents (heavy oil, oil, gas).
Hydrostatic and hydrodynamic pressures.
Specific gravities, densities, pressure gradient.
Over-balance/under-balance.
Pore pressure, frac pressure.

PRESSURE CONTROL APPLIED TO COMPLETION & WELL INTERVENTION 1.5 d
Safety barriers, pressure tests.
Well calculation (pressure, volume, pumping time, pressure to balance at the circulating device).
Shut in procedures.
Kill methods: direct or reverse circulation, bull heading, lubricate and bleed.
Specific problems linked to producing wells: losses, plugging, migration, hydrates, H2S and CO2.

COMPLETION EQUIPMENT 0.5 d
Different types of completion.
Downhole equipment (packers, safety valves), nipples, side pocket mandrels, tubing (sizes, grades and connections), Xmas tree, etc.

DIFFERENT TYPES OF INTERVENTION WITH THEIR RESPECTIVE EQUIPMENT 2 d

Wire line intervention (optional)
- Safety barriers and specific equipment.
- Rigging up and pressure tests surface pressure control equipment.
- Slick line: specific equipment (BOP, lubricator, stuffing box, cable cutter valve…).
- Braided line, e-line: specific equipment (twin BOP, grease injection system, pack-off system, tool-trap, tool-catcher…).

Coiled tubing (optional)
- Barriers and specific equipment (strippers, BOP…).
- Rigging up and pressure tests surface pressure control equipment.

Snubbing (optional)
- Barriers and specific equipment (strippers, annular BOP, stripping rams, safety rams…).
- Rigging up and pressure tests surface pressure control equipment.

IWCF CERTIFICATION 0.5 d
Test on completion equipment (compulsory).
Test on completion operations (compulsory).
Test on Wire Line operations (optional).
Test on Coiled Tubing operations (optional).
Test on Snubbing operations (optional).

Note: 1, 2 or 3 options has to be selected in addition to the compulsory tests.

Reference: CP2-EN-A
Only available as an In-House course.

Contact: ep.contact@ifptraining.com
This course is also available in French: CP2-FR-A. Please contact us for more information.
Enhanced Well Control - Level 4

IWCF certification: "Combined Surface/Subsea BOP" - Certified IWCF training center

Level: SKILLED

Course Content

<table>
<thead>
<tr>
<th>5 days</th>
</tr>
</thead>
</table>
| **IWCF CERTIFICATION**  
Written test on principles and procedures.  
Written test on equipment. |
| 0.5 d |
| **HORIZONTAL WELL KICK CONTROL/SIMULATOR TRAINING**  
Reminder on the kick detection.  
Pressure reading and evolution while circulating a kick in a horizontal well. |
| 0.5 d |
| **PRACTICAL IWCF ASSESSMENT ON SIMULATOR** |
| 0.25 d |
| **WOCRM CLASSROOM**  
Situational awareness.  
Decision making.  
Communication.  
Teamwork.  
Leadership. |
| 0.25 d |
| **EWC TOPICS CLASSROOM**  
Volumetric method theory and exercises using simulator.  
Stripping.  
Lubricate and bleed.  
Bullheading.  
Kick with casing pressure overcoming the MAASP. |
| 0.5 d |
| **SIMULATOR EXERCISES**  
Stripping, volumetric and lubricate and bleed methods.  
Kick with CP higher than MAASP.  
Bullheading method. |
| 2.25 d |
| **CASE STUDY**  
Deepwater underground blowout. |
| 0.25 d |
| **IWCF EWC TEST** |
| 0.25 d |
| **TECHNICAL & NON TECHNICAL (WOCRM) DEBRIEFING** |
| 0.25 d |

Ways & Means

- PPT presentation.
- Course material (PPT, PDF, Word).
- Exercise book.
- Case study.
- Extended practice and enhanced case studies on simulator.
- Certified IWCF instructors and assessors.

Learning Assessment

- Paper level 4 assessments.
- Paper EWC assessment.
- Practical assessment on simulator.

Prerequisites

The enhanced training is for candidates who are renewing their Drilling Well Control Certification and who meet the following criteria:
- completed IWCF Drilling Well Control at Level 4 on at least 2 previous occasions.
- achieved a score of 80% or above on all papers during their previous 2 renewals.
A period of 10 days minimum is prescribed by IWCF before any registration.

More info

Validity of Level 4 certificate is 2 years. Courses can be tailored depending on the needs of the employer and training providers can choose from a list of topics to form an enhanced course and assessment.

Expertise & Coordination

IP Training trainer (permanent or contracted IWCF accredited) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competences are kept up-to-date.

Reference: EWCL4-EN-P  
Only available as an In-House course.
Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode

Well Intervention & Pressure Control - Level 3 or 4
IWCF Certification: “Well Intervention & Pressure Control” - Certified IWCF training center

Level: SKILLED

Purpose
The aim of this training is to increase personnel’s awareness and concern about the impact and negative effects of a well control incident and to develop the knowledge and skills to carry out well intervention operations.

Audience
All personnel concerned with well intervention operations (wire-line, coiled tubing, snubbing, workover) involved in delivering safe operations: engineers, supervisors, operators, etc.

Learning Objectives
- At the end of this training, participants will be able to:
- comply with the well integrity requirements,
- know the safety barrier principles,
- understand the behavior of a producing well,
- learn the equipment of a completion,
- apply the methods used to control well pressure,
- learn procedures and equipment used in wireline, coiled tubing, snubbing and work-over,
- obtain the level 3 or 4 IWCF certification.

Ways & Means
- Course material (PPT, PDF, Word).
- Exercise book.
- Certified IWCF instructor.

Learning Assessment
IWCF Level 3 or 4 examination tests.

Prerequisites
- The Certification Level 2 is recommended for a first IWCF certification.
- A period of minimum 10 days is prescribed by IWCF before any registration.

More info
Possibility to organize this training over 2 weeks, if needed and on request. The validity of the IWCF level 3 and level 4 certificate is 2 years.

Expertise & Coordination
Instructor(s) IFP Training (permanent or contracted) with a good expertise and/or experience in this topic, trained in adult teaching methods and maintained in competencies.

Course Content

BASIC PRINCIPLES & WELL FUNDAMENTALS 0.5 d
Type of well effluents (heavy oil, oil, gas).
Hydrostatic and hydrodynamic pressures.
Specific gravities, densities, pressure gradient.
Over-balance/under-balance.
Pore pressure, frac pressure.

PRESSURE CONTROL APPLIED TO COMPLETION & WELL INTERVENTION 1.5 d
Safety barriers, pressure tests.
Well calculation: pressure, volume, pumping time, pressure to balance at the circulating device. Shut in procedures.
Kill methods: direct or reverse circulation, bull heading, lubricate and bleed.
Specific problems linked to producing wells: losses, plugging, migration, hydrates, H₂S and CO₂.
Responsibilities and decision-making.

COMPLETION EQUIPMENT 0.5 d
Different types of completion.
Downhole equipment as: packers, safety valves SCSSSV, nipples, side pocket mandrels, tubing (sizes, grades and connections), Xmas tree, etc.

DIFFERENT TYPES OF INTERVENTION WITH THEIR RESPECTIVE EQUIPMENT 2 d
Wire line intervention (optional)
Safety barriers and specific equipment.
Rigging up and pressure tests surface pressure control equipment.
Slick line: specific equipment (BOP, lubricator, stuffing box, cable cutter valve...).
Braided line, e-line: specific equipment (twin BOP, grease injection system, pack-off system, tool trap, tool catcher...).
Problems during the interventions, interpretation and decision (shut in).

Coiled tubing (optional)
Barriers and specific equipment (stripers, BOP...).
Rigging up and pressure tests surface pressure control equipment.
Problems during the interventions, interpretation and decision (shut in).

Snubbing (optional)
Barriers and specific equipment (stripers, BOP, stripping rams, safety rams...).
Rigging up and pressure tests surface pressure control equipment.
Problems during the interventions, interpretation and decision (shut in).

IWCF CERTIFICATION 0.5 d
Test on completion operations (compulsory).
Test on completion equipment (compulsory).
Test on Wire Line operations (optional).
Test on Coiled Tubing operations (optional).
Test on Snubbing operations (optional).

Note: 1, 2 or 3 options have to be selected in addition to the compulsory tests.

Reference: CP3-4-EN-A
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Location | Start Date | End Date | Tuition Fees excl. VAT
--- | --- | --- | ---
Pau | 31 May | 4 June | €3,580

This course is also available in French: CP3-4-FR-A. Please contact us for more information.
Stripping

Level: SKILLED

Purpose
This course provides the practical knowledge and skills required for stripping operations.

Audience
Drilling and completion engineers, supervisors, and experienced tool pushers.

Learning Objectives
Upon completion of the course, participants will be able to carry out stripping operations in real conditions through annular preventer alone or rams to rams.

Ways & Means
Exercises on a simulator, to ensure a level of quality in a safe, stress-free environment. The Simulator, with real scale and high graphic definition, helps to stimulate the trainees through multiple scenarios.

Learning Assessment
Quiz.

Prerequisites
To have a valid well control certificate and to correctly know the basics on well control equipment.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

3 days

REMINDERS ON WELL CONTROL

STRIPPING: THEORY
Principle of the volumetric method, of the lubricating method. Application of the volumetric method to a general case: change in annular capacity, deviated well, drill collar safety. Stripping principle. Additional equipment required for a stripping job.

STRIPPING: PRACTICAL ON SIMULATOR
Stripping through the annular preventer while running in on simulator. How teams are organized on the rig site to carry out the job. Stripping through ram BOP while running in on simulator. Stripping procedure when pulling out of hole.

Reference: STRIP-EN-P Only available as an In-House course. Contact: ep.contact@ifptraining.com

This course is also available in French: STRIP-FR-P. Please contact us for more information.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Engineering Certification</td>
<td>198</td>
</tr>
<tr>
<td>Metering &amp; Allocation</td>
<td>199</td>
</tr>
<tr>
<td>Integrated Production Modeling - Module 1</td>
<td>200</td>
</tr>
<tr>
<td>Integrated Production Modeling - Module 2 (Project)</td>
<td>201</td>
</tr>
<tr>
<td>Gathering Network: Design Engineering</td>
<td>202</td>
</tr>
<tr>
<td>Pipeline Network Engineering &amp; Operation Certification</td>
<td>203</td>
</tr>
<tr>
<td>Mature Fields - Surface Production Issues</td>
<td>204</td>
</tr>
<tr>
<td>Heavy Oil Production &amp; Processing</td>
<td>205</td>
</tr>
<tr>
<td>Gas Cycling: an Integrated Approach</td>
<td>206</td>
</tr>
</tbody>
</table>
Production Engineering Certification

This course can be adapted to virtual classroom mode - Graduate Certificate

Course Content

<table>
<thead>
<tr>
<th>Level: KNOWLEDGE</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This training aims to provide a comprehensive knowledge and practical know-how of integrated subsurface and surface production engineering.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production engineers, field engineers, production managers… seeking to acquire comprehensive and solid engineering capabilities in Oil &amp; Gas production, from the reservoir to the surface production facilities. This certification program is well suited for junior Engineers and Engineers in conversion. It can also be tailored to experienced engineers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of the course, the participants will be able to:</td>
</tr>
<tr>
<td>▶ identify and link all key subsurface and surface parameters impacting Oil &amp; Gas production,</td>
</tr>
<tr>
<td>▶ implement integrated production management from the reservoir to the export point,</td>
</tr>
<tr>
<td>▶ use professional software to conduct production analysis studies and make recommendations for production optimization,</td>
</tr>
<tr>
<td>▶ contribute to field development studies.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ways &amp; Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Highly interactive training course, delivered by industry experts and adapted to participants' experience,</td>
</tr>
<tr>
<td>▶ Numerous case studies and hands-on activities on professional software: MBAL™, PROSPER™, GAP™ for production engineering, PIPESIM™ and OLGA™ for gathering networks and flow assurance.</td>
</tr>
<tr>
<td>▶ Teamwork project on a real case study of production optimization.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Continuous assessments all-along the program,</td>
</tr>
<tr>
<td>▶ Final assessment including a presentation in front of a jury.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering degree or equivalent professional experience within the Oil &amp; Gas industry.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Why an IFP Training Certification?</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ An international recognition of your competencies,</td>
</tr>
<tr>
<td>▶ A Graduate Certificate delivered,</td>
</tr>
<tr>
<td>▶ An expertise confirmed in Production Engineering Certification.</td>
</tr>
<tr>
<td>▶ Ready-to-use skills.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expertise &amp; Coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFP Training trainer (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference: PRODENG-EN-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only available as an In-House course.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FUNDAMENTALS OF GEOLOGY, RESERVOIR ENGINEERING &amp; PRODUCTION MODES</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>FUNDAMENTALS OF DRILLING, WELL ARCHITECTURE &amp; COMPLETION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling fundamentals: principles of drilling, functions of the drilling fluid, drilling equipment. Well architecture and equipment: drilling and casing program; wellhead, characteristics of casings; shoe positionning, casing string calculations. Well completion equipment: main factors influencing completion design; completion configurations: requirements, main configuration; equipment of naturally flowing wells.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WELLBORE TREATMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservoir-wellbore interface fundamentals. Matrix treatment; acidizing, Hydraulic fracturing, Sand control. Water or gas shut-off and deposits.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WELL SERVICING &amp; WORKOVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons and well intervention means on production well. Well servicing. Workover: main operations; depleted reservoirs, study of different well workover cases; workover case study.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WELL PERFORMANCE &amp; ARTIFICIAL LIFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflow performance/outflow performance. Well performance: well deliverability nodal analysis (inflow/outflow); well performance modeling, prediction and analysis; reservoir pressure, PI, GRP, BW, tubing ID. Artificial lift: gas lift (fundamentals, unloading procedure, surveillance and troubleshooting), Electrical Submersible Pump - ESP (components, design, problems), rod pumping and jet pumps fundamentals, comparison of the artificial lift methods. Application on PROSPER™ software. PROSPER™ methodology for gas lift design and troubleshooting, manual application; PROSPER™ methodology for ESP troubleshooting.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GATHERING NETWORKS: DESIGN &amp; OPERATION</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>OIL &amp; GAS FIELD PROCESSING</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>OFFSHORE FIELD DEVELOPMENT - PIPELINES &amp; FLOW ASSURANCE</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>METERING, MATERIAL BALANCE &amp; PRODUCTION ALLOCATION</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>HSE IN PRODUCTION ACTIVITIES</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>PRODUCTION OPTIMIZATION: INTEGRATED PRODUCTION MODELING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced well performance. Case study using PROSPER™: Reservoir performance and modeling: prediction of production profile. Case study using MBAL™: Integrated production system models. Global production modeling and optimization: full field optimization and forecasting approach; GAP™ software overview and main functions; system definition, how to link MBAL™ and PROSPER™ models to GAP™ solve network, full field development hands-on exercise: prediction constraints.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRODUCTION OPTIMIZATION: FIELD CASE STUDY &amp; JURY</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-day teamwork on an integrated project with deliverables to be presented on the last day (jury). Agenda of the 5-day group project: field presentation (objectives of the project), building the reservoir model, well performance, surface architecture, jury project presentation, synthesis and wrap-up. Coaching throughout the project by experts using a real case study; bottlenecks are identified in the production system, given reservoir and fluid properties, wellbore configuration and flowing wellhead pressure; production performance is predicted from history production trends.</td>
</tr>
</tbody>
</table>

Reference: PRODENG-EN-A | Only available as an In-House course. Contact: ep.contact@ifptraining.com

This course is also available in French: PRODENG-FR-A. Please contact us for more information.
Metering & Allocation
Single-phase - Multi-phase - Transactional - Fiscal

Level: KNOWLEDGE

Purpose
This course provides a comprehensive knowledge of metering equipment and applications in the Oil & Gas industry.

Audience
Operational staff of Oil & Gas field treatment plants and terminals, instrumentation specialists, petroleum architects, project engineers, reservoir engineers, well performance specialists, completion specialists, personnel from engineering companies and all professionals interested in metering methods and equipment used in the petroleum industry.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Ways & Means
Applications and illustrations from the industry.
Site visit according to possibility.

Learning Objectives
Upon completion of the course, participants will be able to:
- review different kinds of metering and allocation methods and assess importance of accuracy,
- grasp technology and operating principles of single-phase metering equipment,
- understand standards of liquids and gases transactional metering,
- assess operation, maintenance and calibration techniques of metering installations,
- review multiphase metering advantages, technology and operating principles.

Ways & Means
- Applications and illustrations from the industry.
- Site visit according to possibility.

Learning Assessment
Assessment by test at the end of the course.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

DIFFERENT TYPES OF METERING - IMPORTANCE OF METERING
Types of metering: technical, transactional, allocation, fiscal.
Importance of metering accuracy.

DATA PROCESSING
Technical material balances, data reconciliation, data architecture, architecture of DCS, data recording.

IMPLEMENTATION OF A METERING INSTALLATION - INFLUENCE ON PROCESS
Friction losses, introduction of a cold spot, intrusivity, leakage risks...

SINGLE-PHASE METERING: OPERATING PRINCIPLE & EQUIPMENT
Fluids dynamics.
Different types of single-phase meters:
- Meters based on kinetic energy (KE): orifice plate meters, pitot tubes, rotameters.
- Meters based on velocity: direct meters (turbines, volumetric meters) or indirect meters (ultrasounds, electromagnetic, vortex, thermal, turbines).
- Derived meters: use of centrifugal pump characteristic curve, use of rotation speed of a positive displacement pump...
- Tracers: chemical, radioactive, inter-correlation.

TRANSACTIONAL METERING OF LIQUIDS
Static transactional metering or pseudo-transactional metering...
Metering bench; turbines, volumetric, ultrasounds.
Calibration of metering installations on test bench in manufacturing facilities or on site.
Operation of metering installations: maintenance, calibration.
Calculators: corrections, conversion into standard volumes.
Sampling, online analysis and lab analysis.

TRANSACTIONAL METERING OF GASES
Metering bench; turbines, volumetric, ultrasounds.
Calibration of metering installations on test bench in manufacturing facilities or on site.
Operation of metering installations: maintenance, calibration.
Calculators: corrections, conversion into standard volumes.
Sampling, online analysis and lab analysis.

MULTIPHASE METERING: OPERATING PRINCIPLE & EQUIPMENT
Advantages of multiphase metering.
Fluids: flow modes, composition.
Principle of multiphase measurement: gamma-metric measurement, volume measurement, passive noise analysis use of dielectric, of Venturi, of inter-correlation.
Use of optic fibers: inter-correlation, sound velocity.
Description of some equipment available for multiphase measurement: 3D, Roxar, Agar, Haimo, MPM, Weatherford.
Installation of multiphase measurement - Impact on process: fluid conditioning, intrusiveness.
Subsea and downhole multiphase meters.
Calibration at manufacturer facilities.
Operation and maintenance of multiphase meters.

ALTERNATIVES TO THE USE OF MULTIPHASE METERS
4D seismic. Use of natural or introduced tracers.
Estimation of the contribution of each reservoir.

Reference: METER-EN-P
Can be organized as an In-House course.

Course Fees (in €, excl. VAT)

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>27 September</td>
<td>1 October</td>
<td>€3,930</td>
</tr>
</tbody>
</table>

This course is also available in French: METER-FR-P. Please contact us for more information.

www.ifptraining.com

199
Integrated Production Modeling - Module 1

Level: SKILLED

Purpose
This course provides a thorough understanding, methodology and tools to integrate data and models from the reservoir to the surface facilities.

Audience
Production engineers, petroleum engineers or reservoir engineers willing to integrate reservoir with surface models using Integrated Production System technology.

Learning Objectives
Upon completion of the course, participants will be able to:
- predict global production through integrated modeling,
- describe MBAL™, PROSPER™ and GAP™ theory, capabilities and synergies,
- perform a case study aiming at building tank model, PVT match, well performance and surface network including the use of specialized software (IPM™, MBAL™, PROSPER™, GAP™),
- apply integrated modeling using the mentioned tools.

Ways & Means
Interactive presentations, practical exercises and hands-on activities using dedicated software (IPM™, MBAL™, PROSPER™, GAP™).

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
Engineer degree or equivalent experience in Oil & Gas production.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

WELL PERFORMANCE
Introduction to well performance nodal analysis: inflow/outflow.
Review on Productivity Index (PI).
Inflow performance relationship in oil wells, Darcy's law, pseudo-steady state flow, Vogel IPR, composite IPR, Darcy IPR, Fetkovich IPR, Jones IPR.
Transient IPR curves.
Vertical Lift Performance (VLP) correlations and curves, downhole production considerations: skin calculation, gravel pack design.
Multiphase flow in tubing, liquid holdup, flow regimes, correlations in nodal analysis.
Overview of PROSPER™ software workflow.
PROSPER™: building initial well system file - IPR modeling using PROSPER™, building a wellbore model, sensitivity studies.
Partial penetration, deviated wells, hydraulically fractured wells, gravel pack completions, artificial lift.
Skin estimation.

RESERVOIR PERFORMANCE & MODELING:
PREDICTION OF PRODUCTION PROFILE
Material balance for various reservoirs: production mechanisms.
Flow regimes (transient and pseudo-steady state flow).
Reservoir modeling through material balance.
Introduction to MBAL™.
MBAL™ data input and modeling aspects. Aquifer dimensioning and modeling.
History matching techniques on MBAL™: analytical and graphical methods.
Forecasting production performance.
Tank model building, PVT and correlations matching, history matching.

INTEGRATED PRODUCTION SYSTEM MODELS
Definition.
Introduction to the software tool to be used.
From reservoir to surface: the principle of linking MBAL™, PROSPER™ and GAP™.

GLOBAL PRODUCTION MODELING & OPTIMIZATION
Full field optimization and forecasting approach.
GAP™ software overview and main functions.
System definition, how to link MBAL™ and PROSPER™ models to GAP™ solve network.
Full field development hands-on exercise: prediction constraints.

Reference: OPT1-EN-P  Only available as an In-House course.
Contact: ep.contact@ifptraining.com

This course is also available in French: OPT1-FR-P. Please contact us for more information.
Integrated Production Modeling - Module 2 (Project)

Course Content

FIELD PRESENTATION - OBJECTIVES OF THE PROJECT 0.25 d

BUILDING THE RESERVOIR MODEL 1.25 d

MBAL™ is used to build the tank model, according to the given data the production mechanisms must be identified and the history production data will be matched. A PVT correlation will be tuned in MBAL™ aiming to reproduce the parameters given in the PVT report.

WELL PERFORMANCE 2 d

Using PROSPER™, the well performance of five different wells will be generated (vertical, horizontal and deviated wells): IPR model, well test matching, VLP model, well deliverability.

SURFACE ARCHITECTURE 1 d

Using GAP™, the following issues will be investigated:
- Global production modeling linking MBAL™, PROSPER™ and GAP™.
- Identify the bottlenecks in the production system.
- Optimize the surface network to meet the initial target production profile: elements in the network to be implemented, controls in chokes, manifolds, separator constraints.
- Different solutions might be proposed to improve the production profile.

PROJECT PRESENTATION, SYNTHESIS & WRAP-UP 0.5 d

Ways & Means

5-day work on an integrated project with deliverables to be presented the last session.

Learning Assessment

Oral presentation.

Prerequisites

To attend Module 1.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: OPT2-EN-P

Only available as an In-House course.

This course is also available in French: OPT2-FR-P. Please contact us for more information.

www.ifptraining.com
Gathering Network: Design Engineering
Conceptual Design - Architecture - Tie-In

Level: SKILLED

Purpose
This course aims to provide a practical understanding of gathering network conceptual design and tie-in assessment.

Audience
Engineers looking to acquire best practices of Oil & Gas gathering network design and simulation using PIPESIM™.

Learning Objectives
Upon completion of the course, participants will be able to:
- explain operational constraints of single and multi-phase flow lines,
- describe multiphase flow patterns and main disturbing factors,
- assess the implications of different gathering network architectures,
- study actual network configurations and the impact of adding tie-ins using the software PIPESIM™,
- explain the different phases of the construction of a gathering network.

Ways & Means
- Highly interactive training with industry specialist lecturers.
- Methodology illustrated by multiple industrial case studies.
- Numerous design simulation using PIPESIM™.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
Process engineer degree or equivalent experience in field treatment.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUNDAMENTALS OF FLUID MECHANICS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Total energy of a fluid; Bernoulli law.</td>
<td></td>
</tr>
<tr>
<td>Real fluid flow: viscosity, friction coefficient.</td>
<td></td>
</tr>
<tr>
<td>Flow regimes: laminar and turbulent flows.</td>
<td></td>
</tr>
<tr>
<td>Application: evaluation of pressure drop in a pumping station.</td>
<td></td>
</tr>
<tr>
<td>MULTIPHASE FLOW</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Definition of multi-phase flow, main terminology.</td>
<td></td>
</tr>
<tr>
<td>Flow patterns, main considerations.</td>
<td></td>
</tr>
<tr>
<td>Basic understanding of different modeling approaches.</td>
<td></td>
</tr>
<tr>
<td>GATHERING SYSTEMS DESIGN &amp; ARCHITECTURE SELECTION</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Types of gathering systems, a review of common architectures.</td>
<td></td>
</tr>
<tr>
<td>Backpressure and well productivity.</td>
<td></td>
</tr>
<tr>
<td>Design practices and guidelines.</td>
<td></td>
</tr>
<tr>
<td>Main considerations: pressure drop, erosion velocities.</td>
<td></td>
</tr>
<tr>
<td>Design of pipelines, sizing criteria and sizing methodology.</td>
<td></td>
</tr>
<tr>
<td>Application: sizing of an oil/gas condensate production line.</td>
<td></td>
</tr>
<tr>
<td>OIL/GAS GATHERING NETWORK PROJECTS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Project planning; route selection; jurisdiction, permitting and rights of way.</td>
<td></td>
</tr>
<tr>
<td>Surface considerations; alignment; surveying and mapping.</td>
<td></td>
</tr>
<tr>
<td>Construction; inspection and testing.</td>
<td></td>
</tr>
<tr>
<td>Operation and maintenance.</td>
<td></td>
</tr>
<tr>
<td>GATHERING NETWORK DESIGN &amp; OPTIMIZATION USING PIPESIM™</td>
<td>2 d</td>
</tr>
<tr>
<td>Introduction to PIPESIM™ software: building models, main considerations and recommendations.</td>
<td></td>
</tr>
<tr>
<td>PIPESIM™ will be used to study both gas production networks and crude oil production networks. For each type of system, the production network will be analyzed in detail:</td>
<td></td>
</tr>
<tr>
<td>Well performance vs. backpressure.</td>
<td></td>
</tr>
<tr>
<td>Multiphase flow modeling (flow regimes, liquid holdup, slug characteristics and pressure loss analysis) across the production network.</td>
<td></td>
</tr>
<tr>
<td>Comparison of different gathering network configurations.</td>
<td></td>
</tr>
<tr>
<td>Determination of optimal locations for pumps and compressors.</td>
<td></td>
</tr>
<tr>
<td>Identification of locations most prone to flow assurance issues (erosion, corrosion, hydrate formation, deposits).</td>
<td></td>
</tr>
<tr>
<td>Analysis of heat transfer across the production network and associated flow assurance issues.</td>
<td></td>
</tr>
<tr>
<td>Identification of bottlenecks and optimization opportunities.</td>
<td></td>
</tr>
<tr>
<td>TIE-IN ASSESSMENT USING PIPESIM™</td>
<td>1 d</td>
</tr>
<tr>
<td>Tie-ins and their impact on existing networks.</td>
<td></td>
</tr>
<tr>
<td>Implementation strategies, design and operation considerations.</td>
<td></td>
</tr>
<tr>
<td>Introduction to gathering network simulation using PIPESIM™.</td>
<td></td>
</tr>
<tr>
<td>Tie-ins case studies using PIPESIM™.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: NETWORK-EN-P
Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: NETWORK-FR-P. Please contact us for more information.
# Pipeline Certificate - Graduate Certificate
## Pipeline Network Engineering & Operation Certification

### Level: KNOWLEDGE

### Purpose
This course aims to acquire a comprehensive knowledge and practical know-how in gas and liquid hydrocarbons transport facilities, from technical to HSE and economics issues.

### Audience
Graduate engineers and engineers in conversion, aiming to specialize in transportation facilities. This certification program is well suited for junior engineers and engineers in conversion. It can also be tailored to experienced engineers.

### Learning Objectives
Upon completion of the course, participants will be able to:
- Explain pipeline network design, technology and construction.
- Efficiently blend in operation and maintenance teams of hydrocarbon pipeline network.
- Enforce industry best practices of network operation and maintenance.
- Identify risks associated to hydrocarbons pipelines operations and implement mitigation measures.

### Ways & Means
- Highly interactive training course delivered by industry experts and adapted to participants’ experience.
- Numerous industrial case studies.

### Learning Assessment
- Continuous assessments all-along the program.
- Final assessment including a presentation in front of a jury.

### Prerequisites
Engineering degree or equivalent professional experience within the petroleum industry.

### Why an IFP Training Certification?
- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Pipeline Network Engineering & Operation Certification.
- Ready-to-use skills.

### Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

### Course Content

#### INTRODUCTION TO CRUDE OIL & NATURAL GAS PRODUCTION & TRANSPORT
Crude oil and natural gas production: fundamentals of reservoir, drilling and completion; well effluent behavior, need for effluent field processing; crude oil processing, gas processing and conditioning.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 d</td>
<td>Pipeline operations and interaction with other blocks of the crude oil chain and natural gas chain.</td>
</tr>
</tbody>
</table>

#### DESIGN, CONSTRUCTION & OPERATION OF PIPELINES
Fundamentals of fluid mechanics and friction losses in single-phase flow.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 d</td>
<td>Pipeline design standards; pressure, length, volume, diameter. Technology of pipelines: standards, material grades, insulation techniques. Pipe laying: different steps of pipe laying operations (onshore and offshore approaches), cost and duration of pipe laying and compaction station construction. Pipeline operation and maintenance: main flow assurance problems, main available technical solutions; introduction to pipe corrosion monitoring and prevention; introduction to pipeline maintenance.</td>
</tr>
</tbody>
</table>

#### PUMPING STATIONS
Centrifugal pump operating principle, technology and selection criteria.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 d</td>
<td>Centrifugal pump performance and operating conditions. Centrifugal pump maintenance (preventive, conditional and corrective).</td>
</tr>
</tbody>
</table>

#### COMPRESSION STATIONS
Centrifugal compressor operating principle, technology and selection criteria.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 d</td>
<td>Centrifugal compressor performance and operating conditions. Centrifugal compressor maintenance (preventive, conditional and corrective).</td>
</tr>
</tbody>
</table>

#### METALLURGY & MATERIALS, WELDING

<table>
<thead>
<tr>
<th>Duration</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 d</td>
<td>Common types of corrosion: origin and development process, possible methods of prevention. Corrosion prevention: design of equipment, choice of materials, corrosion inhibitors, anti-corrosion coatings and systems; cathodic protection with sacrificial anodes or imposed current (principles and applications, coating and cathodic protection, cathodic protection systems design).</td>
</tr>
</tbody>
</table>

#### INSTRUMENTATION & AUTOMATION

<table>
<thead>
<tr>
<th>Duration</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 d</td>
<td>Planning, material balance, allocations and accounts. Monitoring: facilities remote monitoring, cathodic protection systems performance monitoring. Metering stations: single-phase metering; operating principle and equipment; transactional metering of liquids, transactional metering of gases. Maintenance management: maintenance policy and objectives, maintenance costs and failure costs; reliability process measurement and follow-up, reliability analysis and improvement methods; outsourcing and subcontracting, shutdown management.</td>
</tr>
</tbody>
</table>

#### HSE IN TRANSPORT FACILITIES

<table>
<thead>
<tr>
<th>Duration</th>
<th>Content</th>
</tr>
</thead>
</table>

#### TRANSPORT ECONOMICS

<table>
<thead>
<tr>
<th>Duration</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 d</td>
<td>5-day teamwork on a real case study with deliverables to be presented on the last day (jury). The final project consists in proposing a design and operation philosophy for a pipeline network project.</td>
</tr>
</tbody>
</table>

### Reference: PIPENG-EN-P
- **Only available as an In-House course.**
- Contact: [ep.contact@ifptraining.com](mailto:ep.contact@ifptraining.com)
## Mature Fields - Surface Production Issues

### Course Content

<table>
<thead>
<tr>
<th>5 days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION TO MATURE FIELD DEVELOPMENTS CHALLENGES</strong></td>
</tr>
<tr>
<td><strong>DRIVE MECHANISM &amp; ENHANCED OIL RECOVERY</strong></td>
</tr>
<tr>
<td>Concept selection of an EOR technique. Validation process of an EOR technique. Introduction to chemical EOR techniques.</td>
</tr>
<tr>
<td><strong>RESERVOIR PRESSURE MAINTENANCE TECHNIQUES</strong></td>
</tr>
<tr>
<td><strong>WELL ACTIVATION</strong></td>
</tr>
<tr>
<td>Gas lift. Use of PCP, beam pump and ESPs.</td>
</tr>
<tr>
<td><strong>WELL PRODUCTIVITY</strong></td>
</tr>
<tr>
<td>Identifying a low well productivity. Root causes and remediation.</td>
</tr>
<tr>
<td><strong>TROUBLESHOOTING OF MATURE WELLS</strong></td>
</tr>
<tr>
<td>Identifying problems of each well and associated remediation. Strategy for optimized remediation integration at the level of a field. Integrity of mature wells.</td>
</tr>
<tr>
<td><strong>ADAPTATION OF OIL TREATMENT TO PRODUCTION AGING</strong></td>
</tr>
<tr>
<td>Evolution of emulsion quality over time. Evaluation of separators water handling capacity (design case/current operating conditions). Examples of process adaptation to field aging.</td>
</tr>
<tr>
<td><strong>ADAPTATION OF WATER TREATMENT</strong></td>
</tr>
<tr>
<td>Evolution of water production over time. Adaptation of production water treatment capacities.</td>
</tr>
<tr>
<td><strong>ADAPTATION OF GAS TREATMENT</strong></td>
</tr>
<tr>
<td><strong>ENERGY EFFICIENCY IN MATURE FIELD</strong></td>
</tr>
<tr>
<td><strong>EXAMPLES OF MATURE FIELD DEVELOPMENTS</strong></td>
</tr>
<tr>
<td>Example of Gabon and Cameroon mature fields developments.</td>
</tr>
<tr>
<td><strong>CORROSION MANAGEMENT IN MATURE FIELD</strong></td>
</tr>
<tr>
<td>Corrosion mechanism. Integrity of wells and flow line.</td>
</tr>
</tbody>
</table>

### Level: SKILLED

#### Purpose
This course aims to provide an overview of field aging effects on production and of the solutions to maintain the production in mature fields.

#### Audience
Field, process or project engineers involved in mature oil field development/sales/take-over projects.

#### Learning Objectives
Upon completion of the course, participants will be able to:
- understand the specificities of mature field developments,
- maintain well productivity,
- compensate production decline,
- adapt surface facilities to field aging.

#### Ways & Means
- Highly interactive training by industry-specialist lecturers.
- Numerous applications and illustrations.

#### Learning Assessment
Assessment by test at the end of the course.

#### Prerequisites
Engineer degree or equivalent experience in Oil & Gas field treatment.

#### Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: MATURE-EN-P  
Only available as an In-House course. 
Contact: ep.contact@ifptraining.com 
This course is also available in French: MATURE-FR-P. Please contact us for more information.
**Heavy Oil Production & Processing**

**Level:** SKILLED

**Purpose**
This course aims to acquire a comprehensive knowledge and practical know-how of the production and field processing of heavy crude oil.

**Audience**
Production, field or process engineers involved in heavy oil production.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- describe heavy oil fundamental properties, main reservoir production mechanisms and the adapted techniques,
- explain the reasons for upgrading heavy crude oils, assess the various problems induced by unwanted compounds,
- master oil and water treatment processes, operations and related operating conditions,
- understand the role of different units in a heavy crude upgrading chain,
- acquire a good understanding of the operation of the units related to extra heavy crude oil processing.

**Ways & Means**
Highly interactive training course delivered by industry experts and adapted to participants' experience.

**Learning Assessment**
Assessment by test at the end of the course.

**Prerequisites**
Engineer degree or equivalent experience in Oil & Gas field treatment.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DRIVE MECHANISMS</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Primary recovery. Secondary recovery: water flooding, gas injection, solvent displacement using naphtha, DCO, DRU. Classic EOR methods: miscible gas injection, chemical flooding. Thermal EOR methods: Cyclic Steam Stimulation (CSS), Steam-Assisted Gravity Drainage (SAGD), In Situ Combustion (ISC), Toe-to-heel air injection.</td>
<td></td>
</tr>
<tr>
<td><strong>WELL PERFORMANCE</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Needs for artificial lift. Viscosity reduction: dilution/blending, heating, emulsification through the formation of an oil-in-water emulsion, pour point reduction by using Pour Point Depressant (PPD). Forecast production of heavy crude including behavior of horizontal wells.</td>
<td></td>
</tr>
<tr>
<td><strong>COMPLETION ADAPTED TO HEAVY OIL PRODUCTION</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Cold production. Hot production: cyclic steam stimulation, steam assisted gravity drainage.</td>
<td></td>
</tr>
<tr>
<td><strong>NEED FOR OIL FIELD PROCESSING - QUALITY REQUIREMENTS</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td><strong>CRUDE OIL TREATMENT</strong></td>
<td>1.5 d</td>
</tr>
<tr>
<td>Crude stabilization (gas removal) by Multi Stage Separation (MSS): operating parameters (number of separation stages, pressures, heating and cooling needs...); influence on the quantity and quality (API grade) of the produced oil; foaming problems and main available solutions; associated gas recovery.</td>
<td></td>
</tr>
<tr>
<td>Crude dehydration (water removal) and desalting: emulsion problems in heavy crude oil production and impact of well production techniques on surface facilities; asphaltene management in surface facilities; dehydration processes for heavy crude oils; heavy crude oil desalting.</td>
<td></td>
</tr>
<tr>
<td>Acid crude sweetening (H₂S removal): principle of stripping, stripping of heavy crude oils. Diluent recovery unit, diluent recovery assessment and maximum recovery diluent.</td>
<td></td>
</tr>
<tr>
<td>Asphaltene precipitation in storage.</td>
<td></td>
</tr>
<tr>
<td><strong>PRODUCTION WATER TREATMENT</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Main treatments. Operating principle and required performances.</td>
<td></td>
</tr>
<tr>
<td>Comparison of the different available techniques. Examples of production water treatment block flow diagrams.</td>
<td></td>
</tr>
<tr>
<td><strong>INJECTION WATER TREATMENT</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Reasons for water injection. Quality requirements and necessary treatments. Main operating conditions of each treatment and required performances. Examples of injection water treatment block flow diagrams.</td>
<td></td>
</tr>
<tr>
<td><strong>UPGRADER PRINCIPLES &amp; OBJECTIVES</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Production, fluidification and transportation of extra heavy crude oils. Different ways to upgrade heavy crude oils.</td>
<td></td>
</tr>
<tr>
<td>Overview of an upgrader, role and purposes of the different processes.</td>
<td></td>
</tr>
<tr>
<td><strong>ATMOSPHERIC &amp; VACUUM DISTILLATION</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Upgrader distillation units: principles of distillation, capacity, process flowsheets. Atmospheric and vacuum distillation unit: operating conditions, material balance, energy consumption and heat recovery. Corrosion and corrosion prevention in atmospheric and vacuum distillation units.</td>
<td></td>
</tr>
<tr>
<td><strong>UPGRADER HYDROTREATMENTS TO PROCESS NAPHTHA &amp; DISTILLATE</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Hydrotreatment chemical reactions and hydrogen consumption. Hydrotreatment processes: process flow diagram, operating conditions, products characteristics.</td>
<td></td>
</tr>
<tr>
<td><strong>THERMAL CONVERSION UNITS: VISBREAKING &amp; DELAYED COKEING</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Heavy cuts thermal conversion processes. Visbreaking. Delayed coking process.</td>
<td></td>
</tr>
<tr>
<td><strong>OTHER CONVERSION PROCESSES</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Deasphalting units: vacuum residues structure and properties; deasphalting principles: different deasphalting solvents, overall flow sheet, operating conditions; integration of deasphalting units in conversion schemes.</td>
<td></td>
</tr>
<tr>
<td><strong>INTEGRATION OF UPGRADING PROCESS WITH SUBSURFACE &amp; SURFACE PRODUCTION</strong></td>
<td>0.5 d</td>
</tr>
</tbody>
</table>

Reference: HEAVY-FR-P  Only available as an In-House course.
This course is also available in French: HEAVY-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
Gas Cycling: an Integrated Approach

Course Content

5 days

GAS CYCLING

Introduction.
The integrated gas cycle: elements, configuration, challenges.
Gas cycling for pressure maintenance.
Gas cycling for miscible gas displacement (EOR): sweeping and soaking, compositional effects.
Dry gas cycling in retrograde condensate reservoirs.
Cycling non-hydrocarbon gases.
Major issues and constraints: reservoir, wells, flow lines and surface facilities.

WELL EFFLUENT BEHAVIOR

Different types of well effluent. Main characterization parameters.
 Constituents that pose problems for storage and transport.
Gas composition: rich and lean gas, sweet and sour gas.
Gas PVT behavior.
PVT properties of pure components and mixtures.

RESERVOIR FLUID BEHAVIOR & NEEDS FOR GAS CYCLING

Phase envelop, reservoir and surface PVT issues.
Ternary diagram, first contact miscibility, multiple contact miscibility: condensing drive and vaporizing drive,
Minimum Miscibility Pressure (MMP).
Specificities of condensate gas: retrograde region.

RESERVOIR ASPECTS

Reservoir performance.
Drive mechanisms: gas reservoirs, gas cap, gravity drainage displacement, tertiary gas displacement, miscible
gas displacement.
Requirements for gas quality for injection, flowrate, cycling rate and configuration of injection.
Field development: architecture and phasing.

INTRODUCTION TO SURFACE FACILITIES DESIGN

Gas specifications to conform with gas cycling (dew point, sulfur removal & valorization).
Field processing of gas effluents for gas cycling.

GAS DEHYDRATION & SWEETENING

Moisture content of natural gas.
Gas dehydration processes.
Gas sweetening, acid gases disposal.

CONDENSATE: RECOVERY, STABILIZATION & MONETIZATION

Low-temperature separation techniques.
Condensate stabilization.
Monetization routes.

GAS COMPRESSION

Multistage compression: design criteria.
Gas compression versus field aging: effect on operating parameters, needs for booster station.

COMPRESSORS & DRIVERS

Compressors technology: choice criteria, effect of gas density evolution.
Compressor drivers.

INJECTION NETWORK

Network architecture.
Network operations, backpressure management.
Well performance issues.

CASE STUDY: SYNTHESIS - WRAP UP

Field monitoring, adaptation of surface facilities to field aging, re-injection rate versus surface production capacities and effect on recovery, re-injection rate versus gas sales and effects on reservoir monitoring.

Reference: GASCYCL-EN-P
Only available as an In-House course.
Contact: ep.contact@ifptraining.com

This course is also available in French: GASCYCL-FR-P. Please contact us for more information.
Field Operations

- **Production Operations**
  - Oil Terminals, FSO & FPSO ................................................................. p. 208
  - Oil & Gas Field Processing ................................................................. p. 209
  - Field Processing & Surface Production Facilities ......................... p. 210
  - Oil & Gas Field Processing Troubleshooting ................................. p. 211
  - Preparatory Course for Production Operator ................................. p. 212
  - Field Operator Certification ............................................................. p. 213
  - Panel Operator Certification ............................................................. p. 214
  - Production Supervisor Certification ................................................. p. 215
  - Production Superintendent Certification ........................................ p. 216
  - Field Operations Engineer Certification ......................................... p. 217
  - Well Operation & Testing ............................................................... p. 218
  - Operation of Gas Lift Wells ............................................................. p. 219
  - Chemicals used in Production Activities .......................................... p. 220
  - Production Facilities Control Room Operation ............................... p. 221
  - Laboratory Analyses for Oil & Gas Production ............................... p. 222
  - Refresher Course for Production Operator ...................................... p. 223
  - Pumps Operation ........................................................................... p. 224
  - Compressors Operation ................................................................ p. 225

- **Production Excellence & Management**
  - Production Planning & Monitoring .................................................. p. 226
  - Production Accounting & Material Balance ..................................... p. 227
  - Asset Integrity Management ............................................................ p. 228

- **Maintenance**
  - Turnaround Management ............................................................... p. 229
  - Fundamentals of Mechanical Maintenance .................................... p. 230
  - Pump Maintenance Workshop ....................................................... p. 231
  - Compressors Maintenance ............................................................. p. 232
  - Maintenance Management Certification ........................................ p. 233
  - Upstream Maintenance Engineer Certification ............................... p. 234
  - Maintenance Supervisor Certification ............................................. p. 235
  - Maintenance Superintendent Certification ..................................... p. 236
This course can be adapted to virtual classroom mode

**Oil Terminals, FSO & FPSO**
Technology - Construction - Operation - Regulations

**Level:** KNOWLEDGE

**Purpose**
This course provides a comprehensive knowledge of the technology and operation of oil terminals in general, and of FSO/FPSO in particular (Floating Storage Off-loading/ Floating Production Storage Off-loading).

**Audience**
Managers, engineers, staff, technicians and operators whose activities are related to oil terminals (production, marine maintenance, operation, design, manufacturing, trading, control, regulations...).

**Learning Objectives**
Upon completion of the course, participants will be able to:
- review all loading/unloading operations on oil terminals, FSO’s and FPSO’s,
- understand technical characteristics of onshore or floating storage facilities,
- understand metering and sampling techniques used to measure volume of marketed oil,
- grasp technology of oil tanker loading facilities (jetty, loading buoy, tandem point...),
- learn about mooring crew activities, piloting, port regulations, assess oil terminals HSE hazards and operational constraints.

**Ways & Means**
- Highly interactive training by industry specialist lecturers.
- Several applications and illustrations.

**Learning Assessment**
Assessment by test at the end of the course.

**Prerequisites**
In order to be able to follow this training, trainees are asked to fulfill at least one of the criteria below:
- either a Bac or equivalent level,
- or to have a proven professional experience in terminal of at least 6 month.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

**OVERVIEW OF OIL TERMINALS**
0.5 d
Functions of oil terminals: reception, oil processing, storage, export…
Different actors of an oil terminal.
Crude oil treatment, water treatment…
Evaluation of terminal storage capacity, tanker loading planning…

**ONSHORE STORAGE TANKS**
0.5 d
Different types of storage tank (fixed roof, floating roof). Selection criteria.
Fixed roof tank: shell, roof, bottom, foundation, retention basins and various equipment.
Floating roof tank and various equipment.
Firefighting facilities: water deluge, foam, gas extinguisher…
Safety risks on storage tanks: H₂S, dangers of ignition, explosion risk, collapse, static electricity…
Incidents and equipment failures on storage tanks.
Fire types on storage tanks.

**METERING OF OIL QUANTITIES: RECEIVED, STORED & EXPORTED**
1 d
Metering and sampling on onshore tank (level, reference temperature scales).
Determination of amounts standard issued.
counting dynamic transactional, sampling and calibration. Calculation of standard volume and weight.
Maintenance of metering unit and calibration loop and meter calibration.
Presentation of oil exported commercial documents.

**FLOATING STORAGE FACILITIES (FSO/FPSO)**
1 d
Presentation of the main functions of a FPSO.
Anchoring the FSO/FPSO.
Technology of floating storage tanks.
Storage tanks of crude oil, methanol ballast. Tanks atmosphere control. Inerting system.
Procedures for storage tanks entry. Incidents.
Safety on-board storage of FSO/FPSO.

**EXPORT & MARINE OPERATIONS**
1 d
Tanker approach operations and mooring at: jetty, loading buoy, tandem point…
Tanker loading operations, tanker loading planning, preparations before loading, monitoring during the loading operations and procedures after loading.
International Ship and Port facility Security (ISPS) code: principle, actors, responsibilities, practical difficulties.
Mooring crew operations.
Safety Port Regulations. Pilot activities.
Commercial contracts, demurrage, commercial claims.

**TANKERS TECHNOLOGY & TANKER LOADING INSTALLATIONS**
1 d
Ships transport of crude oil (tankers): different sizes of vessels, equipment related to the handling of products (cargo circuit, pump room), ballasting and deballasting, inert gas generation, tank washing.
Different modes of loading tankers: jetty, tandem and buoy. Advantages/drawbacks.
Safety checklist (IMO).
Description of tandem loading point and loading buoy.

---

Reference: TERM-EN-A  Only available as an In-House course. Contact: ep.contact@ifptraining.com

This course is also available in French: TERM-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

**Oil & Gas Field Processing**

Field Treatments of Oil & Gas Well Effluent

**Level:** KNOWLEDGE

**Purpose**

This course provides a comprehensive overview of Oil & Gas field processing technology.

**Audience**

Engineers and technicians interested, although not directly involved, in day-to-day Oil & Gas field processing operations: reservoir engineers, drilling and completion personnel, platform designers, petroleum architects, equipment suppliers, economists…

**Learning Objectives**

Upon completion of the course, participants will be able to:

- list main characteristics of Oil & Gas well effluents, assess problems induced by unwanted compounds,
- explain gathering network design and operations,
- detail field treatment of Oil & Gas streams and processes technology,
- grasp fundamentals of Oil & Gas field processing operations and related operating conditions,
- ascertain the treatment processes necessary for production water and injection water.

**Ways & Means**

- Course delivered by industry specialists.
- Numerous applications and illustrations.

**Learning Assessment**

Assessment by test at the end of the course.

**Prerequisites**

Engineer degree or 2 months of experience in Oil & Gas operations.

**Reference:** OGFP-EN-A

- Can be organized as an In-House course.
- Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>22 November</td>
<td>26 November</td>
<td>€3,680</td>
</tr>
</tbody>
</table>

This course is also available in French: OGFP-FR-A. Please contact us for more information.

---

**Course Content**

### WELL EFFLUENTS BEHAVIOR

0.5 d

- Different types of well effluent. Main characterization parameters.
- Liquid-vapor equilibrium of pure substances and mixtures. Effluent behavior.
- Constituents that pose problems for storage, transport or commercialization.
- Main specifications to conform with and required treatments.

### FUNDAMENTALS OF RESERVOIR & DRIVE MECHANISM

0.25 d

- Reservoirs: types, exploration techniques.
- Drive mechanisms.
- Enhanced Oil Recovery (EOR): aim and principle of the main techniques.

### FUNDAMENTALS OF DRILLING, COMPLETION & WELL PERFORMANCE

0.25 d

- Drilling principle. Case of offshore drilling.
- Main completion equipment.
- Well performance. Needs for artificial lift: principle of artificial lift by pumping, gas lift…

### WELL EFFLUENT TRANSPORTATION, FLOW-ASSURANCE & GAS HYDRATES PREVENTION

0.5 d

- Gathering network design and operation:
  - Main flow assurance issues.
- Case studies: gas condensate field development; deep-offshore production.

### CRUDE OIL PROCESSING

1 d

- Crude stabilization by Multi Stage Separation (MSS): election of the number of stages, effect of operating parameters, management of foam issues.
- Crude dehydration and desalting. Emulsion treatment: operating parameters, internals, chemicals selection. Crude sweetening (H₂S removal).
- Examples of oil treatment and associated gas compression process schemes.

### PRODUCTION & INJECTION WATER TREATMENT

1 d

- Quality requirements for production water. Environment related constraints.
- Main produced water treatments: API oil-water separators, plate separators, floatators, hydrocyclones…
- Reasons for water injection.
- Quality requirements and necessary treatments: chlorination, filtration, oxygen removal, sulfate removal.
- Examples of process schemes for production and injection water treatment.

### GAS PROCESSING & CONDITIONING

1 d

- Gas dehydration: TEG units, solid desiccants (molecular sieves) units.
- Gas sweetening. Acid components (H₂S and CO₂) removal: amine units, molecular sieves, membranes.
- Natural Gas Liquids (NGL) extraction: use of cryogenic refrigeration, Joule-Thompson expansion, turbo-expander.

### LIQUEFIED NATURAL GAS

0.5 d

- Fundamentals of Liquefied Natural Gas (LNG) chain.
This course can be adapted to virtual classroom mode

Field Processing & Surface Production Facilities
Effluent Treatment & Equipment Technology

Level: KNOWLEDGE

Purpose
This course provides a comprehensive understanding of onshore and offshore Oil & Gas field processing techniques, along with knowledge of technology and operating principles of surface production facilities equipment.

Audience
Engineers and technicians interested in onshore and offshore Oil & Gas field processing technology and equipment.

Learning Objectives
Upon completion of the course, participants will be able to:
- grasp fundamentals of Oil & Gas production techniques,
- explain operating principles and conditions of oil, water and gas treatment,
- detail the technology of main equipment and specifics of offshore production techniques,
- ascertain fundamentals of process control, draw a typical safety system layout,
- explain main metering techniques, corrosion issues, its prevention and monitoring.

Ways & Means
- Very interactive training by industry specialists.
- Numerous applications and illustrations.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
Engineer degree or 2 months of experience in Oil & Gas operations.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Level</th>
<th>KNOWLEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>This course provides a comprehensive understanding of onshore and offshore Oil &amp; Gas field processing techniques, along with knowledge of technology and operating principles of surface production facilities equipment.</td>
</tr>
<tr>
<td>Audience</td>
<td>Engineers and technicians interested in onshore and offshore Oil &amp; Gas field processing technology and equipment.</td>
</tr>
<tr>
<td>Learning Objectives</td>
<td>Upon completion of the course, participants will be able to: - grasp fundamentals of Oil &amp; Gas production techniques, - explain operating principles and conditions of oil, water and gas treatment, - detail the technology of main equipment and specifics of offshore production techniques, - ascertain fundamentals of process control, draw a typical safety system layout, - explain main metering techniques, corrosion issues, its prevention and monitoring.</td>
</tr>
<tr>
<td>Ways &amp; Means</td>
<td>Very interactive training by industry specialists. Numerous applications and illustrations.</td>
</tr>
<tr>
<td>Learning Assessment</td>
<td>Assessment by test at the end of the course.</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>Engineer degree or 2 months of experience in Oil &amp; Gas operations.</td>
</tr>
<tr>
<td>Expertise &amp; Coordination</td>
<td>IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Content</th>
<th>10 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>WELL EFFLUENTS BEHAVIOR</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Different types of well effluent. Main characterization parameters. Liquid/vapor equilibrium of pure substances and mixtures. Effluent behavior. Constituents that pose problems for storage, transport or commercialization. Main specifications to conform with and required treatments.</td>
<td></td>
</tr>
<tr>
<td>FUNDAMENTALS OF RESERVOIR &amp; DRIVE MECHANISM</td>
<td>0.25 d</td>
</tr>
<tr>
<td>FUNDAMENTALS OF DRILLING, COMPLETION &amp; WELL PERFORMANCE</td>
<td>0.25 d</td>
</tr>
<tr>
<td>WELL EFFLUENT TRANSPORTATION, FLOW-ASSURANCE &amp; GAS HYDRATES PREVENTION</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Gathering network design and operation: main flow assurance issues; multiphase flow, flow patterns; hydrates formation prevention strategies, hydrates inhibition. Case studies: gas condensate field development; deep-offshore production.</td>
<td></td>
</tr>
<tr>
<td>CRUDE OIL PROCESSING</td>
<td>1 d</td>
</tr>
<tr>
<td>PRODUCTION &amp; INJECTION WATER TREATMENT</td>
<td>1 d</td>
</tr>
<tr>
<td>GAS PROCESSING &amp; CONDITIONING</td>
<td>1 d</td>
</tr>
<tr>
<td>LIQUEFIED NATURAL GAS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Fundamentals of Liquefied Natural Gas (LNG) chain.</td>
<td></td>
</tr>
<tr>
<td>CASE OF OFFSHORE DEVELOPMENTS</td>
<td>1 d</td>
</tr>
<tr>
<td>ROTATING MACHINERY</td>
<td>1 d</td>
</tr>
<tr>
<td>THERMAL EQUIPMENT</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Heat exchangers, air coolers, furnaces: types, operation, technology.</td>
<td></td>
</tr>
<tr>
<td>FUNDAMENTALS OF CORROSION</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Different types of corrosion, prevention and monitoring.</td>
<td></td>
</tr>
<tr>
<td>ELECTRICAL SYSTEMS - INSTRUMENTATION &amp; PROCESS CONTROL - SAFETY SYSTEMS</td>
<td>1.5 d</td>
</tr>
<tr>
<td>METERING &amp; ALLOCATION</td>
<td>0.5 d</td>
</tr>
</tbody>
</table>

Reference: FPSPF-EN-A  Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>22 November</td>
<td>3 December</td>
<td>€6,970</td>
</tr>
</tbody>
</table>

1 This course is also available in French: FPSPF-FR-A. Please contact us for more information.
Oil & Gas Field Processing Troubleshooting

Course Content

5 days

METHODOLOGY

Troubleshooting flowchart. Recognize a trouble when occurring. Problem definition using ISHIKAWA fishbone chart. Methodological approach to identify causes and remedial options.

CASE STUDIES


CASE STUDIES ON SIMULATOR

The participants will study the different types of control loops and the consequences of an inappropriate tuning of PID algorithm parameters through dynamic simulation exercises.

SPECIFIC CASE STUDY RELATED TO THE PLANT OPERATED BY THE PARTICIPANTS

During these two days:
- Describe normal production operations.
- Review production units current operating conditions.
- List recurrent abnormal conditions, operating parameters disturbances phenomena and observed consequences.
- Use methods studied on the first day to identify causes and potential corrective actions.

Level: KNOWLEDGE

Purpose

To contribute to troubleshooting operations by identifying and tackling process deviations and abnormal conditions using a structured, step-by-step approach.

Audience

Field operators, control room operators, supervisors and maintenance technicians, looking to acquire best practices of Oil & Gas production facilities troubleshooting.

Learning Objectives

Upon completion of the course, participants will be able to:
- Explain operation normal conditions, list common issues on main O&G processes and major equipment,
- Identify roots causes to process deviations and abnormal conditions by using a structured, step-by-step approach,
- Find an adapted solution to the identified problem.

Ways & Means

- Training delivery with industry specialist lecturers.
- Methodology illustrated by multiple industrial case studies.
- Use of a dynamic simulator for process control tuning.
- Specific case study related to the actual plant operated by the participants.

Learning Assessment

Case studies.

Prerequisites

A 6 months experience in field operations.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a solid expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
Preparatory Course for Production Operator

Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERVIEW OF OIL &amp; GAS PRODUCTION</td>
<td>1 d</td>
</tr>
<tr>
<td>APPLIED MATHEMATICS FOR OIL &amp; GAS PRODUCTION OPERATIONS</td>
<td>5 d</td>
</tr>
<tr>
<td>SYSTEMS &amp; MOTIONS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>FORCE &amp; ASSOCIATED QUANTITIES</td>
<td>1.5 d</td>
</tr>
<tr>
<td>FUNDAMENTALS OF ELECTRICITY</td>
<td>2 d</td>
</tr>
<tr>
<td>THERMAL PHYSICS</td>
<td>2 d</td>
</tr>
<tr>
<td>WELL EFFLUENT CHARACTERIZATION &amp; FLUID FLOW</td>
<td>1.5 d</td>
</tr>
<tr>
<td>FUNDAMENTALS OF ORGANIC CHEMISTRY</td>
<td>2 d</td>
</tr>
<tr>
<td>INORGANIC CHEMISTRY - FUNDAMENTALS OF AQUEOUS SOLUTION CHEMISTRY</td>
<td>1.5 d</td>
</tr>
<tr>
<td>PHYSICAL PHENOMENA OF THE SEPARATION PROCESSES</td>
<td>2 d</td>
</tr>
<tr>
<td>MATERIALS USED IN OIL &amp; GAS INDUSTRY</td>
<td>2 d</td>
</tr>
<tr>
<td>SYMBOLIZATION, SCHEMATICS &amp; INDUSTRIAL DRAWINGS</td>
<td>2 d</td>
</tr>
<tr>
<td>MECHANICAL PARTS OF ROTATING MACHINERY</td>
<td>2 d</td>
</tr>
</tbody>
</table>

Level: KNOWLEDGE

Purpose

This course aims to consolidate mathematics, physics, chemistry and mechanics fundamentals required to attend IFP Training’s Production Field Operator certification or other technical courses for operators.

Audience

Newly-hired personnel who need to strengthen their academic fundamentals before attending technical training courses.

Learning Objectives

Upon completion of the course, participants will be able to:
- reach the prerequisite academic level in mathematics, physics, chemistry and mechanics applied to Oil & Gas industry in order to attend technical courses,
- understand the basics of Oil & Gas production,
- explain the main physical phenomena governing well effluent treatment processes,
- identify the main static and rotary equipment of the production facilities and indicate their function.

Ways & Means

Numerous application exercises inspired from Oil & Gas production operations.

Learning Assessment

Assessment by test at the end of each week.

Prerequisites

No prerequisites for this course.

Reference: CPBOA-EN-A

Only available as an In-House course. Contact: ep.contact@ifptraining.com

This course is also available in French: CPBOA-FR-A. Please contact us for more information.
Field Operator Certification

This course can be adapted to virtual classroom mode - Vocational Certificate

Course Content

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAINING COURSE: PIPING, VALVES, FITTINGS &amp; SCHEMATIZATION</td>
<td>10 d</td>
</tr>
<tr>
<td>ON THE JOB ORIENTATION (OJO)</td>
<td>10 d</td>
</tr>
<tr>
<td>TRAINING COURSE: ROTATING MACHINERY &amp; ASSOCIATED DRIVERS</td>
<td>15 d</td>
</tr>
<tr>
<td>TRAINING COURSE: DOWNHOLE PRODUCTION, WELL EFFLUENTS</td>
<td>25 d</td>
</tr>
<tr>
<td>TRAINING COURSE: UTILITIES &amp; HSE PRODUCTION OPERATION</td>
<td>10 d</td>
</tr>
<tr>
<td>TRAINING COURSE: OPERATION TUTORIALS, REVISIONS &amp; FINAL WRITTEN TESTS</td>
<td>10 d</td>
</tr>
<tr>
<td>ON THE JOB TRAINING (OJT)</td>
<td>50 d</td>
</tr>
<tr>
<td>FINAL ASSESSMENTS &amp; JURY</td>
<td>5 d</td>
</tr>
</tbody>
</table>

Ways & Means

The training program is customized to your assets specificities. It alternates between classroom lectures and practice on operational site. The alternation can be adapted to local constraints.

Learning Assessment

- Continuous assessments all along the program.
- Final assessment including a report presentation in front of a jury.

Prerequisites

To be eligible for this training course, the candidate must have an academic scientific knowledge equivalent to British O levels A or year 13 (UK).

Why an IFP Training Certification?

- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in Field Operator Certification.
- Ready-to-use skills.

More info

Duration mentioned here does not include OFF periods; training typically extends over one year. Training duration: 37 weeks spread over one year.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Certification

185 days

Reference: BOAM-EN-A  Only available as an In-House course.
Contact: ep.contact@ifptraining.com
This course is also available in French: BOAM-FR-A. Please contact us for more information.
Production Operations

Vocational Certificate - Vocational Certificate
Panel Operator Certification

Level: SKILLED

Purpose
This course provides the required skills to hold the position of panel operator with the appropriate attitude towards plant operation safety issues. Allow proactive and efficient adaptation to the position of control room operator, based on professional experience of participants.

Audience
Experienced production field operators called on to hold a panel operator position in Oil & Gas production facilities.

Learning Objectives
Upon completion of the course, participants will be able to:
- adopt the fundamental methodology and philosophy to operate Oil & Gas production facilities from the control room,
- be convinced of the absolute necessity of a proactive behavior and to implement an anticipatory operation,
- analyze and react methodically to anomalies, incidents and emergency situations in a safe manner,
- implement emergency procedures.

Ways & Means
- Very practical training course with numerous exercises and case studies on dynamic simulator derived from real-life situations.
- The training is entirely delivered on dynamic simulator replicating a DCS environment.

Learning Assessment
Evaluation using simulator at the end of each module.

Prerequisites
One year at least experience in the industry in a position of production field operator.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in Panel Operator Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Module 1: PROCESS CONTROL, DCS &amp; SIS</th>
<th>5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control room organization and panel operator role.</td>
<td></td>
</tr>
<tr>
<td>Panel operator reporting and handover duties. Plant documentation in control room.</td>
<td></td>
</tr>
<tr>
<td>Radio-communication.</td>
<td></td>
</tr>
<tr>
<td>Process control:</td>
<td></td>
</tr>
<tr>
<td>Control loop, Field instrumentation.</td>
<td></td>
</tr>
<tr>
<td>Controllers operating principles &amp; parameters. Control loops structures.</td>
<td></td>
</tr>
<tr>
<td>Standalone simulator: simple loop controller tuning and impact of P&amp;I actions; study of various control loop structures; typical transmitters faults.</td>
<td></td>
</tr>
<tr>
<td>Distributed Control System (DCS):</td>
<td></td>
</tr>
<tr>
<td>DCS architecture and system components. Human-Machine Interface (HMI).</td>
<td></td>
</tr>
<tr>
<td>HMI functions: trends, alarms… Automated sequences and Safety Instrumented Systems (SIS): PSS, ESD, HIPPS, EDP.</td>
<td></td>
</tr>
<tr>
<td>Examples of simulator exercises performed: DCS views and functionalities browsing, reading safety logics, package sequence analysis.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 2: WELL &amp; PRODUCTION LINE OPERATION</th>
<th>5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservoirs and production modes. Production principles and physics applied to well.</td>
<td></td>
</tr>
<tr>
<td>Surface wells and subsea wells: equipment, architectures, operating procedures.</td>
<td></td>
</tr>
<tr>
<td>Safety and prevention/protection barriers.</td>
<td></td>
</tr>
<tr>
<td>Examples of simulator exercises performed: well; production lines section parameters analysis; FPSO case.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 3: ROTATING MACHINERY OPERATION</th>
<th>5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centrifugal pumps:</td>
<td></td>
</tr>
<tr>
<td>Technology, auxiliaries, operating parameters, protection systems.</td>
<td></td>
</tr>
<tr>
<td>Pumps and operating conditions applied on simulator.</td>
<td></td>
</tr>
<tr>
<td>Examples of simulator exercises performed: effect of a pressure decrease or level decrease in the upstream vessel; plugged strainer; gas carry-under.</td>
<td></td>
</tr>
<tr>
<td>Reciprocating compressors:</td>
<td></td>
</tr>
<tr>
<td>Technology, auxiliaries, process circuit, operating parameters, protection systems.</td>
<td></td>
</tr>
<tr>
<td>Centrifugal compressors:</td>
<td></td>
</tr>
<tr>
<td>Technology, auxiliaries, process circuit, operating parameters, control and protection systems applied on simulator.</td>
<td></td>
</tr>
<tr>
<td>Examples of simulator exercises performed: effect of temperature change; surge conditions; start-up and shutdown sequences.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 4: SURFACE PROCESSING OPERATION</th>
<th>5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude oil processing: stabilization, dehydration and desalting.</td>
<td></td>
</tr>
<tr>
<td>Gas processing: sweetening, dehydration, condensate recovery and fractionation.</td>
<td></td>
</tr>
<tr>
<td>Water processing: produced water treatment and introduction to injection water processing.</td>
<td></td>
</tr>
<tr>
<td>Examples of simulator exercises performed: influence of oil dehydration parameter; foaming symptoms; impact of TEG unit operating conditions; loss of a compressor; limited gas lift…</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 5: SURFACE PROCESSING OPERATION/INTEGRATED PLANT OPERATION</th>
<th>5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarms: priorities management and decision making.</td>
<td></td>
</tr>
<tr>
<td>Panel operator reporting, shift handover and take-over duties: shift report and impact of a faulty report through role play situations.</td>
<td></td>
</tr>
<tr>
<td>Global plant performance checks: identification and implementation of a routine checks roadmap: identifying key parameters and trending them to anticipate deviations.</td>
<td></td>
</tr>
<tr>
<td>Radio communication and other communication means. Communication good practices.</td>
<td></td>
</tr>
<tr>
<td>Oil transfer operations: storage and export, gas metering.</td>
<td></td>
</tr>
<tr>
<td>Analysis of an integrated plant behavior: inertia and interferences.</td>
<td></td>
</tr>
<tr>
<td>Analysis of production facilities shutdown philosophy: implementing safe plant shutdown procedure on simulator.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 6: INTEGRATED PLANT OPERATION/SAFETY IN OPERATION</th>
<th>5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of production facilities start-up philosophy.</td>
<td></td>
</tr>
<tr>
<td>Implementing safe plant start-up procedure on simulator:</td>
<td></td>
</tr>
<tr>
<td>Operating parameters analysis and anticipation of process upset.</td>
<td></td>
</tr>
<tr>
<td>Generation of several malfunctions (by the instructor) to be fixed.</td>
<td></td>
</tr>
<tr>
<td>Learning to react and act to process upsets in a structured manner.</td>
<td></td>
</tr>
<tr>
<td>Identification, analysis and containment of process upsets according to the learnt methodology.</td>
<td></td>
</tr>
<tr>
<td>Examples of simulator exercises performed:</td>
<td></td>
</tr>
<tr>
<td>Operating parameter analysis and anticipation of process upset.</td>
<td></td>
</tr>
<tr>
<td>Managing slugs.</td>
<td></td>
</tr>
<tr>
<td>Gas leakage to the flare.</td>
<td></td>
</tr>
<tr>
<td>Production rate decrease.</td>
<td></td>
</tr>
<tr>
<td>Partial loss of cooling water.</td>
<td></td>
</tr>
<tr>
<td>Overpressure in storage tanks.</td>
<td></td>
</tr>
<tr>
<td>Generation of several malfunctions (by the instructor) to be fixed.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 7: SAFETY IN OPERATION</th>
<th>5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine operations: permit to work, safe isolation of plant equipment.</td>
<td></td>
</tr>
<tr>
<td>Downdated situations. SIMOPS.</td>
<td></td>
</tr>
<tr>
<td>Learning to operate the plant in critical situation, to make adequate decision, to follow-up on actions performed:</td>
<td></td>
</tr>
<tr>
<td>SIS: Process and emergency shutdown levels - Related Panel Operator role and duties.</td>
<td></td>
</tr>
<tr>
<td>Emergency shutdown procedures.</td>
<td></td>
</tr>
<tr>
<td>Examples of simulator exercises performed: inhibition and downdated situation mitigation (faulty pressure transmitter, SDV blocked open…); ESD activation due to process safety trip; manual ESD activation following leakage detection; emergency shutdown procedures implementation and follow-up (monitoring).</td>
<td></td>
</tr>
</tbody>
</table>

Reference: PANELOP-EN-P Only available as an In-House course.
Contact: ep.contact@ifptraining.com

This course is also available in French: PANELOP-FR-P. Please contact us for more information.
Production Supervisor Certification

This course can be adapted to virtual classroom mode - Vocational Certificate

**Level:** SKILLED

**Purpose**

This course provides the required skills and comprehensive knowledge to hold the position of Production Supervisor and ensure safe and efficient operations in upstream Oil & Gas facilities.

**Audience**

Current or future production supervisors in Oil & Gas production, transport or storage facilities.

**Learning Objectives**

Upon completion of the course, participants will be able to:
- Explain fundamental concepts underling oil, water and gas processing.
- Grasp technical details and operating issues of completion and artificial lift.
- Detail typical efficient processing techniques and impact of various operating parameters.
- Describe technology and operation of static equipment and rotating machinery used in production facilities.
- Identify HSE risks linked to operations, constraints and maintenance activities.
- Analyze Oil & Gas processing operations using DCS, suggest and implement adapted solutions.
- Detect and react to abnormal conditions in a structured manner by implementing troubleshooting best practices, using DCS tools readily available.

**Ways & Means**

- Highly interactive training by experienced lecturers.
- Numerous examples taken from the industry and case studies derived from actual situations.
- Analysis and troubleshooting of actual production operations problems using a dynamic simulator.

**Learning Assessment**

Continuous assessments all-long the program.

**Prerequisites**

Experience in Oil & Gas production facilities.

**Why an IFP Training Certification?**

- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in Production Supervisor Certification.
- Ready-to-use skills.

**Course Content** 45 days

**FUNDAMENTALS** 5 d


**DOWNHOLE PRODUCTION** 5 d


**EFFLUENT PROCESSING** 10 d

Oil treatment:

**STATIC EQUIPMENT** 5 d

- Piping and valves. Metallurgy and corrosion. Storage equipment. Thermal equipment.
- Instrumentation, process control, Distributed Control System (DCS). Electricity. Safety System: HIPS, ESD, ESP, F&G, USS.

**ROTATING MACHINERY** 5 d


**CONTROL ROOM OPERATION & SURFACE PRODUCTION TROUBLESHOOTING** 10 d

Troubleshooting methodology:
- Case study. Feedbacks from industry. Troubleshooting in control room operations (on dynamic simulator):
  - Use of DCS tools (trends, historical, alarm summary…) to anticipate deviations, identify and react to common production operations problems.
  - Surface production units operation and troubleshooting: wells and production lines. Rotating machines. Oil & Gas treatment.
  - Production facilities start-up and shutdown. Troubleshooting mini-project on real case studies.

**HSE** 5 d

- Main HSE risks.
- Hazards for personnel.
- HSE in production operations.
- HSE in construction and maintenance works.
- Risks inherent to SIMultaneous OPerationS (SIMOPS).
- HSE management. Responsibilities.
- Risk analysis. Safety engineering concepts.

**Reference:** PRODSUP-EN-A. Only available as an In-House course. **Contact:** ep.contact@ifptraining.com

**www.ifptraining.com**
Production Superintendent Certification

Course Content

58 days

INTRODUCTION
Welcome and program overview. Entry test. Units. Dimensions.

DOWNHOLE PRODUCTION - WELL PERFORMANCE - PRODUCTION FUNDAMENTALS

OIL, WATER & GAS PROCESSING
Oil processing; required specifications; stabilization; dehydration, desalting, Production and injection water treatment; quality requirements and associated treatments; operating conditions. Gas processing: required specifications; dehydration; hydrates; consequences and treatments. Natural Gas Liquids recovery. Oil & Gas sweetening. Liquefied Natural Gas, principles and liquefaction processes. Natural gas liquids treatments.

OFFSHORE DEVELOPMENTS, FLOW ASSURANCE

METERING & ALLOCATION

CHEMICALS USED IN PRODUCTION ACTIVITIES
Introduction to chemical treatment in production field. Chemicals for oil and gas treatment. Chemicals for injection and produced water processing. Special operations.

PRODUCTION FACILITIES TROUBLESHOOTING, DYNAMIC SIMULATOR
Oral presentations of facilities actual malfunctions and teamwork investigation. Operations troubleshooting methodology and case studies: recognize a trouble when occurring; Ishigawa grid; methodological approach to identify causes and remedial options; PARETO graph; troubleshooting toolbox. Case studies on a dynamic simulator: well and production lines; rotating equipment; crude oil and associated gas: operation and troubleshooting; production shutdown and restart.

BEHAVIORAL MANAGEMENT
Teamwork management, written and oral communication. Active listening and communication tools. Team cohesion and stress management. Problems analysis and investigation: tools and behaviors. How to better analyze and know oneself.

INSTRUMENTATION & PROCESS CONTROL - ELECTRICITY
Instrumentation and process control: functional blocks, symbolization; pneumatic, electrical and digital technologies; measurements, sensors, security equipment; control equipment, actuators; controllers and control loops; Distributed Control System (DCS): architecture, connections; Safety Instrumented Systems (SIS): HIPS, ESD, EDP, FGS. Electricity: generation (turbines, alternators, monitoring, troubleshooting); distribution (HT-BT networks, power supply, stability, constituents, cabinets, transformers, batteries, isolation, protections).

ROTATING MACHINERY
Pumps: pumping prerequisites (pressure, flowrate, head); centrifugal pumps (types, technology, auxiliaries, performances); volumetric pumps (rotating, reciprocating). Compressors: compression prerequisites (technology, auxiliaries, practical laws); centrifugal compressors (rotor, stator, bearings, shafts, seals balance); reciprocating compressors (frame, cylinders, pistons and rings, bearings, lubrication, cooling). Gas turbines: operating principles, compression, combustion, expansion, performances; technologies (compressor, combustion chamber, turbine, internal cooling); auxiliaries. HSE concerns.

TERMINAL, FSO & FPSO
Overview of oil terminals. FSO & FPSO technologies. Metering of oil quantities.

CORROSION, INSPECTION & INTEGRITY
Corrosion mechanisms, Types of corrosion in the Oil & Gas industry. Corrosion prevention and monitoring, fundamentals of inspection.

HSE RISKS & MANAGEMENT

REVIEWS - ORAL ASSESSMENT

Level: SKILLED

Purpose
This certifying course provides the in-depth technical knowledge of Oil & Gas processing operations along with managerial and communication skills for qualifying to hold the position of production superintendents. The required high-level knowledge stretches over a wide range of issues in relation to reservoir, corrosion, inspection, maintenance, well performance, flow assurance...

Audience
Professionals with a significant experience in Oil & Gas surface production who are called on to hold position of production superintendents.

Learning Objectives
Upon completion of the course, participants will be able to:
► describe the overall production process, from reservoir to offloading facilities,
► explain available tools and techniques for well performance enhancement and production optimization,
► explain state-of-the-art Oil & Gas production techniques,
► describe HSE management rules and responsibilities,
► acquire world class work methods and communication skills,
► anticipate anomalous events and react effectively to troubleshooting to avoid production loss.

Ways & Means
► Several applications and illustrations.
► Intensive teamwork.
► Use of dynamic training simulations.
► Practical sessions with equipment in a workshop.

Learning Assessment
► Continuous assessments all-along the program.
► Final assessment including a presentation in front of a jury.

Prerequisites
Significant experience in Oil & Gas surface production.

Why an IFP Training Certification?
► An international recognition of your competencies.
► A Vocational Certificate delivered.
► An expertise confirmed in Production Superintendent Certification.
► Ready-to-use skills

More info
The training duration includes 2 days of written and oral competencies evaluation. This training is organized together with the HSE and Maintenance Superintendents trainings. The effective scheduling of the common and specific modules of the three sessions may imply a slightly different chaining of the modules.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Location Start Date End Date Tuition Fees excl. VAT
Pau 8 September 1 December €42,620

Reference: PRODSI-EN-P

This course is also available in French: PRODSI-FR-P. Please contact us for more information.
This course can be adapted to virtual classroom mode - Graduate Certificate

Field Operations Engineer Certification

Level: KNOWLEDGE

Purpose

This course aims to provide in-depth technical knowledge of Oil & Gas production facilities design and operation necessary to hold rapidly, and very effectively, the position of field operations engineer or project engineer.

Audience

Engineers (particularly recently graduated, field, design or project engineers) interested in a specialization in Oil & Gas surface production operations.

Learning Objectives

Upon completion of the course, participants will be able to:

- Grasp fundamentals of reservoir engineering, drilling, well completion and servicing.
- Evaluate well performance and identify needs for artificial lift.
- Explain fundamental concepts underlying Oil & Gas processing.
- Analyze operating conditions and basic design of oil, water and gas treatment.
- Describe the technology of static equipment and rotating machinery used in production facilities.
- Identify offshore development techniques and flow assurance issues.
- Identify main risks related to O&G production operations and contribute to process safety management.
- Contribute to the dynamics of field development projects studies.

Ways & Means

- Highly interactive training with industry specialist lecturers.
- Numerous applications and illustrations.
- Multiple teamwork sessions. Use of dynamic simulations and industrial case studies.
- Numerous simulations performed using the PRO/II™ or HYSYS™ software.
- Several tutorials with equipment in a workshop, site/field visits.

Learning Assessment

- Continuous assessments all-along the program.
- Final assessment including a presentation in front of a jury.

Prerequisites

Engineering degree or equivalent professional experience in an Oil & Gas.

Why an IFP Training Certification?

- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Field Operations Engineer Certification.
- Ready-to-use skills.

More info

This training includes 1 week in Pau (south of France) for mechanical workshop and site visits.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module I:</td>
<td>Thermodynamics applied to well effluent processing</td>
<td>5 d</td>
</tr>
<tr>
<td></td>
<td>Well effluent. Ideal gas and real fluid behavior.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gas compression and expansion.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liquid-vapor equilibrium of pure components and mixtures. Mixture separation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heat transfer, heat balance and thermal equipment.</td>
<td></td>
</tr>
<tr>
<td>Module II:</td>
<td>Oil &amp; water treatment</td>
<td>5 d</td>
</tr>
<tr>
<td></td>
<td>Crude oil treatment: stabilization, dehydration, sweetening.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Storage equipment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reject and injection water treatment.</td>
<td></td>
</tr>
<tr>
<td>Module III:</td>
<td>Gas processing &amp; conditioning</td>
<td>5 d</td>
</tr>
<tr>
<td></td>
<td>Gas processing: dehydration, sweetening, LNG recovery.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fundamentals of Liquefied Natural Gas (LNG) chain.</td>
<td></td>
</tr>
<tr>
<td>Module IV:</td>
<td>Field development project</td>
<td>10 d</td>
</tr>
<tr>
<td></td>
<td>Development studies.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Case study and production balances reconstruction: back allocation, satellite fields…</td>
<td></td>
</tr>
<tr>
<td>Module V:</td>
<td>Value of Exploration &amp; Production projects</td>
<td>3 d</td>
</tr>
<tr>
<td>Module VI:</td>
<td>Production accounting &amp; Material balance</td>
<td>3 d</td>
</tr>
<tr>
<td></td>
<td>Measures and metering systems along the chain. Liquid and gas balances. Performance monitoring and production reporting.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Case study and production balances reconstruction: back allocation, satellite fields…</td>
<td></td>
</tr>
<tr>
<td>Module VII:</td>
<td>Petroleum economics &amp; project management</td>
<td>2 d</td>
</tr>
<tr>
<td></td>
<td>Offshore development projects. Fixed and floating production structures. Construction and installation of platforms.</td>
<td></td>
</tr>
<tr>
<td>Module VIII:</td>
<td>Process safety management</td>
<td>5 d</td>
</tr>
<tr>
<td>Module IX:</td>
<td>Field development project - JURY</td>
<td>10 d</td>
</tr>
<tr>
<td></td>
<td>During this final project, participants will select field development scenario and architecture, design wells, evaluate well performances, design and simulate process, realize heat and mass balance and evaluate profitability of their project.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This 10-day teamwork project is a real case study based on actual data. Participants are coached throughout the project to produce the required deliverables, which are to be presented on the last day (jury): Field architecture. Well design and completion. Process design and simulation. Main equipment sizing. Heat and mass balance. Fuel gas requirements. HAZID and plant layout.</td>
<td></td>
</tr>
</tbody>
</table>

References:

- FIELDIG-EN-A: Can be organized as an In-House course.
- Contact: ep.contact@ifptraining.com

Location

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>30 August</td>
<td>19 November</td>
<td>€35,480</td>
</tr>
</tbody>
</table>

This course is also available in French: FIELDIG-FR-A. Please contact us for more information.

www.ifptraining.com
## Well Operation & Testing

**Level:** KNOWLEDGE

### Purpose
This course provides a comprehensive knowledge for the monitoring of eruptive and activated wells, as well as the monitoring and validation of well tests.

### Audience
Experienced method engineers, technicians and operators involved in well monitoring in Oil & Gas production facilities.

### Learning Objectives
Upon completion of the course, participants will be able to:
- List equipment comprising eruptive and activated wells, including surface equipment for gas lift.
- Analyze well behavior and well material balance.
- Efficiently identify abnormal conditions on eruptive and activated wells.
- Efficiently operate and monitor gas lifted wells, monitor wells safety test.
- Troubleshoot activated wells instabilities for tests validation.

### Ways & Means
- Highly interactive training by industry specialist lecturers.
- Several applications on eruptive and activated well dynamics.
- Several exercises on well material balance following well test.

### Learning Assessment
Assessment by test at the end of the course.

### Prerequisites
Engineer degree or equivalent experience in Oil & Gas production.

### Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

### Course Content

#### ESSENTIALS OF RESERVOIRS & WELL EQUIPMENT
- Hydrocarbon in place. Composition and volume.
- Permeability/porosity/reservoir/borehole interface. Productivity Index (IP).
- Various completions; eruptive wells/activated wells.
- Role of completion.
- Hydrostatic and dynamic wells:
  - Conditions for eruptive wells.
  - Notions of fluid flow. Pressure drop/skin effect.
  
  **0.5 d**

#### ARTIFICIAL LIFT
- Stimulation and activation principle.
- The various methods of activation.
- Well activation by gas lift:
  - Gas lift principle.
  - Pros and Cons.
  - Bottom hole and surface gas lift equipment.
  - Gas lift valve: role/technology.
  - Start-up methods in gas lift well.
  - Operation of multiple wells.

  **1 d**

#### WELL INTERVENTIONS - WORKOVER, WIRELINE, METROLOGY - SAFETY
- Heavy/light wells intervention. Equipment.
- Wireline/workover operations.
- Metrology associated with the operating mode for eruptive or activated wells.
- Downhole and surface safety equipment.
- Safety levels.

  **0.5 d**

#### WELL MONITORING & TESTING - TEST SEPARATOR
- Test separator:
  - Equipment, metrology and test separator control.
  - Control and stability of tested well.
  - Metering equipment.
  - Wells parameters determination: GLR, GOR, WOR, BSW, Specific gravity…
  - Sampling procedure.
- Multi-Phase Flow Meter (MPFM):
  - Operating principle and equipment technology.
  - Results analysis.
- Stability control and well test validation.
- Potential problems. Tuning difficulties: analysis, solutions.
- Troubleshooting of gas lift wells.
- Troubleshooting of wells activated by Electric Submersible Pump (ESP).

  **1 d**

---

Reference: WELLOP-EN-P  
This course is also available in French: WELLOP-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com
Operation of Gas Lift Wells

Level: SKILLED

Purpose
This course provides a comprehensive knowledge and know-how of gas lift wells operation. To identify and troubleshoot most common operations issues.

Audience
Control room operators and field operators involved in gas lift wells monitoring and operation.

Learning Objectives
Upon completion of the course, participants will be able to:
- explain eruptive and assisted well dynamics,
- identify gas potential available to ensure gas lift activation,
- describe downhole and surface equipment of gas lift wells,
- implement and monitor gas lift wells start-up sequence,
- operate and start-up gas lift wells, identify and troubleshoot gas lift wells instabilities.

Ways & Means
- Very interactive training by industry specialists.
- Numerous teamwork exercises on operation and troubleshooting.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
6 months of experience in Oil & Gas production.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

HYDROSTATICS & WELL DYNAMICS
Pressure Gradient. Condition for eruptive well:
Fundamentals of fluid flow. Pressure drop/skin effect.
Wells activation method, stimulation/activation operating principle:
Evolution of reservoir parameters.
Common stimulation methods.
Comparison and selection of activation methods.

GAS LIFT OPERATING PRINCIPLE & ASSOCIATED EQUIPMENT
Gas lift principle:
Pressure gradient evolution.
Downhole equipment:
Completion.
Gas lift valve principle. Different types of valves.
Surface equipment:

GAS LIFT WELL START-UP METHOD & SEQUENCE
Sequential start-up of gas lift wells:
Initial start (first start-up).
Simple Start (after ESD shutdown).
Start-up problems.
Gas lift wells start-up method:
Open tubing start-up sequence.
Closed tubing start-up sequence.
Troubleshooting:
Stabilization and tuning difficulties.
Potential problems and associated solutions.

PROS & CONS OF GAS LIFT

TEAMWORK EXERCISES - TROUBLESHOOTING OPERATIONS
Chemicals used in Production Activities

Level: KNOWLEDGE

Purpose
This comprehensive course provides an advanced knowledge on how production chemicals may improve production processes and cure problems in Oil & Gas production. Chemical natures, properties, selection, treatments monitoring, troubleshooting, optimizations are covered.

Audience
Production Engineers looking for comprehensive technical information on production chemicals use, monitoring, optimization.

Learning Objectives
Upon completion of the course, participants will be able to:
- detail the nature and purpose of each frequently used production chemicals, their specificities and limits,
- explain in which domain and how chemical treatments are applicable,
- select and apply safely the best treating chemicals,
- monitor chemical treatments and detect dysfunctions,
- evaluate chemical performance in a given process, optimize chemical treatments.

Ways & Means
- Highly interactive training by industry specialist lecturers.
- Several applications and case studies.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
Engineer degree or equivalent experience in Oil & Gas industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO CHEMICAL TREATMENT IN PRODUCTION FIELD
Brief description of different types of chemicals used in Oil & Gas production.
Methods for implementing chemical treatment.

CHEMICALS FOR OIL TREATMENT
Purpose, nature and specificities of each: demulsifiers, defoamers, corrosion inhibitors, paraffin control chemicals, drag reducers…
Methodology for selecting the correct chemical and field testing.
Ways for monitoring during operation.
Optimization of the chemical injection and chemical performance evaluation.
Troubleshooting case study.

CHEMICALS FOR GAS TREATMENT
Purpose, nature and specificities of each: defoamers, foamers, corrosion inhibitors, hydrate inhibitors (Methanol, DEG, TEG, KHI)…
Methodology for selecting the correct chemical and field testing.
Ways for monitoring during operation.
Optimization of the chemical injection and chemical performance evaluation.
Troubleshooting case study.

CHEMICALS FOR INJECTION & PRODUCED WATER PROCESSING
Purpose, nature and specificities of each: polyelectrolyte, chlorine, bactericide, oxygen scavenger, deoilers, corrosion inhibitors, acids, mineral scale inhibitors…
Methodology for selecting the correct chemical and field testing.
Ways for monitoring during operation.
Optimization of the chemical injection and chemical performance evaluation.
Troubleshooting case study.

SPECIAL OPERATIONS
Scale removal and prevention in well tubing, electrochlorinator, furnaces and heat exchangers.
Use of H₂S scavenger.

Reference: CHIMIC-EN-P
Only available as an In-House course.

Contact: ep.contact@ifptraining.com
This course is also available in French: CHIMIC-FR-P. Please contact us for more information.
Production Facilities Control Room Operation

**Level:** SKILLED

**Purpose**
This course aims to acquire best practices of production facilities control room operation through role-play situations on integrated Oil & Gas production plant dynamic simulator.

**Audience**
Experienced control room operators and production supervisors looking to advance their know-how in control room operation.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- analyze and anticipate behavior of main control loop structures (DCS and SIS systems architecture and functionalities),
- explain production equipment, process operating parameters and perform troubleshooting,
- implement proactive, anticipatory control room operation and acquire a safety mindset,
- react and act in a structured manner to anomalies and plant upsets,
- enforce safety guidelines during downgraded and critical situations.

**Ways & Means**
- Extensive practice on integrated Oil & Gas production plant dynamic simulator.
- Numerous case studies and role-play situations.

**Learning Assessment**
Assessment by test at the end of the course.

**Prerequisites**
At least a six month experience as a panel operator in Oil & Gas production, refineries, chemical plants or others industrial process sites.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GETTING STARTED - DCS FUNCTIONALITIES FOR PROPER ANALYSIS</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Familiarization with HMI functions and operation.</td>
<td></td>
</tr>
<tr>
<td>DCS tools review.</td>
<td></td>
</tr>
<tr>
<td><strong>PROCESS CONTROL &amp; SAFETY INSTRUMENTED SYSTEMS</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Impact of P&amp;ID parameters and simple closed loop tuning.</td>
<td></td>
</tr>
<tr>
<td>Study of control loop structures: cascade, split-range on simulator.</td>
<td></td>
</tr>
<tr>
<td>Programmable logic controllers: introduction to automated sequences.</td>
<td></td>
</tr>
<tr>
<td>Monitoring of start-up sequence (compressor) through MMI.</td>
<td></td>
</tr>
<tr>
<td><strong>WELLS &amp; PRODUCTION LINES OPERATION</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Well start-up (ramp-up) and shutdown.</td>
<td></td>
</tr>
<tr>
<td>Analysis of automatic well control.</td>
<td></td>
</tr>
<tr>
<td>Well monitoring and detection of abnormal conditions.</td>
<td></td>
</tr>
<tr>
<td><strong>ROTATING MACHINERY OPERATION</strong></td>
<td>1.5 d</td>
</tr>
<tr>
<td>Centrifugal pumps.</td>
<td></td>
</tr>
<tr>
<td>Centrifugal compressors:</td>
<td></td>
</tr>
<tr>
<td>Technology review, study of process and auxiliary lines, protection systems.</td>
<td></td>
</tr>
<tr>
<td>Start-up and shutdown sequences.</td>
<td></td>
</tr>
<tr>
<td>Analysis of operating conditions and operating parameters.</td>
<td></td>
</tr>
<tr>
<td><strong>PROCESS UPSET MANAGEMENT</strong></td>
<td>2.5 d</td>
</tr>
<tr>
<td>Alarms: priorities management and decision making.</td>
<td></td>
</tr>
<tr>
<td>Becoming aware of the need for anticipation VS on-alarm action.</td>
<td></td>
</tr>
<tr>
<td>Managing and predicting process disturbances by using trend views. Use of trends to anticipate deviations.</td>
<td></td>
</tr>
<tr>
<td>Global plant performance checks: identification and implementation of a routine checks roadmap.</td>
<td></td>
</tr>
<tr>
<td>Shift report and impact of a faulty report through role play situations.</td>
<td></td>
</tr>
<tr>
<td>Process upsets: learning to react and act in a structured manner.</td>
<td></td>
</tr>
<tr>
<td>Identification, analysis and containment of process upsets according to the learnt methodology.</td>
<td></td>
</tr>
<tr>
<td>Example of simulator exercises performed:</td>
<td></td>
</tr>
<tr>
<td>- Loss of centrifugal compressor.</td>
<td></td>
</tr>
<tr>
<td>- Loss of cooling media.</td>
<td></td>
</tr>
<tr>
<td>- Production rate decrease.</td>
<td></td>
</tr>
<tr>
<td>- Unexpected slugging.</td>
<td></td>
</tr>
<tr>
<td>- ESD activation due to process safety trip.</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
<tr>
<td><strong>SAFETY IN OPERATION</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Learning to operate the plant in critical situation, to make adequate decision, to follow-up on actions performed.</td>
<td></td>
</tr>
<tr>
<td>Example of simulator exercises performed:</td>
<td></td>
</tr>
<tr>
<td>- Gas leakage to the flare.</td>
<td></td>
</tr>
<tr>
<td>- Inhibition and downgraded situation mitigation (faulty pressure transmitter, SDV blocked open…).</td>
<td></td>
</tr>
<tr>
<td>- Manual ESD activation following leakage detection.</td>
<td></td>
</tr>
<tr>
<td><strong>PRODUCTION START-UP</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Analysis of production facilities start-up philosophy.</td>
<td></td>
</tr>
<tr>
<td>Safe plant start-up.</td>
<td></td>
</tr>
<tr>
<td>Implementing start-up procedure on simulator:</td>
<td></td>
</tr>
<tr>
<td>- Operating parameters analysis and anticipation of process upset.</td>
<td></td>
</tr>
<tr>
<td>- Generation of several malfunctions (by the instructor) to be fixed.</td>
<td></td>
</tr>
<tr>
<td><strong>CONTINUOUS ASSESSMENT TEST</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Weekly tests on simulator.</td>
<td></td>
</tr>
</tbody>
</table>
Laboratory Analyses for Oil & Gas Production
Methodology - Results Analysis - HSE

Level: SKILLED

Purpose
This course provides a comprehensive knowledge and develops practical skills in conducting reliable and safe laboratory analyzes for the Oil & Gas industry.

Audience
Laboratory personnel, operational staff and other professionals (engineers, managerial staff, technical, operator, assistant) interested in laboratory analyzes dedicated to Oil & Gas operations.

Learning Objectives
Upon completion of the course, participants will be able to:
- grasp the physical and chemical concepts involved in various analyzes,
- comprehend issues requiring special attention in various analyzes,
- assess the results of an analysis and decide whether to carry out the analysis over again,
- review main Occupational Health and Safety rules within the framework of laboratory activities.

Ways & Means
Several applications and illustrations.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
In order to be able to follow this training, trainees are asked to fulfill at least one of the criteria below:
- either proven experience in an analysis laboratory of at least 1 year,
- or to be in evolution towards a position related to product analysis.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Role &amp; Responsibilities of Laboratory Staff</th>
<th>0.25 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member of production staff. Equipment yields controls/monitoring. Final product quality controls/monitoring. Recommendations to improve treatments.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analyzes Specific to Crude Oil</th>
<th>1.25 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific gravity or density.</td>
<td></td>
</tr>
<tr>
<td>Vapor Pressure (Reid VP).</td>
<td></td>
</tr>
<tr>
<td>Water content: Basic Sediment &amp; Water (BSW), dean stark distillation.</td>
<td></td>
</tr>
<tr>
<td>Salt content: chlorides content, conductimetry.</td>
<td></td>
</tr>
<tr>
<td>Acid components content:</td>
<td></td>
</tr>
<tr>
<td>$H_2S$ content (methylene blue).</td>
<td></td>
</tr>
<tr>
<td>$H_2S$ and mercaptans by potentiometry.</td>
<td></td>
</tr>
<tr>
<td>Total Acid Number (TAN) of liquid hydrocarbons.</td>
<td></td>
</tr>
<tr>
<td>Fluid rheology: pour point, kinematic viscosity, wax content.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analyzes Specific to Gas</th>
<th>0.75 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas characterization analyzes:</td>
<td></td>
</tr>
<tr>
<td>Dew point (HC and water).</td>
<td></td>
</tr>
<tr>
<td>Gas composition by Gas Phase Chromatography (GPC).</td>
<td></td>
</tr>
<tr>
<td>Gas specific gravity estimate from composition.</td>
<td></td>
</tr>
<tr>
<td>Acid components content:</td>
<td></td>
</tr>
<tr>
<td>$H_2S$ content (Dräger), $H_2S$ and mercaptans content (potentiometry, iodometry).</td>
<td></td>
</tr>
<tr>
<td>$CO_2$ content (Dräger and acidimetry).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analyzes for the Follow-up of Effluent Treatment Operations</th>
<th>1.25 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demulsifiers evaluation and selection (bottle tests, field tests).</td>
<td></td>
</tr>
<tr>
<td>Quality controls/monitoring of poor and rich Triethyleneglycol (TEG):</td>
<td></td>
</tr>
<tr>
<td>Water content, pH.</td>
<td></td>
</tr>
<tr>
<td>Hydrocarbon content.</td>
<td></td>
</tr>
<tr>
<td>Follow-up of equipment performances: water content, residual emulsion.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analyzes Done to Optimize Anticorrosion Treatments</th>
<th>0.75 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deposits and scale analyzes. Chemical corrosion and bacterial corrosion appraisal. Recommendations for chemical additives and treatments.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HSE in Laboratory Activities</th>
<th>0.75 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory facilities design and implementation. Chemicals management (storage, use…). Occupational health and safety behavior.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: LABO-EN-P  Only available as an In-House course. Contact: ep.contact@ifptraining.com

This course is also available in French: LABO-FR-P. Please contact us for more information.
This course can be adapted to virtual classroom mode

Refresher Course for Production Operator

Level: KNOWLEDGE

Purpose

This course aims to increase the knowledge in oil/gas/water processing operations, as well as acquiring or validating fundamentals of rotating machines and static equipment operation.

Audience

Experienced operations personnel who need to validate or strengthen their technical knowledge.

Learning Objectives

Upon completion of the training, participants will be able to:

- efficiently operate Oil & Gas production units, solve operational problems, analyze cause-and-effect relationships related to an action or operation, detect malfunction and anticipate process deviation,
- better monitor rotating machines and their ancillaries by focusing on their critical parameters and equipment,
- help extend equipment uptime,
- take into account machine and process safety aspects,
- optimize static equipment operation, taking into account their technology as well as the related process safety aspects.

Ways & Means

- Numerous exercises and applications concerning the operation of production facilities.
- The course can be adapted according to the experience and/or actual equipment operated by the participants.

Learning Assessment

Assessment by test at the end of each module.

Prerequisites

Six month minimum work experience on an industrial site.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

15 days

**OIL, GAS & WATER PROCESSING & OPERATOR DUTIES**

5 d

Wells: performance, activation, monitoring and operation.

Oil treatment: multi-stage separation, dehydration, desalting, treatment of emulsions, treatment of foaming, sweetening.

Gas treatment: sweetening, dehydration, NGL and condensate recovery.


**ROTATING EQUIPMENT OPERATION & MONITORING**

5 d

Centrifugal and volumetric pumps, centrifugal and reciprocating compressor:

- Technology, seal (gas or oil) system, ancillary circuit, UCP/DCS HMI, safety system.
- Normal operation.
- Troubleshooting.

Drivers: electrical motors, Diesel engines, gas turbines. Associated safety system.

**STATIC EQUIPMENT USED IN OIL & GAS PRODUCTION**

5 d

Wells: from downhole to choke valve, manual valves, automatic valves, safety system, control cabinet.

Separator, distillation column, dehydrator and desalter, wash tanks: technology, control system & safety equipment.

Thermal equipment:

- Heat exchanger: shell and tube, plate heat exchanger, air cooler.
- Furnaces and boilers.

Technology, operation, control system and safety equipment.

Storage tank: floating roof, fixed roof. Associated safety equipment.

Reference: REFREOP-EN-A

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: REFREOP-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

**Pumps Operation**

**Level:** SKILLED

**Purpose**
This course provides a better understanding of centrifugal and displacement volumetric pumps technology and operating principles.

**Audience**
Engineers and technicians involved in centrifugal and positive displacement pump operation or engineering. Employees in charge of running and checking pumping system.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- describe the behavior and the operation of pumps,
- analyze the technical solutions applied in their units,
- establish a diagnosis of the incidents and participate in the troubleshooting meetings,
- identify essential elements in pump selection.

**Ways & Means**
- Functional approach for a better understanding.
- Numerous examples and cases studies from the Oil & Gas production industry and analysis of manufacturer file.

**Learning Assessment**
Written test upon training course completion.

**Prerequisites**
Provide evidence of a professional experience of at least 1 month related to the concerned field.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PUMPING PREREQUISITES</strong></td>
<td>0.5 d</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TECHNOLOGY &amp; PERFORMANCE</strong></td>
<td>2 d</td>
</tr>
<tr>
<td>Centrifugal pumps: Functional approach: study step by step of the main functions; process (impeller, wear rings, balancing, pump body shape…); sealing: mechanical sealing, typical arrangements (single, dual, dry seal), selection according API 382 standard, materials, type, friction face heating; support (axial and radial, thrust and journal bearings); lubrication (oil and grease…); monitoring (rotor displacement, vibrations, temperature, pressure…). Building step by step a monocellular centrifugal pump. Volumetric pumps: Different types of pumps: rotary and reciprocating pumps. Operating principle and utilization of the different types of pumps. Influence of clearance, internal leaks, nature of product on flow rate and pressure. Flow rate control. Installation guidelines: position of tanks, line diameters, metering drums, pulsation dampeners, pressure valves. Particular choices: Coupling and driven machines. ATEX: material consequences.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPERATION &amp; MONITORING</strong></td>
<td>1.5 d</td>
</tr>
<tr>
<td>Preparation: filling, draining; spare pumps: heating, ancillaries. Start-up/shutdown: priming, controls, hammer shock, risks for process and pump. Surveillance: parameters (vibration levels, noises, bearing housing temperature, motor intensity, pressures); impact of stream parameters; hazards. Parallel and series operations: risks, dysfunction.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TROUBLESHOOTING</strong></td>
<td>0.75 d</td>
</tr>
<tr>
<td>Troubleshooting of most frequent problems (cavitation, priming situation, low flowrate…).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAFETY IN OPERATION</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Leaks, vibrations, feed, overcharge… Analysis of industrial incidents and accidents.</td>
<td></td>
</tr>
</tbody>
</table>

---

Reference: PUMPOP-EN-A

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: PUMPOP-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

Compressors Operation

Course Content

**5 days**

### GAS COMPRESSION BASICS 0.5 d
- Compressor types. Selection.
- Gas compression: key points, pressure ratio. Gas composition, typical thermodynamical laws and models.
- Isothermal, isentropic, actual compression.
- Compression work and power.
- Single and multistage compression. Compressor protection against wet gases.

### TECHNOLOGY & PERFORMANCE 2 d
- **Centrifugal compressors:**
  - Centrifugal compressor typical parts and arrangements.
  - Technology of the essential components: stator, rotor, bearings, thrust bearing, seals.
  - Vibrations, critical speed, dynamic balancing.
  - Auxiliary equipment: lubrication system, balancing line, mechanical seals auxiliaries…
  - Safety devices: axial displacement, vibrations, bearing and thrust bearing temperatures, oil pressure…
  - Compression mechanism through a compressor stage.
  - Characteristic curves of the circuit and the compressor. Influence of the operating conditions: intake pressure and temperature, nature of the gas, rotation speed, IGV position.
- **Reciprocating compressors:**
  - Reciprocating compressor parts and arrangements.
  - Technology of the essential components: cylinder, piston, valves, packings, crankshaft, connecting rod…
  - Auxiliary equipment: lubrication of moving parts and cylinders, interstage coolers and cooling devices systems, flare connections.
  - Safety devices: vibrations, rod drop, temperatures…
  - Piston side compression map vs operating conditions Theoretical and practical cycles.
  - Flow control with typical devices: spililback line, unloading, clearance pocket actuation,(e-)Hydrocom™ system.

### OPERATION 2.5 d
- **Centrifugal compressors:**
  - P&ID and logic security matrix analysis.
  - Flow rate regulation. Adaptation to service conditions.
  - Start-up, shutdown and isolation: hazards related to these phases.
  - Survey and monitoring the compressor and auxiliary equipment under normal operating conditions.
  - Case studies: typical incidents.
  - Applications with dynamic simulator: start-up, shutdown, operation vs suction conditions.
- **Reciprocating compressors:**
  - Conventional control: start-up, shutdown associated risks.
  - Monitoring the compressor and auxiliary equipment under normal operating conditions.
  - Case studies: incidents.
  - Applications with dynamic simulator: start-up, shutdown, operation vs suction conditions.

---

Reference: COMPOP-EN-A

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: COMPOP-FR-A. Please contact us for more information.

www.ifptraining.com 225
Production Planning & Monitoring

Level: KNOWLEDGE

Purpose
This course aims to provide production engineers and/or planning engineers with the methodology and know-how in order to plan and analyze production, taking into consideration the integrated production system.

Audience
Production engineers, petroleum engineers, reservoir engineers, method engineers, production planning engineers seeking to acquire a global approach of production planning and gap analysis considering the integrated subsurface surface production system, i.e. from reservoir to tank.

Learning Objectives
Upon completion of the course, participants will be able to:
- describe choke model, explain its components (chokes) and identify required input to build production planning model,
- identify factors impacting well production capacity, production and export facilities capacity as to derive overall constrained production capacity,
- analyze production gaps and identify production opportunities,
- analyze production reports, evaluate and monitor production KPI’s.

Ways & Means
- Highly interactive course delivered by industry experts.
- Numerous examples and feedbacks from the industry.
- Full-fledge production planning and analysis concluding the course.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
In order to be able to follow this training, trainees are asked to fulfill at least one of the criteria below:
- either have an engineer level or equivalent,
- or to have a proven professional experience in field production or reservoir or in methods or planning of at least 6 months,
- or to have followed a discovery course of the entire oil chain from the reservoir to the export point.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content 5 days

THE PRODUCTION CHAIN: FROM THE RESERVOIR TO THE EXPORT POINT 0.25 d
Field operations mapping.
Nature and characteristics of fluids accounted for.
Production specifications to conform with and quality requirements.
Field processing of well effluents: gathering network and surface production facilities.

PRODUCTION PLANNING USING CHOKE MODEL 0.75 d
Choke model (or Integrated Capacity Model) to define production potential and constraints.
Choke model overview: static and dynamic.
Review of typical choke model components (i.e. “chokes”); well production capacity factor, production facilities capacity factor.
Export facilities capacity factor. Commercial capacity factor.
Example of typical choke model reports.

WELL PRODUCTION CAPACITY FACTOR 1 d
Reservoir performance. Production profile:
Fundamentals of reservoir engineering.
Reserves definitions; reserves estimation and production profile.
Forecasting production performance: material balance, decline curves analysis. Water cut.
Well performance and operation:
Fundamentals of well completion and well performance.
Well potential definition through well deliverability nodal analysis.
Artificial lift methods and operation.
Fundamentals of well interventions and workovers.
Impact of field development activities: new wells/ tie-ins to gathering network, workover wells.
Impact of production operations activities: well interventions, maintenance.

PRODUCTION FACILITIES CAPACITY FACTOR 1 d
Surface processing of well effluents:
Fundamentals of oil processing/water processing/gas processing.
Review of main static- and rotating-equipment.
Analysis of typical process equipment design parameters and capacity constraints.
Maintenance management:
Introduction to the different types of maintenance: planned preventive, condition-based, predictive. Planned shutdowns.
Equipment criticality. Equipment availability: main equipment sparing philosophy and management of standby equipment.
Impact of preventive maintenance, planned shutdowns and inspection programs, upgrade programs on plant capacity.

EXPORT FACILITIES CAPACITY FACTOR 0.5 d
Oil terminal:
Functions of oil terminals: reception, oil storage, export.
Evaluation of terminal storage capacity, tanker loading planning.
Crude oil, natural gas and Natural Gas Liquids (NGLs) transport by pipeline:
Pipeline network. Boosting stations, typical design constraints.
Impact of third party on pipeline availability/ capacity constraints.

PERFORMANCE MONITORING & PRODUCTION REPORTING 1 d
Measures and metering systems along the chain:
Well measurements and production tests. Well tests planning and impact on well maximum production capacity.
Multiphase metering and indirect allocation systems.
Metering and allocation rules:
Fundamentals of metering systems (technology, accuracy, calibration & locations); fiscal metering.
Introduction to production accounting rules (based on API MPMS 20.1).
Technical material balances; data reconciliation, data architecture:
Liquid balances; oil balance, condensate balance, LPG balance, water balance.
Gas balances: dry gas and wet gas field cases.
Production KPI definition and monitoring.
Exercises: study of oil & condensate production report, study of gas production report.

PRODUCTION PLANNING & ANALYSIS CASE STUDY 0.5 d
For a given production facility:
Predict production through decline curve and performance analysis.
Establish chokes maximum production capacity to derive constrained production capacity.
Review integrated activity planning and establish choke model to plan production.
Reconstruct production balance and back-allocation.
Analyze actual production discrepancy with constrained production capacity.
Identify prioritize production opportunities on ‘well’, ‘facility’ and ‘export’ chokes.

Reference: PLANING-EN-P - Only available as an In-House course.
Contact: ep.contact@ifptraining.com
This course is also available in French: PLANING-FR-P. Please contact us for more information.
Production Accounting & Material Balance

Liquid & Gas Balances - Measures & Metering - Production Reporting

Level: KNOWLEDGE

Purpose

This course provides the fundamental knowledge for understanding production balance, linking relevant operations and production figures which impact issues such as transfer fee, exchange between fields, field use...

Audience

Managers, engineers, technical or non-technical staff involved in production reporting or material balance handling (assessing fee, value created, etc.).

Learning Objectives

Upon completion of the course, participants will be able to:

► establish production balance from basic data (well tests, process measurements, fiscal data),
► explain performance monitoring mechanisms and production reporting tools,
► assess impact of field operations on material balances,
► describe accounting and back allocation rules specific to process or production mode.

Ways & Means

► Highly interactive and applied course by industry specialist lecturers.
► Numerous illustrations and cases studies.

Learning Assessment

Assessment by test at the end of the course.

Prerequisites

In order to be able to follow this training, trainees are asked to fulfill at least one of the criteria below:

► either have an engineer level or equivalent,
► or proven professional experience in production operations or mass balance of at least 6 months,
► or to have followed a discovery course of the entire oil chain from the reservoir to the export point.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

THE PRODUCTION CHAIN FROM THE RESERVOIR TO THE EXPORT POINT 0.5 d

Field operations mapping.
Nature and characteristics of fluids accounted for.
Field processing of well effluent: surface facilities.
BFD studies.

MEASURES & METERING SYSTEMS ALONG THE CHAIN 0.5 d

Well measurements and production tests.
Metering systems and their location in the plant:
   Technology, accuracy, calibration.
   “Filter” concept of a metering system.
   Process metering.
   Transactional metering.
   Tank gauging.

LIQUID & GAS BALANCES 1.25 d

Production accounting rules.
PFD studies of Oil & Gas treatment units.
Gas balances: dry gas and wet gas field cases.
Case studies:
   Study of oil and condensate balances.
   Reconstruction of a natural gas and associated gas balance (Oil & Gas cap ring).

PERFORMANCE MONITORING & PRODUCTION REPORTING 0.25 d

CASE STUDY & PRODUCTION BALANCES RECONSTRUCTION: BACK ALLOCATION, SATELLITE FIELDS, MAIN PRODUCTION CENTERS 0.5 d

This course is also available in French: BILMAT-FR-P. Please contact us for more information.

Reference: BILMAT-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
Asset Integrity Management

Course Content

**ASSET INTEGRITY MANAGEMENT PROCESS**
0.5 d
Definition of risk, failure, reliability, availability of installations.
Concept and identification of major risk of equipment failure.
Measurement and follow-up of reliability.
Criticality, safety critical elements.

**CRITICALITY & RISK ASSESSMENT TOOLS**
1 d
Main models, failure probability, statistical functions.
FMECA and cause tree: areas of application, method principle, examples.
Identification of 3 groups: static equipment, dynamic equipment, and safety instrumented systems.
Understanding the functioning, the failure possibilities and the need for an adequate policy of operating condition maintenance.

**INSPECTION & TESTS**
1 d
Standards and regulations in force.
Inspection tools and techniques: non-destructive examinations, sampling.
Example of installation commissioning.

**CORROSION**
1 d
Definition of corrosion.
Elements of metallurgy.
Corrosion mechanisms.
Different types of corrosion.
Corrosion control methods.

**INSPECTION & MAINTENANCE BASED ON FAILURE RISK (RBI)**
1 d
Integrating Asset Integrity Management in the operating and maintenance policy.
Preventive, condition-based and predictive maintenance.
Maintenance and inspection based on failure risks.
Notion of life cycle cost.

**IMPLEMENTATION & CHALLENGE**
0.5 d
Safety and productivity objectives.
From outage management to equipment management.
Lowering the tolerance threshold to anomalies and involvement of the operators.
Need for general commitment: implementation of the Total Productive Maintenance.
Detailed preparation, planning, identification of critical operations.
Maintenance plans by equipment item and type of equipment.

Reference: INTEGRI-EN-P
Only available as an In-House course.
Contact: ep.contact@ifptraining.com

This course is also available in French: INTEGRI-FR-P. Please contact us for more information.
Turnaround Management

Course Content

5 days

**ROLES & REQUIREMENTS OF A TURNAROUND**
Frequency and duration of turnarounds, running rate of units, economic impact of a turnaround.

- Elements of maintenance policy.
- Turnaround constraints: legal obligations, safety, technical and economic reasons.
  - Pressure equipment operating constraints.
  - Note of lifetime cost of large machines.
- Maintenance works and new works – modifications – carried out during a turnaround.
- Compliance with the cost, deadlines, quality, environment and safety.

**PREPARATION OF A TURNAROUND**
Turnaround preparation team, organization chart, turnaround manager, definition of tasks and processes.

- Collection, analysis and preparation of work: written compilation of jobs, job process reviews.
- Equipment reservation, cost estimate and budget.
- Preparation of the logistics. Preparation of the specific spare parts and tools.
- Planning. Identification of the critical operations.
- Selection of trades, markets, integration of quality and safety in the call for tenders.
- Scope changes and closure of job requests (scope freeze).
- Effluent and waste management, safety and prevention, quality, QHSE manual.

**SCHEDULING & DELAYS CONTROL**
Concerns of the turnaround manager (pilotage, overview, key dates).

- Planning methods PERT, GANTT: Tracking task levels.
  - Calculation of task dates, at the earliest, at the latest.
  - Optimize work programs (work in parallel, avoid wasting time...).
- Concept of total and free margins. Identification of the critical path. Exercises.

**INSPECTION OF PRESSURE EQUIPMENT**
Effect of pressure and temperature.

- Metals, alloys and potential risks.
- Process fluid aggressiveness.
- Pressure equipment design and manufacturing.
- Legal orders: regulations on pressure equipment operation.

**OUTSOURCING & SUBCONTRACTING**
Definition, origins, interests, risks.

- Problems due to cascading subcontracting.
- Purpose, conditions for efficiency: Why outsourcing? Which abilities to be kept? How to keep control?
- Different types of contracts.

**WORKS EXECUTION, CONTROLS & AUDITS**
General principles of the works activity.

- Preliminary activities: scaffolding, worksite installation, drawings and documents.
- Permit issuance, management of recommendations, inspection.
- Follow-up of works progress: supervisors’ reporting to the planning manager, cost control.
- Worksite audits: communication and observation techniques, report and recommendations.
- Equipment closure and leak test.
- Unit preparation to re-startup: operation review, start-up acceptance, assistance to start-up.
- Commissioning organization.
- Production start-up organization and procedure.

**SAFETY IN WORKS**
Implementation of a HSE management system.

- HSE management of turnover and construction activities.
- Technical and safety worksite audits.
- Management of change.

**END OF WORKS & TERMINATION OF TURNAROUND**
Detail review, final acceptance.

- Turnaround report: inspection report, operation report...
- Turnaround manager’s report.
- Use of performance indicators and sharing of feedback.

---

Reference: TURNARO-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: TURNARO-FR-P. Please contact us for more information.

www.ifptraining.com
This course can be adapted to virtual classroom mode

**Fundamentals of Mechanical Maintenance**

**Level:** KNOWLEDGE

**Purpose**
This course aims to master the elements of language and understanding of mechanical systems, in terms of design, characterization, maintenance and repair. This will contribute to the maintenance follow-up, but also to the optimized operation of the static and dynamic mechanical systems (rotating machinery).

**Audience**
All technicians from the Oil & Gas industry who work in connection with equipment and mechanical systems (operation, maintenance) and who do not know the fundamentals of design of these systems (or who wish to deepen their knowledge). Jobs mainly concerned: mechanicals, mechanical assistants, mechanical supervisors.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- know the basics of technical drawing, characterize a part, a mechanical assembly.
- identify the different mechanical construction materials.
- know the fundamentals of mechanical system design, the main assemblies (bearing assemblies).
- know the main power transmission elements (gears, joints…), wisely use the metrology devices used in workshop.
- describe the mechanical strength, chemical resistance and thermal resistance.

**Ways & Means**
- Very interactive training given by highly experienced trainers.
- Gradual mechanical approach, from the dimensioning of a simple mechanical part to the design basis of a dynamic system such as a rotating machine.

**Learning Assessment**
Quiz.

**Prerequisites**
Provide evidence of a professional experience of at least 1 month related to the concerned field.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

**TECHNICAL REPRESENTATION OF PARTS & SIMPLE MECHANICAL SYSTEMS**

- Technical drawing agreement: 2D and isometric views, projections, section and cut-away views, perspectives, technical vocabulary.
- Dimensioning of parts and mechanical systems, ISO tolerancies and main adjustments.
- Dimensional tolerancies and clearance.
- Geometric tolerancies and surface condition characterization.
- Presentation of the tools in a metrology shop, performances and rules of use.

**Practical exercises:**
- Dimensioning and full geometric control of a pump shaft.
- Understanding of a simple machine cut-away view.
- Representation of a machine element in 2D projection and perspectives.

**ELEMENTS OF CONSTRUCTION**

- Materials used in the Oil & Gas industry: identification of the metals, alloys, plastics and composites, operating and maintenance rules.
- Expansion and effects on the assemblies.
- Manufacturing process of metallic parts, molding, forging.
- Frequent screwed, bolted, welded and stuck constructions.
- Characterization of threads and bores, petroleum thread pitch.
- Removable power transmission: keys, gears, hinged connections (joint…), cone interface.
- Non-removable power transmission: shrink fitting.
- Bearings: characterization, types, identification, assembly rules.
- Seals of static systems (between flanges) and dynamic systems (mechanical seals on bearing boxes), analysis and selection of the materials.
- Pipe, valves and main line accessories: identification, operation and maintenance rules.

**Practical exercises:**
- Selection, identification and assembly of the ball bearings in a simple process pump.

**ELEMENTS OF MAINTENANCE**

- Tightening: importance of torque, order, techniques.
- Alignment: understanding the operation, controlling the mating of piping.
- Lubrication: properties and characterization of common oil and greases, lubricating systems.
- Controlling the condition of parts at disassembly: corrosion, defaults, mating, wear, rupture.
- Controlling the clearances at disassembly.

**Practical exercise:**
- Mechanical completion of a pump on site (control and implementation).

**ELEMENTS OF REPAIR**

- Surface treatments and coatings.
- Overlay welding and reconstitution.
- Machining.
- Casing repair with staples.
- Expertise controlling: dye penetrant testing, metrology, ultrasonic, hardness testing.
- Test and requalification: balancing, test, control of performances.

---

**Reference:** GENMAIN-EN-A

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: GENMAIN-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

Pump Maintenance Workshop

Level: KNOWLEDGE

Purpose

This course aims to master the elements of language and to understand the mechanical systems, in terms of design, characterization and maintenance/repair and to remind or learn how to work on a pump, and more generally on a machine, in a workshop.

Audience

Technicians from the Oil & Gas industry in connection with equipment and mechanical systems (operation, maintenance) who wish to acquire best practices or to upgrade their knowledge about these systems.

Positions mainly concerned are: mechanics, mechanical work preparators, mechanical supervisors.

Learning Objectives

Upon completion of the course, participants will be able to:
- know the basics of technical drawing, characterize a part, a mechanical assembly,
- master the rules of the art of mechanical system design, identify the main assemblies such as bearing assemblies,
- know the main elements of power transmission (gears, gimbals...),
- wisely use the metrology instruments used in the workshop (use, performances, calibration),
- carry out a disassembly and assembly routing of a centrifugal pump – and more generally of a machine – by completing the dimensional and geometrical inspection required.

Ways & Means

- Very interactive course by highly experienced trainers.
- Practical work in the workshop.
- Stepwise approach, from the dimensioning of a simple part to the assembly in the workshop.

Learning Assessment

Written test and practical assessment in the workshop.

Prerequisites

Provide evidence of a professional experience of at least 1 month related to the concerned field.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

10 days

WEEK 1: APPLIED THEORY

OIL & GAS PUMP TECHNOLOGY 1.5 d

Centrifugal pumps - Functional approach
Step-by-step study of the main functions: process (impeller, wear ring, balancing, shape of the pump casing...); sealing: mechanical seal, typical arrangements (simple, double, dry seal), selection as per API 682 standard, materials, type; supporting (axial and radial, thrust bearing, plain bearing and anti-friction bearings); lubrication (oil and grease, mist, lubricating rings); monitoring and troubleshooting.
Step-by-step construction of a single-stage centrifugal pump.
Positive displacement pumps:
Different types of pumps: rotating and positive displacement pumps.
Operating principle and use of the different types of pumps.
Influence of the clearance, the internals leaks, and the type of product on the flowrate and pressure.
Monitoring and troubleshooting.
Specific choices:
- Driving systems.
- ATEX: material consequences.

FUNDAMENTALS OF MECHANICS 1.5 d

Standards of technical drawing: 2D and isometric views, projections, sectional and cutaway views, perspectives, technical vocabulary.
Dimensioning of parts and mechanical systems, ISO tolerances and main adjustments.
Dimensional tolerances and functional clearance.
Geometrical tolerances and surface conditions characterization.
Bearing design and assemblies.
Presentation of the tools in a metrology workshop, performances and rules of use.
Measurements with the caliper, comparators, micrometers.
Tutorials:
- Dimensioning and full geometrical inspection of a pump shaft.
- Understanding the cutaway view of a simple pump.
- Representation of a machine element in 2D projections and perspectives.

DISASSEMBLY, OVERHAUL & REASSEMBLY OF AN OVERHUNG CENTRIFUGAL PUMP 1 d

All the disassembly and reassembly stages step-by-step (routings).
Explanation of the metrological inspection.
Measuring diameters, runout.
Measuring functional clearances (expansion taken into account).
Seal inspection.

TECHNOLOGY OF ANTI-FRICTION BEARINGS & COUPLINGS 0.5 d

Description of the different bearings: description, internal clearances, mounting.
Lifespan: influence of the load, lubrication, humidity, clearances.
Lubrication.
Coupling used depending on the load and the machine speed.

MACHINE ALIGNMENT 0.5 d

Machine alignment techniques: comparators and lasers.
Calculations on practical cases.

WEEK 2: HANDS-ON ACTIVITIES IN WORKSHOP

HANDS-ON ACTIVITIES IN OUR WORKSHOPS WITH OUR TOOLS & METROLOGY INSTRUMENTS 5 d

Work on motor/pump block (asynchronous motor/overhung centrifugal pump) and work on double shaft centrifugal pump.
Receipt of a pump from the plant or the site (*)
Use of the technical file, maintenance routings and understanding of anything related to the schemes and information files: dimensions, adjustments, tolerances, functional clearance.
Identification of the spare parts (*)
Presentation of the tools in a metrology workshop, performances and rules of use.
Compliance with disassembling/assembly procedures.
Geometrical inspection of the piece of equipment.
Inspection of the condition of the elements and the wearing parts at disassembly: corrosion, defects, coupling, wear, rupture.
Inspection of clearances at disassembly.
Functioning and use of support equipment: bearing heating by induction, monochromatic light for mechanical seal inspection (*)...
Tests after repair and compliance with good practices.
Preparation of an intervention report.

For in-house courses, the above-described hands-on activities can be carried out in in-house workshops and on-site, on a piece of equipment to be repaired or overhauled, with in-house tools and metrological instruments.

(*) indicates activities that can only be performed in the case of an in-house course in in-house workshop.

Reference: PPMAIN-EN-A | Only available as an In-House course.
Contact: ep.contact@ifptraining.com
Compressors Maintenance

**Level:** SKILLED

**Purpose**
This course provides a better understanding of the technology, performance and maintenance of centrifugal and volumetric compressors.

**Audience**
Engineers and technicians involved in centrifugal and volumetric compressor maintenance or engineering. Employees in charge of maintenance running of the compression systems.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- describe the behavior and the technology of compressors,
- provide the maintaining solutions applied in their compression units,
- establish a diagnosis of the incidents and participate in the troubleshooting meetings.

**Ways & Means**
- Functional approach for a better understanding.
- Interactive course.
- Numerous examples and cases studies from the Oil & Gas production industry and analysis of manufacturer file.

**Learning Assessment**
Written test upon training course completion.

**Prerequisites**
Provide evidence of a professional experience of at least 1 month related to the concerned field.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

**TECHNOLOGY & OPERATION**

Centrifugal compressors:
- Different types of centrifugal compressors.
- Component parts and architecture of a centrifugal compressor.
- Technology of the essential components: stator, rotor, bearings, thrust bearing, seals.
- Vibrations, critical speed, dynamic balancing.
- Auxiliary equipment: lubrication system, buffer gas, balancing line…
- Safety parameters: axial displacement, vibrations, bearing and thrust bearing temperatures, oil pressure…

Reciprocating compressors:
- Different types of reciprocating compressors.
- Component parts and architecture of a reciprocating compressor.
- Technology of the essential components: cylinder, piston, valves, sealing systems, crankshaft, connecting rod…
- Auxiliary equipment: lubrication of motion parts and cylinders, cooling interstage and cooling devices systems, connections to the flare.

Rotary compressors:
- Different types: screw, liquid ring, lobes, sliding vanes…
- Component parts and architecture of a rotary compressor.
- Auxiliary equipment: lubrication system.
- Typical using.

**MAINTENANCE (preventive, conditional, corrective)**

Preventive maintenance: systematic actions, routine, alignment…
Conditional maintenance: vibrations measurement, oil of lubrication analysis, thermography…
Corrective maintenance: mounting, dismounting, metrology, repairing technics.

**ANALYSIS OF A MANUFACTURER DATABOOK**

Data sheet.
Technologic choices.
P&ID reading.

**TROUBLESHOOTING**

Failure and incidents: surge, slugging, over limits functioning…

---

Reference: COMPMAI-EN-P
This course is also available in French: COMPMAI-FR-P Please contact us for more information.

Contact: ep.contact@ifptraining.com

Only available as an In-House course.
Advanced Certificate
Maintenance Management Certification

Course Content

**Level: SKILLED**

**Purpose**

This certifying course aims to bring elements related to the implementation of a modern and adapted maintenance policy (such as the risk-based maintenance policy), to define a continuous improvement of reliability, to consider failure direct and indirect costs, to be able to manage maintenance contracts as well as unit shutdowns or turnarounds.

**Audience**

Maintenance engineers and managers from process industries, as well as production managers concerned by operation costs and equipment management.

**Learning Objectives**

Upon completion of the course, participants will be able to:

- know the proven maintenance policies (TPM, RCM, RBM, key performance indicators, preventive maintenance tools…) in order to be able to set goals in terms of company global efficiency,
- implement reliability measurement, analysis and improvement techniques (reliability indicators, assessment matrix, failure tree, FMECA, Pareto, Weibull, …),
- know the necessary elements to define a subcontracting policy as well as to efficiently manage shutdowns,
- through various unexpected group exercises, to remind that multidisciplinary and reactivity are part of maintenance managers' jobs.

**Ways & Means**

- Applications and case studies illustrating the techniques studied,
- Active pedagogy based on participants' experiences,
- Short scenarios of the most frequent and the most serious key equipment failures, proposed by the trainer and analyzed by the group. Participants shall use their technical knowledge, reasoning skills, multidisciplinarity and operational capabilities.

**Learning Assessment**

- Entry test at the beginning of the course.
- Final written assessment upon course completion.

**Prerequisites**

- Entry test at the beginning of the course.
- Final written assessment upon course completion.

**Why an IFP Training Certification?**

- An international recognition of your expertise.
- An Advanced Certificate delivered.
- An expertise confirmed in Maintenance Management Certification.
- Ready-to-use skills.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

<table>
<thead>
<tr>
<th>5 days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MAINTENANCE POLICY &amp; OBJECTIVES</strong></td>
</tr>
<tr>
<td>Integration of the maintenance policy to the plant policy. Financial, technical and workforce objectives. Current methods and trends: criticality analysis, TPM, RCM, RBM, maintenance program optimization based on criticalities (redundancy, utilization rate, impact on production, age…), risk analysis, local conditions. Different types of maintenance and respective importance: planned preventive, condition-based, predictive, corrective. Importance of condition-based and predictive maintenances in modern maintenance policies, and particularly data importance (from SAP, PI, site report, root causes…) for the use of efficient methods (RED, e-monitoring…). Application of the methods studied: criticality ranking, emergency levels, spare parts management.</td>
</tr>
</tbody>
</table>

| 1 d |
| **RELIABILITY MEASUREMENT & FOLLOW-UP** |
| Descriptive statistics: reliability and reliability indicators, equipment performance monitoring in terms of availability, MTBF, MTTR… Statistical functions and their applications to preventive maintenance. Main models, application to the search for preventive control optimization, equipment redundancy studies, standby equipment management. Pareto law, identification of bad-actors. |

| 1 d |
| **RELIABILITY ANALYSIS & IMPROVEMENT METHODS** |
| FMECA (Failure Modes, Effects and their Criticality Analysis). Areas of application, basic techniques, probability assessment, common methodological errors. Action plan. Failure trees, method principle. RCM - Overall policy. Interest of the decision logics. TPM - Total Productive Maintenance (global involvement to maintain the production tool). Concept of asset integrity management as a SECE (Safety and Environment Critical Element). Concept of machine learning: failure prediction by accumulation and cross analysis of process and equipment data. |

| 1 d |
| **MAINTENANCE COSTS & FAILURE COSTS** |
| Overall failure costs versus direct costs (materials, spare parts, repair contractors…) and indirect (shortfall in production or injection, quality defect, reputation…). Notion of cost efficiency: overall effectiveness, adaptation to petroleum industry and practical calculations. Life Cycle Cost (LCC): Application to the choice of investments; application to the search for optimum equipment life duration. Spare parts management. Cost of inventory. Unsuitability of some conventional stock management calculations, cost of risk. Computerized maintenance management. System (CMMS) and related processes. |

| 0.5 d |
| **IMPROVEMENT PLANS** |
| From failure management to equipment management. Lowering the tolerance threshold to defects and operators' involvement. Maintenance plans by equipment item and equipment type. |

| 0.5 d |
| **OUTSOURCING & SUBCONTRACTING** |

| 0.5 d |
| **SHUTDOWN MANAGEMENT** |

| 0.5 d |
| **TROUBLESHOOTING** |
| The trainer regularly proposes short operational scenarios that are analyzed by the group. These are related to practical problems that maintenance managers may face on an Oil & Gas site (pump cavitation, compressor pumping, a defect on a control loop or safety system…). To solve these problems, participants must use their technical knowledge, reasoning skills, multidisciplinarity and operational capability. |

Reference: GESMAIN-EN-P

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>25 October</td>
<td>29 October</td>
<td>€3,680</td>
</tr>
</tbody>
</table>

This course is also available in French: GESMAIN-FR-P. Please contact us for more information.
This upstream maintenance engineer certification course is designed for professionals looking to develop their expertise and experience in the oil and gas industry. It covers a wide range of topics, from technology and maintenance of static equipment to the practical application of new knowledge in various maintenance scenarios.

**Course Content**

- **WELL EQUIPMENT & WELL EMISSIVE TREATMENTS**
  - 2 days
  - Notions of drilling/completion. Artificial lift: pumping, gas lift. Oil field processing (stabilization, dehydration, sweetening) and water processing (production and injection water). Gas processing and conditioning (dehydration, sweetening).

- **TECHNOLOGY & MAINTENANCE OF STATIC EQUIPMENT**
  - 3 days
  - Wellhead, pipe, fittings and line equipment, safety valve, pressure vessel. Thermal equipment: heat exchangers, boilers, heaters, condensers. Standards, design, operation, inspection, maintenance. PFD, P&ID, isometric drawings.

- **TECHNOLOGY & MAINTENANCE OF PUMPS**
  - 5 days
  - Pumping fundamentals (pressure, flow rate, conservation of energy, mechanical and hydraulic powers…). Dynamic pumps. Functional approach: different types of dynamic pumps and integration into the processes; generic functional study (process, sealing, supporting/ guiding, lubrication). Positive displacement pumps: different types (piston pumps and rotary pumps); operating principles, influence of the clearance, internal and external leak, impact of the type of product on the flow rate and pressures.
  - Preventive maintenance, condition-based maintenance (measurement of vibrations, oil analysis, thermography), corrective maintenance (troubleshooting and repair techniques). Analysis of manufacturer folders and P&ID.

- **PRACTICE IN MECHANICAL WORKSHOP**
  - 5 days

- **TECHNOLOGY & MAINTENANCE OF COMPRESSORS**
  - 5 days

- **TECHNOLOGY & MAINTENANCE OF DRIVING MACHINES**
  - 5 days

- **COMMON ELEMENTS OF MACHINES & STRUCTURES**
  - 5 days
  - Moving part lubrication: grease, oil (designations, characteristics). Pressurized and bubbled lubrication, sealing rings. Rotors and shafts: balancing (unbalance, eccentricity, balancing class) and shafts geometric alignment. Roller bearings (designation, internal clearances, assembling rules), plain bearings (calculations, incidents, instability) and magnetic bearings. Shaft output seals: braded packings, mechanical seals (functioning, description of the different types, conditions of stability, auxiliaries); P&ID study of a complex mechanical seal, of a centrifugal compressor. Couplings and alignment. Machine shaft alignment techniques. Corrosion: main types. Corrosion prevention and basics of inspection.

- **TECHNOLOGY & MAINTENANCE OF ELECTRICAL EQUIPMENT**
  - 5 days
  - Sources of electrical power (alternator, generator) and motors (alternate and direct current): functioning, technology, operation, maintenance, safety. Electrical power distribution and networks: constitution of HV and LV networks, distribution philosophy, control and protection elements, transformers, circuit breakers; redundancy of sources and supply means. Earthing and neutral systems. Protection against the electrical risks and hazardous areas and ATEX standards.

- **INSTRUMENTATION, CONTROL, SAFETY INSTRUMENTED SYSTEMS**
  - 5 days

- **HSE DURING MAINTENANCE WORKS**
  - 5 days
  - Identification of the hazards and specific risks on site, in maintenance situation. Job safety analysis procedures and steps, permit to work. Audits and improvement of HSE performance. Safety in construction and maintenance works (lifting and rigging, sand blasting, test, works on electrical equipment, in confined spaces, welding…). HSE management system: SImultaneous OPerations (SIMOPS), management of changes, downgraded situation, human factors.

**Prerequisites**

- Engineering degree or equivalent experience in the Oil & Gas industry.

**Why an IFP Training Certification?**

- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Upstream Maintenance Engineer Certification.
- Ready-to-use skills.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.
This course can be adapted to virtual classroom mode - Vocational Certificate

Maintenance Supervisor Certification

Course Content

35 days

**FUNDAMENTALS OF OIL & GAS PRODUCTION**
Fundamentals of chemistry: atoms, molecules, atomic weight, molecular weight.
Hydrocarbons types and main characteristics.
Applied physics: force, work and energy, temperature, thermal energy and heat transfer, pressure, hydrostatics, hydraulics and friction losses.
Well effluent: composition, types and characterization parameters.
Liquid-vapor equilibrium of pure components and mixtures.
Well effluents behavior. Need for effluents field processing. Specifications.

**FUNDAMENTALS OF MECHANICAL MAINTENANCE**
5 d
Technological representation of parts and simple mechanical systems: technical drawing and vocabulary (2D views, projections, section and cut-away views, perspectives); dimensioning, tolerances, main adjustments, surface conditions; tools of metrology, performances and rules of use.
Elements of construction: metals, alloys, plastics and composites, operating and maintenance rules; screwed, bolted, welded and stuck constructions; bearings, seals. Pipe, valves and main line accessories.
Elements of repair: surface treatments and coatings; overlay welding and reconstitution; test and requalification.

**MAINTENANCE & INSPECTION OF ROTATING MACHINERY**
(in mechanical workshop)
10 d
General characteristics and technology of rotating machines: reliability, technological descriptions, operating parameters, characteristics; effect of external process parameters; composition of the products, modified suction or discharge conditions; stresses in normal operation and in abnormal conditions, operating limits; influence on the machine lifespan, general operating rules; effect on reliability, associated risks.
Technology and maintenance of the common elements: ball bearings, hydrodynamic bearings, magnetic bearings; sealing systems; balancing: imbalance, eccentricity, balancing class; coupling and alignments; lubrication.
Inspection and failure forecast: diagnosis, functioning point, checking the performance, detection of failure by vibrations and oil analysis; fundamentals of inspection; friction and materials, roughness, surface conditions, fretting corrosion, main rupture modes (stress, fatigue, impact, creep...).

**INSTRUMENTATION, PROCESS CONTROL & SAFETY INSTITURED SYSTEMS**
5 d
Sensors and transmitters: measurement of operating parameters, measurement uncertainties; physical principles, technologies, units of measurement, local reading/transmission; transmitter technology; preventive maintenance.
Controllers and actuators: control valves (technology, types of valves, characteristic curves, safety position); positioners: principle of operation, types; ON/OFF valves: types, technology. Special ON/OFF valves: SDV, ESDV, BDV.
Controllers and control loop structures: behavior of a P&ID controller: operating point, gain, interactions...; control loops: simple, cascade and split-range.
Distributed Control Systems (DCS): architecture, security/redundancy; alarms, history, newspapers.
Safety Instrumented Systems (SIS): safety loop and safety functions, Safety Integrity Level; high Integrity Protection Systems (HIPS), Emergency Shutdown (ESD), Emergency DePressurization (EDP); Fire & Gas system (F&G).

**ELECTRICAL EQUIPMENT & POWER DISTRIBUTION NETWORK**
5 d
Electricity generation: gas turbine, alternator; monitoring and maintenance of the equipment, troubleshooting.
Electrical distribution and networks: HV and LV networks, architectures and equipment, distribution philosophy, differential protection; switchboards and switchgears, transformers, circuit breakers, protection and isolation elements, batteries; equipotential networks, earthing.
Electric motors: functioning and operation of AC and DC electric motors, windings coupling, adjustment to site conditions; routine monitoring, troubleshooting, starting systems, variable speed systems, maintenance.
Protection against electrical risks (as per the UTE C-18 510): hazards, voltage levels, safe approach distances, operating conditions; tools of metrology, performances and rules of use.
Protection against electrical risks: measurement of operating parameters, measurement uncertainties; physical principles, technologies, units of measurement, local reading/transmission; transmitter technology; preventive maintenance.

Ways & Means

- Lecturing by industry specialists.
- Team work exercises.
- Course sessions in relation with practical exercises and case studies.
- Mechanical workshops.

Learning Assessment

HSE
Continuous assessments all-along the program.

Prerequisites

Experience in Oil & Gas production facilities operation and maintenance.

Why an IFP Certification Training?

- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in Maintenance Supervisor Certification.
- Ready-to-use skills.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: MAINSUP-EN-A
Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com

This course is also available in French: MAINSUP-FR-A. Please contact us for more information.
**Maintenance Superintendent Certification**

**Course Content**

**58 days**

**INTRODUCTION**
Welcome and program overview. Entry test. Units. Dimensions.

**DOWNHOLE PRODUCTION - WELL PERFORMANCE - PRODUCTION FUNDAMENTALS**

**OIL, WATER & GAS PROCESSING**
Oil processing; required specifications; stabilization; dehydration, desalting. Production and injection water treatment; why a water treatment; expected qualities and required treatments; operating conditions. Gas processing; required specifications; dehydration; hydrates, consequences and treatments; Natural Gas Liquids recovery. Work on study cases to detail processes and concerns.

**OFFSHORE DEVELOPMENTS, FLOW ASSURANCE**

**TERMINAL, FSO & FPSO**
Overview of oil terminals. FSO & FPSO technologies. Metering of oil quantities.

**BEHAVIORAL MANAGEMENT**
Teamwork management, written and oral communication. Active listening and communication tools. Team cohesion and stress management. Problems analysis and investigation: tools and behaviors. How to better analyze and know oneself.

**INSTRUMENTATION & PROCESS CONTROL - ELECTRICITY**
Instrumentation and process control: functional blocks, symbolization; pneumatic, electrical and digital technologies; measurements, sensors, security equipment; control equipment, actuators; controllers and control loops; Distributed Control System (DCS); architecture, connections; Safety Instrumented Systems (SIS); HIPS, ESD, EDP, FGS. Electricity: generation (turbines, alternators, monitoring, troubleshooting); distribution (HT-BT networks, power supply, stability, constituents, cabinets, transformers, batteries, isolation, protections).

**ROTATING MACHINERY (in mechanical workshop)**
Pumps: pumping prerequisites: pressure, flowrate, head; centrifugal pumps: types, technology, auxiliaries, performances; volumnetric pumps. Compressors: compression prerequisites: technology, auxiliaries, practical laws; centrifugal compressors: rotor, stator, bearings, shafts, seals balance; reciprocating compressors: frame, cylinders, pistons and rings, bearings, lubrication, cooling. Gas turbines: operating principles, compression, combustion, expansion, performances; technologies: compressor, combustion chamber, turbine, internal cooling; auxiliaries. HSE concerns. Technology and maintenance of the elements: bearings (ball, hydrodynamics, magnetic); shaft outlet sealing systems: braided and mechanical seals; rotors and shafts: balancing, geometric control; coupling and alignments: types, stresses; diagnostics from process, vibration or oil analysis data; wear and rupture phenomena.

**CORROSION, INSPECTION & INTEGRITY**
Corrosion mechanisms. Types of corrosions in the Oil & Gas industry. Corrosion prevention and monitoring, fundamentals of inspection.

**MAINTENANCE MANAGEMENT - EQUIPMENT AVAILABILITY CONTROL**

**HSE RISKS & MANAGEMENT**

**REVISIONS - ORAL ASSESSMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>8 September</td>
<td>1 December</td>
<td>€42,620</td>
</tr>
</tbody>
</table>

Reference: MAINSI-EN-P. Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

This course is also available in French: MAINSI-FR-P. Please contact us for more information.
Surface Facilities Engineering

- **Process Engineering**
  - Oil & Gas Process Engineering Certification ................................................................. p. 238
  - Advanced Oil & Gas Process Engineering Certification ........................................................ p. 239
  - Advanced Oil & Gas Field Processing Certification .......................................................... p. 240
  - Module 1: Thermodynamics Applied to Well Effluent Processing .................................... p. 241
  - Module 2: Oil & Water Processing .................................................................................... p. 242
  - Module 3: Gas Processing & Conditioning ....................................................................... p. 243
  - Oil & Gas Process Simulation ......................................................................................... p. 244
  - Gas Sweetening & Sulfur Recovery .................................................................................. p. 245
  - Technical Standards for Surface Facilities Design .............................................................. p. 246

- **Static Equipment**
  - Process Equipment Engineering ..................................................................................... p. 247
  - Flare Network Design Engineering ................................................................................. p. 248

- **Electricity & Instrumentation**
  - E&I Technology for Oil & Gas Facilities .......................................................................... p. 249

- **Maintenance & Inspection**
  - Corrosion Prevention in Oil & Gas Production ................................................................ p. 250
  - Maintenance & Inspection of Static Equipment ................................................................. p. 251
# Oil & Gas Process Engineering Certification

This course can be adapted to virtual classroom mode - Graduate Certificate

## Course Content

**Thermodynamics Applied to Well Effluent Processing**

5 d

**Oil & Water Treatment**

5 d

**Gas Processing & Conditioning**

5 d

**Dynamic Simulation of Oil & Gas Processing Facilities**

5 d
- During this week, case study and exercises are performed using a dynamic simulator replicating a DCS environment in order to allow the participants to understand process dynamics: analysis of wellhead pressure/temperature variations choke valve tuning, hydrates detection and inhibition; crude oil processing (study of operating parameters on oil stabilization, dehydration and desalting); gas dehydration (impact of TEG operating conditions); multistage gas compression and export: effect of operating parameters.

**Piping Systems & Process Equipment: Sizing & Operation**

5 d

**Gathering & Distribution Systems Design - Flow Assurance**

5 d

**Instrumentation, Process Control, Automation & Electrical Systems**

5 d

**Rotating Equipment - Technology, Selection & Operation**

5 d
- Fundamentals of pumping circuits and gas compression. Operating principles, technology, selection criteria, performances and operating conditions of centrifugal and volumetric pumps; centrifugal and reciprocating compressors; gas turbines; turbo-expanders.

**Oil & Gas Processing Facilities Troubleshooting**

5 d

**Safety Engineering Case Studies**

5 d
- Main safety engineering studies: HAZOP and HAZOP workflow and application; plant layout case study; QRA; consequence analysis methodology.

**Process Development Project - Jury**

10 d
- During this final project, participants will be required to design a process, simulate it, evaluate its performances with reference to various production scenarios, select and size associated key equipment. This 10-day teamwork project is real case study based on actual data. Participants are coached throughout the project to produce the required deliverables, which are to be presented on the last day (jury): process design and simulation; main equipment sizing; heat and mass balance; fuel gas requirements; HAZOP and plant layout.

---

**Reference:** OGPROC-EN-A  |  **Contact:** ep.contact@ifptraining.com

[This course is also available in French: OGPROC-FR-A. Please contact us for more information.]
This course can be adapted to virtual classroom mode - Advanced Certificate

Advanced Oil & Gas Process Engineering Certification

Level: SKILLED

Purpose

The program proposed hereafter aims at providing an advanced knowledge of and industry best practices in Oil & Gas processing and in management.

Audience

Senior process engineers involved in Oil & Gas field processing facilities engineering seeking to acquire advanced knowledge in process and equipment design and operation.

Learning Objectives

Upon completion of the course, participants will be able to:

- support oil, gas and water field processing plant and equipment,
- participate to troubleshooting studies,
- review, comment and validate engineering documents (process and equipment datasheets, safety engineering results),
- lead a project according to project management best practices,
- efficiently manage a team.

Ways & Means

- Highly interactive training by industry-specialist lecturers.
- Numerous case studies, applications, illustrations and teamwork sessions.

Learning Assessment

Continuous evaluation.

Prerequisites

At least 10 years of experience as process, production or site engineer.

Why an IFP Training Certification?

- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Advanced Oil & Gas Process Engineering Certification.
- Ready-to-use skills.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>OVERVIEW OF OIL &amp; GAS FIELD PROCESSING</td>
<td>2 d</td>
</tr>
<tr>
<td>Module 2</td>
<td>EQUIPMENT DESIGN &amp; OPERATION</td>
<td>6 d</td>
</tr>
<tr>
<td>Module 3</td>
<td>CORROSION MANAGEMENT IN OPERATION</td>
<td>1 d</td>
</tr>
<tr>
<td>Module 4</td>
<td>PROCESS CONTROL &amp; SAFETY</td>
<td>4 d</td>
</tr>
<tr>
<td>Module 5</td>
<td>PROCESS DESIGN DOCUMENTS VERIFICATION METHODOLOGY</td>
<td>2 d</td>
</tr>
<tr>
<td>Module 6</td>
<td>PROCESS TROUBLESHOOTING METHODOLOGY</td>
<td>2 d</td>
</tr>
<tr>
<td>Module 7</td>
<td>TROUBLESHOOTING EXERCISES</td>
<td>3 d</td>
</tr>
<tr>
<td>Module 8</td>
<td>HAZID, HAZOP &amp; QRA REVIEW METHODOLOGY</td>
<td>4 d</td>
</tr>
<tr>
<td>Module 9</td>
<td>PLANT LAYOUT &amp; GAD REVIEW</td>
<td>2 d</td>
</tr>
<tr>
<td>Module 10</td>
<td>PROJECT MANAGEMENT</td>
<td>3 d</td>
</tr>
<tr>
<td>Module 11</td>
<td>TEAM MANAGEMENT &amp; TEAM LEADING</td>
<td>6 d</td>
</tr>
</tbody>
</table>

Reference: OGADV-EN-A Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: OGADV-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode - Advanced Certificate

Advanced Oil & Gas Field Processing Certification

**Level:** SKILLED

**Purpose**
This course aims to deepen understanding of Oil & Gas field processing techniques.

**Audience**
Engineers involved in operating or designing Oil & Gas field processing facilities.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- Understand main thermodynamic transformations involved in Oil & Gas processing.
- Grasp a comprehensive picture of Oil & Gas processing facilities.
- Simulate main Oil & Gas facilities.
- Master operating variables and conditions of processing facilities.

**Ways & Means**
- Highly interactive training with industry-specialist lecturers.
- Numerous applications and illustrations.
- Extensive practice of PRO/II™ process simulation software: a case study will be developed all along these 3 weeks (simulation of a crude oil and associated gas treatment process).

**Learning Assessment**
Assessment by test at the end of each module.

**Prerequisites**
Engineer degree or equivalent experience in Oil & Gas industry.

**Why an IFP Training Certification?**
- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Advanced Oil & Gas Field Processing Certification.
- Ready-to-use skills.

**More info**
This course is a combination of three separate modules. Refer to next pages for detailed content.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

**Module 1: THERMODYNAMICS APPLIED TO WELL EFFLUENT PROCESSING**
Well effluent.
Ideal and real fluid behavior.
Liquid-vapor equilibrium of pure substances:
- Vapor pressure curves.
- Enthalpy diagrams.
- PRO/II™ simulation exercises.
Liquid-vapor equilibrium of mixtures - Mixture separation processes:
- Phase envelopes.
- Flash, distillation, absorption, stripping.
- PRO/II™ simulation exercises.
Heat transfer, heat balance and thermal equipment.

**Module 2: OIL & WATER TREATMENT**
Need for field processing of oil - Quality requirements.
Crude oil treatment:
- Crude stabilization.
- Crude dehydration.
- Acid crude sweetening.
- Crude oil treatment process simulation using PRO/II™.
Storage tanks: technology, operations and maintenance.
Production water treatment:
- Regulation for disposal.
- Main treatments.
Injection water treatment:
- Quality requirements.
- Main treatments.

**Module 3: GAS PROCESSING & CONDITIONING**
Need for field processing of gas - Quality requirements.
Gas processing:
- Gas dehydration.
- Gas sweetening.
- NGL extraction.
- Simulation of a gas processing chain using PRO/II™.
Liquefied Natural Gas (LNG).

Reference: ADV-EN-A
This course is also available in French: ADV-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com
Module 1: Thermodynamics Applied to Well Effluent Processing
Fluid Behavior - Mixture Separation - Gas Compression

Level: SKILLED

Purpose
This course provides a thorough understanding of thermodynamics principles underlying operation and design of Oil & Gas processing facilities.

Audience
Engineers involved in operating or designing Oil & Gas field processing facilities.

Learning Objectives
Upon completion of the course, participants will be able to:
- describe Oil & Gas well effluents composition, properties and characteristics,
- grasp ideal gas law, real fluid behavior and characterization methods,
- explain liquid-vapor equilibrium of pure substances and mixtures,
- master the operating principles and performances of mixture separation processes,
- perform simulations with PRO/II™ and master the fundamentals of equations of state.

Ways & Means
- Highly interactive training with industry-specialist lecturers.
- Numerous applications and illustrations.
- Extensive practice of PRO/II™ process simulation software.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
Engineer degree or equivalent experience in Oil & Gas industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

WELL EFFLUENT
- Constitution and physical states of matter.
- Constituents of well effluents: hydrocarbons, impurities, water, sediments…
- Different types of effluents: black oil, light oil, volatile oil, condensate gas, dry gas…
- Characterization parameters: GOR, CGR, BSW, WOR, water cut, Bo, Bg, B’g…
- Examples of compositions of crude oil and natural gas effluent.

LIQUID-VAPOR EQUILIBRIUM OF PURE SUBSTANCES
- Pressure curves.
- Overall phase diagram of a pure substance (three dimensions: P, T, and V).
- Enthalpy diagrams of pure substances.
- Exercises: vapor pressure and boiling points of pure components; vapor pressure and boiling point; case of a column.
- PRO/II™ simulation: propane cryogenic loop; operating parameters optimization; effect of ambient conditions.

LIQUID-VAPOR EQUILIBRIUM OF MIXTURES - MIXTURE SEPARATION PROCESSES
- Phase envelopes.
- PRO/II™ simulation: phase envelope of well effluents, sales gas, stabilized crudes.
- Well effluents behavior from pay zone to surface processing facilities.
- PRO/II™ simulation: evolution of the effluent behavior in a well.
- Techniques applied to mixture separation: flash process, distillation process.
- Absorption and stripping phenomena.
- PRO/II™ simulation: LPG recovery by physical absorption; mixture separation by distillation (LPG splitter).

IDEAL GAS & REAL FLUID BEHAVIOR
- Ideal gas behavior.
- Behavior of real fluids: compressibility factor, Amagat’s law, law of corresponding state with two and three parameters.
- Equations Of State (EOS): conception, uses, examples, selection.

HEAT TRANSFER, HEAT BALANCE & THERMAL EQUIPMENT
- Fundamentals of heat transfer.
- Heat balance.
- Technology of heat exchangers and air coolers.
- Examples of thermal equipment applications.

Reference: ADV1-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>13 September</td>
<td>17 September</td>
<td>€3,980</td>
</tr>
</tbody>
</table>

This course is also available in French: ADV1-FR-P. Please contact us for more information.
Module 2: Oil & Water Processing
Sizing - Simulation - Operation

Level: SKILLED

Purpose
This course provides a comprehensive understanding of oil and water treatment processes, operation and troubleshooting.

Audience
Engineers involved in operating or designing oil and water field processing facilities.

Learning Objectives
Upon completion of the course, participants will be able to:
- list various problems that can be induced by unwanted elements and compounds in crude oil streams,
- master oil and water treatment processes, operations and related operating conditions,
- design main equipment used for oil processing,
- troubleshoot main operating problems encountered in oil and water processing and related solutions,
- simulate crude oil treatment processes using the PRO/II™ software,
- describe technology, operating principles and maintenance of storage tanks.

Ways & Means
- Highly interactive training with industry-specialist lecturers.
- Numerous applications and illustrations.
- Extensive practice of PRO/II™ process simulation software.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
To attend Module 1 or engineer degree or equivalent experience in Oil & Gas industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

NEED FOR OIL FIELD PROCESSING - QUALITY REQUIREMENTS
0.25 d
- Constituents raising problems for storage, transport, or crude oil sale.
- Different specifications and quality requirements of crude oils.
- Necessary treatments to reach these specifications.
- Examples of compositions of commercialized crude oils.

CRUDE OIL TREATMENT
2.75 d
- Crude stabilization by Multi Stage Separation (MSS):
  - Process principle.
  - Operating parameters: number of separation stages, pressures, heating and cooling needs... - Influence on the quantity and quality (API grade) of the produced oil.
  - Foaming problems and main available solutions.
  - Associated gas recompression - Typical associated gas compression schemes.
  - Applications: practice of separator summary design methods.
  - PRO/II™ simulation: study of the influence of separation stage number on the performances of a MSS process.
- Crude dehydration and desalting:
  - Emulsion problems.
  - Main dehydration processes.
  - Crude oil desalting.
  - Applications: practice of desalter summary design methods.
- Acid crude sweetening (H₂S removal):
  - Cold stripping: origin of stripping gas, need for sweetening of stripping gas.
  - Hot stripping.
  - Applications: practice of stripping column summary design methods.
  - PRO/II™ simulation: simulation of a crude oil stripping units case study.
- Case study: simulation of a whole crude oil field treatment plant; study of an offshore crude oil field treatment unit, based on a Multiple Stage Separation (MSS) process scheme; optimization of the operating parameters.

STORAGE EQUIPMENT
0.5 d
- Atmospherics tanks.
- Case of floating storage vessels (FSO, FPSO).
- Maintenance and operation.

PRODUCTION WATER TREATMENT
0.5 d
- Regulations for disposal.
- Main treatments. Operating principle and required performances.
- Comparison of the different available techniques. Selection criteria.
- Examples of production water treatment block flow diagrams.

INJECTION WATER TREATMENT
1 d
- Reasons for water injection.
- Quality requirements and necessary treatments.
- Main operating conditions of each treatment and required performances.
- Examples of injection water treatment block flow diagrams.

Reference: ADV2-EN-P
Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>20 September</td>
<td>24 September</td>
<td>€3,980</td>
</tr>
</tbody>
</table>

This course is also available in French: ADV2-FR-P. Please contact us for more information.
Module 3: Gas Processing & Conditioning

Sizing - Simulation - Operation

Level: SKILLED

Purpose

This course provides a comprehensive understanding of gas treatment processes, operation and troubleshooting.

Audience

Engineers involved in operating or designing gas field processing and conditioning facilities.

Learning Objectives

Upon completion of the course, participants will be able to:

- assess various problems induced by unwanted elements in natural gas streams,
- master gas treatment and liquefaction processes, operations and related operating conditions,
- perform hand calculations for summary design of main gas processing equipment,
- ascertain main operating problems encountered in gas processing, conditioning and related solutions,
- simulate natural gas treatment processes using the PRO/II™ software.

Ways & Means

- Highly interactive training by industry-specialist lecturers,
- Numerous applications and illustrations,
- Extensive practice of PRO/II™ process simulation software.

Learning Assessment

Assessment by test at the end of the course.

Prerequisites

To attend Module 1 or engineer degree or equivalent experience in Oil & Gas industry.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

### NEED FOR FIELD PROCESSING OF GAS - QUALITY REQUIREMENTS
0.25 d

Constituents raising problems for storage, transport or end use of natural gas.
Different specifications and quality requirements for natural gas.
Necessary treatments to conform these specifications.
Examples of compositions of commercialized natural gases.

### GAS DEHYDRATION (drying) & HYDRATE FORMATION INHIBITION
1.25 d

System behavior. Moisture content of a saturated gas:
Applications: moisture content of different gases of various compositions.
Hydrate formation inhibition by injection of inhibitors: MeOH, MEG, DEG, LDHI…
Gas dehydration processes: TEG units, molecular sieves…
Application: summary design of TEG unit.
PRO/II™ simulation: simulation of TEG unit.

### GAS SWEETENING: REMOVAL OF ACID COMPONENTS (H2S and/or CO2)
0.75 d

Overview of the techniques dedicated to gas sweetening:
- Chemical solvent processes. Amine units (MEA, DEA, DGA, MDEA…).
- Physical solvent processes.
- Hybrid (physico-chemical) solvent processes.
- Overview of other techniques.
Conversion of H2S: sulfur production (CLAUS process) and tail gas processing.
Application: summary design of an amine unit.

### NATURAL GAS LIQUIDS (NGL) EXTRACTION (removal of heavy components)
0.75 d

- External refrigeration loop.
- Joule-Thomson expansion.
- Turbo-expander.
Application: calculation of cryogenic loop used for extraction.
PRO/II™ simulation: simulation of NGL extraction unit - Process selection.

### CASE STUDY: SIMULATION OF A WHOLE NATURAL GAS FIELD PROCESSING PLANT
1 d

Study of a natural gas dehydration, NGL extraction and compression unit.
Optimization of the operating parameters.
Analysis of hydrate formation risks.

### LIQUEFIED NATURAL GAS (LNG)
1 d

Liquefaction processes: operating principle, typical operating conditions, technology of specific equipment (plate fin heat exchangers, spiral-wound heat exchanges, refrigeration loop compressors…), power consumption…
LNG storage and transport: storage tanks, LNG carriers, jetty, loading arms…
Safety considerations specific to natural gas liquefaction plants.
Industrial examples of natural gas liquefaction units.

Reference: ADV3-EN-P

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>27 September</td>
<td>1 October</td>
<td>€3,980</td>
</tr>
</tbody>
</table>

This course is also available in French: ADV3-FR-P. Please contact us for more information.
Oil & Gas Process Simulation
Simulation using HYSYS & PRO/II™

Level: KNOWLEDGE

Purpose
This course provides a comprehensive knowledge of all field treatments, and develops practical skills in simulation of Oil & Gas treatment processes using the software HYSYS™ and PRO/II™.

Audience
Professionals involved or interested in Oil & Gas field treatment processes: operation or process personnel, engineering staff, R&D engineers…

Learning Objectives
Upon completion of the course, participants will be able to:
- understand Oil & Gas processing operations: flash separation, compression, expansion, heating or cooling, mixing, pumping, etc.,
- grasp common Oil & Gas processing schemes and operating parameters,
- build a Process Flow Diagram (PFD) and optimize existing processing schemes,
- simulate an industrial unit at different operating stages,
- extract thermodynamics data from the simulation software database (phase envelope, critical point parameters, hydrate formation risk area, different physical properties…).

Ways & Means
- Highly interactive training by industry-specialist lecturers.
- Several simulation case studies, addressing most of Oil & Gas field treatments.
- Extensive practice of PRO/II™ and HYSYS™ simulation software.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
Engineer degree or equivalent experience in Oil & Gas industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content
0.25 d
SOFTWARE PRESENTATION
Presentation of the different pieces of equipment: pumps, compressors, heat exchangers, turbines, turbo expanders, separators, valves, pipes.
Choice of the thermodynamic model: PR, SRK…
Definition of components, pseudo-components, heavy cuts.

1 d
SIMULATION OF A CRUDE OIL FIELD TREATMENT UNIT
Main field treatments for crude oils: stabilization, sweetening, desalting and dehydration, associated gas compression and treatment.
Study of an offshore crude oil field treatment unit, based on Multiple Stage Separation (MSS).
Influence of the number of separators on the quality (API°, RVP…) and quantity of stabilized oil.
Optimization of the operating parameters: pressures and temperatures of separators, suction and discharge condition of compressors, pumping needs for export by pipe.
Identification and adjustment of the controlling parameters.

1 d
SIMULATION OF A NATURAL GAS FIELD TREATMENT UNIT
Main field treatments for natural gases: dehydration, sweetening, LNG extraction/recovery, compression and export…
Study of an offshore natural gas dehydration, liquids extraction and compression unit.
Optimization of the operating parameters: primary separator operating conditions, dehydration parameters, cooling temperature for a sufficient liquid extraction, compression needs upstream the export pipe.
Identification and adjustment of the controlling parameters.
Analysis of hydrate formation risks.

0.75 d
SIMULATION OF A GAS DEHYDRATION UNIT BY PHYSICAL ABSORPTION (TEG)
Simulation of the glycol loop: contactor, flash separator, regenerator (still), circulation pumps, glycol/glycol exchanger.
Adjustment of controlling parameters: dry gas residual moisture content versus purity of lean TEG, moisture flow to be removed versus TEG circulation flow.

0.75 d
SIMULATION OF A NATURAL GAS LIQUIDS (NGL) EXTRACTION/RECOVERY UNIT
Progressive build up of the PFD of a Natural Gas Liquids (NGL) extraction unit.
Three processes are studied:
- External refrigeration loop (cryogenic loop).
- Joule Thomson expansion valve.
- Turbo Expander.
Illustration of the results on phase envelope diagram.

0.75 d
SIMULATION OF A PROPADE CRYOGENIC LOOP
Study of a simple loop.
Improvement of loop performances by addition of an intermediate expansion.
Use of propane enthalpy diagram to validate the software results.
Influence of propane purity and consequences of air ingress.

0.5 d
SIMULATION OF NATURAL GAS LIQUID FRACTIONATION UNIT - DISTILLATION PROCESS
Principle of separation by distillation process and main operating parameters.
Simulation of a LNG fractionation unit using distillation columns.
Characteristics and operating conditions of the main equipment. Specific constraints.

Reference: SIMUL-EN-P. Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Location
Rueil-Malmaison

Start Date
6 December

End Date
10 December

Tuition Fees excl. VAT
€3,980

This course is also available in French: SIMUL-FR-P. Please contact us for more information.
Gas Sweetening & Sulfur Recovery

Course Content

OVERVIEW OF GAS SWEETENING PROCESSES
0.25 d
Nature, origins and compositions of the streams to be treated.
The properties of sulfur compounds and CO₂.
Reasons for removing acid gases, usual specifications.
Cost impact of gas sweetening and stakes.
Acid gas management, impact on the sweetening unit.
The different types of gas sweetening processes.

AMINE SWEETENING PROCESSES
1.5 d
General principles.
Generic processes and proprietary processes.
Typical process flow scheme.
Amine unit design: key design parameters.
Specific process arrangements.
Equipment review, process control.
Operational issues and troubleshooting.
Specificities of amine units.
Elgin-Franklin, an example of a versatile MDEA sweetening unit.
An example of successive revamping of an amine unit.
Acid gas enrichment.

OTHER GAS SWEETENING PROCESSES
0.75 d
Scavengers.
Solid bed processes.
Redox processes.
Other solvent processes: hot carbonate, physical solvents, hybrid solvents.
Permeation membranes.
Cryogenic distillation processes.
LPG sweetening.
Guidelines for process selection.

RECOVERING SULFUR FROM ACID GASES
0.25 d
Architecture of the sulfur recovery facilities.
Sulfur properties.
The sulfur market (sulfur uses).

SULFUR RECOVERY UNITS (Claus)
1.25 d
Chemical mechanisms and general process flow diagram.
Key parameters of the Claus process.
The thermal stage.
The catalytic stages.
Adapting the process to the acid gas quality (rich/lean acid gas).
Operational issues.

TAIL GAS TREATMENT
0.75 d
Types of TGT processes.
Direct oxidation processes.
Sub-dew point processes.
Wet sub-dew point process.
H₂S absorption processes.

SULFUR CONDITIONING & STORAGE
0.25 d
Liquid sulfur degassing.
Sulfur forming.
Sulfur storage.

Ways & Means

Highly interactive training by industry-specialist lecturers.
Numerous applications and illustrations.
Parts of the session customizable to a virtual remote classroom.

Learning Assessment

Assessment by test at the end of the course.

Prerequisites

Process engineer degree or equivalent experience in natural gas field treatment.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.
Technical Standards for Surface Facilities Design

Course Content

HSE GUIDELINES FOR OIL & GAS DEVELOPMENT PROJECTS
Settle down the minimum safety requirements for the layout of installations.
Risks resulting from industrial activity, either routine operation or abnormal event.
Methodology for identifying Safety Critical Elements and minimize the risk of major accidents.
Global HSE dossier of project. Comparison of EU directive SEVESO III and offshore safety case regulation 2015.
0.5 d

WELDING & QUALITY CONTROL INSPECTION OF PIPING
Minimum requirements for welding of pressure containing piping and/or equipment.
Review of ASME Section IX Welding and Brazing Qualifications and comparison with EN 287 Qualification Test of Welders - Fusion Welding.
0.25 d

PIPELINE DESIGN, STANDARD FOR CONSTRUCTION & INSPECTION
General considerations for onshore pipeline design.
Specifications applicable to pre-project engineering, basic engineering, and construction engineering of the pipeline systems.
Review of API 1104 Standard for Welding Pipelines and Related Facilities.
0.25 d

STANDARD PRACTICE FOR EQUIPMENT DESIGN, MAINTENANCE & INSPECTION
0.5 d
Scope of the inspections for certain stages in construction, in particular on hand over to a third party.
Minimum measures regarding risk mitigation during construction and installation activities.
Requirements for the evaluation and rating of the criticality of the units delivered under the contract.
Identification of key inspection documents using EN 10204 Types of inspection documents.

ENVIRONMENTAL REQUIREMENTS FOR PROJECTS
Establish the environmental requirements for projects design and E&P activities.
Environmental Baseline Survey (EBS) and Environmental Impact Assessment (EIA).
Effects and potential impacts of the Project on the natural and human environment, and of their extent.
0.25 d

LIQUID STORAGE TANKS
Minimum rules and requirements to be met with respect to design, fabrication, manufacturer quality control, inspection test and painting of single containment, double-walled metalic storage tanks.
0.25 d

INSPECTION PLAN FOR EQUIPMENT & STRUCTURES
Corrosion control on production facilities: field operation.
Minimum inspection requirements necessary to assure the integrity of plant and structures.
0.25 d

GAS FACILITIES DESIGN
Minimum requirements for process sizing criteria to be used during pre-project and basic or detailed engineering phases.
Defining maintainability and inspectability criteria necessary to ensure the installations’ integrity throughout their life.
0.2 d

INTRODUCTION TO ISO 29001
Main requirements for quality management.
0.25 d

WATER TREATMENT SYSTEMS
Emulsions in crude oil processing.
Produced water treatment.
Injection water treatment.
0.5 d

Level: SKILLED

Purpose
This course provides a comprehensive overview of technical standards applied in projects for construction, maintenance and operation of Oil & Gas facilities.

Audience
Engineers and technicians interested or directly involved in day-to-day activities of Oil & Gas projects: safety, design, construction, operation and/or maintenance of Oil & Gas field.

Learning Objectives
Upon completion of the course, participants will be able to:

- list the main Norms and recommended practices for Oil & Gas projects,
- assess standards that ensure the long-term productivity of surface installations,
- explain guidelines and procedures for promotion and maintenance of safe working conditions throughout construction, maintenance and operation activities,
- detail the basic requirements for safe and environmentally sound construction and maintenance of Oil & Gas infrastructures,
- grasp the key aspects of safety, design, construction and operation, necessary for the orderly and effective development of Oil & Gas projects,
- ascertain the treatment processes necessary for production water and injection water.

Ways & Means

- Several illustrations from recent projects.
- Review of applicable standards, norms and current industry best practices.

Learning Assessment
Quiz at the end of the module.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: STAND-EN-P
Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: STANDFR-FR-P. Please contact us for more information.
Process Equipment Engineering

**Level:** KNOWLEDGE

**Purpose**

This course aims to select and size piping system equipment, process equipment and review main problems in operation.

**Audience**

Engineers looking to acquire best practices for equipment design and troubleshooting.

**Learning Objectives**

Upon completion of the course, participants will be able to:

- understand pipe standards and metallurgy,
- be able to select several types of control valves, safety valves and restriction orifices,
- describe heat exchangers technology and design,
- describe oil-water separation equipment and gas-liquid separation equipment technology and design,
- identify and propose adequate solutions to process equipment common operating issues.

**Ways & Means**

- Highly interactive training with industry specialist lecturers.
- Methodology illustrated by case studies for the sizing of key equipment.
- Parts of the session customizable to a virtual remote classroom.

**Learning Assessment**

Assessment by test at the end of the course.

**Prerequisites**

Engineer degree or equivalent experience in Oil & Gas field processing.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Course Content**

**5 days**

**PIPING SYSTEMS**

<table>
<thead>
<tr>
<th>1.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main concepts and definitions: operating/design pressure, piping schedules and rating, thickness…</td>
</tr>
<tr>
<td>Piping codes and standards.</td>
</tr>
<tr>
<td>Pipe materials and manufacturing.</td>
</tr>
<tr>
<td>Flanges assembly, fittings, gaskets and other pipework elements (spectacle blinds, strainers…).</td>
</tr>
<tr>
<td>Valves for flow control and flow shut-off: technology and selection criteria; check valves.</td>
</tr>
<tr>
<td>Pressure relief equipment sizing guidelines and datasheet review: pressure safety valves, thermal expansion valves, rupture disks, restriction orifices.</td>
</tr>
<tr>
<td>Line sizing basics; pipe and valves material selection according to service; consequences of an incorrect choice or assembly.</td>
</tr>
<tr>
<td>Basics of pipe stress and rupture analysis.</td>
</tr>
<tr>
<td>Pressure vessels: various types of pressure vessels, vessels behavior under pressure and under vacuum.</td>
</tr>
</tbody>
</table>

**HEAT EXCHANGERS**

<table>
<thead>
<tr>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamentals of heat transfer.</td>
</tr>
<tr>
<td>Technology of heat exchangers and air coolers: selection criteria.</td>
</tr>
<tr>
<td>Fundamentals of design and heat exchanger performance.</td>
</tr>
</tbody>
</table>

**CRUDE OIL PROCESSING EQUIPMENT DESIGN & SIZING**

<table>
<thead>
<tr>
<th>1.5 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separators technology (review of typical internals and impact on sizing) and selection criteria.</td>
</tr>
<tr>
<td>Operating parameters and operations problems.</td>
</tr>
<tr>
<td>Elements of calculation standards (thickness, welding coefficient…).</td>
</tr>
<tr>
<td>Sizing a 2-phase and 3-phase separator (nozzles, diameter, thickness, liquid hold-up times…).</td>
</tr>
</tbody>
</table>

**GAS PROCESSING EQUIPMENT DESIGN & SIZING**

<table>
<thead>
<tr>
<th>1 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columns technology (review of typical internals and impact on sizing).</td>
</tr>
<tr>
<td>Selection criteria.</td>
</tr>
<tr>
<td>Operating parameters: pressure, temperature, flowrate…</td>
</tr>
<tr>
<td>Elements of sizing (diameter, number of theoretical and actual trays…).</td>
</tr>
<tr>
<td>Case study: summary design of a TEG column.</td>
</tr>
<tr>
<td>Column troubleshooting.</td>
</tr>
</tbody>
</table>

---

Reference: EQDESIGN-EN-P only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
Flare Network Design Engineering

Course Content

OVERVIEW OF TYPICAL RELIEF & FLARE SYSTEMS
Codes and standards typical in Oil & Gas facilities.
Safety implications and causes of overpressure.
Overpressure source:
- Protection philosophy.
- Source isolation.
- Relief.
Environmental regulation and standards.

MECHANICAL SPECIFICATION OF PRESSURE VESSELS & HEAT EXCHANGERS
Vessels codes and standards.
Material selection.
Metallurgy, heat effect and corrosion mechanism.
Design calculation for pressure vessels and heat exchangers.
Vessel integrity, evaluation according to the Oil & Gas standards.

RELIEF GAS SYSTEM OVERVIEW
System equipment and components.
Relief gas parameters and process safety management.
Monitoring systems and procedures.
Blow down:
- Purpose.
- Operational consideration.
- Design and specification.

FLARE SYSTEM
Flare gas recovery, smokeless flaring and purge gas conservation.
Defining need and quantity of purge gas.
Selection and design of key components:
- KØ drum, vent and flare stack, vent and flare tips.
- Flare ignition systems.
- Thermal oxidizers:
  - Principle of operation.
  - Components and equipment.
Radiation calculation.

CASE STUDY: FLARE SYSTEM SIZING
Study of an existing plant.
Introduction to Aspen Flare System.
Design of the relief gas system and the corresponding flare network using Aspen Flare System.

Reference: FLARE-EN-P
Only available as an In-House course.

This course is also available in French: FLARE-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com
E&I Technology for Oil & Gas Facilities

Level: KNOWLEDGE

Purpose
Provides the basic knowledge for electrical & instrumentation equipment used in the Oil & Gas industry.

Audience
Personal working in the Oil & Gas industry, needing overview on E&I.

Learning Objectives
Upon completion of the training, participants will be able to:
- identify electrical and instrumentation equipment used in Oil & Gas,
- acquire the technological knowledge necessary to understand the control and safety schemes.

Ways & Means
Demonstration (illustration) of process control on dynamic simulator (IndissPlus de CORYS).

Learning Assessment
Quiz.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content 5 days

ELECTRICAL & ELECTROTECHNIC BASICS 1.5 d
Generalities: origin of electricity, electrical energy production, alternate and direct currents, the electrical circuits.
Electrical generation: alternator, coupling of sources and throughput on structured networks.
Equipment monitoring and maintenance.
Electrical risks: hazards in the electrical installations. Effects and consequences of the electrical risks. Protection against the electrical risks.
Hazardous areas classification: current standards (API RP 500, European ATEX standards) and applications on Oil & Gas facilities. Protection and identification of the material set in hazardous area.

FIELD INSTRUMENTATION 2 d
Control loop: function and symbolization.
Field instrumentation: main technologies for measuring pressure, temperature, level, flow.
Automatic valves: technologies of control valves and on-off valves. Role of accessories: limit switches, solenoid valves, positioners…

CONTROL SCHEMES 1 d
Single loop: structure and representation.
Control schemes: single loop, cascade, split-range. Case of overrides.
PID controller: control diagrams. Function, operation, direction of action and operating modes.
Automatism: distributed control systems. Operation of a controller, operator interface, network architecture.

SAFETY INSTRUMENTED SYSTEMS (SIS) 0.5 d
Identification of Safety Instrumented Systems.
Fire and gas sensors: main technologies and applications.
Different safety systems and architecture.

Reference: E&I-EN-P. Can be organized as an In-House course.
Contact: exp.pau@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>4 October</td>
<td>8 October</td>
<td>€1,680</td>
</tr>
</tbody>
</table>

www.ifptraining.com

249
This course can be adapted to virtual classroom mode

Corrosion Prevention in Oil & Gas Production

Level: KNOWLEDGE

Purpose
This course provides in-depth understanding of corrosion phenomena specific to Oil & Gas production facilities and the main corrosion prevention techniques.

Audience
Engineers and technicians working for the design, construction, operation, inspection or maintenance of Oil & Gas upstream production facilities.

Learning Objectives
Upon completion of the course, participants will be able to:
- list the main characteristics and types of corrosion of metallic materials used in the Oil & Gas industries,
- describe the means of protection against each type of corrosion,
- select the most appropriated material for a given Oil & Gas application,
- explain the available ways of monitoring the state of corrosion of a metallic equipment.

Ways & Means
Highly interactive teaching by experienced lecturers.
Several applications and illustrations.

Learning Assessment
Written test upon training course completion.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

DEFINITION & MECHANISMS OF CORROSION
Ferrous and non-ferrous metals: structure, composition, mechanical properties, metallurgy.
Definitions: wet corrosion, dry corrosion.
Cost of corrosion: financial and human.
Basics: electrochemical mechanisms, polarization, passivity, diffusion.

COMMON TYPES OF CORROSION
Analysis of the origin and development process of each form of corrosion and possible methods of prevention.
Forms of corrosion studied: uniform, galvanic, pitting, crevice, inter-granular, selective, corrosion-erosion and cavitation, stress corrosion, contact corrosion.

TYPES OF CORROSION ENCOUNTERED IN THE OIL & GAS INDUSTRY
Each type of corrosion is studied together with possible remedial treatment:
- Corrosion by hydrogen sulfide.
- Corrosion by carbon dioxide.
- Corrosion due to oxygen in aqueous environment.
- Caustic soda corrosion.
- Corrosion in acid gas treatment units.
- Atmospheric corrosion or corrosion by sea water.
- Corrosion by mercury.
- Corrosion of reinforced concrete.
Case studies of corrosion observed in Oil & Gas installations: identification of the types of corrosion and suggested remedial treatments.

CORROSION PREVENTION
Design of equipment aimed at avoiding certain types of corrosion.
Choice of the materials best suited to the environment.
Corrosion inhibitors, filming, passivating, neutralizing, absorbing the oxygen.
Anticorrosion coatings and systems.
Cathodic protection with sacrificial anodes or imposed current.
Methodology and control of processes. Control of process and environmental parameters.
Analysis of the means of prevention implemented in the units.

CORROSION MONITORING - FUNDAMENTALS OF INSPECTION
Corrosion coupons and probes.
Non-destructive testing of the state of walls.
Corrosion monitoring plan.
Fundamentals of inspection.

Reference: CORR-EN-A
Only available as an In-House course.
Contact: ep.contact@ifptraining.com

This course is also available in French: CORR-FR-A. Please contact us for more information.
Maintenance & Inspection of Static Equipment

Level: KNOWLEDGE

Purpose
This course aims to acquire a comprehensive and practical knowledge of static equipment inspection in order to efficiently contribute to the entire scope of duties performed by an inspection department of an Oil & Gas company.

Audience
Inspectors of the Oil & Gas industry, maintenance and inspection technicians, engineers and managers looking to acquire comprehensive inspection knowledge.

Learning Objectives
Upon completion of the course, participants will be able to:
- use and explain pressure vessels, international rules and regulations,
- identify materials comprising equipment, their composition, their mechanical characteristics and select the most appropriated material for a given Oil & Gas application,
- describe the various welding processes and their limits,
- identify most appropriate non-destructive or destructive testing for the different modes of degradation and perform several simple non-destructive testing,
- list the main characteristics and types of corrosion of metallic materials used in the Oil & Gas industries, describe protection means against each type of corrosion and implement associated monitoring.

Ways & Means
Numerous industrial case studies and practical exercises.

Learning Assessment
Written test upon training course completion.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

Module 1: INSPECTOR OCCUPATION & STATUTORY REGULATIONS RELATING TO PRESSURE VESSELS 5 d
Introduction to production facilities inspection:
- Impact on safety, pressure vessel integrity, accident analysis.
- Inspector occupation:
  - Duties and organization of inspection services: inspector role and responsibilities.
  - Inspection plan: definition, set-up, implementation.
  - Inspection report: Interaction with the other departments.
- Statutory regulations applicable to pressure vessels:
  - Main regulatory texts. Area of application and regulatory context of pressure vessels.
  - Roles and responsibilities of various parties. Managing feedback and lessons learnt.

Module 2: METALLURGY & MATERIALS, WELDING 5 d
Metallurgy:
- Ferrous and non-ferrous metals.
- Structures and behavior of metals and alloys at service conditions for static equipment.
- Evaluation of the mechanical characteristics required for predictable behavior at service conditions.
- Most widely used metals and metal alloys in production facilities: steels, their composition, structure and behavior at service conditions.
  - Steels: HIC-resistant, CRA resistant, cupronickel, aluminum bronze.
- Effect of heating and cooling on steels: current heat treatments resulting from welding or deliberately applied.
  - Common defects in steels.
- Boilermaking - Welding:
  - Current cutting, forming and welding processes; impact on metals structure.
  - Post-welding heat treatment.
  - Identification of welding defects in welded assemblies using non-destructive checks and destructive tests on weld test pieces.
  - Qualification of welding procedures and welders.
  - Technique for the permanent assembly of heat exchanger bundle tubes and tube plates: roll and mechanical expansion.
  - Case study.

Module 3: CONSTRUCTIVE TECHNOLOGY, NON-DESTRUCTIVE & DESTRUCTIVE TESTING 5 d
Equipment construction technology:
- General information on static equipment.
- Type of pressure vessels and pressurized accessories.
- Drawings: reminder on PFD, P&ID, Isometrics reading.
- Introduction to construction codes and standards:
  - Rules and regulations application areas, standards, harmonized standards, professional guides.
  - Notions of materials strength and pressure vessel shells calculations. Safety and welding margins.
  - Construction monitoring, destructive and non-destructive testing.
  - Notions of strength test.
  - Introduction to relevant codes and standards (ASME).
- Techniques for non-destructive and destructive testing:
  - Standard faults in external and internal walls.
  - Principles, possibilities and areas of application of main NDTs: visual, sweating, magnetic crack detection, ultrasound, X-ray, sealing, acoustic emission.
  - Review of innovative NDTs: digital radioc, phased array, TOFD, IRIS, MFL, intelligent pigging, ROVs, drones, reinforced ultrasound, X-ray, sealing, acoustic emission.
- Implementation in equipment inspection: on base materials and components, during production, on acceptance, in operation.
  - Principles, possibilities and areas of application of destructive test methods.

Module 4: CORROSION PREVENTION IN PRODUCTION FACILITIES 5 d
Definition and mechanisms of corrosion:
- Wet corrosion, dry corrosion.
- Elements of electrochemistry.
- Cost of corrosion: both financial and human, impact on safety.
- Common types of corrosion: origin and development process, possible methods of prevention.
- Types of corrosion encountered in the Oil & Gas industry:
  - Case studies of corrosion observed in Oil & Gas installations: identification of the types of corrosion and suggested remedial treatments.
- Corrosion prevention:
  - Design of equipment: choice of materials; corrosion inhibitors; anti-corrosion coatings and systems.
  - Cathodic protection with sacrificial anodes or imposed current.
  - Methodology and control of processes. Control of process and environmental parameters.
  - Corrosion monitoring:
  - Corrosion coupons and probes; non-destructive testing of wall condition.
  - Corrosion monitoring plan.

Reference: INSPECT-EN-P. Only available as an In-House course.
Contact: ep.contact@ifptraining.com
This course is also available in French: INSPECT-FR-P. Please contact us for more information.

www.ifptraining.com
## Project Implementation
- E&P Project Management Certification ................................................................. p. 253
- Upstream Project Management Certification .......................................................... p. 254
- E&P Value Chain & Front-End Development ............................................................. p. 255
- E&P Projects Value Management ........................................................................... p. 256
- E&P Project Risk & Decision Analysis Workshop ................................................... p. 257
- E&P Project Quality & Risk Management ............................................................... p. 258
- Offshore E&P Project Management ....................................................................... p. 259
- Building a Project Management Office (PMO) ....................................................... p. 260
- E&P Project Logistics Management ....................................................................... p. 261

## Project Control
- E&P Project Control Tools ..................................................................................... p. 262
- E&P Technical Service Contracts ........................................................................... p. 263
- E&P Technical Contract Negotiation ....................................................................... p. 264
- E&P Project Cost Estimation & Control Certification ........................................... p. 265
- E&P Project Operating Expenses Optimization .................................................... p. 266
- E&P Project Planning & Scheduling Workshop ...................................................... p. 267

## Project Construction
- Upstream Project Construction Techniques .......................................................... p. 268
- Upstream Project Construction Site Administration .............................................. p. 269
- Upstream Project Construction HSE Management ................................................. p. 270
- Offshore Oil & Gas Project Installation ................................................................... p. 271
- Upstream Project Construction Works Supervision .............................................. p. 272
- Upstream Project Abandonment Operations ....................................................... p. 273
- E&P Project Construction Certification ................................................................. p. 274
- E&P Construction Superintendent Certification .................................................. p. 275
Advanced Certificate
E&P Project Management Certification

Level: SKILLED

Purpose
This course explains how large E&P projects are managed from initial stage to completion.

Audience
Professionals who require a comprehensive understanding of project management practices for E&P projects.

Learning Objectives
Upon completion of this course, participants will be able to:
- Conduct the preliminary stages of the project: conceptual and feasibility studies, economic evaluation, FEED,
- Enforce project control processes to meet scope, cost and schedule objectives,
- Strengthen HSE in project design and construction,
- Select the right type of technical contract,
- Manage pre construction phases: mainly basic engineering and call for tenders,
- Manage construction phases: engineering, procurement, construction and commissioning.

Ways & Means
The course is illustrated with several examples taken from E&P projects.
A project case study is used throughout the course to illustrate each chapter.

Learning Assessment
Quiz at the end of the module.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Why an IFP Training Certification?
- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in E&P Project Management Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

E&P CHAIN VALUE MANAGEMENT 0.5 d
Project evaluation and choices throughout the exploration and production value chain.

INTEGRATION & SCOPE MANAGEMENT 0.5 d
Preliminary, conceptual and pre-project studies and their deliverables.
EPC phase objectives and project execution plan.
Local content and sustainable development.

TECHNICAL SERVICE CONTRACTS 0.5 d
Contracting strategy (project breakdown into contracts).
Types and comparison of technical contracts.
Endorsements and assignments.
Tendering process.

PROJECT ORGANIZATION 0.5 d
Interface management.
Management of human resources, organization charts, project manager’s role.
Stakeholder management.
Communication management.

HSE, QUALITY & RISK MANAGEMENT 1 d
HSE: tools and techniques for safety and environment design, project reviews, safety concept and safety dossier.
HSE during construction phase, HSE indicators.
Quality: assurance, control and surveillance management.
Risks: identification, ranking, action plans.

PROJECT CONTROL: COSTS & SCHEDULE 1 d
Planning and scheduling: schedule elaboration, progress control, recovery plan.
Costs: estimation of facilities expenditures, budget elaboration, cost control, reporting.

OIL & GAS PROJECT PHASES 1 d
Detailed engineering: work packages, main deliverables, project reviews, documentation control, changes.
Procurement: activities (purchasing, expediting, inspection, shipping), long lead items, company supplied items, material control systems.
Construction/fabrication challenges: contractors and resources, (sub) contract types.
Construction at site: execution plan, construction methods (temporary construction facilities, prefabrication, modularization, delivery, erection), interface with commissioning.
Fabrication at yards: load-out, transport and installation.
Completion activities: methodology, sequence, completion dossiers, commissioning systems, hand-over and acceptance of the facilities.
Project close out and management of collective knowledge.

Reference: PROJ-EN-P
Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>7 June</td>
<td>11 June</td>
<td>€3,680</td>
</tr>
<tr>
<td>Rueil-Malmaison</td>
<td>15 November</td>
<td>19 November</td>
<td>€3,680</td>
</tr>
</tbody>
</table>
This course can be adapted to virtual classroom mode - Graduate Certificate

Upstream Project Management Certification

**Level:** SKILLED

**Purpose**
This course provides an understanding of the structure of an E&P project and aims to acquire the necessary techniques and know-how to successfully manage them.

**Audience**
Engineers who are newly involved in project activities and who are in need of a global understanding of upstream projects.

**Learning Objectives**
Upon completion of this course, participants will be able to:
- grasp Oil & Gas activities, vocabulary, economy,
- conduct the stage-gate preliminary phase and the relevant economic studies,
- appraise project planning: schedule, costs, execution plan,
- strengthen HSE in project design and construction,
- choose within the various technical contract types,
- manage pre-construction phases: basics, calls for tenders, etc.,
- manage construction phases: engineering, procurement, construction and commissioning.

**Ways & Means**
Each step of the training is illustrated by numerous examples, drawings, photos and videos taken from actual Oil & Gas upstream projects.

**Learning Assessment**
Quiz at the end of each module and project presentation at the end of the program.

**Prerequisites**
Engineering degree or equivalent professional experience in an Oil & Gas company or consultant firm.

---

**Course Content**

<table>
<thead>
<tr>
<th>Part</th>
<th>Title</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E&amp;P TECHNOLOGIES OVERVIEW</td>
<td>5 d</td>
</tr>
<tr>
<td>2</td>
<td>PROCESS EQUIPMENT &amp; MATERIAL</td>
<td>5 d</td>
</tr>
<tr>
<td>3</td>
<td>E&amp;P CONTRACTUAL &amp; ECONOMIC FRAMEWORK</td>
<td>5 d</td>
</tr>
<tr>
<td>4</td>
<td>PROJECT MANAGEMENT</td>
<td>5 d</td>
</tr>
<tr>
<td>5</td>
<td>ENGINEERING, QUALITY &amp; RISK MANAGEMENT</td>
<td>5 d</td>
</tr>
<tr>
<td>6</td>
<td>TECHNICAL SERVICE CONTRACTS</td>
<td>5 d</td>
</tr>
<tr>
<td>7</td>
<td>PLANNING &amp; SCHEDULING</td>
<td>5 d</td>
</tr>
<tr>
<td>8</td>
<td>COST ESTIMATION &amp; CONTROL</td>
<td>5 d</td>
</tr>
<tr>
<td>9</td>
<td>PRECOMMISSIONING - COMMISSIONING</td>
<td>5 d</td>
</tr>
<tr>
<td>10</td>
<td>LOGISTICS</td>
<td>5 d</td>
</tr>
<tr>
<td>11</td>
<td>TECHNICAL CONTRACT NEGOTIATION</td>
<td>5 d</td>
</tr>
<tr>
<td>12</td>
<td>FIELD DEVELOPMENT PROJECT</td>
<td>10 d</td>
</tr>
</tbody>
</table>

**Ways & Means**
- Each step of the training is illustrated by numerous examples, drawings, photos and videos taken from actual Oil & Gas upstream projects.
- Practical case studies in each module can account for some 50% of training time.

**Learning Assessment**
Quiz at the end of each module and project presentation at the end of the program.

---

**Reference:** UPMC-EN-A

Contact: ep.contact@ifptraining.com

---

This course is also available in French: UPMC-FR-A. Please contact us for more information.

---

254
E&P Value Chain & Front-End Development

**Level:** KNOWLEDGE

**Purpose**

This course provides a thorough understanding of Front-End Engineering issues and the interaction between all experts involved along the decision path in formulating Project Development Plans (PDP) and submitting them for Final Investment Decisions (FID).

**Audience**

Professionals involved in E&P projects requiring a comprehensive view of the methodology and tools needed for successful front-end development.

**Learning Objectives**

Upon completion of the course, participants will be able to:
- Conduct field development feasibility studies.
- Build and develop project options scenarios.
- Define scope for project (front-end) estimates.
- Identify costly projects.
- Produce project development plans.

**Ways & Means**

Several case studies are used to illustrate the E&P decision process and the various issues of front-end development studies.

**Learning Assessment**

Quiz.

**Prerequisites**

Provide evidence of a professional experience of at least 1 month, related to the concerned field.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

**DECISION PATH ALONG THE E&P VALUE CHAIN**

1.5 d

Strategic issues in exploration-production:
- Requirements for decision in the Oil & Gas industry. Primary objectives of an Oil & Gas company. Strategies to feed the E&P portfolio asset funnel. E&P risk dynamics and objectives of economic analysis. Life cycle of upstream assets. Critical decision points and value creation at experts meeting points.
- Decision process from block evaluation to exploration drilling:
- Decision process from discovery to development and production:
  - Discovery appraisal, reserves evaluation and recovery mechanisms. Reserves probability distribution and classification. Oil & Gas field development scenarios. Decision tree analysis for choosing optimal strategy (case study).
- Expected value of perfect and imperfect information (case studies). Framework and interaction of various disciplines. Forward investment analysis for a development project. Steps along the decision path up to the FID (Final Investment Decision). Overview of appraisal, development and project studies.

**VALUE ASSESSMENT OF DEVELOPMENT PROJECTS**

2 d

Fundamental contractual and economic aspects:
- Economic rent: value and sharing, bottom line of Oil & Gas E&P contracts. Overview of the contractual framework of E&P activities. Motivations for State participation and role of NOCs (National Oil Companies). Risk mitigation through Joint Ventures and JOAs (Joint-Operating Agreements). Sharing value through concession and production-sharing contracts (case studies). Regressive aspects of E&P contracts and fields’ economic thresholds (case studies).
- A field development project economic evaluation:
  - Choosing the most economically viable option, with or without capital constraints (case studies).
  - Methodology of quantitative risk analysis:

**CONCEPTS FOR SUCCESSFUL FRONT-END DEVELOPMENT**

0.5 d

Closer look at why projects fail:
- Discussion of issues and constraints facing Oil & Gas projects. Large capital Oil & Gas projects challenges and performance. Aggressive pursuit and conservative response. Project risks, organizational risks, external risks and the influence curve. Asset front-end loading index. Keys to successful project delivery.

**DYNAMICS OF FEL 1 & FEL**

0.5 d

FEL 1: Feasibility stage:
- Objective of preliminary studies and appraisal requirements. Preliminary scheme and technical feasibility. Preliminary schedule and cost estimates. Economic, safety, environment and stakeholders issues.

FEL 2: Feasibility stage:
- Objective of conceptual studies. Screening of alternatives and confirmation of feasibility. Key parameters definition and various technical options. Concept study content and concept selection criteria. Pre-project or pre-FEED study content and output. Field development plan, project economics and execution principles. Pre-requisites for launching the FEED or Basic Engineering. (Case study).

**DYNAMICS OF FEL 3 & FID**

0.5 d

FEL 3: basic engineering and development stage:
- Project scope definition and integration management. Work breakdown structure for an Oil & Gas field. Scope of the basic engineering package. Reference documents needed and validation process. FEED activities, deliverables and organizations. Company and contractor execution plans. Final Investment Decision:
  - Project sanction. Typical project organization. FEED contract types. Managing changes to the scope baseline. SOR (Statement Of Requirements) modifications.
  - Key field development planning and FEL issues to keep in mind.

Reference: PROJAFL-EN-P

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>18 October</td>
<td>22 October</td>
<td>€3,680</td>
</tr>
</tbody>
</table>

www.ifptraining.com 255
E&P Projects Value Management

Level: KNOWLEDGE

Purpose
This course aims to acquire a thorough understanding of how upstream projects are structured and carried out within their contractual and economic framework.

Audience
Oil & Gas professionals from various disciplines who require formal training in management and are particularly interested in a comprehensive view of the methodology and tools needed for evaluating projects in the exploration-production sector.

Learning Objectives
Upon completion of the course, participants will be able to:
- identify the various components in the Oil & Gas chains,
- see the various technical components of upstream projects,
- grasp the essence of Oil & Gas contracts, and economic rent sharing,
- comprehend the risks involved in and the decision process for exploration-production projects,
- follow the methodology of Oil & Gas project studies leading to a final investment decision,
- understand the concepts behind various indicators of value and profitability,
- see the fundamentals of project management techniques applied to E&P projects.

Learning Assessment
Quiz.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

**STRUCTURE & DYNAMICS OF UPSTREAM PROJECTS**

- Strategic issues in Oil & Gas: structure of the Oil & Gas industries, picture of worldwide Oil & Gas supply and demand, primary objectives of an oil company, economic analysis and long-term planning, E&P portfolio components and risk dynamics, focus on geological risk and economic risk, important value drivers, life cycle of upstream assets, critical decision points and value creation, E&P assets valuation, stakeholders, business and operational processes.

- Exploration phase: exploration rounds and blocks, fundamental questions for a manager, speculation and decision process, petroleum system, and prospect evaluation, techniques and expertise involved (geology, geophysics, geological modeling, exploration drilling), exploration risk and reward analysis, probability of success and decision tree analysis, expected monetary value, exploration block valuation and basis for decision in exploration, impact of state participation, exploration risk mitigation through farm-out agreements.

- Development/production phase: from discovery to development and production, appraisal phase, uncertainties and reserves evaluation, reserves probability distribution and classification, techniques and expertise involved (reservoir modeling, drilling and well completion, recovery mechanisms, production profiles, Oil & Gas processing, production facilities), field development schemes, capital expenditures, operating expenses, abandonment issues and costs, concept of value of a discovery for an oil company, decision tree analysis for choosing optimal strategy, cost and value of information.

E&P contractual framework: strategic objectives of States and IOCs, state participation and role of NOCs, economic rent sharing, risk mitigation through joint-ventures, different types and structure of patrimonial contracts, important obligations, fundamental concepts in joint-operating agreements, decision committees, financing of operations, unitization agreements, cost recovery, sharing value through mechanisms of production-sharing contracts and risk-service contracts, government take, state control and supervision.

**OIL & GAS PROJECT STUDIES & MANAGEMENT**

- Front-end development studies: front-end loading as a foundation for smarter project execution, phases and deliverables (prefeasibility stage, feasibility stage, basic engineering), project scope definition and execution plan. Fundamentals of financial management: corporate finance, project finance, cost of debt capital, cost of equity capital, balance sheet, return on capital employed, return on equity, weighted average cost of capital and fundamental condition for project value creation, cost accounting and budgeting.

- Field development project economic evaluation: methodology for assessing the economic value of an Oil & Gas field development project, global project cash flows (Revenues, Capex, Opex and Gvt Take), discounting, risks and discount rate, economic indicators (net present value, internal rate of return, pay-out-time), quantitative risk analysis.

- Case study: oil field development project with State participation within the framework of a PSC. Principles of project management: large capital Oil & Gas projects challenges and performance, final investment decision, project risks, organizational risks and external risks, FEED and EPC contracts, project organization, control and management (schedule, cost, quality, HSE, and risk issues), keys to successful project delivery.

Reference: PVM-EN-P  Only available as an In-House course.

Contact ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode

E&P Project Risk & Decision Analysis Workshop

Level: KNOWLEDGE

Purpose

This course aims to comprehend the methods and gain a practical knowledge of the probabilistic models applied in Oil & Gas project decision analysis through a workshop dedicated to problem solving with spreadsheet applications.

Audience

Oil & Gas professionals from various disciplines who need to acquire the skills needed to analyze risk of Oil & Gas projects and build probabilistic models to provide the decision analysis required for analyzing investment opportunities.

Learning Objectives

Upon completion of the course, participants will be able to:

- understand the concepts of risks, uncertainties and probability distributions and tables,
- practice the use of the various tools of expected values, decision trees and Monte Carlo simulation,
- develop and solve different types of probabilistic models used in prospect evaluation and field development projects.

Ways & Means

- Spreadsheet applications for numerous problems of decision analysis in the upstream sector.
- Illustrations with software @Risk and PrecisionTree.

Learning Assessment

Quiz at the end of the module.

Prerequisites

- Provide evidence of a professional experience of at least 1 month, related to the concerned field.
- Have a good knowledge of basic functions of Microsoft Excel.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

**OVERVIEW OF THE DECISION PROCESS**

Strategic issues in Oil & Gas: E&P portfolio components and risk dynamics, important value drivers, life cycle of upstream assets, critical decision points and value creation, economic rent sharing through Oil & Gas contracts.

Exploration phase: exploration rounds and blocks, fundamental questions for a manager, speculation and decision process, exploration risk and prospect reserves evaluation, techniques and expertise involved, exploration risk and reward analysis, impact of state participation, risk mitigation.

Development/production phase: appraisal, uncertainties and discovery reserves evaluation, techniques and expertise involved, field development schemes, capital expenditures, operating expenses, abandonment issues and costs, economic modeling, value of a discovery, fundamental condition for value creation.

Fundamental issues in decision analysis: uncertainty in capital investments, decision analysis process, terminology used in decision analysis, various applications in the Oil & Gas industry.

**MAIN STATISTICS & PROBABILITY CONCEPTS**

Descriptive statistics: measures of central tendency, measures of dispersion, grouping of large data sets, frequency distribution, cumulative and decumulative relative frequency.

Probability concepts: simple, conditional, joint, and marginal probability, probability rules, discrete probability distributions, continuous probability distributions.

Spreadsheet applications: drilling data, exploration drilling, reservoir data, workover...

**RISK & DECISION ANALYSIS**

Expected value concepts: expected value and standard deviation of random variables, structural elements of decision problems, payoff tables, expected monetary value, expected profitability index, performance index, expected opportunity loss, sensitivity analysis, fundamental decision criteria, mean-variance analysis.

Decision tree analysis: designing and solving decision trees, risk profiles, expected value of information (perfect or imperfect), expected net gain, prior, conditional and posterior probabilities, Baye’s rule.

Attitudes towards risk: expected preference value or expected utility, utility function, risk tolerance, certainty equivalent and risk premium, assessing the utility function, mathematical representation of utility functions, gambler’s ruin, risk-adjusted value and working interest.

Reference: PROAW-EN-A  Only available as an In-House course. Contact: ep.contact@ifptraining.com
E&P Project Quality & Risk Management

Level: KNOWLEDGE

Purpose
This course explains the importance of quality management in projects as well as how to continuously improve project practices.

Audience
Professionals involved in the management of industrial projects, in particular Oil & Gas projects.

Learning Objectives
Upon completion of the course, participants will be able to:
- manage project quality, the stakes involved and the benefits of feedback,
- apply quality assurance, quality control, quality tools, human and material quality resources in the development of projects,
- continuously improve project development methods to create added value for their company.

Ways & Means
- Extensive use of examples from actual Oil & Gas projects.
- Practical exercises: project objectives, surveillance plan, experience feedback, risk analysis.

Learning Assessment
Quiz.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

FROM CORPORATE MANAGEMENT SYSTEM TO PROJECT OBJECTIVES

0.5 d
- Project reference standards and associated requirements.
- Definition of project objectives in terms of quality, safety and health, environmental, security, social, etc.
- Integrated management systems to meet these objectives.
- Support project documentation and helpful Key Performance Indicators (KPIs).

SETTING UP A PROJECT QUALITY MANAGEMENT SYSTEM

0.5 d
- Links between management and project process.
- Project processes: identification and cartography.
- Management processes and process owners.
- Project organization and quality responsibilities.
- Involvement of the management team and quality independence.
- Transversal key documents: project execution plan, quality plan (and associated procedures), HSE plan.
- Key documents for each project phase: engineering plan, procurement plan, construction plan, commissioning plan.
- Related processes: interface management plan, documentation management, change management, risk management.

QUALITY ASSURANCE ACTIVITIES PRIOR TO PROJECT START

0.25 d
- Requirements from ISO-9001 standard and application to projects.
- Document control practices.
- Audit planning and preparation.
- Inspection planning and issue of Inspection and Test Plans (ITPs).

QUALITY CONTROL ACTIVITIES DURING PROJECT EXECUTION

0.25 d
- Surveillance plan to be enforced during procurement and construction phases.
- Factory Acceptance Test (FAT), company witnesses, quality surveyors and vendor representatives.
- Workshop assessments and visits to contractors’ and subcontractors’ premises.

CLOSING THE QUALITY IMPROVEMENT LOOP

0.5 d
- PDCA cycle of continuous improvement.
- Periodical surveillance meetings and follow-up of actions.
- Feedback gathering and use for benchmarking.
- Review of vendor documentation, approvals and updates.
- Management of quality records.
- Use of project non-conformances for improvement purposes.
- Consolidation of project as-built documentation.

RISK MANAGEMENT

1 d
- Risks and opportunities.
- Risk identification methods.
- Severity, probability and criticality.
- Risk register: organization, owners, meetings and stakeholders.
- Risk mitigation plan.
- Example of contingency calculation.

Reference: EPQAQC-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Offshore E&P Project Management

Level: KNOWLEDGE

Purpose
This course provides an understanding of all major aspects specific to offshore project management.

Audience
Technical supervisors and managers, project and general managers and government officials.

Learning Objectives
Upon completion of the course, participants will be able to:
- understand Offshore project management constraints,
- dealing with internal (company) and external requirements (government, partners, contractors, etc.),
- comply with core requirements for major projects in terms of planning, costs and risks,
- master the specific vocabulary of offshore projects and toll gating processes.

Ways & Means
Guidelines and standards, as well as best practices will be illustrated by numerous examples.

Learning Assessment
Quiz.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

SPECIFIC TOPICS OF PROJECT MANAGEMENT APPLIED TO OFFSHORE PROJECTS
Risk Management - Group session and discussion.
Costs and schedule control.
Management of facilities risks and safety.

DESIGN CONSIDERATIONS
Pre-feasibility and feasibility checklists - Group session and discussion.
Plan and value improvement practices.

WORKS PREPARATION
Introduction and planning for success - Principles and elements.
Phases, organization and teamwork.

CONSTRUCTION ISSUES
Modularization.
Safety.
Quality.

LIFTING & INSTALLATION
Heavy lifts offshore and cranes.
Lifting offshore (center of gravity, weight control).

CASE STUDIES
Case History I: Project Risks for FLNG - Shell - Prelude.
Case History II: The Dangers of “Entering a New Country”.
Case History III: The World’s First Gas Pipeline Export.
Case History IV: All Subsea Development, the Future?

Reference: OFFPM-EN-P
Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
Building a Project Management Office (PMO)

Level: SKILLED

Purpose
This course aims to understand the building blocks of an effective Project Management Office (PMO).

Audience
Managers and Project managers called upon to take responsibilities in project or disciplines management.

Learning Objectives
Upon completion of the course, participants will be able to:
- develop a vision of a project management office,
- help improve project success,
- grasp the processes in project portfolio management,
- enhance alignment of project management with portfolio management.

Learning Assessment
Quiz at the end of the module.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>VALUE OF A PROJECT MANAGEMENT OFFICE</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Setting up a PMO vision and creating a charter.</td>
<td></td>
</tr>
<tr>
<td>State of project and portfolio management.</td>
<td></td>
</tr>
<tr>
<td>Defining the to-be state and analyzing the gap.</td>
<td></td>
</tr>
<tr>
<td>Planning for success and defining PMO responsibilities within the organization.</td>
<td></td>
</tr>
<tr>
<td>Roadmap to mature the PMO.</td>
<td></td>
</tr>
<tr>
<td>PROJECT MANAGEMENT PROCESSES</td>
<td>0.75 d</td>
</tr>
<tr>
<td>Benefits of standardizing project management processes.</td>
<td></td>
</tr>
<tr>
<td>Developing and updating processes and standard document templates.</td>
<td></td>
</tr>
<tr>
<td>Standards for project content storage.</td>
<td></td>
</tr>
<tr>
<td>Project management and portfolio management.</td>
<td></td>
</tr>
<tr>
<td>Project Portfolio Management (PPM) tools.</td>
<td></td>
</tr>
<tr>
<td>Issues of capacity management.</td>
<td></td>
</tr>
<tr>
<td>PROJECT TRAINING &amp; SUPPORT</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Project staffing, knowledge management and career development.</td>
<td></td>
</tr>
<tr>
<td>Project managers’ skill development.</td>
<td></td>
</tr>
<tr>
<td>Project/portfolio management competencies.</td>
<td></td>
</tr>
<tr>
<td>Audits and project recovery assistance.</td>
<td></td>
</tr>
<tr>
<td>PERFORMANCE MEASURES</td>
<td>0.75 d</td>
</tr>
<tr>
<td>Portfolio analysis and project progress.</td>
<td></td>
</tr>
<tr>
<td>Key Performance Indicators (KPI).</td>
<td></td>
</tr>
<tr>
<td>Measuring project costs and benefits.</td>
<td></td>
</tr>
<tr>
<td>Establishing KPI roles and responsibilities.</td>
<td></td>
</tr>
<tr>
<td>Assessing at-risk projects/portfolios and reporting progress.</td>
<td></td>
</tr>
<tr>
<td>Performance reports.</td>
<td></td>
</tr>
<tr>
<td>CONTINUOUS IMPROVEMENT</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Providing guidance and control.</td>
<td></td>
</tr>
<tr>
<td>Structuring PMO roles and responsibilities.</td>
<td></td>
</tr>
<tr>
<td>Validating compliance to standards and regulations.</td>
<td></td>
</tr>
<tr>
<td>Incorporating best practices and implementing change.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: PMO-EN-P
Only available as an In-House course.
Contact: ep.contact@ifptraining.com
E&P Project Logistics Management

Level: KNOWLEDGE

Purpose
This course aims to provide an overall view of the logistics issues of Oil & Gas upstream projects.

Audience
Engineers or technicians who will hold positions in an E&P logistics organization.

Learning Objectives
Upon completion of the course, participants will be able to:
- identify the stakes and challenges related to the development of an Oil & Gas field,
- explain the differences between road, sea and air transport,
- deal with HSE challenges.

Learning Assessment
Quiz at the end of the module.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

TRANSPORT
2.5 d
Road transport: characteristics of road transportation; transport of dangerous goods; risks, contracts, operation, maintenance; referential; infrastructure.
Air transport: aircraft, international referential.
Sea transport: vessels, marine inspection, port facilities, transportation of personnel, tanker loading, rig move, marine operations, weather.

LOGISTICS
2.5 d
Logistics base management: base concept, organization and sizing, material management, base operations.
Warehouse management: warehouse concept, warehouse organization, transit areas, shelter, workshop, lifting and handling operations.
Industrial risks.
Waste management.
E&P Project Control Tools

Level: SKILLED

Purpose
This course provides a comprehensive understanding of the techniques used to control a project.

Audience
Professionals who have already occupied a position within a project task force and need to understand the fundamental project control processes.

Learning Objectives
Upon completion of the course, participants will be able to:
- specify scope and interfaces of the project control function,
- apply different methods and tools related to project control,
- identify areas of concern and propose a corrective action plan.

Ways & Means
- The course is illustrated by numerous examples taken from actual Exploration & Production projects.
- A project case study is used stage-by-stage while constantly comparing the viewpoints of the company and the contractor.

Learning Assessment
Quiz.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content 5 days

PROJECT CONTROL FRAMEWORK
Project control process map. Project scope and execution strategy. Project control plan implementation.
1 d

SCHEDULE
1.5 d

COSTS
1.5 d

VALUE ANALYSIS & RISKS
Value analysis and engineering.
Risk management. Assess risks factors.
0.5 d

PERFORMANCE ASSESSMENT & CHANGES
Assess work process and productivity.
Report project performance assessment.
Change management.
0.5 d

Reference: PCGB-EN-P
Can be organized as an In-House course.

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>11 October</td>
<td>15 October</td>
<td>€3,680</td>
</tr>
</tbody>
</table>

Contact: ep.contact@ifptraining.com
E&P Technical Service Contracts

Course Content

INTRODUCTION
Different types of technical contracts.  

0.25 d

CONTRACTING STRATEGY

0.5 d

CALL FOR TENDER PROCEDURES

0.75 d

LEGAL ISSUES
Interfaces between patrimonial agreements and operations contracts. Legal issues and contract negotiation/administration.

0.25 d

LIABILITIES & INSURANCES

0.5 d

CONTRACT ARTICLES

0.75 d

CONTRACT ADMINISTRATION
Progress measurement and control. Change orders. Claim management.

0.5 d

PROCUREMENT ACTIVITIES

0.5 d

SPECIFIC TOOLS & REQUIREMENTS

1 d

Ways & Means
The course is illustrated by numerous examples taken from actual Exploration & Production projects.

Learning Assessment
Quiz.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: CONTRA-EN-P  Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com
Location Start Date End Date Tuition Fees excl. VAT
Rueil-Malmaison 25 October 29 October €3,680
E&P Technical Contract Negotiation

Course Content

METHODOLOGY
Case study A - LILAC project: negotiation of a claim.

0.5 d

METHODOLOGY APPLIED TO PROJECTS
Preparation and discussions wheels. Performance evaluation.
Case study B - TUMACO project: how to manage variations in time schedules.

0.5 d

SIMULATION 1
Case study: negotiation of a claim.

0.5 d

ARGUMENTS & SEARCHING FOR A COMPROMISE

0.5 d

SIMULATION 2
Case study: resolution of a technical dispute linked with problems occurred during transportation of equipment.

0.5 d

CLAIM MANAGEMENT
Methodology. Application to projects.
Case study C - CARACAL project: modernization of existing plant & construction of a new 16" pipeline.

0.5 d

SIMULATION 3
Case study D - PANALPINA project: negotiation of a transit contractor and the supplier of a sub-equipment required by CPY for the safety of its helicopter fleet.

0.5 d

INFLUENCE GAMES & GROUP DYNAMICS
Decode the games of influence. How to identify and manage them? Group dynamics: How to build a team? Legitimacy and credibility. Your group dynamic and the one of the other party. Final case study (compilation of cases A, B, C and D).

0.5 d

Reference: NEGO-EN-P  
Only available as an In-House course.

Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode - Advanced Certificate E&P Project Cost Estimation & Control Certification

Level: SKILLED

Purpose
This course provides a structured and comprehensive approach towards cost estimation and control of Oil & Gas projects.

Audience
Project engineers and managers, petroleum architects, cost/estimation engineers for new or existing facilities projects.

Learning Objectives
Upon completion of the course, participants will be able to:

- technically define a project to provide a comprehensive cost estimate,
- perform estimates using a variety of methods and tools,
- apply the main cost control techniques used throughout the project execution.

Ways & Means
Case studies from various projects.
Application for cost estimates on simple project.

Learning Assessment
Quiz.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Why an IFP Training Certification?

- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in E&P Project Cost Estimation & Control Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

OVERVIEW OF PROJECT
Integration of global context of the project. Project types, project stages. Project management process reminder, including deliverables at each stage. Project initiation. Feasibility studies. Preliminary project planning. Global schedule/constraints, cost estimate principles, main feasibility issues. Overview of project cost estimating methods. Scope and exclusions. Cost management process. Definitions, cost references, AACE classes. Order of magnitude estimate. Direct and Indirect costs. CAPEX vs. OPEX. Breakdown of the project according to the principle of Work Breakdown Structure (WBS)

ESTIMATION DURING THE VARIOUS PHASES OF THE PROJECT
Initial phase: Chilton factors, extrapolation method (comparison with similar projects). Typical accuracy and traps. Location factors.
Basic engineering/FEED: semi-detailed estimate, cost of main equipment and works. Owner costs. Key role of engineering studies, factored estimate.
Adjustments required to these methods in estimating the cost of revamping projects.

COST OPTIMIZATION

ASSESSMENT OF FINANCIAL RISKS & UNCERTAINTIES

COST CONTROL

Reference: ESTIM-EN-A Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

Table:

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>22 November</td>
<td>26 November</td>
<td>€3,680</td>
</tr>
</tbody>
</table>
E&P Project Operating Expenses Optimization

Level: SKILLED

Purpose
This course provides an insight on how to manage higher operating costs which invariably arise as production revenues decline but also how to mitigate risks and uncertainties associated with long-term cost forecasting.

Audience
Field engineers and operation managers who need to understand how to optimize operating expenses.

Learning Objectives
Upon completion of this course, participants will be able to:
- perform analysis of high and critical expense areas,
- assess gaps between budget and actual costs, planned and actual activities,
- identify cost performance improvement opportunities.

Ways & Means
The course is illustrated by numerous examples.

Learning Assessment
Quiz.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

2 days

IDENTIFY OPEX SAVINGS
Use of an open standard technology. Increased information for better operation, accuracy of measurement and control. Enhancement in control function and the performance. Improved throughput. Online diagnosis enables true preventive maintenance. Improve troubleshooting.

INCREASING PLANT AVAILABILITY

MANAGING OPERATION & PRODUCTION COSTS
Improving maintenance for fewer process upsets and high availability, quality and productivity, alert capabilities for better operation, accuracy of measurement and control. Data access for business intelligence.

MANAGING MAINTENANCE COSTS

CONTROL IN THE FIELD

MAXIMIZING ASSETS UTILIZATION
Field controllers. Equipment monitoring. Role-based diagnostics.

MANAGING MAINTENANCE OPERATIONS

Reference: OPEX-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com
E&P Project Planning & Scheduling Workshop

Level: SKILLED

Purpose
This course provides participants with the know-how to elaborate, optimize and control a project schedule.

Audience
Project engineers responsible for building, optimizing and controlling the schedule of upstream projects.

Learning Objectives
Upon completion of the course, participants will be able to:
- take into consideration the different project execution phases when building the schedule,
- understand the advantages and drawbacks of the various schedule computer tools available on the marketplace,
- create the detailed planning of a project on Microsoft Project or Primavera according to the client’s software).

Ways & Means
- Examples of onshore and offshore exploration and production projects.
- Adaptable case studies on MS Project/Primavera.

Learning Assessment
Quiz.

Prerequisites
- Provide evidence of a professional experience of at least 1 month, related to the concerned field.
- Know the main basic functions of MS Project.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: PSPC-EN-P
Only available as an In-House course.

This course is also available in French: PSPCFR-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com

Course Content

Planning & Scheduling Processes
Planning basis, scheduling sequence and critical path. Schedule updates reflecting actual performance. Progress measurement and control of each execution phase (engineering, procurement and construction).

Onshore Case Study Using MS Project
Presentation of a fictitious revamping onshore project (which entails a plant shutdown) to be used as case study. Demonstration of software functions. Critical path visualization. Input and coding of activities, tasks and resources. Reporting levels. Physical progress update for reporting purposes.

Offshore Case Study Using Primavera
Presentation of a fictitious deep offshore project to be used as a case study. Demonstration of software functions. Definition of the list of project activities to be carried out according to the project scope of works. Input and coding of activities, tasks and resources necessary to project execution. Sequence of the activities and estimation of their duration. Probabilistic approach in scheduling. Critical path visualization. Various types of progress (physical, cost, hours). Follow-up methods. Relationship between cost progress and schedule.

Ways & Means
- Examples of onshore and offshore exploration and production projects.
- Adaptable case studies on MS Project/Primavera.

Learning Assessment
Quiz.

Prerequisites
- Provide evidence of a professional experience of at least 1 month, related to the concerned field.
- Know the main basic functions of MS Project.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: PSPC-EN-P
Only available as an In-House course.

This course is also available in French: PSPCFR-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com
Upstream Project Construction Techniques

Level: SKILLED

Purpose
This course provides a thorough understanding of construction techniques and is reinforced by an optional site visit.

Audience
Professionals from the upstream sector that are responsible for managing construction activities on site.

Learning Objectives
Upon completion of the course, participants will be able to:

▸ evaluate and manage construction site risks,
▸ manage construction projects with efficient skills,
▸ monitor and control construction quality.

Ways & Means
▸ Exercises for each step of the construction process.
▸ Numerous examples taken from Oil & Gas construction activities.

Learning Assessment
Quiz at the end of the module.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>5 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTRUCTION WORKS &amp; THEIR CONTEXT</td>
</tr>
<tr>
<td>Overview of E&amp;P projects. Importance and criticality of the construction phase. Main areas of concern.</td>
</tr>
<tr>
<td>CIVIL &amp; STRUCTURAL WORKS</td>
</tr>
<tr>
<td>ELECTRICAL WORKS</td>
</tr>
<tr>
<td>Potential issues. Installation of power and instrument cables.</td>
</tr>
<tr>
<td>STRUCTURES</td>
</tr>
<tr>
<td>PIPING</td>
</tr>
<tr>
<td>CATHODIC PROTECTION &amp; PAINTING</td>
</tr>
<tr>
<td>Introduction to corrosion. Cathodic protection. Painting and coating.</td>
</tr>
<tr>
<td>CRANES &amp; LIFTING OPERATIONS ON SITE</td>
</tr>
<tr>
<td>SITE VISIT</td>
</tr>
<tr>
<td>Visit of a construction yard in order to illustrate the techniques presented during the first three days of training. Such a visit is to be organized with the assistance of the company requesting the training in order to select the most suitable local construction contractor.</td>
</tr>
</tbody>
</table>

Reference: CONST1-EN-P Only available as an In-House course. Contact: ep.contact@ifptraining.com
Upstream Project Construction Site Administration

Level: SKILLED

Purpose
This course provides an overview of team management, site control scheduling, cost control, contracts, precommissioning, commissioning and quality.

Audience
Field engineers and supervisors involved in the construction activities of an upstream project.

Learning Objectives
Upon completion of the course, participants will be able to:
- evaluate and manage construction site risks,
- apply construction management skills,
- monitor and control quality, schedule, and costs during construction activities.

Ways & Means
- Exercises for each step of the construction process,
- Numerous examples taken from Oil & Gas construction activities.

Learning Assessment
Quiz at the end of the module.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

TEAM MANAGEMENT
2 d

SITE CONTROL SCHEDULE, COSTS & CONTRACTS
2 d

PRECOMMISSIONING, COMMISSIONING & QUALITY
1 d
Quality control of work on site, non-conformity reports, technical queries, site instructions. Material control: warehouses, storage areas, receipt/control of main equipment and bulk material. Mechanical completion, commissioning and start-up of the facilities.

Reference: CONST2-EN-P. Only available as an In-House course.
Contact: ep.contact@ifptraining.com

www.ifptraining.com
Upstream Project Construction HSE Management

Course Content 5 days

SAFETY RISK MANAGEMENT ON THE FIELD 0.5 d
HSE prevention plan: definition and evaluation of risk, subcontractor organization and training.

HSE MANAGEMENT 1.5 d

ON SITE HSE 0.5 d
Surveillance: surveillance plan, field HSE audits, safety tour, behavioral observations, subcontractor HSE evaluation. Monitoring of SIMOPS activities.

AUDITS 0.5 d
Objectives of an audit. Pre-audit preparations: boundaries, expectations, checklists, plans. Findings vs. expectations.

HAZARD IDENTIFICATION & RISK ASSESSMENT OF MAINTENANCE & CONSTRUCTION WORKS 1.5 d
Risk assessment and recommended mitigation measures associated to lifting: manual and mechanical, Work at height/over water/diving, use of tools, radioactive sources, electrical equipment, confined space works, hydrostatic testing, welding/grinding/cutting.

SECURITY 0.5 d
Security management: definition, site management with regards to external events (robbery, kidnapping, data), security control and technologies.

Reference: CONST3-EN-P Only available as an In-House course. Contact: ep.contact@ifptraining.com
Offshore Oil & Gas Project Installation

Level: SKILLED

Purpose
This course provides a thorough understanding of offshore installation and works, management challenges and control tools.

Audience
Field engineers and supervisors from the upstream sector who are responsible for the overall management of construction site activities.

Learning Objectives
Upon completion of the course, participants will be able to:
- differentiate among the various installation processes,
- apply installation management skills,
- monitor and control quality and schedule during installation.

Ways & Means
This course is illustrated by:
- exercises for each step of the construction process,
- numerous examples taken from Oil & Gas construction activities.

Learning Assessment
Quiz at the end of the module.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

DEVELOPMENT CONCEPTS 1 d

CONTRACTING MATTERS 0.75 d
Field development process. EPCI contracts.

KEY STAKEHOLDERS & THEIR ROLE 0.25 d

ORGANIZATION & OPERATIONS MANAGEMENT 0.5 d
Organization: project objectives, development studies, project management team, installation campaign. Offshore operations management: prior to offshore operations, work on offshore site. Management of offshore operations. Reporting.

OFFSHORE OPERATIONS 2.5 d

Reference: CONST4-EN-P. Only available as an In-House course.
## Upstream Project Construction Works Supervision

**Level:** SKILLED

### Purpose
This course provides transverse experience, know-how and soft skills that are essential to construction supervising positions.

### Audience
Managers, engineers, plant supervisory staff (construction, maintenance, operation) and contractor staff (engineering contractors and constructors) in charge of upstream Oil & Gas projects.

### Learning Objectives
Upon completion of the course, participants will be able to:
- apply proven practices within operational situations,
- define a suitable organization and execution plan, adapted to the plant requirements,
- manage critical interfaces with operational staff, at each step of the project implementation,
- identify and manage safety, health and environment issues during project design and execution.

### Ways & Means
Photos and videos will be used to illustrate the issues.

### Learning Assessment
Quiz at the end of the module.

### Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

### Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

## Course Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONSTRUCTION WORKS FRAMEWORK</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Roles and responsibilities of stakeholders in an Oil &amp; Gas project.</td>
<td></td>
</tr>
<tr>
<td>Different stages of an Oil &amp; Gas project.</td>
<td></td>
</tr>
<tr>
<td>Importance of preliminary stages.</td>
<td></td>
</tr>
<tr>
<td>Field modification works: responsibilities, constraints and challenges.</td>
<td></td>
</tr>
<tr>
<td>Working on operating facilities.</td>
<td></td>
</tr>
<tr>
<td>Roles and constraints of field operators.</td>
<td></td>
</tr>
<tr>
<td>Site organization, typical site construction manual.</td>
<td></td>
</tr>
<tr>
<td>Construction contractor organization and relationship with it.</td>
<td></td>
</tr>
<tr>
<td><strong>HSE ISSUES</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Typical construction risk analysis.</td>
<td></td>
</tr>
<tr>
<td>Organization of operations on the facilities.</td>
<td></td>
</tr>
<tr>
<td>SIMultaneous OPerationS (SIMOPS).</td>
<td></td>
</tr>
<tr>
<td>Work permits (instructions, procedure, audit).</td>
<td></td>
</tr>
<tr>
<td><strong>WORK INSTRUCTIONS &amp; QUALITY ISSUES</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Procedures to be enforced, their objectives, base principles and validation process.</td>
<td></td>
</tr>
<tr>
<td>Learning how to read the plans.</td>
<td></td>
</tr>
<tr>
<td>How to supervise quality of prefabricated and site works.</td>
<td></td>
</tr>
<tr>
<td>Quality control at supplier’s premises.</td>
<td></td>
</tr>
<tr>
<td>Visiting a construction contractor.</td>
<td></td>
</tr>
<tr>
<td>Visit reports.</td>
<td></td>
</tr>
<tr>
<td><strong>CONSTRUCTION SUPERVISION</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Preparation and organization of successful meetings with the contractor.</td>
<td></td>
</tr>
<tr>
<td>Basic notions of welding (principles and used techniques).</td>
<td></td>
</tr>
<tr>
<td>Follow-up of works for each discipline (piping, E&amp;I and mechanical).</td>
<td></td>
</tr>
<tr>
<td>Pre-commissioning and commissioning.</td>
<td></td>
</tr>
<tr>
<td>Planning, cost and schedule control.</td>
<td></td>
</tr>
<tr>
<td><strong>RELATIONSHIPS &amp; TEAM WORK</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Roles and responsibilities of team leaders (leadership and relationships with the other stakeholders).</td>
<td></td>
</tr>
<tr>
<td>Qualification, knowledge and aptitude.</td>
<td></td>
</tr>
<tr>
<td>Reflexes, rules and obligations.</td>
<td></td>
</tr>
<tr>
<td>Non-conflictual interpersonal relationships.</td>
<td></td>
</tr>
<tr>
<td>Ethics.</td>
<td></td>
</tr>
<tr>
<td>Feedback and lessons learned.</td>
<td></td>
</tr>
<tr>
<td>Proper communication.</td>
<td></td>
</tr>
<tr>
<td>Use of emails.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: CONSUP-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: CONSUP-FR-P. Please contact us for more information.
Upstream Project Abandonment Operations

**Level:** KNOWLEDGE

**Purpose**

Presents the various steps of decommissioning, with a smooth transition from operation to cessation of production (CoP).

**Audience**

Engineers and technicians whose activities are related to the decommissioning of Oil & Gas facilities either onshore or offshore.

**Learning Objectives**

Upon completion of the course, participants will be able to understand:

- The regulatory and technical complexities of late life operations and decommissioning,
- Cessation of production (CoP) preparation,
- Decommissioning activities organization.

**Ways & Means**

Highly interactive course delivered by experts of the E&P industry:

- Case studies.
- Videos illustrating the main aspects of dismantlement.

**Learning Assessment**

Quiz.

**Prerequisites**

Provide evidence of a professional experience of at least 1 month, related to the concerned field.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

- **DECOMMISSIONING PROJECTS MANAGEMENT** 1 d
  - Case study: decommissioning cost liability estimation.

- **PERMITTING & REGULATORY COMPLIANCE** 1 d
  - Regulatory framework. Decommissioning execution plan.
  - Environmental impact assessment: pre/post decommissioning surveys, soil, surface water and ground water pollution control, soil pollution remediation.
  - Understand and reduce risk.
  - Case study: integrated decommissioning planning.

- **PLATFORM PREPARATION - SAFETY IN DECOMMISSIONING ACTIVITIES** 1 d
  - Topsides preparation, modules separation and preparation for lifting.
  - Risk related to process equipment decommissioning and preparation for lifting; associated safety procedures.
  - Subsea preparation.
  - Compliance with government and industry guidelines and standards.
  - Ongoing operational verification of safety critical elements.
  - Class and certification of innovative decommissioning.
  - Case study: decommissioning cost liability estimation.

- **WELL PLUGGING & ABANDONMENT (P&A)** 1 d
  - Well abandonment overview. Short term and long term well integrity. Types of well completions.
  - Plugging and abandonment methods, procedures and technologies.
  - Remedial squeeze cementing and cement-plug placement as permanent well-barrier elements.
  - Conductor removal.

- **PLATFORM REMOVAL** 0.5 d
  - Transport barge and lifting capacity requirements.
  - Topsides removal.
  - Subsea structure (jacket) removal.
  - Seabed removal (templates, pilings).

- **PIPELINE DECOMMISSIONING** 0.25 d
  - Pipeline decommissioning and burial procedure.

- **MATERIALS DISPOSAL & SITE CLEARANCE** 0.25 d
  - Platform materials disposal and recycling.
  - Site clearance: pre/post decommissioning surveys, site clearance assessment (divers, ROV, test trawling).

Reference: DISMGB-EN-P. Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
E&P Project Construction Certification

Level: KNOWLEDGE

Purpose
This course presents the most critical choices and different HSE constraints to cope with in order to deliver surface production facilities that meet the various stakeholders’ objectives.

Audience
Engineers who already have a global understanding of Oil & Gas Projects and need to further develop their knowledge of the main challenges associated with the construction of surface facilities.

Learning Objectives
Upon completion of the course, participants will be able to:
- manage construction phases: engineering, procurement, construction and commissioning,
- master technology, operating constraints and maintenance of static and rotating equipment,
- identify the hazards and assess the risks associated to construction activities,
- establish the responsibilities of each actor regarding HSE subjects,
- apply different methods and tools to effectively control projects,
- plan and organize the start-up and acceptance of processing units with respect to specific constraints,
- negotiate technical service contracts for large Oil & Gas projects.

Ways & Means
- Each phase of the training is illustrated by several exercises, examples, drawings, photos and videos taken from actual Oil & Gas projects.
- Practical case studies in each module can account for some 50% of training time.

Learning Assessment
Quiz at the end of each module.

Prerequisites
Provide evidence of a professional experience of at least 1 month, related to the concerned field.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in E&P Project Construction Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

OVERVIEW OF OIL & GAS PRODUCTION & PROCESSING 5 d

STATIC EQUIPMENT TECHNOLOGY & SIZING 5 d

ROTATING EQUIPMENT TECHNOLOGY & SELECTION 5 d

SAFETY ENGINEERING 10 d

CONSTRUCTION TECHNIQUES 5 d

PRECOMMISSIONING, COMMISSIONING & START-UP 5 d

HSE IN CONSTRUCTION ACTIVITIES 5 d

SIMULTANEOUS OPERATIONS 5 d

PROJECT CONTROL 5 d

HSE MANAGEMENT OF CONTRACTORS 5 d

HSE MANAGEMENT OF LOGISTICS 5 d
Land transportation. Marine and river transportation. Air transportation. Storage.

NEGOTIATION SKILLS 5 d
Methodology and application to projects. Arguments and searching for a compromise. Claim management. Influence games and group dynamics.

Reference: CONENG-EN-P Only available as an In-House course. Contact: ep.contact@ifptraining.com
E&P Construction Superintendent Certification

Course Content

**OIL, WATER & GAS PROCESSING**

**ADVANCED TREATMENTS**
Oil & Gas sweetening. Liquefied Natural Gas, principles and liquefaction processes. Liquid Natural Gas treatments. Actual malfunctions of facilities and teamwork investigation.

**CONSTRUCTION TECHNIQUES**
15 d
Construction:
- Lifting and handling. Equipment erection on site. Civil works, structural steel, equipment layout. Piping (welding and weld controls), and installation (erection, pipe-racks, supports). Electrical and instrumentation. Painting, insulation works.
- Offshore works:
  - Transportation and installation barges, vessels. Marine warranty surveys.
  - Offshore and deep offshore operations. Anchoring, positioning.
  - Hook-up, pre-commissioning. Offshore organization.
- Oil & Gas equipment:
  - Unshore sites. Offshore facilities.
  - SP&S and other subsea equipment. Pipelines (onshore & offshore).
- LNG tanks. Terminals (onshore & offshore).

**HSE MANAGEMENT & SAFETY ENGINEERING**
15 d
HSE risks, flammability, overpressure systems. PSV, flare and flare network, closed and open drains.
- Safety in operation: use of utilities, degassing/inerting, confined space entry, start-up & shutdown.
- Safety during construction and maintenance works: lifting & rigging, work at height, electrical safety.
- Work permit system. SIMultaneous OPerations (SIMOPS) management.
- Safety systems: HIPS, ESD, EOP, F&G, USS. Safety logic diagrams.
- Incident analysis and reporting. Root cause analysis.

**SHUTTDOWNS: ORGANIZATION, COORDINATION & MANAGEMENT**
5 d
Preparation of the works:
- Tasks. Integration of the actions followed by the superintendent.
- Schedule and organization charts of preparation works and of the realization works.
- Subcontracting level, HSE impact.
- Organization of the works:
  - Analysis of the works: range of coordination, definition of the resources, duration, weather conditions, technical constraints or HSE specific requirements. Integration of the construction site constraints in calls for tender and documentation.
  - Adaptation of the analysis to the role and to the capacity of preparation of the Company.
  - Application: organization of a shutdown sequence with hot works.
  - Book of shutdown works: role, constitution. Schedule: sequence, schedule with bars, margins, critical path, leveling of resources, general schedule, by company, by building trade, by device.
  - Application: elaboration of a coordination schedule.
  - Quality, pre-commissioning, commissioning, transfer to production. Reports.

**MULTIDISCIPLINARY CONFERENCES**
5 d
Terminals and FS0/FS0. Deep offshore: development challenges and specific operating constraints.
Field Operations Initiative (FOI): objectives and methodology.

**PROJECT CONTROL**
5 d
Management of contracts:
- Contract strategy, documentation, call for tender, tender analysis and choice of contractor.
- Planning and costs:
  - Schedule. Trend, adverse trend. Schedule analysis.
  - Cost. Follow-up. Variation.

**WORK METHODS & COMMUNICATION**
2 d
Work methods and team management.
Written and oral communication.

**REVIEW & FINAL ASSESSMENT**
3 d

Prerequisites
Engineering degree or equivalent experience in an Oil & Gas company.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in E&P Construction Superintendent Certification.
- Ready-to-use skills.

Ways & Means
- Several applications and illustrations (videos, samples, tools…).
- Intensive teamwork.
- Use of dynamic training simulations.

Learning Assessment
Quiz at the end of each module.

Audience
Professionals with a significant experience in Oil & Gas surface production who are called upon to become a construction superintendent.

Purpose
This course provides an in-depth technical knowledge of Oil & Gas processing operations, along with the managerial and communication skills needed for construction superintendents.

Learning Objectives
Upon completion of the course, participants will be able to:
- understand all issues of the overall production process, from reservoir to offloading facilities,
- anticipate production and maintenance constraints on works,
- understand state-of-the-art Oil & Gas construction techniques,
- identify HSE management rules and individual responsibilities,
- apply methods and communication skills,
- anticipate anomalous events and react effectively,
- propose well-argued plans to improve construction activities.

Level: SKILLED

Certification?
Why an IFP Training Certification?
- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in E&P Construction Superintendent Certification.
- Ready-to-use skills.

Offshore & Completion Engineering
Reservoir & Field Development
Project Management
Surface Facilities Engineering
Production Engineering
Offshore
E&P Chain
Gas
Unconventional
HSE
www.ifptraining.com
275
ep.contact@ifptraining.com Reference: CONSH-EN-P
Only available as an In-House course. Contact: ep.contact@ifptraining.com

Level: SKILLED

Purpose
This course provides an in-depth technical knowledge of Oil & Gas processing operations, along with the managerial and communication skills needed for construction superintendents.

Audience
Professionals with a significant experience in Oil & Gas surface production who are called upon to become a construction superintendent.

Learning Objectives
Upon completion of the course, participants will be able to:
- understand all issues of the overall production process, from reservoir to offloading facilities,
- anticipate production and maintenance constraints on works,
- understand state-of-the-art Oil & Gas construction techniques,
- identify HSE management rules and individual responsibilities,
- apply methods and communication skills,
- anticipate anomalous events and react effectively,
- propose well-argued plans to improve construction activities.

Ways & Means
- Several applications and illustrations (videos, samples, tools…).
- Intensive teamwork.
- Use of dynamic training simulations.

Learning Assessment
Quiz at the end of each module.

Prerequisites
Engineering degree or equivalent experience in an Oil & Gas company.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in E&P Construction Superintendent Certification.
- Ready-to-use skills.

Ways & Means
- Several applications and illustrations (videos, samples, tools…).
- Intensive teamwork.
- Use of dynamic training simulations.

Learning Assessment
Quiz at the end of each module.

Prerequisites
Engineering degree or equivalent experience in an Oil & Gas company.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in E&P Construction Superintendent Certification.
- Ready-to-use skills.
Operational HSE

- HSE Superintendent Certification ......................................................... p. 277
- HSE in Surface Production Operations .................................................... p. 278
- Positive HSE Culture ........................................................................ p. 279
- HSE in Maintenance & Construction Activities ........................................ p. 280
- Occupational Safety .......................................................................... p. 281
- Occupational Health ......................................................................... p. 282

Process Safety & Safety Engineering

- Process Safety Engineer Certification ...................................................... p. 283
- Fundamentals of Process Safety ................................................................. p. 284
- Process Safety Management .................................................................. p. 285
- Safety Engineering Certification ................................................................. p. 286
- Safety Engineering - Module 1 ................................................................. p. 287
- Safety Engineering - Module 2 ................................................................. p. 288
- Safety Engineering - Module 3 (Project) .................................................... p. 289

Sustainable Development

- Environmental & Social Risk Management .............................................. p. 290
- Social Risk Management ........................................................................ p. 291
- Environmental Management .................................................................... p. 292
- Environmental Pollution & Waste Management ........................................ p. 293

HSE Management

- HSE Engineer Certification ..................................................................... p. 294
- HSE Management .................................................................................. p. 295
- Emergency Response Planning ................................................................. p. 296
- HSE for Support Personnel .................................................................... p. 298
- Energy Transition Engineer Certification .................................................. p. 299
**Vocational Certificate**

**HSE Superintendent Certification**

**Course Content**

**58 days**

**INTRODUCTION**

Welcome and program overview. Entry test. Units. Dimensions.

**DOWNHOLE PRODUCTION - WELL PERFORMANCE - PRODUCTION FUNDAMENTALS**


**OIL, WATER & GAS PROCESSING**

Oil processing; required specifications, stabilization, dehydration, desalting. Production and injection water treatment: water quality requirements and associated treatments. Gas processing; required specifications, dehydration, hydrates, consequences and treatments; Natural Gas Liquids recovery.

**OFFSHORE DEVELOPMENTS, FLOW ASSURANCE**


**TERMINAL, FSO & FPSO**

Overview of oil terminals. FSO & FPSO technologies. Metering of oil quantities.

**BEHAVIORAL MANAGEMENT**

Teamwork management, written and oral communication. Active listening and communication tools. Team cohesion and stress management. Problems analysis and investigation: tools and behaviors. How to better analyze and know oneself.

**INSTRUMENTATION & PROCESS CONTROL - ELECTRICITY**


**ROTATING MACHINERY**

Pumps: centrifugal pumps (types, technology, auxiliaries, performances); volumetric pumps. Compressors: centrifugal compressors; rotor, stator, bearings, shafts, seals balance; reciprocating compressors (frame, cylinders, pistons and rings, bearings, lubrication, cooling). Gas turbines: compression, combustion, expansion, performances, technology. HSE concerns.

**CORROSION, INSPECTION & INTEGRITY**

Corrosion mechanisms. Types of corrosions in the Oil & Gas industry. Corrosion prevention and monitoring, fundamentals of inspection.

**HSE IN SURFACE PRODUCTION OPERATIONS**

Main hazards: inflammability, toxicity, pressure, temperature. Risk assessment tools: Job Safety Analysis (JSA). Risks in process operation: Static equipment, rotating machines, electricity, utilities. Safe isolation and start-up; degassing-inerting, mechanical lock-out, PPE. Permit to work; responsibilities, processes, risk types. Organizational framework; human factors; HSE management system.

**SAFETY ENGINEERING**


**HSE MANAGEMENT**


**CRISIS MANAGEMENT**

Emergency response plan: response levels, crisis management teams. Rescue planning and resources, role and responsibilities. Training and information, emergency situations responses exercises. Fire protection and detection systems, strategies and typical scenarios. Firefighting equipment, passive, active, fixed, mobile.

**ENVIRONMENTAL MANAGEMENT**


**FINAL ASSESSMENT**

2 d

---

**Why an IFP Training Certification?**

- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in HSE Superintendent Certification.
- Ready-to-use skills.

**More info**

The training duration includes 2 days of written and oral competency evaluation. This training is organized together with the Production and Maintenance Superintendents trainings. The actual scheduling of the common and specific modules of the three sessions may imply a slightly different sequencing of the modules.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

**Reference:** HSES3-EN-P  
**Contact:** ep.contact@ifptraining.com

---

**This course is also available in French: HSES3-FR-P. Please contact us for more information."
HSE in Surface Production Operations

Course Content

**OPERATIONS & HSE**  
0.25 d  
Hazards and risks incurred. Consequences.  
Risk management means: equipment, organizational and human aspects.

**MAIN HAZARDS OF HYDROCARBON PROCESSING**  
0.75 d  
Flammability: flame ignition and propagation principles. Types of combustibles, oxidizers and most common ignition sources in process facilities.  
Toxicity: exposure limits. Specific hazards associated to H₂S. Use of Safety Data Sheet (SDS).  
Fluid behavior and related hazards: vessel pressure, consequences of temperature variation (thermal expansion, vaporization, vacuum, water hammer).  
Fundamentals of pressure relief equipment: pressure relief valves, rupture disks, vacuum protection, flame arrestors.

**RISK ASSESSMENT TOOLS - JOB SAFETY ANALYSIS**  
0.5 d  
Fundamentals of risk assessment process.  
Job Safety Analysis (JSA) procedure and steps.  
JSA exercise.

**PERMIT TO WORK SYSTEM PROCEDURE**  
0.5 d  
Permit To Work (PTW) system. Objectives. Roles and responsibilities.  
Main elements of PTW system. Typical approval process and information flowchart.  
Master permit and associated certificates.  
Management of shift and rotation handover. Permit renewals.  
New technologies applied to PTW system. Digital PTW.

**SAFE ISOLATION OF PLANT & EQUIPMENT**  
1.5 d  
Management of isolations.  
Lock-out/tag-out procedure.  
Steps of process isolations.  
Degassing-mixing: steam, nitrogen, water, vacuum, work permits…  
Risks associated to operations of depressurization and drainage toward: flare, slops, tanks, oily water.  
Start-up: checks, accessibility and cleanliness, line up, deaeration, seal tests, oil in.  
Personal Protective Equipment (PPE).

**HSE IN MAINTENANCE & CONSTRUCTION WORKS**  
0.5 d  
Risks associated to construction and maintenance works:  
Lifting and rigging operations.  
Access and working in confined space. Ventilation and atmosphere analysis: oxygen content explosivity, toxicity.  
Works at height: ladders, scaffolding, mobile elevated working platforms…  
Safe use of tools.  
Radioactive sources.

**ORGANIZATIONAL FRAMEWORK - HUMAN FACTORS**  
0.5 d  
Introduction to HSE management system.  
SIMultaneous OPerations (SIMOPS) management.  
Management of change.  
Downgraded situations.  
Human factors in risk management.

**ENVIRONMENTAL MANAGEMENT IN FIELD OPERATIONS**  
0.5 d  
Main concepts.  
Tools to manage sustainability.  
Potential environmental impacts in field operations.  
Sustainability reporting. Introduction to regulatory framework.

Reference: EPSAFOP-EN-P  
Can be organized as an In-House course.  
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>27 September</td>
<td>1 October</td>
<td>€3,680</td>
</tr>
</tbody>
</table>

This course is also available in French: EPSAFOP-FR-P. Please contact us for more information.
This course can be adapted to virtual classroom mode

Positive HSE Culture

Level: KNOWLEDGE

Purpose
This course aims to integrate HSE in the decision making process of the participants.

Audience
Anyone working in the Oil & Gas industry.

Learning Objectives
Upon completion of the course, participants will be able to:
- describe the positive safety culture features and apply them to their decision making process,
- participate in an HSE observation visit,
- contribute to build a positive HSE culture in the organization.

Ways & Means
Several case studies.

Learning Assessment
Continuous assessments all-along the program.

Prerequisites
Provide evidence of a professional experience of at least 3 months related to Oil & Gas process industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Element</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEMENTS OF POSITIVE HSE CULTURE</td>
<td>1 d</td>
</tr>
<tr>
<td>What is HSE culture. HSE culture assessment.</td>
<td></td>
</tr>
<tr>
<td>Elements of positive HSE culture: informed, reporting, learning, flexible and just.</td>
<td></td>
</tr>
<tr>
<td>Case studies.</td>
<td></td>
</tr>
<tr>
<td>Characteristics of positive HSE culture vs. negative HSE culture.</td>
<td></td>
</tr>
<tr>
<td>Importance and barriers for communication.</td>
<td></td>
</tr>
<tr>
<td>HSE LEADERSHIP</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Elements defining HSE leadership in the organization.</td>
<td></td>
</tr>
<tr>
<td>Characteristics of HSE leaders.</td>
<td></td>
</tr>
<tr>
<td>HUMAN FACTORS &amp; BEHAVIORS</td>
<td>0.75 d</td>
</tr>
<tr>
<td>Analysis of incidents. Underlying and root causes.</td>
<td></td>
</tr>
<tr>
<td>Human error. Modelisation of decision making process.</td>
<td></td>
</tr>
<tr>
<td>Analysis of behavior. Types of approaches to risk.</td>
<td></td>
</tr>
<tr>
<td>Observation of behavior. Participate in HSE observation visits.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: POSCULT-EN-A
Only available as an In-House course.
Contact: ep.contact@ifptraining.com

www.ifptraining.com
## HSE in Maintenance & Construction Activities

### Level: KNOWLEDGE

### Purpose

This course provides a thorough understanding of risks related to products, equipment and different operations involved in the execution of construction/maintenance works.

### Audience

Engineers, technicians and operators involved in the supervision of construction and maintenance of Oil & Gas field processing facilities.

### Learning Objectives

Upon completion of the course, participants will be able to:

- identify the hazards and assess the risks associated to a construction/maintenance work,
- describe the main elements and responsibilities of the Permit To Work (PTW) system,
- identify the environmental impacts of the activity and to plan the appropriate mitigation measures,
- identify the main HSE challenges associated with the management of contractors,
- lead a team carrying out a safety audit of construction/maintenance works.

### Ways & Means

- Several applications and illustrations.
- Several case studies and teamwork sessions.

### Learning Assessment

Continuous assessments all-along the program.

### Prerequisites

Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

### Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

### Course Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPERATIONS &amp; HSE</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Hazards and risks incurred - Consequences.</td>
<td></td>
</tr>
<tr>
<td>Risk management means: equipment, organizational and human aspects.</td>
<td></td>
</tr>
<tr>
<td><strong>MAIN HAZARDS OF HYDROCARBON PROCESSING</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Flammability: flame ignition and propagation principles; types of combustibles, oxidizers and most common ignition sources in process facilities.</td>
<td></td>
</tr>
<tr>
<td>Toxicity: exposure limits; specific hazards associated to H₂S; use of Safety Data Sheet (SDS).</td>
<td></td>
</tr>
<tr>
<td>Fluid behavior and related hazards: vessel pressure, consequences of temperature variation (thermal expansion, vaporization, vacuum, water hammer).</td>
<td></td>
</tr>
<tr>
<td><strong>RISK ASSESSMENT TOOLS - JOB SAFETY ANALYSIS</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td><strong>PERMIT TO WORK SYSTEM PROCEDURE</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Permit To Work (PTW) system. Objectives. Roles and responsibilities.</td>
<td></td>
</tr>
<tr>
<td>Main elements of PTW system. Typical approval process and information flowchart.</td>
<td></td>
</tr>
<tr>
<td>Master permit and associated certificates. Management of shift and rotation handover. Permit renewals. New technologies applied to PTW system. Digital PTW.</td>
<td></td>
</tr>
<tr>
<td><strong>HAZARD IDENTIFICATION &amp; RISK ASSESSMENT OF MAINTENANCE &amp; CONSTRUCTION WORKS</strong></td>
<td>1.5 d</td>
</tr>
<tr>
<td>Risk assessment and recommended mitigation measures associated to:</td>
<td></td>
</tr>
<tr>
<td><strong>ENVIRONMENTAL MANAGEMENT IN MAINTENANCE &amp; CONSTRUCTION OPERATIONS</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Main concepts. Potential environmental impacts in maintenance and construction operations. Waste management principles and strategies for planning and implementation.</td>
<td></td>
</tr>
<tr>
<td><strong>ORGANIZATIONAL FRAMEWORK - HUMAN FACTORS</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td><strong>HSE MANAGEMENT OF CONTRACTORS</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Contractor management as a key element of HSE Management system. Definition of elements for HSE contractor management from selection process to final performance evaluation. HSE risk assessment of contract scope.</td>
<td></td>
</tr>
<tr>
<td><strong>AUDITS - MEANS OF IMPROVING THE HSE PERFORMANCE</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Objectives of an audit. Pre-audit preparations: audit boundaries, expectations, audit checklists, audit plans. Audit: findings versus expectations.</td>
<td></td>
</tr>
</tbody>
</table>

---

Reference: EPWORK-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: EPWORK-FR-P. Please contact us for more information.
This course can be adapted to virtual classroom mode

**Occupational Safety**

<table>
<thead>
<tr>
<th>Level: KNOWLEDGE</th>
</tr>
</thead>
</table>

**Purpose**
This course provides a thorough understanding of expectations and mandatory requirements regarding occupational safety. To give insight regarding operational implementation of a safe workplace within Oil & Gas facilities.

**Audience**
Safety officers, HSE supervisors, offshore installation managers, field managers.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- deepen knowledge of codes and regulations relative to occupational health and safety,
- evaluate health and safety performance indicators,
- assess an activity in order to promote a safe workplace,
- audit health and safety elements in a workplace.

**Ways & Means**
- Several applications and illustrations.
- Several case studies and teamwork sessions.

**Learning Assessment**
Continuous assessments all-along the program.

**Prerequisites**
Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

### Course Content 5 days

**INTRODUCTION TO OCCUPATIONAL HEALTH & SAFETY** 0.5 d
Historical approach to occupational health and safety. Introduction to safety culture. Roles and responsibilities of the different elements of the organization. Safety leadership characteristics. Roles of safety leaders. Communication and motivation. Safety communication examples.

**WORKPLACE ACCIDENTS & OCCUPATIONAL DISEASES** 0.5 d

**OCCUPATIONAL SAFETY MANAGEMENT** 2 d

**OCCUPATIONAL HEALTH & HYGIENE MANAGEMENT** 1 d

**ERGONOMICS & HUMAN FACTORS** 0.5 d

**OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM - AUDIT** 0.5 d

Reference: OCCSAF-EN-A
Only available as an In-House course.
This course is also available in French: OCCSAF-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com

www.ifptraining.com

281
This course can be adapted to virtual classroom mode

Occupational Health

Level: KNOWLEDGE

Purpose
This course provides a thorough understanding of expectations and mandatory requirements regarding occupational health and hygiene.

Audience
Safety officers, HSE supervisors, human resources personnel, field managers.

Learning Objectives
Upon completion of the course, participants will be able to:
- identify and assess the basic occupational health hazards in workplace,
- explain the relevant elements of fatigue management,
- identify the most important elements and possible impacts of ergonomics and psychosociology at workplace.

Ways & Means
- Several applications and illustrations.
- Several case studies and teamwork sessions.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

HEALTH & HYGIENE RISK ASSESSMENT
1.5 d

MEDICAL EMERGENCY RESPONSE
0.25 d
Medical emergency evacuation plan. Requirements for medical facilities.

ERGONOMICS & APPLIED PSYCHOSOCIODY
1 d

FATIGUE MANAGEMENT
0.25 d
Concept and why it is relevant. Fatigue risk assessment.

Reference: OCCHEAL-EN-A
Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: OCCHEAL-FR-P. Please contact us for more information.
Graduate Certificate

Process Safety Engineer Certification

Level: KNOWLEDGE

Purpose
To provide an in-depth knowledge of process safety management in Oil & Gas production activities.

Audience
Engineers called on to take the position of process safety engineer.

Learning Objectives
Upon completion of the course, participants will be able to:

- describe the overall production chain and explain main techniques and equipment used in the Oil & Gas facilities,
- detail process safety elements and purpose,
- describe process safety management roles and responsibilities,
- contribute to process hazard analysis studies, events analysis and investigation reporting and monitoring,
- develop leadership techniques to enhance safety culture in the organization.

Ways & Means
Highly interactive training by industry specialist lecturers, with numerous teamwork sessions.
Numerous applications, case studies and experience feedback.

Learning Assessment
Assessment by test at the end of each module and a final oral assessment in front of a jury.

Prerequisites
Engineering degree or equivalent experience within the Oil & Gas industry.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Process Safety Engineer Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

OIL & GAS FIELD PROCESSING
Fundamentals of reservoir engineering, drilling, completion and well servicing.
Fundamentals of thermodynamics applied to effluent processing.
Crude oil treatment.
Production water treatment and injection.
Gas processing and conditioning.
Overview of static equipment. Piping, valves, thermal and storage equipment.
Overview of rotating equipment. Pumps, compressors and gas turbines.
Instrumentation and process control.

INTRODUCTION TO PROCESS SAFETY MANAGEMENT
Process safety management system. Documentation controls and applicable tools. Implementation.
Commitment to Process Safety:
Workforce involvement and process safety culture.
Workforce training.
Human factors in process control.
Process Safety Information.
Management of contractors.
Continuous improvement elements. Audits and inspections. Establishment of objectives and KPI.
Process safety management in project development.

SAFETY ENGINEERING
Process hazard analysis. HAZID studies, HAZOP studies. Consequence analysis methodology.
Major hazard assessment and bowtie diagrams analysis.
Quantitative risk assessment.
Layers of protection.
Safety instrumented systems.
Fire detection and protection systems.

HSE IN SURFACE PRODUCTION OPERATIONS
Safe isolation of plant and equipment (LOTO, degassing-inerting, ventilation…).
Permit to work system.
Introduction to operating procedures. Pre-startup safety review.
Safe work practices. Management of change.
Downgraded situations.
Simultaneous operations.
Environmental impact of production activities.

ASSET INTEGRITY
Introduction to Asset Integrity Management.
Criticality and risk assessment tools. FMECA, FTA.
Inspection and test.
Corrosion.
Maintenance and inspection based on failure risk.
Implementation and challenges.

EMERGENCY RESPONSE PLANNING
Introduction to emergency response management.
Scenario identification and development. Tier definition.
Definition of resources.

ACCIDENT INVESTIGATION WORKSHOP - ROOT CAUSE ANALYSIS
Introduction to undesired events reporting and investigation.
Initiating investigation process. Gathering of information.
Analysis of information. Root cause analysis.
Identification of risk control measure and definition of action plan.
Case study.

FINAL ORAL ASSESSMENT
This course is also available in French: PSENG-FR-P. Please contact us for more information.

Reference: PSENG-EN-P
Only available as an In-House course.
Contact: ep.contact@ifptraining.com
**Fundamentals of Process Safety**

**Level:** KNOWLEDGE

**Purpose**
To understand and describe the objectives of the elements of process safety management.

**Audience**
Engineers, technicians, involved in operating Oil & Gas field processing facilities or in designing Oil & Gas projects architecture.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- describe standards and participate in the deterministic methods of safety engineering in Oil & Gas processing,
- explain the different elements of process safety management and to identify strategies for implementation,
- explain the most relevant elements of asset integrity for the design of process plants,
- establish operating procedures for a safe operation.

**Ways & Means**
- Several applications and illustrations.
- Several case studies and teamwork sessions.

**Learning Assessment**
Continuous assessments all-along the program

**Prerequisites**
Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

**FUNDAMENTALS OF PROCESS SAFETY**

**PROCESS HAZARD ANALYSIS**

**ASSET INTEGRITY**

**OPERATING PROCEDURES**

**Reference:** FUNDPSM-EN-P

Can be organized as an In-House course.

Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>2 November</td>
<td>5 November</td>
<td>€3,680</td>
</tr>
</tbody>
</table>

This course is also available in French: FUNDPSM-FR-P. Please contact us for more information.
Process Safety Management

Level: SKILLED

Purpose

This course provides the knowledge necessary to acquire a consistent approach to achieve an efficient development to effectively manage process safety in production facilities.

Audience

Engineers, technicians and staff, not familiar with the concepts of process safety, involved in operating Oil & Gas field processing facilities or in designing Oil & Gas projects architecture.

Learning Objectives

Upon completion of the course, participants will be able to:

- describe standards and participate in the deterministic methods of safety engineering,
- explain the different elements of process safety management and identify strategies for implementation,
- identify and describe the safety critical elements in the production process, explain the most relevant features of asset integrity,
- define roles and responsibilities applicable to process safety management,
- establish process safety management objectives.

Ways & Means

- Several applications and illustrations.
- Several case studies and teamwork sessions.

Learning Assessment

Continuous assessments all-along the program.

Prerequisites

Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

10 days

FUNDAMENTALS OF PROCESS SAFETY

Concept of process safety. Historical approach.
Process safety roles and responsibilities.
Safe design principles. Introduction to inherently safer design.
Concept of loss of containment. Fundamentals of flammability and fluid behavior.
Major accident hazards. Introduction to bowtie diagram representation.

PROCESS SAFETY REGULATIONS

Identification and compliance with legislation and industry standards.
Best practices standards: OSHA, CCPS.
Relationship with other benchmarking standards: offshore safety case regulation, SEVESO III.

PROCESS SAFETY CULTURE

Safety leadership and commitment.
Safety culture.
Workforce involvement.
Stakeholders identification and communication.

PROCESS HAZARD ANALYSIS

Process safety information: products, technology, equipment and human intervention.
Hazards related to typical Oil & Gas process.
Methodology for carrying out a HAZID.
HAZID application.
HAZOP register matrix. Group management.
Introduction to What-if methodology.
HAZOP exercise.
Introduction to Failure Mode and Equipment Analysis (FMEA study).
Introduction to fault tree analysis.
Plant layout. Introduction to consequence analysis.

OPERATING PROCEDURES

Definition of operating phase steps and limits.
Safe isolation of equipment.
Pre-startup safety review. Operational readiness.
Case study: Buncefield.

ASSET INTEGRITY

Safety critical equipment. Equipment deficiencies and quality assurance.
Definition and functions of safety systems.
Control of ignition sources. Electrical equipment regulations.
Control of hydrocarbon inventory. Flares and vents.
Introduction to safety instrumented systems.
Fire & gas detection systems.
Definition and functions of safety systems.
Safety critical equipment. Equipment deficiencies and quality assurance.

ORGANIZATIONAL ELEMENTS

Safe work practices. Permit to work system.
Management of change.
Downgraded situations.
Emergency response planning. Escape, evacuation and rescue.
HSE management of contractors: evaluation and performance monitoring.
Workforce training. Training matrix development.
Human factors in process control. Alarm systems. Human error in process plants.
Case study: platform P-36.

CONTINUOUS IMPROVEMENT ELEMENTS

Undesired events reporting and investigation. Analysis strategies.
Management system audit.
Process Safety Key Performance indicators. API RP 754.
IOGP Process safety reporting scope.
Management review.
Case study: Piper Alpha.

Reference: PSM-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: PSM-FR-P. Please contact us for more information.
Advanced Certificate

Safety Engineering Certification

Level: SKILLED

Purpose
This course aims to achieve deepen knowledge to assess and mitigate risks, and apply industry-required safety codes and practices when designing, constructing and operating Oil & Gas processing facilities.

Audience
Engineers, technicians and staff, not familiar with the concepts of safety engineering, involved in operating Oil & Gas field processing facilities or in designing Oil & Gas projects architecture.

Learning Objectives
Upon completion of the course, participants will be able to:
- describe risk assessment methods of safety engineering in Oil & Gas processing,
- identify the main advantages and constraints of safety engineering studies,
- identify the necessary safety engineering studies to be carried out during a project,
- interpret the contents of standard hazard studies, explain the safe design principles and propose mitigation measures,
- define, predict and measure possible outcomes and effects.

Ways & Means
- Several applications and illustrations.
- Several case studies and teamwork sessions.
- A mini project will be developed and presented during the last week as part of the certification process.

Learning Assessment
Assessment by test at the end of each module and group presentations.

Prerequisites
Engineering degree or equivalent experience within the Oil & Gas industry.

Why an IFP Training Certification?
- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Safety Engineering Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

Module 1: FUNDAMENTALS  5 d
Fundamentals of safety engineering.
Preliminary hazard analysis, HAZID.
Hazard and operability, HAZOP.
Major hazard assessment.
Layer of protection.
Plot plan review.
Prevention of hydrocarbon ignition.
Prevention of fire escalation.
Engineering of emergency escape and evacuation resources.

Module 2: ADVANCED TECHNIQUES  5 d
Inherently safer plant design.
Consequence analysis methodology.
Quantitative Risk Assessment (QRA).
Safety Instrumented Systems (SIS).
Design of fire and gas detection systems.
Active and passive fire protection.
Human factors and human errors.

Module 3: PROJECT  5 d
Safety engineering mini-project for a specific surface production facility:
Hazard identification: HAZID/HAZOP.
Major hazard assessment. Consequence analysis.
Plant layout. QRA.
Safety Instrumented Systems (SIS).
Fire protection and emergency response.

Reference: SAFENGC-EN-P  Can be organized as an In-House course.

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>15 November</td>
<td>3 December</td>
<td>€9,680</td>
</tr>
</tbody>
</table>

This course is also available in French: SAFENGC-FR-P. Please contact us for more information.
Safety Engineering - Module 1

**Level:** SKILLED

**Purpose**

This course provides the knowledge necessary to assess and mitigate risks, and apply industry-required safety codes and practices when designing, constructing and operating Oil & Gas processing facilities.

**Audience**

Engineers, technicians and staff, not familiar with the concepts of safety engineering, involved in operating Oil & Gas field processing facilities or in designing Oil & Gas projects architecture.

**Learning Objectives**

Upon completion of the course, participants will be able to:

- identify HSE standards and describe hazard identification methods of safety engineering in Oil & Gas processing,
- interpret the contents of standard hazard studies,
- explain the safe design principles and to propose mitigation measures,
- define, predict and measure possible outcomes and effects.

**Ways & Means**

- Several applications and illustrations.
- Several case studies and teamwork sessions.

**Learning Assessment**

Assessment by test at the end of the course.

**Prerequisites**

Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

**FUNDAMENTALS OF SAFETY ENGINEERING**

- Safety engineering throughout the life of a project and during operations.
- Safe design principles.
- Risk assessment. Probabilistic and deterministic methods.
- Scenario definition. Concept of barriers.

**“PRELIMINARY HAZARD ANALYSIS” - HAZID**

- Objectives of preliminary hazard identification during conceptual/feasibility studies.
- Hazards related to typical Oil & Gas process.
- Methodology for carrying out a HAZID.
- HAZID application.

**“HAZARD & OPERABILITY” - HAZOP**

- HAZOP register matrix.
- HAZOP exercise.

**MAJOR HAZARD ASSESSMENT**

- Major Accident Hazard (MAH) scenarios.
- Scenario representation. Bowtie diagrams.
- Risk reduction process. Risk matrices and ALARP principle.
- Safety critical elements.
- Major accident hazards analysis. Tools Fault Tree Analysis (FTA) and Event Tree Analysis (ETA).

**LAYERS OF PROTECTION**

- Concept of Layer of Protection. Characteristics.
- Introduction to Safety Instrumented Systems. Emergency shutdown system, blow-down system, introduction to HIPS systems.
- Fundamentals of reliability. SIL level.

**PLOT PLAN REVIEW**

- Fundamentals of consequence analysis for MAH scenarios.
- Safety engineering approach to plant layout.
- Plant layout exercise.

**PREVENTION OF HYDROCARBON IGNITION**

- Hazardous area classifications methodology and examples. Electrical equipment and suitability with regard to hazardous area classification.
- Safe disposal networks. Flares and vents

**INTRODUCTION TO FIRE & GAS SYSTEM**

- Fire and Flammable gas detection systems. Technologies and suitability.

**PREVENTION OF FIRE ESCALATION**

- Introduction to Fire Detection Systems.
- Passive fire and blast protection.
- Introduction to active firefighting systems. Main elements and applications.

**ENGINEERING OF EMERGENCY ESCAPE & EVACUATION RESOURCES**

- Alarm system. Types of alarm.
- Introduction to evacuation and escape resources.

Reference: SAFENG1-EN-P  Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>15 November</td>
<td>19 November</td>
<td>€3,680</td>
</tr>
</tbody>
</table>

This course is also available in French: SAFENG1-FR-P. Please contact us for more information.
Safety Engineering - Module 2

Level: SKILLED

Purpose
This course provides the knowledge and tools for coordinating HSE studies, for the different stages of an onshore or offshore, Oil & Gas, grass-roots or major revamping project.

Audience
Safety engineers, HSE superintendents, other engineers and managers (environment, project, process, instrument and operations) involved in operating or designing and implementing major projects.

Learning Objectives
Upon completion of the course, participants will be able to:
- describe the probabilistic methods of safety engineering and typical safety systems design,
- design safety systems including firewater, fire and gas detection, and over-pressure relief,
- take part in risk assessment and project evaluation,
- contribute to a corporate, experience-based, safety culture.

Ways & Means
- Highly interactive training by industry specialist lecturer.
- Numerous applications and illustrations.
- Several case studies and teamwork sessions.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
Fundamental knowledge of statistical analysis and hazard identification techniques.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INHERENTLY SAFER PLANT DESIGN
Possible options for the elimination of a hazard.
Provision or addition of control means.
Limitation of inventories of hazardous products.

0.25 d

CONSEQUENCE ANALYSIS METHODOLOGY
Examples of types of scenarios to be considered.
Consequence modeling e.g. blast overpressure, dispersion modeling…
Criteria for impact assessment.
Exercise.

0.75 d

QUANTITATIVE RISK ASSESSMENT (QRA)
Methodology to be used.
Systematic QRA approach (step by step).
Assessment and improvement.
Case studies and application.

1 d

SAFETY INSTRUMENTED SYSTEMS (SIS)
Examples of Safety Instrumented Systems and performance targets.
Typical architecture.
Safety Instrumented Function (SIF) and Safety Integrity Level (SIL).
Design of ESD systems, hierarchy of ESD and actions, causes and effects.

1 d

DESIGN OF FIRE & GAS (F&G) DETECTION SYSTEMS
Selection of F&G detector types.
Positioning of F&G detectors.
Logic associated with the activation of the F&G detectors.

1 d

ACTIVE & PASSIVE FIRE PROTECTION
Design of firewater network, calculations for firewater demand.
Fire protection using water, foam, dry chemicals and inert gas.
Firewater systems, pump types and selection guidance.
Practical exercise.

0.5 d

HUMAN FACTORS & HUMAN ERRORS
Human factors in process control. Alarm systems.
Human error in process plants. Downgraded situations.
Emergency situations.

0.5 d

Location Start Date End Date Tuition Fees excl. VAT
Pau 22 November 26 November £3,680

This course is also available in French: SAFENG2-FR-P. Please contact us for more information.

Reference: SAFENG2-EN-P
Safety Engineering - Module 3 (Project)

Level: SKILLED

Purpose
This course provides the knowledge necessary to assess and mitigate risks involved in designing, constructing and operating Oil & Gas processing facilities. The various workshops performed throughout the week will thus enable the constitution of a safety dossier for a given production facility. Each workshop will comprise of a plenary training session, which will provide the theory required for the participants to then work on their case study. For this purpose, participants will be grouped in teams. Following each case study, debriefing sessions are organized, during which the results are presented by and discussed with the participants.

Audience
Engineers, technicians and staff (environment, project, process, instrument and operations) involved in operating Oil & Gas field processing facilities or in designing Oil & Gas projects architecture.

Learning Objectives
Upon completion of the course, participants will be able to:
- apply HSE standards, process hazards analysis methods and key safety management rules,
- explain the contents of standard hazard studies,
- select safety systems including firewater, fire and gas detection,
- take part in risk assessment and project evaluation for offshore and onshore facilities.

Ways & Means
- Highly interactive and participative training method where a mini-project will be presented, so the different workshop activities will be applied to this project.
- Workshop sessions with several exercises, applications, real case studies.
- Brainstorming sessions in small groups, with reporting.
- Plenary sessions to consolidate fundamental knowledge and discuss results of workshop sessions.

Learning Assessment
Assessment by daily group presentations.

Prerequisites
Engineering degree or equivalent experience within the Oil & Gas industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

SAFETY ENGINEERING MINI-PROJECT FOR A SPECIFIC SURFACE PRODUCTION FACILITY
Throughout the course, the participants will be guided in the development of safety engineering studies for a production facility. Each workshop will comprise of a plenary training session, which will provide the theory required for the participants to then work on their case study. For this purpose, participants will be grouped in teams. Following each case study, debriefing sessions are organized, during which the results are presented by and discussed with the participants.

HAZARD IDENTIFICATION: HAZID/HAZOP
Plenary session (0.25 day)
Hazard analysis methodology: definitions, vocabulary, deterministic and probabilistic methods, preliminary hazard analysis.
Workshop (0.5 day)
HAZID exercise.
HAZID application.
Plenary session (0.25 day)
Workshop results, Day 1 debriefing, questions-answers.

MAJOR HAZARD ASSESSMENT - CONSEQUENCE ANALYSIS
Plenary session (0.25 day)
Major hazard assessment process plants. Consequence analysis methodology.
Workshop (0.5 day)
Plenary session (0.25 day)
Workshop results, Day 2 debriefing, questions-answers.

PLANT LAYOUT - QRA
Plenary session (0.25 day)
Plot plan review: safety engineering approach to plant layout.
Workshop (0.5 day)
Plenary session (0.25 day)
Workshop results, Day 3 debriefing, questions-answers.

SAFETY INSTRUMENTED SYSTEMS (SIS)
Plenary session (0.25 day)
Introduction to Safety Instrumented Systems (SIS). Fire & Gas (F&G) systems. Case study for layout and equipment selection. SIL determination and effects matrix development exercise.
Workshop (0.5 day)
Determination of SIL level requirements. Case study for layout and equipment selection. SIL determination and effects matrix development exercise.
Plenary session (0.25 day)
Workshop results, Day 4 debriefing, questions-answers.

FIRE PROTECTION & EMERGENCY RESPONSE
Plenary session (0.25 day)
Passive fire protection. Active fire protection. Emergency escape, evacuation and rescue resources.
Workshop (0.5 day)
Active fire protection systems. Case study for layout design and equipment selection. Emergency response. Historical incidents.
Plenary session (0.25 day)
Workshop results, Day 5 debriefing, questions-answers.

Reference: SAFENG3-EN-P
Contact: ep.contact@ifptraining.com

Can be organized as an In-House course.

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>29 November</td>
<td>3 December</td>
<td>€3,680</td>
</tr>
</tbody>
</table>

This course is also available in French: SAFENG3-FR-P. Please contact us for more information.
This course can be adapted to virtual classroom mode

Environmental & Social Risk Management

Level: KNOWLEDGE

Purpose
This course provides a thorough and applied knowledge of best industry standards and practices for appraising environmental and social matters that need to be handled cautiously throughout the life cycle of an upstream project, from design to construction and operation of Oil & Gas processing facilities.

Audience
Managers, advisors, engineers and operations staff involved in oversight or management of environmental and social issues all along the lifetime of an upstream project.

Learning Objectives
Upon completion of the course, participants will be able to:
- understand the global prevailing context for the Oil & Gas industry,
- grasp legal requirements and standards with respect to impact on local environment and populations,
- understand techniques and contents of environmental and social impact assessments,
- identify mitigation measures, perform stakeholders’ mapping and build public consultation and disclosure plans,
- select key performance indicators, and set up monitoring with environmental and social management plans.

Ways & Means
Several applications and illustrations.
Several case studies and teamwork sessions.

Learning Assessment
Continuous assessments all along the program.

Prerequisites
Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

ENVIRONMENTAL ISSUES RELATED TO E&P ACTIVITIES 0.25 d
Historical overview of impact awareness, management.
Definitions: environmental impact, significance, accidental vs. operational discharges, discharge and pollution.

THE STAKES 0.75 d
Environmental issues: local, regional, global.
Air, water (availability, pollution), biodiversity, wastes.
Kyoto protocol, carbon dioxide accounting, cap and trade, clean development mechanisms. Toxicity, ecotoxicity.

ENVIRONMENTAL RISK ASSESSMENT (ERA), LEGAL REQUIREMENTS/LEGAL STANDARDS: NATIONAL, REGIONAL, INTERNATIONAL 0.25 d
Environmental Risk Assessment (ERA).
Legal standards: definition, standard determination, best available technology, best environmental practices. Environmental Quality Standards (EQS), discharge standards - Regional, international, conventions.

ENVIRONMENTAL IMPACT ASSESSMENT - PROJECTS 0.5 d
Environmental impact assessment activities throughout the life cycle of a field, tools used for impact prediction. The EIA process, scoping an EIA, ENVID (Environmental Hazard Identification), environmental management plan. Case study.

ENVIRONMENTAL RISK MANAGEMENT - PRODUCTION ACTIVITIES 0.5 d
HSE MS - EMS (ISO 14001), continuous improvement processes.
Key environmental procedures: wastes management, chemical management, monitoring. Oil spill contingency planning.

MONITORING & REPORTING 0.5 d

ENVIRONMENTAL RISK MANAGEMENT - ABANDONMENT 0.25 d

SOCIAL ISSUES RELATED TO E&P ACTIVITIES: THE RISKS, THE STAKES & THE STRATEGIES 0.5 d
The risks and the stakes. Some high profile cases (human rights, NGOs activism, etc.). Documentary viewing and discussion on social risks in E&P activities. How to change practices and image?

PARTICIPATIVE SOCIAL IMPACT ASSESSMENT AS A RISK MANAGEMENT TOOL 0.5 d

STAKEHOLDER ENGAGEMENT 0.5 d

CASE STUDY: SOCIAL SCREENING OF AN OIL & GAS PROJECT 0.5 d
Based on a group work, participants should prepare a:
Stakeholder mapping. Social impacts identification and mitigation plan.

Reference: ENVSOC-EN-A Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>15 November</td>
<td>19 November</td>
<td>€3,680</td>
</tr>
</tbody>
</table>

This course is also available in French: ENVSOC-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

Social Risk Management

**Course Content**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCIAL ISSUES RELATED TO OIL &amp; GAS ACTIVITIES: RISKS, STAKES &amp; STRATEGIES</td>
<td>1 d</td>
</tr>
<tr>
<td>STAKEHOLDER ENGAGEMENT</td>
<td>1 d</td>
</tr>
<tr>
<td>PARTICIPATIVE SOCIAL IMPACT ASSESSMENT AS A RISK MANAGEMENT TOOL</td>
<td>1 d</td>
</tr>
<tr>
<td>SOCIAL IMPACT MANAGEMENT PLANS &amp; MONITORING: TOOLS &amp; PROCESSES</td>
<td>0.5 d</td>
</tr>
<tr>
<td>SOCIAL IMPACT MANAGEMENT PLANS &amp; MONITORING: FOCUS ON SPECIAL TOPICS &amp; ISSUES</td>
<td>1 d</td>
</tr>
<tr>
<td>CASE STUDY: SOCIAL SCREENING OF AN OIL &amp; GAS PROJECT</td>
<td>0.5 d</td>
</tr>
</tbody>
</table>

**Level:** KNOWLEDGE

**Purpose**

This course aims to identify and understand social issues related to Oil & Gas activities.

**Audience**

Managers, advisors, engineers, and operations staff involved in oversight or management of operational, environmental and social issues throughout the lifetime of an upstream project.

**Learning Objectives**

Upon completion of the course, participants will be able to:

- Identify and understand what constitutes a social risk (non-technical risk), an impact assessment and management,
- Understand key concepts related to SIA and Social Impact Management Plans (SIMPs),
- Understand social management methodologies and their appropriate uses,
- Design and implement of a stakeholder engagement strategy and plan,
- Understand the main components of a Social Impact Management Plan (RAP, local content, etc.), including design and implementation.

**Ways & Means**

The training will have an interactive format providing room for practice and discussion. It will involve multimedia presentations, case studies, quizzes and teamwork sessions.

**Learning Assessment**

Continuous assessments all-along the program.

**Prerequisites**

Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: SOCIAL-EN-A

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: SOCIAL-FR-A. Please contact us for more information.

www.ifptraining.com
This course provides a thorough and
applied knowledge of best industry
standards and practices for appraising
environmental matters throughout the life
cycle of a field development, to implement
the management of impact and risks
throughout the life cycle of a project from
exploration up to abandonment.

Purpose
This course provides a thorough and
applied knowledge of best industry
standards and practices for appraising
environmental matters throughout the life
cycle of a field development, to implement
the management of impact and risks
throughout the life cycle of a project from
exploration up to abandonment.

Audience
Managers, advisors, engineers, and
operations staff involved in management of
environmental issues all along the lifetime
of a field development.

Learning Objectives
Upon completion of the course, participants
will be able to:
► explain the fundamentals of
environmental management in terms of
risks and impacts,
► describe techniques, fundamentals
and contents of environmental impact
assessments,
► identify mitigation measures,
► select key performance indicators, and
set up environmental management plans,
► explain the content of an oil spill
contingency plan.

Ways & Means
► Several applications and illustrations.
► Several case studies and teamwork
sessions.

Learning Assessment
Continuous assessments all-along the
program.

Prerequisites
Provide evidence of a professional
experience of at least 3 months related to
HSE and/or Oil & Gas process industry.

Expertise & Coordination
IFP Training trainer (permanent or
contracted) having a good expertise and/
or experience of the related topics, trained
to adult teaching methods, and whose
competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>5 days</th>
</tr>
</thead>
</table>

FUNDAMENTALS OF ENVIRONMENTAL MANAGEMENT 0.5 d
Why environmental management is necessary. Concept of sustainability.
Definitions: environmental impact, significance, accidental vs. operational discharges, discharge and pollution.
Legal standards: definition, standard determination. Best available technology. Best environmental practices.
Environmental Quality Standards (EQS), discharge standards - Regional, international, conventions.
Introduction to social management.

ENVIRONMENTAL, SOCIAL & HEALTH IMPACT ASSESSMENT 1 d
Risk assessment: concept of hazards, risks, hazard identification and risk assessment process.
Impact assessment throughout the lifecycle of the project.
Aspect and potential impact identification.
Sources of environmental information.
Impacts on atmosphere: air pollution, GHG emissions.
Impacts on aquatic resources: water pollution and water availability.
Impacts on land resources: ground pollution and land use.
Impacts on biodiversity.
Socio-economic and cultural impact.

ENVIRONMENTAL MANAGEMENT PLAN 0.75 d
Concept and elements.
Control measures to reduce air emissions.
Control measures to reduce water consumption and water pollution.
Control measures to reduce land pollution and use.

MONITORING & REPORTING 0.5 d
Environmental monitoring and surveillance.
Green house gases estimation and reporting.

WASTE MANAGEMENT PLAN 0.5 d
Strategy - Type of waste.
Waste collection.
Transport and storages (primary, final…).
Treatments options (biological, thermal desorption).

MANAGEMENT OF ENVIRONMENTAL EMERGENCIES 0.75 d
Identification of spill scenarios.
Oil spill contingency planning strategies: onshore and offshore cases.
Typical resources for oil spill contingency plans.

STAKEHOLDERS ENGAGEMENT 0.25 d
Stakeholders identification.
Engagement and information process.
Stakeholders engagement plan review.

ENVIRONMENTAL MANAGEMENT SYSTEM 0.5 d
Elements of environmental management systems.
Referentials and certification. ISO 14001.
EMS as part of integrated management systems.
Environmental culture and leadership in the organization.

ENERGY MANAGEMENT 0.25 d
Introduction to energy sources.
Energy efficiency. Measures for improvement.

Reference: ENVMGT-EN-A  Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pau</td>
<td>18 October</td>
<td>22 October</td>
<td>£3,660</td>
</tr>
</tbody>
</table>

This course is also available in French: ENVMGT-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

Environmental Pollution & Waste Management

Level: KNOWLEDGE

Purpose

This course provides a thorough and applied knowledge of efficient techniques, industry standards and best practices for managing waste and environmental pollution.

Audience

Managers, advisors, engineers and operations staff involved in the management of environmental issues all along the lifetime of a field development: from design to operation.

Learning Objectives

Upon completion of the course, participants will be able to:

- understand the stakes for the Oil & Gas industry for environmental management;
- understand contents of environmental impact assessments and mitigations (treatments);
- identify mitigation measures, air treatment techniques, wastewater treatment, soil remediation;
- implement an oil spill contingency plan, including the combating strategy;
- select key performance indicators and set up monitoring with environmental management plans.

Ways & Means

- Highly interactive training by industry-specialist lecturers.
- Numerous applications and illustrations, case studies and teamwork sessions.

Learning Assessment

Continuous assessments all-along the program.

Prerequisites

Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

5 days

INTRODUCTION TO WASTE & POLLUTION MANAGEMENT 0.25 d

Environmental stakes of Oil & Gas companies and projects. Environmental mitigation measures principles.

ATMOSPHERIC POLLUTION & TREATMENT 1 d

Air emission and pollutant inventory. Greenhouse gases. Flare emissions reduction techniques.

Case studies:
- Gas injection and gas lift.
- Gas valorization strategies.

Process emissions reduction. Control of fugitive emissions. Reduction of emissions related to power generation:
- Electrification.
- Energy efficiency strategies.
- Logistics management to reduce emissions.

WASTE EFFLUENT POLLUTION & TREATMENT 1.25 d

Waste effluent inventory (production water, cooling water), pollutants.

Production water treatment and disposal:
- Primary: API tanks, plate separators.
- Secondary: flotation, coalescent filters, hydrocyclones.
- Tertiary: membranes, biological treatments.
- Chemicals and chemical treatments.
- Water injection.

Open drain and closed drains: collection and treatment.

Drilling fluids treatment:
- Water base mud recovery and cuttings treatment.
- Oil base mud recovery and cuttings treatment.

Domestic effluents treatment:
- Isolated camps treatment options.
- Permanent camps treatment options.

OIL SPILL RESPONSE AT SEA - TECHNOLOGIES 1 d

Content of an oil spill contingency plan.

Offshore spill treatment (dispersants, booms and recovery…).

Onshore spill treatment (pumping, skimming, bioremediation, thermal desorption…).

SOLID WASTE TREATMENT TECHNOLOGIES 0.5 d

Chemical treatments.

Physical treatments.

Disposal methods: advantages/drawbacks.

POLLUTION & REMEDIATION TECHNIQUES 0.75 d

Treatment selection: in-situ, onsite, ex-situ.

When and how applying technologies: physical, chemical, biological treatments.

Case study.

MONITORING & REPORTING 0.25 d

Main key performance indicators related to pollution control and waste treatment.

Reference: WASTMGT-EN-A

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

This course is also available in French: WASTMGT-FR-P. Please contact us for more information.

www.ifptraining.com
Graduate Certificate
HSE Engineer Certification

Level: KNOWLEDGE

Purpose
This course provides an in-depth knowledge of safety and environment issues in Oil & Gas production activities: from design to facilities operation.

Audience
Engineers (particularly field/project engineers) called on to take the position of HSE or safety engineer.

Learning Objectives
Upon completion of the course, participants will be able to:
- describe the overall production chain and explain main techniques and equipment used in the Oil & Gas facilities,
- detail HSE aspects regarding production operations, construction, maintenance works, projects/logistics,
- describe HSE management roles and responsibilities, set-up and implement HSE management system,
- contribute to safety engineering studies, incident analysis and investigation reporting, HSE monitoring,
- Highly interactive training by industry specialist lecturers, with numerous teamwork sessions.
- Numerous applications, case studies and experience feedback.

Ways & Means
- Continuous assessments all-along the program.
- Final assessment including a presentation in front of a jury.

Learning Assessment
- Engineering degree or equivalent experience within the Oil & Gas industry.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in HSE Engineer Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

DOWNHOLE PRODUCTION
5 d
Fundamentals of reservoir engineering, drilling, completion and well servicing.

OIL & GAS FIELD PROCESSING
10 d
Fundamentals of reservoir engineering, drilling, completion and well servicing.
Fundamentals of thermodynamics applied to effluent processing.
Crude oil treatment.
Production water treatment and injection.
Gas processing and conditioning.
Overview of static equipment. Piping, valves, thermal and storage equipment.
Overview of rotating equipment. Pumps, compressors and gas turbines.
Instrumentation and process control.

HSE MANAGEMENT
10 d
HSE management system.
Occupational health and safety management.
Human factors and responsibilities - HSE culture and HSE leadership.
HSE management in projects.
HSE management of contractors.
HSE management of logistics.
Undesired events reporting and investigation.
HSE audits.

HSE IN PRODUCTION & MAINTENANCE ACTIVITIES
10 d
Hazard identification and risk assessment of surface processing operations: hazardous products, flammability, fluid behavior.
Utilities, flares & drains. Safe isolation of plant and equipment (LOTO, degassing-inerting, ventilation…).
Risk assessment of maintenance and construction works.
Permit to work system.
Emergency response. Strategies and crisis management.

SAFETY ENGINEERING
10 d
Process hazard analysis. HAZID studies, HAZOP studies. Consequence analysis methodology.
Major hazard assessment & quantitative risk assessment.
Safety instrumented systems.
Fire detection and protection systems.

ENVIRONMENTAL MANAGEMENT
5 d
Environmental management system.
Environmental and social impact assessment. Projects.
Applicable technologies for impact mitigation.
Waste management planning.
Oil spill contingency plan.

ASSET INTEGRITY
5 d
Introduction to Asset Integrity Management.
Criticality and Risk Assessment Tools. FMECA, FTA.
Inspection and test.
Corrosion.
Maintenance and inspection based on failure risk.
Implementation and challenges.

HSE IN DRILLING & WELL INTERVENTION OPERATIONS
4 d
Hazard identification and risk assessment of drilling operations.
HSE management of drilling, completion, rig move and well intervention operations.
HSE evaluation of drilling contractors.

FINAL ORAL ASSESSMENT
1 d

Reference: HSEENG-EN-P

This course is also available in French: HSEENG-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com

Only available as an In-House course.
HSE Management

Course Content

OVERVIEW OF HSE MANAGEMENT SYSTEM
0.25 d
Historical approach. Initial development and current standards.
Introduction to integrated management system. Certification.
Fundamentals of HSE management system.
General structure of HSE management system. Policy and elements.

MANAGEMENT COMMITMENT & LEADERSHIP - HSE CULTURE
0.5 d
Leadership. HSE leadership characteristics. Roles of safety leaders. Communication and motivation.
Establishment of a HSE culture throughout the organization. Importance of communication.
HSE competence assurance. Training matrix.

RISK MANAGEMENT
1.5 d
Introduction to risk management. Risk assessment process.
Establishment of risk assessment and control - Concepts, strategies and objectives.
Risk management tools, hazard identification and risk register.
Establishment of a corporate risk matrix.
Environmental and social impact assessment process.
Health and ergonomics management.
Human factors and human error.
Management of change procedure.
Downgraded situations and simultaneous operations.
Safety design and asset integrity assurance - Main concepts.
Identification and management of safety critical elements.

HSE PLANNING & CRISIS MANAGEMENT
0.75 d
Fundamentals of HSE management in projects.
HSE management of contractors. Contractor selection process.
Structure and elements of HSE plans.
Environmental management plans.
Crisis management organization and management of information and resources during emergencies.

ELEMENTS FOR EXECUTION & CONTROL
0.5 d
Tools for risk management of onsite activities:
Job safety analysis.
Permit to work system.
Observation and HSE awareness programs.
Pre-start up review.
Logistics HSE management.

AUDITS & CONTINUOUS IMPROVEMENT
1.5 d
Strategies for establishment of HSE objectives. Main key performance indicators in the industry.
Undesired events reporting and investigation procedure. Accident investigation workshop.
Environmental and social monitoring.
Public reporting, sustainability reporting.
Audit planning.

Ways & Means
Several applications and illustrations.
Several case studies and teamwork sessions.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: HSEMGT-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Location  Start Date  End Date  Tuition Fees excl. VAT
Pau  25 October  29 October  €3,680

This course is also available in French: HSEMGT-FR-P. Please contact us for more information.
Emergency Response Planning

Course Content

Introduction to Major Crisis Management 1 d
What is a crisis? Consequence of a catastrophic event.
Emergency response levels. Tier 3 emergency definition.
Identification of catastrophic events through risk assessment tools. Risk map.
Tools to evaluate catastrophic scenarios.
Types of catastrophic events with historic examples:
  - Industrial accidents: blowout, industrial accident affecting public, major oil spills.
  - Social and political incidents.
  - Security incidents.
Examples from other industries.

Crisis Management Plan 1.5 d
Structure, roles and resources of crisis management plan at HQ level.
Responsibilities of top management.
Development of scenarios and identification of potential affected parties: relatives, partners, public, authorities, media...
Activation of Crisis Management Plan. Support for decision making.
Crisis Management Team members. Roles of decision makers (managers) and technical advisors.
Resources of a crisis management control center.
Information and communication means.
External resources for crisis management: blowout contingency, oil spill management, evacuation and rescue, external communication, legal advice.
Human factors in crisis situations.
Training requirements and emergency drills.

Exercise 0.5 d
A specific event is proposed and participants will develop the crisis management plan scenario, defining roles, required resources and identifying the external elements affected.

Level: KNOWLEDGE

Purpose
This course provides the necessary knowledge to assess and plan crisis management of major severity events at headquarters level, identifying the required technical and human resources.

Audience
Engineers involved in the development crisis management plans for operators, national companies or public administrations, managers and support personnel who can be involved in the Crisis Management Team.

Learning Objectives
Upon completion of the course, participants will be able to:
- Identify and evaluate major severity scenarios and develop response strategies.
- Provide a thorough understanding of a Crisis Management Plan at headquarters level.
- Identify the roles and responsibilities applicable to crisis management team.
- Identify the resources available for crisis management.

Ways & Means
- Several applications and illustrations.
- Several case studies and teamwork sessions.

Learning Assessment
Continuous assessments all along the program.

Prerequisites
Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: CRISIS-EN-P  Only available as an In-House course.
Contact: ep.contact@ifptraining.com
This course is also available in French: CRISIS-FR-P. Please contact us for more information.
Major Emergency Management - Initial Response Training

Level: KNOWLEDGE

Purpose
This course provides personnel with formal training in command, control, communications and stress-related factors in the management of major emergencies.

Audience
Personnel designated as being in charge of, are members of, or provide support to an emergency management team.

Learning Objectives
Upon completion of the course, participants will be able to:
- Identify the key factors associated with maintaining control throughout the development or escalation of an emergency situation.
- Describe how to manage communication, emergency-related information and put into place predetermined plans during emergency situations.
- Describe how stress can impact on performance during emergencies.
- Role-play as the emergency manager in a number of specific types of emergency scenarios.

Ways & Means
- Several applications and illustrations.
- On site exercise.

Learning Assessment
Continuous assessments all along the program.

Prerequisites
Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

| WHAT IS A MAJOR EMERGENCY | 0.25 d |
| Local safety regulations. |
| Company rules. |
| Hazard study: escalation, consequences. |
| Emergency Response Plan (ERP). |
| Organization. |
| Resources required to face emergencies. |
| External parties: |
| Headquarters. |
| Authorities. |
| Neighbors. |
| Other companies. |

| EMERGENCY RESPONSE PLAN | 0.5 d |
| Typical content. |
| Analysis of Emergency Response Plan. |
| How to use it? |
| Why is it an essential document? |
| Which parts are essential? |

| EMERGENCY RESPONSE TEAM | 0.25 d |
| General organization. |
| Functions and responsibilities of ERT members. |
| Competencies and training. |
| To be permanently ready to face accidents: functions and roles, ERP, CRR and its equipment. |
| Frequency of drills. |

| EMERGENCY RESPONSE MANAGER | 0.25 d |
| Function and responsibilities. |
| Competencies and training. |
| How to manage a team in emergencies situations: |
| Difference between normal and emergency management. |
| Leadership. |
| Uncertainty. |
| Importance of decision making. |
| Stress: managing self and team stress. |

| CRISIS RESPONSE ROOM | 0.25 d |
| Equipment: |
| Communication means. |
| Recording means. |
| Plans and technical data. |
| Ergonomics. |

| EMERGENCIES SPECIFIC TOOLS & METHODS | 0.5 d |
| Time management: “time-out”. |
| How to communicate: |
| With company staff. |
| With authorities. |
| With ERT. |
| Communication tools: radio, phone… |
| Analysis of initial situation: |
| Evaluate quickly. |
| Anticipate. |
| Specific tools: |
| Reflex sheets. |
| Guide sheets. |
| Checklists. |
| How to record events, decisions and actions. |

| EXERCISE | 1 d |
| Based on one of the ERP scenarios. |

Reference: MEMIR-EN-P
Contact: ep.contact@ifptraining.com

Can be organized as an In-House course.

Location Start Date End Date Tuition Fees excl. VAT
Pau 3 November 5 November €2,220

This course is also available in French: MEMIR-FR-P. Please contact us for more information.
HSE for Support Personnel

Level: KNOWLEDGE

Purpose
This course provides the participants with a wider and high level HSE management knowledge, allowing them to take a step forward regarding risk awareness and safety leadership, as well as developing their team management and oral & written communication skills.

Audience
This program is intended to all professionals within the petroleum industry (commercial, legal, financial or support entities) who seek to acquire professional skills regarding Health, Safety and Environment management subjects for a successful long term career conversion and in order to ensure a safe and sustainable workplace.

Learning Objectives
Upon completion of the course, participants will be able to:
- identify the elements of the overall production chain, from reservoir to offloading facilities,
- detail the elements of HSE management applicable to the different E&P activities,
- contribute to risk assessment process for the different E&P activities,
- participate in undesired event investigation teams,
- explain the different key performance indicators applicable to HSE management,
- describe the different elements of the environmental and societal management in E&P.

Ways & Means
- Highly interactive training by industry specialist lecturers, with numerous teamwork sessions.
- Numerous applications, case studies and experience feedback.
- 3-week group project concluding the program and calling for all the topics devised in the program.

Learning Assessment
- Continuous assessments all-along the program.
- Final assessment including a presentation in front of a jury.

Prerequisites
Provide evidence of a professional experience of at least 3 months related to Oil & Gas activities.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

**60 days**

**EXPLORATION & PRODUCTION OVERVIEW**
Fundamentals of reservoir engineering, drilling, completion and well servicing. Notions of field operations and field development process.

**HSE CULTURE & LEADERSHIP**
Human factors.
HSE leadership.
HSE culture development.

**OCCUPATIONAL HEALTH & SAFETY**
Company responsibilities.
Workplace incident reporting and investigation.
Life saving rules.
Basic health risk assessment.
First aid training.
Ergonomics.

**HSE MANAGEMENT SYSTEMS**
Structure of HSE management systems.
HSE management of contractors.
HSE performance evaluations.

**RISK AWARENESS & EMERGENCY RESPONSE**
Risk awareness in the workplace.
Introduction to emergency response.
Fire fighting training.

**HSE IN LOGISTICS**
Land transportation.
Marine transportation.
Air transportation selection.

**ENVIRONMENTAL & SOCIAL MANAGEMENT**
Environmental impact and environmental management planning.
Environmental reporting.
Social risk assessment and social engagement activities.
Social management workshop.

**FINAL PROJECT EVALUATION**
Group project.
Jury.

Reference: HSESUP-EN-P
Only available as an In-House course.
Contact: ep.contact@ifptraining.com

This course is also available in French: HSESUP-FR-P. Please contact us for more information.
**Course Content**

<table>
<thead>
<tr>
<th>Energy Transition Engineer Certification</th>
<th>60 days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENERGY PRODUCTION &amp; MANAGEMENT IN THE CONTEXT OF ENERGY TRANSITION</strong></td>
<td>5 d</td>
</tr>
<tr>
<td>Energetic worldwide context - Low carbon energy production.</td>
<td></td>
</tr>
<tr>
<td><strong>NATURAL &amp; BIOGAS PROCESSING</strong></td>
<td>10 d</td>
</tr>
<tr>
<td>Thermodynamics applied to hydrocarbons processing.</td>
<td></td>
</tr>
<tr>
<td>Gas processing.</td>
<td></td>
</tr>
<tr>
<td>Process design case studies using process simulation software.</td>
<td></td>
</tr>
<tr>
<td><strong>TECHNOLOGY OF PRODUCTION FACILITIES &amp; PROCESS EFFICIENCY</strong></td>
<td>10 d</td>
</tr>
<tr>
<td>Piping systems and process equipment, metallurgy, corrosion management.</td>
<td></td>
</tr>
<tr>
<td>Electrical systems, instrumentation, process control and safety instrumented systems.</td>
<td></td>
</tr>
<tr>
<td>Energy optimization and heat exchangers network.</td>
<td></td>
</tr>
<tr>
<td><strong>ELECTRICITY PRODUCTION</strong></td>
<td>10 d</td>
</tr>
<tr>
<td>Gas turbines.</td>
<td></td>
</tr>
<tr>
<td>Power generator.</td>
<td></td>
</tr>
<tr>
<td>Offshore wind challenges.</td>
<td></td>
</tr>
<tr>
<td><strong>ECONOMICS &amp; PROJECT MANAGEMENT</strong></td>
<td>10 d</td>
</tr>
<tr>
<td>Fundamentals of contracts - Project profitability evaluation - Risk analysis of energy transition projects.</td>
<td></td>
</tr>
<tr>
<td>Project cost estimation and control.</td>
<td></td>
</tr>
<tr>
<td>Cost of energy: conventional and renewables (biogas, solar, wind), LCOE, grid parity…</td>
<td></td>
</tr>
<tr>
<td><strong>PROCESS SAFETY MANAGEMENT</strong></td>
<td>5 d</td>
</tr>
<tr>
<td>Process hazard analysis: HAZID, HAZOP, plant layout…</td>
<td></td>
</tr>
<tr>
<td>Operating procedures, mechanical integrity, organizational elements.</td>
<td></td>
</tr>
<tr>
<td><strong>SOCIAL &amp; ENVIRONMENTAL IMPACT MANAGEMENT</strong></td>
<td>5 d</td>
</tr>
<tr>
<td>Societal consequences and problem linked to new energies development.</td>
<td></td>
</tr>
<tr>
<td>Communication challenges and constraints, managing the relationships with partners.</td>
<td></td>
</tr>
<tr>
<td><strong>BIOGAS DEVELOPMENT PROJECT</strong></td>
<td>5 d</td>
</tr>
<tr>
<td>Teamwork on a biogas project using actual data.</td>
<td></td>
</tr>
</tbody>
</table>

**Reference:** NRJENG-EN-A

**Why an IFP Training Certification?**

- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Energy Transition Engineer Certification.
- Ready-to-use skills.

**Audience**

Engineers (particularly recently graduated operation, design or project engineers) interested in a specialization in energy transition.

**Prerequisites**

Engineering degree or equivalent experience in the energy sector.

**Ways & Means**

- Highly interactive training with industry specialist lecturers.
- Numerous applications and illustrations.
- Multiple teamwork sessions. Use of dynamic simulations and industrial case studies.
- Numerous simulations performed using the PRO/II™ or HYSYS™ or UNISIM™ software.
- Several tutorials with equipment in a workshop. Site/field visits.

**Learning Assessment**

- Continuous assessments all-along the program.
- Final assessment including a presentation in front of a jury.

**Course Content 60 days**

**ENERGY PRODUCTION & MANAGEMENT IN THE CONTEXT OF ENERGY TRANSITION**

- Energetic worldwide context - Low carbon energy production.

**NATURAL & BIOGAS PROCESSING**

- Thermodynamics applied to hydrocarbons processing.
- Gas processing.
- Process design case studies using process simulation software.

**TECHNOLOGY OF PRODUCTION FACILITIES & PROCESS EFFICIENCY**

- Piping systems and process equipment, metallurgy, corrosion management.
- Electrical systems, instrumentation, process control and safety instrumented systems.
- Energy optimization and heat exchangers network.

**ELECTRICITY PRODUCTION**

- Gas turbines.
- Power generator.
- Offshore wind challenges.

**ECONOMICS & PROJECT MANAGEMENT**

- Fundamentals of contracts - Project profitability evaluation - Risk analysis of energy transition projects.
- Project cost estimation and control.
- Cost of energy: conventional and renewables (biogas, solar, wind), LCOE, grid parity…

**PROCESS SAFETY MANAGEMENT**

- Process hazard analysis: HAZID, HAZOP, plant layout…
- Operating procedures, mechanical integrity, organizational elements.

**SOCIAL & ENVIRONMENTAL IMPACT MANAGEMENT**

- Societal consequences and problem linked to new energies development.
- Communication challenges and constraints, managing the relationships with partners.

**BIOGAS DEVELOPMENT PROJECT**

- Teamwork on a biogas project using actual data.

**Reference:** NRJENG-EN-A

**Contact:** ep.contact@ifptraining.com

www.ifptraining.com
Natural Gas Chain

- Natural Gas ................................................................. p. 301
- Natural Gas Storage ......................................................... p. 302
- Natural Gas Transport by Pipeline ..................................... p. 303
- From Gas to Energy ......................................................... p. 304
- Gas Production & Processing Engineer Certification .......... p. 305
- Gas Processing & Compression Operations ...................... p. 306

LNG Chain

- Liquefied Natural Gas (LNG) ........................................ p. 307
- LNG Processing Engineer Certification ............................. p. 308
- Natural Gas Liquids Extraction ........................................ p. 309
- LNG Process Simulation ................................................ p. 310
### Natural Gas Chain

This course can be adapted to virtual classroom mode

**Natural Gas**
Production - Treatments - Transport - End Uses

<table>
<thead>
<tr>
<th>Level: KNOWLEDGE</th>
</tr>
</thead>
</table>

**Purpose**
This course provides a comprehensive review of the techniques involved in natural gas production, processing and transport, complemented with an overview of natural gas valorization channels.

**Audience**
Professionals from all sectors, involved or interested in the natural gas industry.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- explain fundamentals of natural gas composition, characteristics, production and field processing,
- understand technical issues and specific constraints of natural gas transport and storage,
- review the various end-user markets available for valorizing natural gas,
- grasp key natural gas chain economic issues.

**Ways & Means**
- Highly interactive training by industry-specialist lecturers.
- Numerous applications and illustrations.

**Learning Assessment**
Assessment by test at the end of the course.

**Prerequisites**
Engineer degree or equivalent experience in Oil & Gas industry.

**IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.**

<table>
<thead>
<tr>
<th>Course Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NATURAL GAS: TYPES &amp; PRODUCTION TECHNIQUES</strong></td>
<td>0.75 d</td>
</tr>
<tr>
<td>Types and characteristics of natural gas fields. Production techniques. Different types of natural gases (condensate, wet or dry gas) and characterization parameters. Constitution of natural gas well effluent, properties and specific hazards. Case of associated gases: recovery techniques, characteristics, composition, etc.</td>
<td></td>
</tr>
</tbody>
</table>

| **END USES OF NATURAL GAS - MAIN QUALITY REQUIREMENTS** | 0.25 d |
| End uses of natural gases: fuel (domestic and industrial uses), conversion into other energy types (electricity production and cogeneration), automotive fuel (Natural Gas for Vehicles (NGV) and conversion into liquid automotive fuels GTL), chemical valorization, etc. Quality requirements for commercial natural gases and associated products (ethane, LPG, condensates). Examples of quality standards. |

| **NATURAL GAS PROCESSING** | 2 d |
| Gas dehydration (drying) and hydrate formation inhibition: System behavior. Moisture content of a saturated gas. **Applications:** moisture content of different gases having various compositions. Hydrate formation inhibition by injection of inhibitors: MeOH, MEG, LDHI, etc. Gas dehydration: TEG units, Molecular Sieves, etc. **Application:** summary design of TEG unit. Gas sweetening: removal of acid components (H₂S and/or CO₂): Different techniques applicable for gas sweetening: chemical solvent processes, amine units (MEA, DEA, DGA, MDEA, etc.); physical solvent processes; hybrid (physico-chemical) solvent processes; overview of other techniques; conversion of H₂S: sulfur production (CLAUS process) and tail gas processing. **Application:** summary design of an amine unit. |

| **NATURAL GAS: TYPES & PRODUCTION TECHNIQUES** | 0.75 d |
| Natural Gas Liquids (NGL) extraction (removal of heavy components): External refrigeration loop. Joule-Thomson expansion. Turbo-Expander. **Application:** calculation of cryogenic loop used for NGL extraction. |

| **TRANSPORT & STORAGE OF NATURAL GAS IN GAS PHASE** | 0.5 d |
| Gas pipes: technology, capacities, equipment, recompression units, operating conditions, etc. Underground storage (old reservoirs, aquifers, salt domes, etc.). Required treatments at outlet. |

| **NATURAL GAS ECONOMICS** | 0.5 d |

Reference: NATGAS-EN-A  - Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>4 October</td>
<td>8 October</td>
<td>€3,680</td>
</tr>
</tbody>
</table>

This course is also available in French: NATGAS-FR-A. Please contact us for more information.

www.ifptraining.com
Natural Gas Storage
Types - Technology - Operation - Economics

Course Content

NATURAL GAS: AS A STORABLE ENERGY
0.25 d
How? Summary presentation of the different storage systems: depleted reservoirs, aquifers, salt domes.
LNG storage tanks, etc.
Where? History of underground gas storage, storage sites in Europe and worldwide. Maps and tables by types of storage, per country and stored volumes.
Gas storage and its environment: noise, exhaust, surface footprints, landscape integration, local taxes, workforce.

STORAGE TYPES
0.5 d
Fluid flow in porous media. Reservoir modeling.
Depleted reservoirs, aquifers, salt domes, LNG storage tanks.
For each type of storage, presentation of development conditions, geological and structural characteristics, their specificities, the inherent hazards, the operational constraints, the repartition of sites throughout the world, etc.

STORAGE EQUIPMENT
0.25 d
Wells: drilling specificities, downhole and surface equipment.
Gathering network.
Gas compression: why, when and how?
Extracted gas treatment: dehydration, sweetening, odorization.
Auxiliary equipment: manifolds, instrumentation and control system, safety, treatment of effluents.
Metering: primary meter, correctors, data processing.

COMPRESSION
0.25 d
Characteristics of compressors specific to natural gas storage sites: compression ratio, runtime frequency, environment related issues (exhaust gases, noise, etc.), power types.
Types of compressor units: driver type (engine, electrical motor, gas turbine, etc.), reciprocating or centrifugal compressor, etc.
Comparison between gas turbine and motor drivers, fuel gas and electricity power.

GAS TREATMENT
0.25 d
At the wellhead: hydrate prevention by heating or methanol injection.
In the station: dehydration, sweetening, odorization.
For each treatment, presentation of the treatment target, risks, regulation aspects, treatment techniques, common processes used for gas treatment and product regeneration, effluent treatment.

ECONOMICAL ASPECT OF GAS STORAGE
0.5 d
Life cycle of a gas storage site.
Estimated values for CAPEX and OPEX for each storage type.
Pricing of access of third parties to storage facilities in France: analysis of the price breakdown, taking into account constraints and specificities of the storage.
Simulation of cost price per kWh, stored or delivered, for common site configurations.

Reference: NGSTOCK-EN-P Only available as an In-House course. Contact: ep.contact@ifptraining.com
This course is also available in French: NGSTOCK-FR-P Please contact us for more information.
Natural Gas Transport by Pipeline
Technology - Operation - Economics

Level: KNOWLEDGE

Purpose
This course provides an overview of the technical and economic issues of natural gas transport by pipeline.

Audience
Professionals (engineers, commercial, managerial staff, technical managers, technicians, operators…) interested in natural gas transport by pipeline, including equipment and services suppliers to gas transport companies.

Learning Objectives
Upon completion of the course, participants will be able to:
- gain an overview of the world map of natural gas pipeline networks,
- review marketed gas pipeline design: route, sizing, material, compression stations positioning and design, etc.,
- assess pipe laying organization, management, constraints, planning, and techniques,
- understand gas transportation network maintenance and daily operations within the framework of regulations,
- grasp fundamental issues of natural gas transport economics and third-party access.

Ways & Means
- Highly interactive training by industry-specialist lecturers.
- Numerous applications and illustrations.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
In order to be able to follow this training, trainees are asked to fulfill at least one of the criteria below:
- either a Bac or equivalent level,
- or to have a proven professional experience in pipeline transportation of LNG of at least 6 months.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO NATURAL GAS
From reservoir to end user. Chemical composition and properties of natural gas. Comparison to other combustible gases. World reserves. Panorama of offer, demand and movements.

TRANSPORT NETWORK

DESIGN & CONSTRUCTION OF A GAS PIPE

COMPRESSION
Characteristics of compressors: compression ratio, run-time frequency, environment-related issues (exhaust gases, noise, etc.), power types. Types of compressor units: driver type (engine, electrical motor, gas turbine, etc.), reciprocating or centrifugal compressor. Comparison between gas turbine and motor drivers, fuel gas and electricity power.

OPERATION OF A NETWORK

ECONOMICAL ASPECTS OF GAS TRANSPORT BY PIPELINE
Investment costs (CAPEX). Lifetime of a gas pipe. Operation costs (OPEX). Pricing for access of third parties to the gas transport network: analysis of the price breakdown in France. Simulations of cost price per kWh delivered, for some typical cases.

Reference: NGTRANS-EN-P
Only available as an In-House course.
This course is also available in French: NGTRANS-FR-P. Please contact us for more information.

Contact: ep.contact@ifptraining.com

www.ifptraining.com

303
This course can be adapted to virtual classroom mode

From Gas to Energy

**Course Content**

**NATURAL GAS PRODUCTION OVERVIEW**

<table>
<thead>
<tr>
<th>Types and characteristics of natural gas fields. Production techniques.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different types of natural gases (condensate, wet or dry gas) and characterization parameters.</td>
</tr>
<tr>
<td>Natural gas processing:</td>
</tr>
<tr>
<td>Gas dehydration (drying) and hydrate formation inhibition.</td>
</tr>
<tr>
<td>Gas sweetening: removal of acid components (H₂S and/or CO₂).</td>
</tr>
<tr>
<td>Natural Gas Liquids (NGL) extraction (removal of heavy components).</td>
</tr>
<tr>
<td>Examples of gas field development schemes.</td>
</tr>
<tr>
<td>Transport:</td>
</tr>
<tr>
<td>Transport and storage of natural gas in gaseous phase.</td>
</tr>
<tr>
<td>Transport of natural gas in liquid phase. LNG option and regasification.</td>
</tr>
</tbody>
</table>

**ECONOMIC ASPECT**

| Gas markets: natural gas reserves and production, worldwide gas demands distribution, international natural gas trade. |
| Gas contracts, specificities of LNG contracts, pricing, shipping contracts. |
| Power supply market trends and deployment over the world. |

**THERMAL POWER PLANT OVERVIEW**

| Introduction to Steam Power Plant (SPP). |
| Overview of characteristic equipment. |
| Characteristics of simple cycles associated to SPP: |
| Carnot cycle. |
| Rankine cycle. |
| Overview of existing cycles. |
| Notion of energetic performance. Energy measurement: |
| Energy balance. |
| Energy efficiency. |
| Safety associated with this kind of installation. |
| Environment consideration. |
| Overview of existing plant P&ID. |

**TECHNOLOGY OF THERMAL POWER PLANT EQUIPMENT**

| Boilers: |
| Boilers description and operating conditions. |
| Combustion. Burners. |
| Steam production. |
| Boiler operation and safety in operation. |
| Steam turbines. Gas turbines: |
| Turbine performance. |
| Technology. |
| Turbine control systems, operation and safety in operation. |

**OVERVIEW OF COMBINED POWER PLANT**

| Combined cycles: gas/steam. |
| CHP (Combined Heat and Power): |
| Steam production. |
| Steam end-uses. |
| Gas turbines and waste heat recovery. |

**SOLAR & THERMAL POWER PLANT OVERVIEW**

| Concentrating solar power plant: |
| Current technology: parabolic through, solar power tower, Fresnel reflectors. |
| Efficiency and costs. |
| Deployment over the world. Overview of existing plant. |

Reference: ENERGY-EN-A  [Only available as an In-House course.]

Contact: ep.contact@ifptraining.com

This course is also available in French: ENERGY-FR-P. Please contact us for more information.
Graduate Certificate
Gas Production & Processing Engineer Certification

Level: KNOWLEDGE

Purpose
This course aims to acquire comprehensive and practical knowledge of natural gas production, processing and transport engineering in order to quickly and efficiently adapt and contribute to a broad range of engineering positions within the gas industry.

Audience
Production engineers, field engineers, process engineers…, seeking to acquire comprehensive and solid engineering capabilities in gas production, from the reservoir to the transport network.

Learning Objectives
Upon completion of the course, participants will be able to:
- Identify key subsurface parameters impacting gas production.
- Design gas processing plants and anticipate process performances by simulation.
- Select appropriate technology of static/rotating equipment according to service and analyze key operating parameters/performances.
- Identify main risks related to gas production facilities and participate to safety engineering studies.
- Efficiently contribute to gas field development studies.

Ways & Means
- Highly interactive training course delivered by industry experts and adapted to participants’ experience.
- Multiple teamwork sessions and industrial case studies.
- Hands-on activities on professional software: HYSYS™ or PRO/II™ for process simulation, PIPESIM™ and OLGA™ for gathering networks and flow assurance.
- Teamwork project on a real case study of gas field development.

Learning Assessment
- Continuous assessments all along the program.
- Final assessment including a presentation in front of a jury.

Prerequisites
Engineering degree or equivalent professional experience within the Oil & Gas industry.

Why an IFP Training Certification?
- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Gas Production & Processing Engineer Certification.
- Ready-to-use skills.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content 70 days

FUNDAMENTALS OF GEOLOGY, RESERVOIR ENGINEERING & PRODUCTION MODES 5 d

FUNDAMENTALS OF DRILLING, WELL COMPLETION & WELL PERFORMANCE 5 d

GATHERING NETWORKS DESIGN & OPERATION - FLOW ASSURANCE ISSUES 5 d

THERMODYNAMICS APPLIED TO WELL EFFLUENT PROCESSING 5 d

GAS PROCESSING & CONDITIONING 5 d

PROCESS SIMULATION 5 d
Using HYSYS™ or PRO/II™: participants are coached throughout the week to build a complete gas plant model including: gas field treatment (primary separation, dehydration, compression); NGL recovery and fractionation; propane loop, distillation. Analysis of gas plant design and operating parameters.

NATURAL GAS STORAGE & TRANSPORT BY PIPELINE 5 d
Gas storage: storage types, storage equipment, compression. Gas transport by pipelines: transport network; design and construction of gas pipelines; compression, corrosion prevention, metering stations; operation of a network.

PIPELINING SYSTEMS & PROCESS EQUIPMENT: SIZING & OPERATION 5 d

ELECTRICAL SYSTEMS, INSTRUMENTATION, PROCESS CONTROL & SAFETY SYSTEMS 5 d

ROTATING MACHINERY: TECHNOLOGY, SELECTION & OPERATION 5 d
Operating principles, technology, selection criteria, performances and operating conditions of centrifugal and volumetric pumps; centrifugal and reciprocating compressors; gas turbines; turbo-expanders.

HSE & SAFETY ENGINEERING APPLIED TO GAS PLANTS 5 d
Main hazards in gas production facilities. Risk in normal production operations. Safe isolation of plant and equipment. Main safety engineering studies: HAZID/HAZOP workflow and application; plant layout case study; QRA - Consequence analysis methodology.

PROJECT MANAGEMENT & ECONOMICS 5 d

GAS FIELD DEVELOPMENT PROJECT & JURY 10 d
10-day teamwork on a real case study with deliverables to be presented on the last day (jury).

Reference: INGGAZ-EN-P Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
Gas Processing & Compression Operations
Technology - Operation

**Course Content**

**VAPOUR-LIQUID EQUILIBRIUM, ELEMENTS OF DISTILLATION & ABSORPTION** 0.5 d
- Phase envelopes.
- Well effluents behavior from pay zone to surface processing facilities.
- Techniques applied to mixture separation: flash process, distillation process.
- Absorption and stripping phenomena.

**SPECIFICATIONS & WATER CONTENT OF GAS - HYDRATES** 0.5 d
- Constituents raising problems for storage, transport or end use of natural gas.
- Different specifications and quality requirements for natural gas.
- Necessary treatments to conform these specifications.
- System behavior. Moisture content of a saturated gas.
- Applications:
  - Moisture content of different gases of various compositions.
  - Hydrate formation inhibition by injection of inhibitors: MeOH, MEG, DEG, LDHI…

**GAS DEHYDRATION: TEG ABSORPTION, MOLECULAR SIEVES** 0.75 d
- Gas dehydration process: conventional TEG process.
- Case study of gas processing operations: TEG process troubleshooting.
- Gas dehydration by physical adsorption (molecular sieves): technologies, performances and operating principles.

**GAS TREATMENT: SWEETENING, CONDENSATE EXTRACTION & FRACTIONATION** 0.75 d
- Overview of the techniques dedicated to gas sweetening:
  - Chemical solvent processes - Amine units (MEA, DEA, DGA, MDEA…).
  - Physical solvent processes.
  - Hybrid (physico-chemical) solvent processes.
- Overview of other techniques.
- Conversion of H₂S: sulfur production (CLAUS process) and tail gas processing.
- Natural Gas Liquids (NGL) extraction (removal of heavy components).
- Low Temperature Separation processes (LTS):
  - External refrigeration loop.
  - Joule-Thomson expansion.
  - Turbo-Expander.
- NGL Fractionation Schemes (C₃/LPG/C₅⁺ recovery).

**TECHNOLOGY & OPERATION OF CENTRIFUGAL & RECIPROCATING COMPRESSORS** 1 d
- Operating principle, flowrate tuning.
- Technology: constitutive elements and their function.
- Circuits auxiliaries: lubrication, sealing system, cooling, safety systems.
- Compressors operation: routine surveillance, transient conditions.

**COMPRESSORS OPERATION (case studies)** 0.75 d
- Start-up, shutdown and on-line monitoring.

**FEEDBACK & CASE STUDIES - TROUBLESHOOTING SPECIFIC TO CLIENT ASSETS** 0.75 d
- Tailored workshops as per client requirements.

---

**Ways & Means**
- Highly interactive training by industry specialist lecturers.
- Feedback, case studies and illustrations (possibility to adapt according client assets specificities).

**Learning Assessment**
Assessment by test at the end of the course.

**Prerequisites**
Engineer degree or equivalent experience in Oil & Gas industry.

**IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.**
This course can be adapted to virtual classroom mode

Liquefied Natural Gas (LNG)
Hazards - Technology - Operation - Economics

Level: KNOWLEDGE

Purpose
This course provides a comprehensive technical and economic review of the Liquefied Natural Gas industry.

Audience
Professionals involved or interested in the LNG industry: technical and managerial staff in the LNG industry, equipment providers, personnel from engineering companies, etc.

Learning Objectives
Upon completion of the course, participants will be able to:
- review the structure of an LNG chain and the world map of LNG plants,
- understand main LNG physical properties and specificities,
- assess LNG facilities’ hazards and HSE issues, along with risk mitigation and prevention techniques,
- grasp main liquefaction processes’ operating principles, conditions and constraints,
- gain an overview of the technology of equipment used in the LNG industry, grasp the essence of LNG markets and contracts.

Ways & Means
- Highly interactive training by industry-specialist lecturers.
- Numerous applications, illustrations and videos.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
Engineer diploma or equivalent experience in the Oil & Gas industry.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content 5 days

THE LNG WORLD
The LNG chain. Order of magnitude and trends. Location of main plants worldwide.

LNG SPECIFIC PROPERTIES & ASSOCIATED HAZARDS
Physical properties: liquid-vapor equilibrium, density, ratio of vapor methane/LNG, heat of vaporization, heat of combustion…
Safety aspects: flash point, fire point, auto-ignition point, minimum spark energy, flammability limits, deflagration.
LNG vaporization, Rapid Phase Transition (RPT), radiation levels, stratification/roll-over, sloshing, LNG clouds ignition.
Asphyxiation risks, cryogenic liquids jets, piping behavior.

LNG HAZARD PREVENTION & MITIGATION MEASURES
LNG spillage control at design stage and in operation.
LNG clouds control in operation.
LNG fires control at design stage and in operation.

LIQUEFACTION & REGASIFICATION PROCESSES
Feed pretreatment: sweetening, dehydration, NGL extraction, Hg and aromatics removal.
Different liquefaction processes: pure component refrigerants, pure component(s) and mixed refrigerant(s), mixed refrigerants.
Peak shaving simplified scheme.
Regasification process.

LNG STORAGE, LOADING/OFFLOADING & TRANSPORT
LNG tanks: single or double or full containment (self-standing, membrane). Hazards.
Jetty head, jetty trestle, harbor.
LNG carriers: common features, technology, cargo operations, safety systems.

TECHNOLOGY OF LNG SPECIFIC EQUIPMENT
LNG cryogenic heat exchangers: spiral wound heat exchangers, aluminum brazed heat exchangers.
Technology of the cryogenic compressors and their drivers (gas turbines).
LNG Vaporizers: Open Rack Vaporizers (ORV), Submerged Combustion Vaporizers (SCV), etc.
Safety and environmental aspects.
Submerged LNG pumps: in-tank retractable pumps, cargo pumps, HP canned send out pumps, etc.
Liquid cryogenic turbo-expanders, cryogenic valves.
Cryogenic personnel protection items.

LNG PLANT OPERATION
Day to day activities in an LNG plant. Experience of some plants.

LNG TRENDS - RESEARCH & NEW DEVELOPMENTS

LNG ECONOMIC ASPECTS
Gas markets: natural gas reserves and production, worldwide gas demands distribution, international natural gas trade.
LNG contracts: specificities of LNG contracts, pricing, shipping contracts.
LNG markets trends.

Reference: LNG-EN-A
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>15 November</td>
<td>19 November</td>
<td>€4,840</td>
</tr>
</tbody>
</table>

This course is also available in French; LNG-FR-A. Please contact us for more information.

www.ifptraining.com
This course can be adapted to virtual classroom mode - Graduate Certificate

**LNG Processing Engineer Certification**

## Purpose

This course provides in-depth technical knowledge of natural gas treatment and liquefaction facilities design and operation necessary to hold rapidly, and very effectively, the position of process engineer, field engineer or technical service engineer.

## Audience

Engineers (particularly recently graduated engineers or engineers in conversion) interested in specialization in gas treatment and liquefied natural gas processing.

## Learning Objectives

Upon completion of the course, participants will be able to:

- explain the thermodynamics involved in natural gas treatment and liquefaction, especially cryogenic loops,
- explain natural gas processing and liquefaction process,
- analyze operating conditions and basic design of gas treatment and liquefaction plant,
- describe the technology of static equipment and rotating machinery used in LNG plants,
- identify the main risks related to gas treatment and liquefaction and efficiently contribute to safety engineering studies.

## Ways & Means

- Highly interactive training with industry-specialist lecturers,
- Multiple teamwork sessions and industrial case studies,
- Practice on dynamic simulator,
- Numerous process simulation exercises using HYSYS™ or PRO/II™ software.

## Learning Assessment

- Continuous assessments all along the program,
- Final assessment including a presentation in front of a jury.

## Prerequisites

Engineering degree or equivalent professional experience within the Oil & Gas industry.

## Why an IFP Training Certification?

- An international recognition of your competences,
- A Graduate Certificate delivered,
- An expertise confirmed in LNG Processing Engineer Certification,
- Ready-to-use skills.

## Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

## Course Content

### THERMODYNAMICS APPLIED TO WELL EFFLUENT PROCESSING

5 d  

### GAS PROCESSING & CONDITIONING

5 d  

### DYNAMIC SIMULATION OF GAS PROCESSING FACILITIES

5 d  
During this week, case study and exercises are performed using HYSYS™ or PRO/II™ software in order to allow the participants to understand process dynamics. Hydrates detection and inhibition in gathering network. Gas processing. Gas dehydrations: impact of operating conditions. Multistage gas compression and export: study of operating parameters.

### LIQUEFIED NATURAL GAS

5 d  

### LNG PROCESS SIMULATION

5 d  
During this week, case study and exercises are performed using HYSYS™ or PRO/II™ software in order to allow the participants to design and optimize liquefaction processes: gas field treatment (separators, dehydrations, compression); NGL fractionation and stabilization; simulation of a cascade liquefaction process, of a C3MR liquefaction process, of a turbo-expander based liquefaction process; integration of the liquefaction processes with the NGL recovery/fractionation; comparison of the efficiency of the processes versus load and conditions.

### PIPING SYSTEMS & PROCESS EQUIPMENT: TECHNOLOGY & SIZING

5 d  

### INSTRUMENTATION, PROCESS CONTROL & SCHEMATIZATION

5 d  

### PUMPS & COMPRESSORS

5 d  
Fundamentals of hydraulic circuits and gas compression. Operating principles, technology, selection criteria, performances and operating conditions of centrifugal and volumetric pumps as well as centrifugal and reciprocating compressors.

### GAS TURBINES - ELECTRICAL GENERATION

5 d  
Upon customer request, this module can be tuned to team generation and team turbines operations. Gas turbines: equipment technology, operating conditions, performances, operation. Turbo-expander: technology, operation. Electrical power generation. Electrical power distribution network and equipment.

### LNG - SPECIFIC SAFETY ENGINEERING

5 d  
LNG specific hazards: stratification/roll-over, sloshing, LNG clouds ignition, asphyxiation risks, cryogenic liquids jets, piping behavior. LNG spillage control at design stage and in operation. LNG clouds control in operation. LNG fires control at design stage and in operation. Main safety engineering studies: HAZID and HAZOP workflow and application; plant layout case study; QRA - Consequence analysis methodology.

### HSE IN OPERATIONS & MAINTENANCE WORKS

5 d  

### CASE STUDY BASED ON LNG PLANT P&IDS & JURY

5 d  
During this week, participants will work in team to analyze LNG plant P&ID’s and present the results of their analysis to a jury: this 5-day teamwork project is a real case study based on actual data. Participants are coached throughout the project to produce the required deliverables, which are to be presented on the last day (jury): process operating parameters, process control loops and safety loops; operating philosophy; materials and equipment selection.

Reference: LNGENG-EN-A  
Only available as an In-House course.  
Contact: ep.contact@ifptraining.com

This course is also available in French: LNGENG-FR-A. Please contact us for more information.
Natural Gas Liquids Extraction
Production - Treatments

Level: KNOWLEDGE

Purpose
This course provides an advanced review of the techniques involved in natural gas liquids extraction and processing.

Audience
Process engineers, involved in advanced Natural Gas Liquids recovery.

Learning Objectives
Upon completion of the course, participants will be able to:
- explain technical issues and specific constraints of natural gas liquids extraction,
- explain and simulate main NGL extraction processes,
- compare process performances,
- explain NGL specifications and associated treatments.

Ways & Means
- Highly interactive training by industry-specialist lectures.
- Process simulation using HYSYS or PROII.

Prerequisites
6 months experience process engineering and process simulation.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NATURAL GAS &amp; NATURAL GAS LIQUIDS PRODUCTION &amp; VALORIZATION</td>
<td>0.5 d</td>
<td>Field treatment of natural gas, transportation by pipe and associated quality requirements. Natural gas monetization routes and NGLs markets.</td>
</tr>
<tr>
<td>MAIN QUALITY REQUIREMENTS</td>
<td>0.25 d</td>
<td>Quality requirements for commercial natural gases and associated products (ethane, LPG, condensates) and associated pre-treatment: mercury removal, conversion or adsorption of mercaptans (RSH), etc.</td>
</tr>
<tr>
<td>TECHNOLOGY USED IN THE NGL EXTRACTION UNITS</td>
<td>0.25 d</td>
<td>Review and main characteristics of the equipment used in the NGL recovery units: plate fine heat exchangers (typical pressure drops), turbo-expander (typical efficiency, acceptable liquid ratio, enthalpy drop), demethanizer (used internals and their efficiency).</td>
</tr>
<tr>
<td>NGL RECOVERY WITH CONVENTIONAL PROCESS</td>
<td>0.5 d</td>
<td>Needed notions of process performances and associated thermodynamics. Process review. Case studies: Simulation of expansion of a natural gas stream through a valve and a turbo-expander, impact of operating parameters on NGL recovery and products quality. Simulation of NGL recovery process with columns, impact of reflux on NGL recovery.</td>
</tr>
<tr>
<td>ORTLOFF PROCESS</td>
<td>0.5 d</td>
<td>Process review. Case study: simulation of Ortloff process, impact of reflux stream composition on NGL recovery.</td>
</tr>
<tr>
<td>CRYOMAX PROCESS</td>
<td>0.5 d</td>
<td>Process review. Case study: simulation of Cryomax process, comparison with Ortloff process.</td>
</tr>
<tr>
<td>NGL FRACTIONATION &amp; ASSOCIATED TREATMENTS</td>
<td>0.5 d</td>
<td>NGL fractionation process review. Case study: simulation of NGL fractionation process with mercaptans, mercaptans mass balance. NGL needed treatments (Merox or equivalent) and comparison with the adsorption process on the main gas stream.</td>
</tr>
</tbody>
</table>

Reference: NGL-EN-P
Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

Location	Start Date	End Date	Tuition Fees excl. VAT
Rueil-Malmaison	23 March	25 March	€2,950
Blended Learning
This course offers a combination of online and face-to-face training sequences

LNG Process Simulation

Level: SKILLED

Purpose

This course aims to acquire a comprehensive knowledge and practical know-how in the simulation of natural gas pre-treatment and liquefaction processes, with an emphasis on condensate recovery, fractionation and integration with the liquefaction process.

Audience

Process design engineers involved in conceptual design, basic or detailed engineering of LNG plants.

Learning Objectives

Upon completion of the course, participants will be able to:

▸ assess various problems that can be induced by unwanted elements and compounds in gas streams,
▸ design, explain the operation and operating parameters of gas condensate recovery systems and natural gas liquefaction processes,
▸ perform steady-state simulations with PRO/II™ or HYSYS™, model set-ups, and simulate gas processing and liquefaction processes,
▸ optimize process operating conditions, compare processes performances, evaluate power requirements, size equipment...
▸ check plant performance under different operating conditions, implement the optimal process scheme.

Ways & Means

▸ Highly interactive training course delivered by industry experts and adapted to participants’ experience.
▸ Numerous simulation and case studies performed using PRO/II™ or HYSYS™.
▸ Simulation of DMR, MFC, N2/dual-expander & SMR processes can be performed in classroom or as e-learning upon request.

Learning Assessment

Assessment by test at the end of the course.

Prerequisites

▸ 6 months experience in Process Design Engineering.
▸ Use of process simulators (PRO/II™ or HYSYS™).

Expertise & Coordination

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

NEED FOR GAS FIELD PROCESSING - QUALITY REQUIREMENTS

0.25 d

Review of main concepts and products within the gas/condensate chain.
Undesired constituents for storage, transport, or end use of natural gas.
Different specifications and quality requirements for natural gas: sales gas specifications, reach/lean gas specifications.
Required treatments and overview of gas processing.
Examples of compositions of commercialized natural gases.

STEADY-STATE PRO/II™ OR HYSYS™ SIMULATION CASE STUDIES

0.75 d

Equations Of State (EOS); uses, examples, selection:
Reservoir fluids phase envelope.
Flash separation of multicomponent mixtures.
Phase envelope of gases versus composition.
GHV and WI calculation using PRO/II™ or HYSYS™.
Construction of simulation reports.

CONDENSATE RECOVERY, FRACTIONATION & REFRIGERANT MAKE-UP

0.5 d

Condensate fractionation: choice of the operating conditions.
Quality requirements for methane, ethane, propane and butane used for MR make-up.
Storage of methane, ethane, propane and butane for make-up.
Nitrogen requirements for make-up.

SIMULATION OF CONDENSATE RECOVERY & FRACTIONATION USING PRO/II™ OR HYSYS™

0.5 d

Selection of thermodynamics packages.
Simulation of a condensate fractionation and stabilization process.

CASCADE PROCESS OPERATING CONDITIONS & SIMULATION

0.5 d

Process diagram and operating parameters.
Simulation of the liquefaction process: optimization of the operating conditions, compressors sizing.

COMPARISON OF THE MAIN MIXED REFRIGERANTS LIQUEFACTION PROCESSES

0.5 d

Fields of application of liquefaction processes.
Comparison with cascade process and turbo expander based process.

LIQUEFACTION WITH C3 - MIXED REFRIGERANTS - OPERATING CONDITIONS & SIMULATION

1 d

Process diagram and operating parameters.
Simulation of the liquefaction process: optimization of the operating conditions, compressors sizing.
Optimization of MR composition.

LIQUEFACTION WITH 2 MIXED REFRIGERANTS - OPERATING CONDITIONS & SIMULATION

0.5 d

Process diagram and operating parameters.
Simulation of the liquefaction process: optimization of the operating conditions, compressors sizing.
Optimization of MR composition.

LIQUEFACTION PROCESSES PERFORMANCES COMPARISON

0.5 d

Heat and mass balance for each process.
Comparison of power requirements for the different processes.

Reference: LNGSIM-EN-B ❍ Can be organized as an In-House course.
Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>20 September</td>
<td>24 September</td>
<td>€4,270</td>
</tr>
</tbody>
</table>

This course is also available in French: LNGSIM-FR-B. Please contact us for more information.
Tight Sand & Shale Plays - In Unconventional Settings

Course Content

PETROLEUM SYSTEM CONCEPT OF UNCONVENTIONAL RESOURCES  
1 d
Definition of petroleum systems: Conventional vs. Unconventional.
Characterization of these two systems in terms of elements, processes, timing, Oil & Gas composition.
Origin, composition, preservation and types of sedimentary organic matter: defining a typical source rock.
Oil & Gas generation, retention, expulsion and migration processes from source to reservoir rocks.
Introduction to Petroleum System Models: classical source rocks vs. unconventional source-reservoir rocks.

TIGHT SANDS  
1.5 d
Tight sands at the basin scale: geological distribution and geochemical characterization.
Depositional settings, diagenesis and stratigraphy framework.
Definition of tight sand plays (tight gas) in a petroleum system perspective.
Characteristics: regional extent, diffuse boundaries, heterogeneities, low matrix permeability.
Porosity networks and their impact on fluid flow.

SHALE PLAYS  
2 d
Definition of shale plays (shale gas, condensate, oil) in a petroleum system perspective.
Key geological parameters.
Integration of applied geochemical data (organic richness, Rock-Eval pyrolysis, estimating original TOC, vitrinite reflectance measurements, biomarkers, isotopes) and basin models (input, calibration and output) as a tool for defining “sweet spots” in existing plays (lecture, discussion and exercises).
Porosity system (organic and inorganic porosity) and impact on fluid flow.
Types of shale plays (tight, hybrid, fractured), impact on production (lecture and exercises).

RESOURCE APPLICATIONS: CASE STUDY  
0.5 d
Other potential worldwide plays: Vaca Muerta, Bazhenov, North Africa, Posidonia.

Reference: SHALEP-EN-P  
Only available as an In-House course.

Contact: ep.contact@ifptraining.com

Level: KNOWLEDGE

Purpose
This course provides a general introduction to unconventional hydrocarbon systems, mainly focused on geological and geochemical data interpretation to define potential producible Oil & Gas intervals. Emphasize is put on tight sand and shale plays.

Audience
This course provides a general introduction to unconventional hydrocarbon systems, mainly focused on geological and geochemical data interpretation to define potential producible Oil & Gas intervals. Emphasize is put on tight sand and shale plays.

Learning Objectives
At the end of the course, participants will be able to:
- Integrate both geological and geochemical data to identify potential targets in unconventional petroleum systems,
- Acquire a global knowledge of existing unconventional resources, mainly tight sands and shale plays,
- Understand the exploration implications in this recent domain and future potential impacts.

Ways & Means
- Interactive courses and exercises.
- Examples with the most known unconventional reservoirs in the world.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Engineer diploma or equivalent experience in Oil & Gas industry.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.
This course provides a general introduction to various non-conventional hydrocarbons, focused solely on a consistent geological rationale to the different potentially producing objectives, through a “petroleum system” approach.

Audience
Geologists, geophysicists, engineers, managers, E&P professionals in charge of basin exploration and prospect evaluation. E&P professionals involved in production of unconventional hydrocarbons.

Learning Objectives
Upon completion of the course, participants will be able to:
▶ understand the geological rationale of unconventional resources as an extension of the petroleum system concept,
▶ acquire a general knowledge of all unconventional resources,
▶ understand what is at stake in this recent domain and future potential impacts.

Ways & Means
▶ Examples from all over the world commented by an expert.
▶ Interactive discussions.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Degree in geology, geophysics or reservoir engineering, with basic knowledge in prospect evaluation.

More info
Kindly refer to complementary courses which might be of interest: “Unconventional Resources - Shale Gas Fundamentals”, “Unconventional Reservoirs Completion and Stimulation”.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: UNCON-EN-A  Only available as an In-House course.
This course can be adapted to virtual classroom mode

Unconventional Resources - Shale Gas Fundamentals

Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORLD ENERGY DEMAND &amp; SHALE GAS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>HYDROCARBONS IN UNCONVENTIONAL SETTINGS</td>
<td>1 d</td>
</tr>
<tr>
<td>SHALE GAS STIMULATION</td>
<td>1 d</td>
</tr>
<tr>
<td>SHALE GAS PETROPHYSICS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>SHALE GAS RESOURCES</td>
<td>0.5 d</td>
</tr>
<tr>
<td>PRODUCTIVITY &amp; FIELD DEVELOPMENT</td>
<td>0.5 d</td>
</tr>
<tr>
<td>ECONOMICS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>ENVIRONMENTAL IMPACT</td>
<td>0.5 d</td>
</tr>
</tbody>
</table>

Level: SKILLED

Purpose

This course provides an overview of unconventional hydrocarbons resources, highlighting main technical, economic and environmental issues of shale gas exploration and production.

Audience

Geoscientists, reservoir engineers, petroleum engineers and managers interested in shale gas resources.

Learning Objectives

Upon completion of the course, participants will be able to:

- discuss the fundamentals of gas shale formation evaluation,
- discuss about assessment and improvement of unconventional developments productivity,
- discuss about economic and environmental issues of unconventional developments.

Ways & Means

Interactive courses and exercises.

Learning Assessment

Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites

Degree in geology, geophysics or reservoir engineering, with basic knowledge in shale gas.

More info

Kindly refer also to the complementary courses which might be of interest: “Unconventional Field Development Program - Hydrocarbons in Unconventional Settings”, “Unconventional Reservoirs Completion & Stimulation”.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: UNCONV-EN-A  Only available as an In-House course. Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode

Unconventional Resources - “Tight & Shale Gas: an Integrated Subsurface to Surface Approach”

Level: SKILLED

Purpose

This course provides a practical understanding of exploration, drilling & completion, and production techniques & procedures in an unconventional hydrocarbon context.

Audience

Geoscientists, reservoir engineers and petroleum engineers involved in exploring, developing and producing unconventional fields.

Learning Objectives

Upon completion of the course, participants will be able to:

▶ assess the unconventional hydrocarbon potential of a basin,
▶ define a completion program, assist in and manage on-site operations and design the completion methods of shale gas wells,
▶ demonstrate the stimulation techniques (hydraulic fracturing) in shale gas wells,
▶ select the relevant characteristics of a shale gas system and related fluid properties to optimize well performance,
▶ propose adapted field architecture options and take into account safety aspects,
▶ adopt emerging best practices regarding environmental issues and set-up appropriate water management plan,
▶ assess risks associated with unconventional field operations and implement appropriate mitigation measures.

Ways & Means

▶ Highly interactive training by industry’s specialist lecturers.
▶ Numerous hands-on and workshop practical activities based on real data sets and practice of dedicated state-of-the-art software.
▶ Teamwork sessions to develop team-building and stimulate debates and communication between the participants.

Learning Assessment

▶ Initial and final evaluation will be organized in order to assess participants’ learning curve and knowledge acquisition.
▶ Knowledge assessments with multiple choice questions and open explanatory questions will be organized at the end of each unit.

Prerequisites

Engineering degree or equivalent experience in the Oil & Gas industry.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/ or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: UNCONVR-EN-A  Only available as an In-House course.
Contact: ep.contact@ifptraining.com

Course Content

50 days

Module 1: TIGHT SAND & SHALE PLAYS - IN UNCONVENTIONAL SETTINGS  5 d
Module 2: UNCONVENTIONAL RESOURCES: ENVIRONMENTAL MANAGEMENT  5 d
Module 3: UNCONVENTIONAL RESOURCES: SHALE GAS CHARACTERIZATION, MODELING & ENGINEERING  10 d
Module 4: WELL ARCHITECTURE & DIRECTIONAL DRILLING IN UNCONVENTIONAL WELLS  5 d
Module 5: UNCONVENTIONAL RESERVOIRS COMPLETION & STIMULATION  5 d
Module 6: WELL PERFORMANCE: SHALE GAS WELLS  5 d
Module 7: UNCONVENTIONAL RESOURCES: FIELD ARCHITECTURE  5 d
Module 8: UNCONVENTIONAL RESOURCES: WATER MANAGEMENT  5 d
Module 9: UNCONVENTIONAL RESOURCES: SAFETY ISSUES  5 d
Unconventional Resources -
Shale Gas Characterization, Modeling & Engineering
Organized in collaboration with GO GEO Engineering

Level: SKILLED

Purpose
This course provides information about handling the major data requirements and modeling issues associated with unconventional reservoirs in general as well as how to set up rational exploitation programs for these reservoirs.

Audience
This course is intended for geoscientists, reservoir engineers, petroleum engineers and production engineers interested in the characterization, modeling, engineering and exploitation of unconventional reservoirs.

Learning Objectives
Upon completion of the course, participants will be able to:

- discuss the characteristics of unconventional reservoirs,
- discuss all geological, geomechanical and seismic aspects related to unconventional reservoirs modeling,
- integrate geology, geophysics, geomechanics and reservoir engineering concepts for building a reservoir model,
- identify natural fractures and model their density and orientation,
- simulate the Fracs propagation and their interaction with fractures,
- calculate the Stimulated Reservoir Volume (SRV) generated by the Fracs,
- recognize productive zones and design wells with optimum Fracs stages,
- create fracture porosity and permeability models for reservoir simulation,
- estimate the recovery and design the optimum FDP.

Ways & Means
- Interactive courses and exercises with a real case studies data set.
- Videos and examples with the most known unconventional reservoirs in the world.
- Hands-on practice using dedicated software allowing to generate actual reservoir models from real data sets.

Learning Assessment
Knowledge assessment with multiple choice questions and open explanatory questions.

Prerequisites
Degree in geology, geophysics or reservoir engineering, with basic knowledge in shale gas and reservoir characterization/ modeling.

Expertise & Coordination
IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

INTRODUCTION TO UNCONVENTIONAL RESOURCES
Introduction to unconventional reservoirs.
Production from unconventional reservoirs in the world.
Petrophysics of unconventional reservoirs.

UNCONVENTIONAL RESERVOIR CHARACTERIZATION
Methodologies for characterizing unconventional reservoirs.
Seismic attributes for unconventional reservoirs.
Calculating post stack seismic attributes.
Calculating pre stack seismic attributes.
Azimuthal anisotropy.
Hands-on application using dedicated software on two real unconventional reservoir data sets.

GEOLOGIC & GEOMECHANICS MODELING FOR UNCONVENTIONAL RESERVOIRS
Shale geological and geomechanical modeling drivers.
Using seismic for improving unconventional reservoir modeling.
Natural fractures in unconventional reservoirs.
Calculating geological and geomechanical properties.
Correlation between geomechanical properties and micro seismic events and other tracers.
Stimulated reservoir volume from geomechanical properties.
Hands-on application using dedicated software on two real unconventional reservoir data sets.

HYDRAULIC FRACKING FOR UNCONVENTIONAL RESERVOIRS
Modeling the propagation of the hydraulic fractures and their interaction with natural fractures.
Optimum Frac stages placement and design.
Hands-on application on various unconventional wells data sets.

RESERVOIR ENGINEERING FOR UNCONVENTIONAL RESERVOIRS
Predicting and imaging production spots.
Well interference effect.
Fracs stages in the dynamic model.
Unconventional well performance study.
Reservoir simulation for unconventional wells.
Predicting production and development problems by type of reservoirs.
Completion optimization while drilling in unconventional reservoirs.
Hands-on application using dedicated software on two real unconventional reservoir data sets.

INTEGRATED WORKFLOW FOR MODELING UNCONVENTIONAL RESERVOIRS
Integrated workflow for unconventional reservoirs: from the raw data to the engineering study.
Hands-on application using dedicated software on two real unconventional reservoir data sets.

Reference: SHALE-EN-P  Only available as an In-House course. Contact: ep.contact@ifptraining.com
Well Architecture & Directional Drilling in Unconventional Wells

Level: KNOWLEDGE

Purpose
This certifying training aims to provide the necessary knowledge to plan and carry out a directional drilling (geothermal, water, storage, oil, gas), including the architecture.

Audience
This certification is intended for technicians, tool pushers, site managers, supervisors, superintendents and engineers who will be involved in oil/gas drilling operations.

Learning Objectives
Upon completion of the course, participants will be able to:
- calculate different casing strings using the Drilling Data Handbook,
- select the right position of casing shoes,
- calculate the stress applied to the casing pipes,
- choose the right wellhead with regards to the casings used,
- know the equipment needed for directional drilling,
- design a directional well,
- calculate the trajectories of a deviated well in 2D,
- design the drill stem adapted to the well’s profiles to reach a target,

Ways & Means
- Exercises.
- Movies.
- Work in groups, teamwork.
- Computer use for the design of a personal spreadsheet program.

Learning Assessment
Exercises, quiz, written exam.

Prerequisites
- Knowledge of the drilling operations.
- Blowout prevention and kick control is a plus.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRILLING &amp; CASING PROGRAM</td>
<td>0.5 d</td>
</tr>
<tr>
<td>CHARACTERISTICS OF CASINGS</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Geometric, physical and mechanical properties of pipes and connections. Use of Drilling Data Handbook.</td>
<td></td>
</tr>
<tr>
<td>SHOE POSITIONING</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Hypotheses to be considered, casing point - Kick tolerance. Examples and exercises.</td>
<td></td>
</tr>
<tr>
<td>CASING STRING CALCULATION</td>
<td>0.25 d</td>
</tr>
<tr>
<td>CALCULATION EXAMPLES</td>
<td>1 d</td>
</tr>
<tr>
<td>Case studies and writing of a spreadsheet in order to determine the casing point, the kick margin, the pressure max…</td>
<td></td>
</tr>
<tr>
<td>DIRECTIONAL DRILLING EQUIPMENT</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Specific drilling equipment: downhole motors, rotary steerable system. Measuring equipment: MWD.</td>
<td></td>
</tr>
<tr>
<td>DRILLING ENGINEERING</td>
<td>1 d</td>
</tr>
<tr>
<td>HORIZONTAL &amp; ERD</td>
<td>0.25 d</td>
</tr>
<tr>
<td>ERD, multilateral and short radius.</td>
<td></td>
</tr>
<tr>
<td>CASE STUDIES</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Writing of a spreadsheet in order to determine the trajectory of a 2D well according to the needs.</td>
<td></td>
</tr>
<tr>
<td>KNOWLEDGE ASSESSMENT</td>
<td>0.5 d</td>
</tr>
</tbody>
</table>

Reference: UARCOO-EN-P Only available as an In-House course. Contact: ep.contact@ifptraining.com
Unconventional Reservoirs Completion & Stimulation

**Course Content**

<table>
<thead>
<tr>
<th></th>
<th>5 days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DRILLING &amp; CASING PROGRAM FOR DIRECTIONAL &amp; HORIZONTAL WELLS</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Introduction: directional and horizontal drilling, objectives, well geometry…</td>
<td></td>
</tr>
<tr>
<td>Directional drilling equipment: downhole motors, rotary steerable system, measuring equipment ‘MWD’.</td>
<td></td>
</tr>
<tr>
<td>Drilling consideration of deviated and horizontal wells: torque and drag, bucking, hole cleaning…</td>
<td></td>
</tr>
<tr>
<td>Casing program for horizontal wells.</td>
<td></td>
</tr>
</tbody>
</table>

| **COMPLETION DESIGN** | 0.5 d |
| Introduction to well completion and hydraulic fracturing. |
| Completion design, operations, equipment. |
| Plug and perf technique. |
| Ball and sleeve technique. |
| Actual completion trends: examples. |
| Technological challenges: new techniques. |
| Stimulation: fracturing techniques & design (horizontal multistaged hydraulic fracking techniques & operations). |

| **INPUT & FRACTURE DESIGN** | 1.75 d |
| Requirement for fracture design. |
| Rock mechanics for fracturing design. |
| In situ stress, fracture orientation and fracture propagation. |
| Different types of pressures: net pressure, tortuosity, friction. |
| Fluid leak-off, slurry efficiency, dimensionless fracture conductivity. |
| Fracture growth analysis. |
| Hydraulic fracturing models. |

| **FRACTURING FLUIDS, PROPPANTS & FRACTURE CONDUCTIVITY** | 1 d |
| Types of fracturing fluids. |
| Types of proppants. |
| Fluid and proppant selection. |

| **EQUIPMENT & PLACEMENT TECHNIQUES** | 0.5 d |
| Surface pumping equipment. |
| Placement techniques in horizontal wells. |
| Planning and executing operation. |
| Flow back techniques: wellhead isolation tool, frac valve. |

| **FRACTURE MAPPING & POST-JOB ANALYSIS** | 0.5 d |
| Mapping: well test, tracer and micro-seismic. |
| Post-job evaluation. |
| Environmental considerations of hydraulic fracturing. |

| **KNOWLEDGE ASSESSMENT** | 0.25 d |
| Reference: URCS-EN-P |

Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Well Performance: Shale Gas Wells

**Course Content**

**INTRODUCTION TO PRODUCTION SYSTEM**
- Introduction to well performance nodal analysis: inflow x outflow.
- Overview of PROSPER™ software workflow.
- PROSPER™: building initial well system file.

**PVT DATA/PVT MODELING**
- Gas PVT properties.
- PROSPER™: building PVT model for shale gas well.

**SHALE GAS PLAYS PROPERTIES & WELLOBORE INTERFACE**
- Shale gas systems characterization: dual porosity, stress dependent permeability, gas desorption.
- Shale gas completion stimulation (hydraulic fracturing).
- Introduction to well performance analysis of unconventional gas reservoirs.
- Effect of productivity parameters for horizontal wells (length, wellbore radius, permeability “anisotropy”, thickness vs. position “Well Eccentricity”; drainage area, formation damage “Skin”).
- Derivation of analytical solutions.

**INFLOW PERFORMANCE/IPR MODELING**
- Inflow Performance Relationship (IPR).
- Back pressure equation for gas wells.
- Transient gas model for horizontal wells completed and stimulated with multiple transverse fractures.
- IPRs for horizontal wells:
  - PROSPER™: IPR modeling exercise.
- IPR of horizontal drains: shale gas well exercise:
  - PROSPER™: fractured horizontal well modeling.

**WELLOBORE FLOW, OUTFLOW PERFORMANCE/VLP MODELING**
- Minimum flow rate/gas well loading (pressure drop through a horizontal well for gas flow, effect of the well geometry TOE up, TOE down).
- Pressure gradient and Vertical Lift Performance (VLP) curves.
- Tubing head pressure, tubing ID impacts:
  - PROSPER™: tubing correlations, VLP modeling of shale gas well.
- Flow in a choke.

**WELL PERFORMANCE**
- Well deliverability nodal analysis: inflow x outflow on shale gas well:
  - PROSPER™: IPR + VLP well performance modeling, prediction, analysis and diagnosis.
- Sensitivity study.
- Effect of compaction permeability reduction.
- Effect of well geometry.

**KNOWLEDGE ASSESSMENT**
- Quiz.

**Ways & Means**
- Use of the software program PROSPER™ (training license provided for the duration of the course).
- Short lectures alternating with hands-on sessions.
- Course ends with a 2-day integrated case study.

**Learning Assessment**
- Quiz.

**Prerequisites**
- Basic knowledge of the use of PROSPER™ software.

**Expertise & Coordination**
- IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

---

Reference: UPROD-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com

www.ifptraining.com
NEW

Well Productivity & Decline Curve Analysis in Unconventional Reservoirs

Level: SKILLED

Purpose

This course provides a basic understanding on dynamic data analysis for wells completed in unconventional reservoirs.

Audience

Reservoir and production engineers involved in unconventional reservoirs development and management.

Learning Objectives

Upon completion of the course, participants will be able to:
- discuss main characteristics of shale oil and gas reservoirs,
- explain the impact of the SRV (Stimulated Reservoir Volume) configuration on the final recovery,
- interpret a DFIT (Diagnostic Fracture Injection Test),
- explain the impact of pressure drawdown management on well productivity,
- design a flowback test,
- apply modern rate and pressure transient analysis methods using specialized software.

Ways & Means

- Interactive lectures and exercises.
- Use of specialized software to reinforce acquired knowledge.

Prerequisites

Degree in reservoir engineering or equivalent experience, with basic knowledge in well production profiles.

Expertise & Coordination

IFP Training trainers (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

SHALE OIL & SHALE GAS RESERVOIRS

1 d

Introduction and definitions:
- Shale oil and shale gas reservoirs.
- Low permeability impact.
- Diffusion equation, desorption.
- Stress and pressure dependent properties.
- PVT aspects.
- Multi-fractured horizontal well completions: simple and complex hydraulic fractures configuration.
- Methods to assess fracture architecture:
  - Micro seismic.
  - Fiber optics.
- DFIT (Diagnostic Fracture Injection Test).

FLUID FLOW IN SHALE RESERVOIR

1 d

Storage and transport:
- Molecular diffusion.
- Langmuir isotherm.
- Adsorption and desorption.
- OIIP & GIIP.

Fluid flow modelling:
- Matrix, Hydraulic, natural and induced fractures.
- Discrete fracture network.
- Two porosity model, transient and pseudo steady state solutions.
- Trilinear flow model.

STIMULATED RESERVOIR VOLUME DESCRIPTION

1 d

Configuration and mathematical model representation.
- Main fluid flow regimes:
  - Bilinear and pseudo linear.
  - Pseudo-pseudo steady state.
  - Elliptical.
  - Pseudo radial.
  - Pseudo steady state.

Rate normalized pressure: type curve representation.
- Determination of hydraulic fracture parameters.

PRESSURE DRAWDOWN MANAGEMENT

1 d

Horizontal stress and reservoir pressure.
- Porosity and permeability dependence on stress:
  - Drawdown management.
  - Choke management.
- Hydraulic fracture conductivity damage monitoring.
- Flowback period, static and dynamic modeling.
- Design of a flowback test:
  - Expected bottom-hole pressure and effective stress value.
  - Diagnostic plots.
  - Review of flowback results from field cases.

PRODUCTION DECLINE ANALYSIS

1 d

Modern rate and pressure transient analysis:
- Normalized pressure and normalized rate.
- Blasingame and rate normalized pressure plot.
- Decline curve analysis:
  - Power law exponential.
  - Stretched exponential.
  - Arps.
  - Duong.
  - Logistic growth.
  - SRVB.
- Field example:
  - Analytical and numerical solutions.
  - EUR results using different methods.

Reference: UNCODCA-EN-P

Only available as an In-House course.

Contact: ep.contact@ifptraining.com
This course can be adapted to virtual classroom mode

**Unconventional Resources: Safety Issues**

**Level:** SKILLED

**Purpose**
This course provides a thorough understanding of risks and safety measures related to products, equipment and different operations in unconventional Oil & Gas production facilities.

**Audience**
Engineers and staff involved in operating unconventional Oil & Gas field production facilities.

**Learning Objectives**
Upon completion of the course, participants will be able to:
- deepen knowledge of hazards involved in hydrocarbon processing,
- assess risks involved in drilling and well intervention operations,
- assess risks associated with land transportation,
- describe the main elements to correctly manage simultaneous operations of production and drilling.

**Ways & Means**
- Several applications and illustrations.
- Several case studies and teamwork sessions.

**Learning Assessment**
Continuous assessments all-along the program.

**Prerequisites**
Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

**Expertise & Coordination**
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERAL RISKS ASSOCIATED TO OIL &amp; GAS OPERATIONS</td>
<td>0.75 d</td>
</tr>
<tr>
<td>RISKS ASSOCIATED WITH DRILLING EQUIPMENT</td>
<td>0.75 d</td>
</tr>
<tr>
<td>Introduction to risks associated to derrick, rig floor, stabbing board, derrick board and crown block. Certificates. Risk of dropped objects. Works at height. Introduction to risks associated to draw works, top drive, travelling block, winches and pipe handling system. Certificates. HSE management of lifting and rigging operations. General layout of drilling activities: safety distances.</td>
<td></td>
</tr>
<tr>
<td>RISKS ASSOCIATED WITH DRILLING OPERATIONS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Risks associated to mud preparation, mud tanks and mud pumps. Risks associated to cuttings treatment units: shakers, degasser, desander, centrifuge… Risks associated to cementing units and cementing operations. Well control hazards and equipment. Testing requirements: functional and pressure tests. Inspection and certification of equipment and personnel with responsibilities in well control scenarios.</td>
<td></td>
</tr>
<tr>
<td>RISKS ASSOCIATED WITH COMPLETION &amp; WELL INTERVENTION OPERATIONS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>RISKS OF LOGISTICS - LAND TRANSPORTATION</td>
<td>0.5 d</td>
</tr>
<tr>
<td>MANAGEMENT OF SIMULTANEOUS PRODUCTION &amp; WELL OPERATIONS</td>
<td>1.5 d</td>
</tr>
<tr>
<td>CASE STUDY - MANAGEMENT OF SIMOPS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Case study of a shale gas production plant and drilling: Hazard identification and risk assessment. SIMOPS compatibility matrix development.</td>
<td></td>
</tr>
</tbody>
</table>

Reference: UCSAFOP-EN-A  Only available as an In-House course.  
Contact: ep.contact@ifptraining.com  
This course is also available in French: UCSAFOP-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode - Advanced Certificate

**Unconventional Resources: Environmental Management Certification**

**Level:** SKILLED

**Purpose**

This course provides a thorough and applied knowledge of the environmental stakes of an unconventional Oil & Gas development project, including key technical requirements and regulations and public perception. This training is focused on key straightforward arguments that resonate with the public.

**Audience**

Managers, engineers and operations staff involved in the management of environmental issues of unconventional development.

**Learning Objectives**

Upon completion of the course, participants will be able to:
- describe the global prevailing context for unconventional developments for environmental management at worldwide level,
- identify key issues and impacts of specific shale gas activities (exploration, fracking, production),
- identify key technical requirements and regulations in USA and Europe,
- describe and discuss specific contents of a shale gas Environmental Impact Assessment, mitigation (treatments), and how to develop communication (public participation).

**Ways & Means**

- Highly interactive training by an industry-specialist lecturer involved in several shale gas projects.
- Numerous case studies, applications and illustrations and teamwork sessions.
- Key internet references and videos (case studies).

**Learning Assessment**

Assessment by test at the end of the course.

**Prerequisites**

Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

**Why an IFP Training Certification?**

- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Unconventional Resources: Environmental Management Certification.
- Ready-to-use skills.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

**Course Content**

<table>
<thead>
<tr>
<th>Content</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THE STAKES: A CONTROVERSIAL ENERGY</strong></td>
<td>0.25 d</td>
</tr>
<tr>
<td>Public perception and the industry point of view.</td>
<td></td>
</tr>
<tr>
<td><strong>TECHNOLOGIES: KEY ENVIRONMENTAL ISSUES</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Fracking and water. Hazardous chemicals; proppant. Waste (e.g. sans, NORM &amp; metals). Air emissions. Induced seismicity.</td>
<td></td>
</tr>
<tr>
<td><strong>ENVIRONMENTAL REGULATION &amp; IMPACT ASSESSMENT</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Environmental regulation overview. Environmental impact assessment (what is specific: e.g. induced seismicity). Mitigation and emissions treatment (aquifer protection, gas capture...).</td>
<td></td>
</tr>
<tr>
<td><strong>WATER MANAGEMENT</strong></td>
<td>1 d</td>
</tr>
<tr>
<td><strong>SOCIO-ECONOMIC IMPACT &amp; SUSTAINABLE DEVELOPMENT</strong></td>
<td>1 d</td>
</tr>
<tr>
<td>Lessons learned.</td>
<td></td>
</tr>
<tr>
<td><strong>CASE STUDIES (South Africa, Denmark, USA...)</strong></td>
<td>0.75 d</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>THE INTERNATIONAL ENERGY AGENCY APPROACH (the golden rules) &amp; INTERNATIONAL OIL &amp; GAS PRODUCERS ASSOCIATION</strong></td>
<td>0.5 d</td>
</tr>
<tr>
<td>Proactive measures.</td>
<td></td>
</tr>
</tbody>
</table>

**Ways & Means**

- High interaction training by an industry-specialist lecturer involved in several shale gas projects.
- Numerous case studies, applications and illustrations and teamwork sessions.
- Key internet references and videos (case studies).

**Learning Assessment**

Assessment by test at the end of the course.

**Prerequisites**

Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

**Why an IFP Training Certification?**

- An international recognition of your competencies.
- An Advanced Certificate delivered.
- An expertise confirmed in Unconventional Resources: Environmental Management Certification.
- Ready-to-use skills.

**Expertise & Coordination**

IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: UCENV-EN-A. Only available as an In-House course. Contact: ep.contact@ifptraining.com
Offshore Field Architecture

Offshore Field Development - Pipelines & Flow Assurance ................................................................. p. 324
Offshore Field Development Engineering Certification ................................................................................. p. 325

Subsea

Pipeline Hydraulics & Multiphase Flow ........................................................................................................ p. 326
Subsea Activities ............................................................................................................................................... p. 327
Subsea Production Systems (SPS) ................................................................................................................... p. 328
Subsea Pipelines ............................................................................................................................................... p. 329
Subsea Integrity Management (I) - Inspection, Monitoring & Testing ......................................................... p. 330
Subsea Integrity Management (II) - Non Conformity Management ............................................................... p. 331
Offshore Field Development - Pipelines & Flow Assurance

**Course Content**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERVIEW OF OFFSHORE DEVELOPMENTS</td>
<td>0.25 d</td>
</tr>
<tr>
<td>FIXED &amp; FLOATING PRODUCTION STRUCTURES</td>
<td>0.25 d</td>
</tr>
<tr>
<td>CONSTRUCTION &amp; INSTALLATION OF PLATFORMS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>DEEP OFFSHORE DEVELOPMENTS</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Typical subsea architecture: subsea wellheads, well jumpers, production manifolds, production lines, production risers, preservation lines, umbilicals. Role and technology of each piece of equipment. Examples of deep offshore developments.</td>
<td></td>
</tr>
<tr>
<td>FPSO/FSO TECHNOLOGY</td>
<td>0.5 d</td>
</tr>
<tr>
<td>OPERATION OF TERMINALS</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Technology of tankers and loading/offloading equipment. Marine operations of reception and exports. Terminal constraints: storage capacity, scheduling.</td>
<td></td>
</tr>
<tr>
<td>NEW DEEP WATER TECHNOLOGIES</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Overview of new deep-water technologies that are in R&amp;D or pilot stages.</td>
<td></td>
</tr>
<tr>
<td>FLOW ASSURANCE 1/2: PREVENTION OF DEPOSITS IN FLOWLINES</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Main flow assurance problems: hydrates, paraffins, sulfates, sand, salt, naphtenates… Main technical solutions and preservation operations. Intervention techniques.</td>
<td></td>
</tr>
<tr>
<td>FLOW ASSURANCE 2/2: MONITORING OF MULTI-PHASE FLOW THROUGH FLOWLINES</td>
<td>1 d</td>
</tr>
<tr>
<td>Multi-phase flow patterns. Application to Oil &amp; Gas upstream activities. Gas dominated systems: dry versus wet scheme, flowline and slug catcher design. Oil dominated systems: hydrodynamic slug flow, examples.</td>
<td></td>
</tr>
<tr>
<td>PIPELINES: TECHNOLOGY, LAYING &amp; OPERATION</td>
<td>1 d</td>
</tr>
</tbody>
</table>

**Reference:** OFFSH-EN-P. Can be organized as an In-House course.

**Contact:** ep.contact@ifptraining.com

**Location Start Date End Date Tuition Fees excl. VAT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>£3,680</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rueil-Malmaison</td>
<td>18 October</td>
<td>22 October</td>
<td></td>
</tr>
</tbody>
</table>

This course is also available in French: OFFSH-FR-P. Please contact us for more information.
This course can be adapted to virtual classroom mode - Graduate Certificate

Offshore Field Development Engineering Certification

Level: KNOWLEDGE

Purpose

This program aims to provide engineers a comprehensive knowledge of offshore field development best practices in order for them to efficiently contribute to offshore field development studies and/or projects.

Audience

Production engineers, field engineers, project engineers... seeking to acquire practical knowledge of offshore field development projects, spanning from field development operations, to facilities engineering, through to HSE, economics and project management considerations. This certification program is well suited for junior engineers and engineers in conversion. It can also be tailored to experienced engineers.

Learning Objectives

Upon completion of the course, participants will be able to:
- adopt industry best practices for offshore drilling and well control,
- propose most adapted field architecture scenario,
- contribute to subsea production systems and pipelines design, taking into account flow assurance issues,
- assess hazards specific to offshore developments and participate in safety engineering and environmental impact assessment studies,
- efficiently contribute to offshore field development studies taking into account economics, project management and offshore installation aspects.

Ways & Means

- Highly interactive course delivered by experts of the E&P industry.
- Numerous examples and feedbacks from the industry.
- Multiple teamwork sessions on industrial case studies.
- Final group project on a real offshore field development case study.

Learning Assessment

- Continuous assessments all-along the program.
- Final assessment including a presentation in front of a jury.

Prerequisites

Engineering degree or equivalent experience in an Oil & Gas company.

Why an IFP Training Certification?

- An international recognition of your competencies.
- A Graduate Certificate delivered.
- An expertise confirmed in Offshore Field Development Engineering Certification.
- Ready-to-use skills.

Expedite & Coordination

IFP Training trainer (permanent or on-call), having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUNDAMENTALS OF GEOSCIENCES &amp; RESERVOIR ENGINEERING</td>
<td>Petroleum geology and geophysics. Reservoir fluids. Petrophysics. Well log interpretation. Well testing. Reservoir engineering and simulation.</td>
<td>5 d</td>
</tr>
<tr>
<td>OFFSHORE DRILLING</td>
<td>Offshore rig descriptions. Limits of use of the rigs. Specific equipment for various rigs (jack-up, semi-submersible, drillship): Mud line suspensions. Riser tensioner, passive and active heave compensator. BOP, BOP closing unit, risers, positioning. Typical drilling program for each type of rig (fixed and floating).</td>
<td>5 d</td>
</tr>
<tr>
<td>WELL CONTROL</td>
<td>Various pressures in the well. Definitions of pressures. Kick detection. Principles of well control methods. Equipment and testing procedures. Subsea equipment. Simulator.</td>
<td>5 d</td>
</tr>
<tr>
<td>OFFSHORE FIELD ARCHITECTURE &amp; PRODUCTION STRUCTURE</td>
<td>Casing program design, implementation and procedures. Well productivity of horizontal and multilaterals wells. Well completion design, and well completion equipment. New completion trends: Intelligent completion.</td>
<td>5 d</td>
</tr>
<tr>
<td>SUBSEA WELL ARCHITECTURE, COMPLETION &amp; ACTIVATION</td>
<td>Constraints specific to offshore production. Offshore production structures: jacket, semi-submersible, SPAR, TLP, FPSO... technology, selection criteria, limitations; focus on FPSO technology. Offshore field architecture (study of various options, feedback from industry, selection criteria): surface/subsea wells, natural gas field developments, crude oil field developments.</td>
<td>5 d</td>
</tr>
<tr>
<td>SUBSEA PIPELINES &amp; FLOW ASSURANCE ISSUES</td>
<td>Pipelines technology: design of subsea pipelines and risers, flexible pipelines design; offshore pipeline construction, shore approach construction, subsea tie-in, pipeline operation and integrity. Study of flow assurance issues using PIPESIM™ software: fundamentals of fluid mechanics, multiphase flow; flow assurance issues (flow stability, erosion, deposits, hydrates, heat transfer issues); study of wet gas streams. Study of crude oil streams.</td>
<td>5 d</td>
</tr>
<tr>
<td>OFFSHORE PROCESSING TECHNOLOGY</td>
<td>Main specifications and required treatments. Crude oil processing: Multi-Stage Separation (MSS), dehydration and desalting, sweetening, offshore storage. Technologies specific to offshore facilities (case of FPSOs). Gas processing and compression; sweetening, dehydration, Natural Gas Liquids (NGLs) extraction; gas compression chain. Production and injection water processing: produced water treatment technologies for offshore facilities, seawater treatment for injection: chlorination, filtration, oxygen removal, sulfate removal.</td>
<td>5 d</td>
</tr>
<tr>
<td>SAFETY ENGINEERING APPLIED TO OFFSHORE DEVELOPMENTS</td>
<td>Process Hazard analysis - HAZID studies, HAZOP studies. Plant layout in offshore facilities. Case study of shallow waters and FPSO. Major hazard assessment in offshore process facilities. Safety instrumented systems. Fire detection and protection systems. Emergency evacuation and rescue in offshore facilities.</td>
<td>5 d</td>
</tr>
<tr>
<td>ENVIRONMENTAL IMPACT MANAGEMENT OF OFFSHORE DEVELOPMENT PROJECTS</td>
<td>Environmental impact of offshore production operations. Main regulations regarding offshore operations. OSPAR, IMO, other regional agreements. Environmental impact assessment in offshore projects. Best available technologies for impact mitigation. Oil spill contingency plan.</td>
<td>5 d</td>
</tr>
<tr>
<td>PETROLEUM ECONOMICS - PROJECT MANAGEMENT &amp; OFFSHORE INSTALLATION</td>
<td>Project profitability evaluation - Risk analysis of Exploration &amp; Production projects. Project management: project cost estimation and cost control, contracts management, offshore installation: preparation, installation operations, construction vessels, works management.</td>
<td>5 d</td>
</tr>
<tr>
<td>OFFSHORE FIELD DEVELOPMENT PROJECT - JURY</td>
<td>10-day teamwork offshore field development project based on actual data. Participants are coached throughout the project to produce the required deliverables, which are to be presented on the last day (jury): Field architecture. Drilling campaign, well design and completion. (Subsea) Production system design and sizing. Assessment of flow assurance issues. Production structure and process scheme. HAZID, plant layout studies. Project profitability. Project Management. Contracting strategy. Installation Management.</td>
<td>10 d</td>
</tr>
</tbody>
</table>

Reference: OFFSHIG-EN-A. Only available as an In-House course. Contact: ep.contact@ifptraining.com

This course is also available in French: OFFSHIG-FR-A. Please contact us for more information.

www.ifptraining.com
Pipeline Hydraulics & Multiphase Flow
Simulation using OLGA™ & Multiflash™

Level: SKILLED

Purpose
This course provides a practical understanding of pipeline hydraulics, flow simulation and pipe friction loss calculations.

Audience
Engineers involved in designing, constructing or operating Oil & Gas production facilities.

Learning Objectives
Upon completion of the course, participants will be able to:
- assess friction losses in a pipeline and fittings for a single-phase flow,
- understand multiphase flow patterns and main perturbing factors,
- grasp multiphase flow hydrodynamics for wet gas streams and crude oil streams,
- understand operational constraints of single and multiphase flow lines,
- deal with pipeline flow assurance issues, simulate a pipeline using the software program OLGA™.

Ways & Means
- Highly interactive training by industry-specialist lecturers.
- Several applications and illustrations.
- Use of simulation software programs OLGA™ and Multiflash™.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
2 months of experience with process simulation.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

FUNDAMENTALS OF FLUID MECHANICS FRICTION LOSSES IN SINGLE-PHASE FLOW 1.5 d
Total energy of a fluid. Bernoulli law.
Real fluid flow: viscosity, friction coefficient.
Flow regimes: laminar and turbulent (eddy) flows. Reynolds number.
Calculation of friction loss through pipes: Moody chart, AFTP charts (Lefevre).
Calculation of friction loss through fittings:
- Method 1: resistance coefficient.
- Method 2: equivalent straight pipe length.
Case of compressible fluids (gas) - Main empirical equations.
Several exercises.

MULTIPHASE FLOW IN OIL & GAS PRODUCTION 0.5 d
Incentives and stakes.
Definition of multiphase flow.
Main terminology.
Basic understanding of different modeling approaches.
Historical methods to study steady-state two-phase flow.
Example of multiphase dynamic flow simulator OLGA™.
Future with multiphase flow modeling.

FLOW ASSURANCE 1 d
Main flow assurance issues.
Flow stability: flow pattern (horizontal and vertical); slugging.
Erosion constraints, wax, hydrates.
Heat transfer: main heat transfer phenomenon, OHTC, cold spot issue.
Fluid modeling (example with Multiflash™).
Phase envelope, hydrate dissociation curve, emulsion, viscosity.

WELL GAS STREAMS 1 d
Natural gas field development:
“Dry” scheme versus “Wet” scheme.
Main flow assurance issues (hydrates, TLC, surge liquid volume handling).
“Wet” scheme simulations.
Operating envelope.
Geometry impacts.
Example of slug-catcher design.

CRUDE OIL STREAMS 1 d
Crude oil field development:
Deep water constraints.
Classical loops versus alternative development architectures.
Subsea processing.
Crude oil stream:
Severe slugging.
Hydrodynamic slug flow. Slug-catcher design.
Thermal constraints during production/transient (cool down).

Reference: HYDR-EN-P  Only available as an In-House course.
Contact: ep.contact@ifptraining.com
This course is also available in French: HYDR-FR-P. Please contact us for more information.
This course can be adapted to virtual classroom mode

Subsea Activities
Application to Oil & Gas Upstream Projects

Level: SKILLED

Purpose
This course provides technical knowledge on Oil & Gas subsea production systems.

Audience
This course is designed for engineers and technicians whose activity is related to the design, construction and/or operation of Oil & Gas subsea production systems.

Learning Objectives
Upon completion of the course, participants will be able to:
- select the technology with the right criteria for the different equipment used for subsea production systems,
- select through typical subsea architecture and in particular in deep offshore,
- check installation techniques (with ROV, etc.),
- manage main problems of flow assurance and prevention techniques.

Ways & Means
- Lectures carry numerous examples from ongoing upstream projects.
- Each step of the course is illustrated by numerous examples taken from actual Oil & Gas construction activities.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
In order to be able to follow this training, trainees are asked to fulfill at least one of the criteria below:
- either a proven experience in the design or the conception of pipelines of at least 1 year,
- or to have a proven experience of deep offshore projects of at least 1 year,
- or to be evolving towards a conception position or subsea pipeline design or deep offshore projects.

More info
The modules are independent and may be done separately. Please refer to the training description for more details. This training may be validated once both modules have been completed.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: OFF-EN-A Only available as an In-House course.
Contact: ep.contact@ifptraining.com

Course Content

Module 1: SUBSEA PRODUCTION SYSTEMS
5 d
Subsea components and field architecture.
Subsea construction and intervention.
Inspection, maintenance and repair.
Operation from production platforms.

Module 2: SUBSEA PIPELINES
4 d
Pipeline operation: main constraints.
Design of rigid pipelines and risers.
Flexible pipelines design.
Offshore pipeline construction.
Shore approach construction.
Trenching and protection.
Subsea tie-in methods.
Precommissioning and pigging.
Pipeline integrity.
Workshop.

Ways & Means
- Lectures carry numerous examples from ongoing upstream projects.
- Each step of the course is illustrated by numerous examples taken from actual Oil & Gas construction activities.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
In order to be able to follow this training, trainees are asked to fulfill at least one of the criteria below:
- either a proven experience in the design or the conception of pipelines of at least 1 year,
- or to have a proven experience of deep offshore projects of at least 1 year,
- or to be evolving towards a conception position or subsea pipeline design or deep offshore projects.

More info
The modules are independent and may be done separately. Please refer to the training description for more details. This training may be validated once both modules have been completed.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: OFF-EN-A Only available as an In-House course.
Contact: ep.contact@ifptraining.com

www.ifptraining.com

327
This course can be adapted to virtual classroom mode

Subsea Production Systems (SPS)

Level: SKILLED

Purpose
This course provides an in-depth technical knowledge of Oil & Gas subsea production systems.

Audience
Engineers and technicians involved in the design, construction or operation of Oil & Gas subsea production systems.

Learning Objectives
Upon completion of the course, participants will be able to:
- select the technology with the right criteria for the different equipment used for subsea production systems,
- select through typical subsea architecture and in particular in deep offshore,
- check installation techniques (with ROV, etc.),
- deal with the main problems of flow assurance and prevention techniques.

Ways & Means
- Numerous examples from ongoing projects.
- Trainers are specialized engineers, presently involved in deep-offshore projects.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
In order to be able to follow this training, trainees are asked to fulfill at least one of the criteria below:
- either have proven experience of deep offshore projects of at least 1 year,
- or to be in evolution towards a position related to deep offshore projects.

More info
This module is part of the course “Subsea Activities”. Training “Subsea Activities” may be validated once both modules have been completed.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Reference: SPS-EN-A Can be organized as an In-House course. Contact: ep.contact@ifptraining.com

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition Fees excl. VAT</th>
</tr>
</thead>
</table>
| Rueil-Malmaison| 13 September| 17 September| €3,510

This course is also available in French: SPS-FR-A. Please contact us for more information.
This course can be adapted to virtual classroom mode

Subsea Pipelines

Level: Skilled

Purpose
This course provides an in-depth technical knowledge of Oil & Gas subsea pipelines.

Audience
Engineers and technicians involved in the design, construction or operation of Oil & Gas subsea pipelines and risers.

Learning Objectives
Upon completion of the course, participants will be able to:
- understand the fundamental concepts for designing subsea pipelines,
- comprehend the construction methods and laying techniques, including subsea tie-in and shore approach,
- manage pipeline integrity, inspection and repairs.

Ways & Means
- Lectures carry numerous examples from ongoing projects.
- Trainers are specialized engineers, currently involved in deep-offshore projects.

Learning Assessment
Assessment by test at the end of the course.

Prerequisites
In order to be able to follow this training, trainees are asked to fulfill at least one of the criteria below:
- either a proven experience in the design or the conception of pipelines of at least 1 year,
- or to be evolving towards a conception position or subsea pipeline design.

More info
This module is part of the course “Subsea Activities”. Training “Subsea Activities” may be validated once both modules have been completed.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content 4 days

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipeline Operation: Introduction &amp; Main Constraints</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Design of Rigid Pipelines &amp; Risers</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Flexible Pipelines Design</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Offshore Pipeline Construction</td>
<td>0.5 d</td>
</tr>
<tr>
<td>Shore Approach Construction</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Trenching &amp; Protection</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Subsea Tie-In Methods</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Precommissioning &amp; Piggling</td>
<td>0.25 d</td>
</tr>
<tr>
<td>Pipeline Integrity</td>
<td>0.75 d</td>
</tr>
<tr>
<td>Workshop</td>
<td>0.5 d</td>
</tr>
</tbody>
</table>

Reference: SPIPE-EN-A

Location: Rueil-Malmaison
Start Date: 20 September
End Date: 23 September
Tuition Fees excl. VAT: €2,750

Contact: ep.contact@ifptraining.com

This course is also available in French: SPIPE-FR-A. Please contact us for more information.
Subsea Integrity Management (I) - Inspection, Monitoring & Testing

Course Content

**INSPECTIONS & THEIR OBJECTIVES**
By contractor (with operator follow-up).
By operator.

**DEEP WATER SYSTEMS INSPECTION ACTIVITIES**
“Standard” types.
Means, constraints, limitations.
Visual indications specific to deep subsea conditions.
Main challenges.

**INSPECTION PLAN/INTERVALS**
Regulatory requirements, RBI approach…
Inspection plan.
Inspection zones, inspection mean times.
Inspection plan revision.

**GENERIC SUPPORT DOCUMENTS**
**SPECIFIC SUPPORT DOCUMENTS**
**INSPECTION MANAGEMENT DATABASE**
Objectives and functionalities.
Contents and structure.
Inputs and outputs.

**KEYS FOR THE SUCCESSFUL IMPLEMENTATION OF AN INSPECTION DATABASE**
Usability.
Portability.

**“INITIAL STATUS” REFERENCES**
Technical specifications, manufacturing dossiers.
Inspections reports.
Installation/commissioning reports.

**SPECIFIC INSPECTIONS**
Flowlines intelligent pigging.
Occurrence/anomaly follow-up.

**MONITORING**
Adequate response to commands.
Adequate operating parameters.
Sand production monitoring.
Sand erosion monitoring.
Flexible risers/IPBs.
Riser towers/risers.

**TESTING**
Valves testing.
“Safety valves” testing.
Others.
Control fluid consumption.
Downhole chemical injection flow test.

Reference: SUBINT1-EN-P
Only available as an In-House course.

Contact: ep.contact@ifptraining.com
Subsea Integrity Managemenwt (II) - Non Conformity Management

Level: SKILLED

Purpose
This course provides technical knowledge pertaining to the integrity management of subsea systems.

Audience
Engineers and technicians whose activity is related to the operation of Oil & Gas subsea facilities.

Learning Objectives
Upon completion of the course, participants will be able to:
- determine integrity characteristics,
- evaluate consequences of failures,
- plan repairs.

Ways & Means
- Lectures carry numerous examples from ongoing projects.
- Trainers are specialized engineers currently involved in deep offshore projects.

Learning Assessment
Written test upon training course completion.

Prerequisites
- 3 months of experience in offshore operations.
- Ideally, participants should have participated to Subsea Integrity Management (I) - Inspection, Monitoring & Testing module prior to attend this module.

Expertise & Coordination
IFP Training trainer (permanent or contracted) having a good expertise and/or experience of the related topics, trained to adult teaching methods, and whose competencies are kept up-to-date.

Course Content

PHYSICAL & STRUCTURAL INTEGRITY ISSUES & THEIR MAIN CONSEQUENCES
Stress and fatigue.
External corrosion, internal erosion/corrosion.
Hydrogen induced stress cracking.
External event.
Thermal Insulation, heat loss.
Case studies, prevention & remediation.

“FUNCTIONAL” INTEGRITY ISSUES & THEIR MAIN CONSEQUENCES
Defective subsea retrievable modules.
“Internal” leakages (passing valves, passing non-return valves…).
Leaks to environment.
Electrical lines/conductors defects.
Monitoring sensors signal loss.
Hydraulic locks.
Chemical lines blockages.

NON CONFORMITY MANAGEMENT
Objective.
Non conformity.
Non conformity “dossiers”.
Non conformity register/database.

MAINTENANCE & REPAIR
Planned events.
Unplanned events.

Reference: SUBINT2-EN-P  Only available as an In-House course.  Contact: ep.contact@ifptraining.com

www.ifptraining.com
Registration

Identify on the course program the course reference, the price, the location and the dates you are interested in; as well as the contact name for registration.

So that your registration is done in the best conditions, please follow the procedure below:

- **3 weeks minimum** before the beginning of the course → register preferably on our website:
  https://www.ifptraining.com
  
or send the fully completed registration form (downloadable on our website or available from one of our secretarial departments).

- **2 weeks minimum** before the beginning of the course → Please make the full payment
  
  - By check payable to IFP Training, 232 avenue Napoléon Bonaparte – 92852 RUEIL MALMAISON CEDEX
  
  - By bank transfer to IFP Training
    
    NATIXIS n° 30007 99999 04165583000 12
    
    IBAN: FR76 3000 7999 9904 1655 8300 012 – NATXFRPPXXX

  Should a sponsoring organization (like OPCA in France) pay for the course, please specify it on the registration form.

  Do not hesitate to contact us for a late registration.

  **Tuition fee includes instruction, documentation as well as meals and beverage breaks.**

  **IFP Training will send to the authorized person indicated on the registration form:**
  
  - a written confirmation by mail
  
  - one or several invitations for the participants
  
  - useful information about the training course (access to the training center, training hours, etc.).

Who should you send your registration form to?

The registration form can be sent by email, mail or fax.

It should be sent to the entity organizing the course you have chosen. This entity appears at the bottom of the course program.

All enrolments are considered as accepted orders as soon as the enrolment confirmation issued by IFP Training has been received and implies the client's full commitment to these Terms & Conditions which prevail over all other Client documents, including general purchasing conditions.
# Your Contacts

## Exploration & Production

**Rueil-Malmaison**

- **Geosciences & Reservoir Engineering**
- **Production & HSE**
  - **Engineering & Project Management**
  
  232 avenue Napoléon Bonaparte
  92852 Rueil-Malmaison Cedex - France
  
  Secretarial Department
  Tel. + 33 (0)1 41 39 11 60
  Fax + 33 (0)1 47 08 92 83
  ep.contact@ifptraining.com

**Pau**

- **Drilling & Completion**
- **Production & HSE**
  - **Engineering & Project Management**
  
  Rue Paul et Henri Courteault
  64000 Pau - France
  
  Secretarial Department
  Tel. + 33 (0)5 59 30 82 50
  Fax + 33 (0)5 59 30 68 76
  ep.contact@ifptraining.com

## Refining & Chemicals

**Rueil-Malmaison**

232 avenue Napoléon Bonaparte
92852 Rueil-Malmaison Cedex - France

Secretarial Department
Tel. + 33 (0)1 41 39 10 80
Fax + 33 (0)1 47 08 92 83
ml.contact@ifptraining.com

**Martigues**

Le Bâteau Blanc - Bât. C
Chemin de Paradis
13500 Martigues - France

Secretarial Department
Tel. + 33 (0)4 42 44 43 00
Fax + 33 (0)4 42 80 61 20
rc.contact@ifptraining.com

**Lillebonne**

Immeuble Futura 1
Rue A. Desgenetais
76170 Lillebonne - France

Secretarial Department
Tel. + 33 (0)2 35 39 60 77
Fax + 33 (0)2 35 38 62 03
rc.contact@ifptraining.com

**Solaize**

Rond-point de l’échangeur de Solaize
BP3 - 69360 Solaize - France

Secretarial Department
Tel. + 33 (0)4 37 37 68 20
rc.contact@ifptraining.com

**CFA Lillebonne**

Immeuble Futura 1
Rue A. Desgenetais
76170 Lillebonne - France

Secretarial Department
Tel. + 33 (0)2 35 39 60 70
Fax + 33 (0)2 35 38 62 03
op.certif@ifptraining.com

## IC Engines & Lubricants

232 avenue Napoléon Bonaparte
92852 Rueil-Malmaison Cedex - France

Secretarial Department
Tel. + 33 (0)1 41 39 12 00
Fax + 33 (0)1 47 08 92 83
ml.contact@ifptraining.com

## Economics & Management

232 avenue Napoléon Bonaparte
92852 Rueil-Malmaison Cedex - France

Secretarial Department
Tel. + 33 (0)1 41 39 10 80
Fax + 33 (0)1 47 08 92 83
em.contact@ifptraining.com

## IFP Training Middle-East

contact.middleeast@ifptraining.com
Tel. +973 17 21 01 38

## IFP Training Congo

contact.congo@ifptraining.com
Tel. +242 (0)6 655 43 43
Tel. + 33 (0)1 41 39 12 12

---

General Contact Information: Tel. + 33 (0)1 41 39 12 12 - contact@ifptraining.com
General Terms of Sale

1. Purpose and scope
The purpose of these General Conditions of Sale (hereinafter referred to as the “GTC”) is to define, both in France and internationally:
- on the one hand, the organization and implementation of In-house training sessions (including via virtual classes) by IFP Training on behalf of the client (hereinafter the «Client»), signatory of the Training Order defined below;
- on the other hand, the general conditions for participation in the Public training sessions (including via virtual classes) organized by IFP Training.

2. Order provisions
Every request is placed on the basis of an IFP Training commercial proposal (serving as the special terms for the present GTC), particularly setting specific conditions for training services to be provided, the price and the payment terms (hereafter the “Training Order”).

For In-house training sessions
Unless indicated otherwise, IFP Training commercial proposals are valid for a three-month (3) period from the date of dispatch of the IFP Training commercial proposal to the client.

The Training Order shall be submitted by the Client at least five (5) weeks before the starting date of the first requested session. IFP Training reserves the right to refuse late orders.

The Training Order will be binding upon IFP Training once IFP Training has received the following documents:
- the IFP Training commercial proposal initialed on each page, with the last page containing the handwritten indication “Accepted and Agreed”, as well as the Client’s signature and commercial stamp, if any;
- these GTC with initials on each page;
- contact details of the invoice’s recipient, and all information to be contained in the invoice.

As such, the Training Order is made up of the following documents, in decreasing order of priority:
1. IFP Training commercial proposal;
2. IFP Training GTC;
3. all other documents referred to in the IFP Training commercial proposal.
Client’s acceptance of the IFP Training commercial proposal constitutes its firm and definitive commitment to the Training Order and implies the non-applicability of its own general terms of purchase, even if mentioned in the Client purchase request.

For training sessions delivered via virtual classes, the connection links will be sent to the Client at least five (5) days before the training session to allow the Client to carry out connection tests.

For Public training sessions
All inscriptions to training sessions shall be carried out three (3) weeks prior to the session start date. IFP Training reserves itself the right to accept late enrolment. The number of participants per session is limited.

Enrolment will be confirmed once the organization center receives a fully complete enrolment form via email, fax or mail. Incomplete enrolment forms will not be accepted. Enrolment will be final once payment has been received in full or once an acceptance certificate from a sponsoring organization has been received.

All enrolments are considered as accepted orders as soon as the enrolment confirmation issued by IFP Training has been received and implies the client’s full commitment to these Terms & Conditions which prevail over all other Client documents, including general purchasing conditions.

If the entire cost of the session is not paid two (2) weeks before the training session begins, IFP Training reserves itself the right to reopen to registration the places booked by the Client, after having informed them. If full payment is received IFP Training will, at least two (2) weeks prior to the start of the session, send a letter to the Client designated on the form to confirm their enrolment. A personal invitation will be attached to the letter and which provides all practical information about the session (schedule, directions, etc.).

For training sessions delivered via virtual classes, the connection links will be sent to the Client at least five (5) days before the training session to allow the Client to carry out connection tests.

3. Invoicing and payment

3.1. Price
For In-house training sessions
Invoicing and payment schedule is defined in the commercial proposal. Unless indicated otherwise in said proposal, quoted prices are in Euros and exclusive of taxes: VAT at the applicable rate and/or any other duties and/or taxes withheld at the source according to the applicable legislation shall be added. Prices are firm and not subject to revision.

For Public training sessions
Enrolment fees cover training (teaching, practical activities, simulators and other IT tools, documentation, supplies) as well as break-time related costs (refreshments). And do not cover transport and accommodation. The price on the order form is indicated in Euros, tax not included. VAT at the current rate will be added to the indicated price plus any other withholding taxes. All training sessions, once started, have to be paid in full. Upon request, IFP Training may decide to apply reduced enrolment fees for job seekers.

3.2. Payment
Payment will be made by bank transfer to the beneficiary IFP Training: NATIXIS account No. 30007 99999 04165583000 12 IBAN: FR76 3000 7999 9904 1655 8300 012 – BIC: NATXFRPP000
Payment by a third party organization (such as accredited collecting funds for training): if Client makes a third party pay for the training, it must so inform IFP Training at the time of the Training Order. In this case, IFP Training will make its reasonable efforts to provide the documents requested by the Client (possible translation at the Client’s expense). The Client will ensure that payment is made by that third party. In case of non-payment or partial payment by said third party for any reason whatsoever, all sums not received by IFP Training on the due date will be borne by the Client.

For Public training sessions, the training session will only be accessible to the Client once that IFP Training has been paid in full. By check to the order of:
IFP Training - 232, Avenue Napoléon Bonaparte
F-92852 Rueil-Malmaison Cedex.
Via bank transfer to IFP Training above mentioned account.
A duplicate is available provided that the Client requested it on the enrolment form.

If the Client wishes to pay using a sponsoring organization, the following procedures should be followed:
- before the start of the session, a request for direct billing should be issued and accepted;
- this shall be indicated explicitly on the enrolment form;
- the Client ensures the completion of payment by the designated organization.

IFP Training will provide the Client with all documents needed to make a sponsoring request.

If the sponsoring organization only bears part of the training cost, the remaining amount will be charged to the Client. Only payments by sponsoring organizations before the first day of training will ensure enrolment and access to the training.

If, for whatever reason, the sponsoring organization doesn’t pay, the Client will be charged the full training amount. At the end of the session IFP Training will send the sponsoring organization an invoice along with a copy of the certificate of attendance signed by the participant.

3.3 Late payment
Pursuant to the provisions of article L441-6 of the French Commercial code, all sums not paid on their due date will require Client to pay late payment penalties equal to three (3) times the French legal interest rate. These penalties are due until full payment. In the event of late payment,
General Terms of Sale

the Client will also owe to IFP Training a fixed compensation of forty (€40) Euros for collection costs. Should collection costs be higher than such fixed compensation, IFP Training can demand additional compensation from the Client by providing supporting proof.

IFP Training also reserves the right to interrupt the performance of the services if an invoice is not paid on or before the due date, without prejudice to any other recourse.

4. Cancellation and deferral - Modification of services

4.1 Cancellation and deferral conditions

For in-house training sessions

By the Client: Any request for cancellation or deferral of all or part of the Training Order by Client shall be notified to IFP Training in writing, with acknowledgment of receipt, no later than three (3) weeks before the session date. This three (3) week delay is counted from the date of reception by IFP Training of said request.

(i) In case of deferral:

Any deferral requested less than three (3) weeks before the session date will be considered by IFP Training as a session cancellation. The conditions of (ii) or (iii) below will then apply.

(ii) In case of partial cancellation of the Training Order (i.e. cancellation of one or more sessions):

For any Training Order or part thereof cancelled while giving the required three-weeks prior written notice, the Client will only pay the expenses already incurred by IFP Training (including internal preparation costs) that cannot be deferred.

For any session cancelled between one and three (3) weeks before the session date, the Client will have to pay 60% of the price of the cancelled session.

For any session cancelled with a notice given less than one (1) week before the session date, the Client will have to pay 100% of the cancelled session’s price.

Full payment is required for every session performed, however partial. The Training Order will remain valid for all non-cancelled sessions.

(iii) In case of the Training Order’s total cancellation:

The provisions of (i) will be applicable to the entirely cancelled Training Order and to the total price of the Training Order.

By IFP Training: IFP Training reserves the right to cancel or defer any session providing a three-(3) week prior notice, by e-mail, fax or letter. No compensation will be paid to the Client but IFP Training undertakes to agree with Client on a new session date within four (4) months.

For Public training sessions

By the Client: Cancellation by the Client shall be sent in writing to IFP Training. In the eventuality of a cancellation, even due to force majeure, less than 14 calendar days before the beginning to the session, 50% of the enrolment fee will be charged by IFP Training. In case of non-cancelled enrolments (including absenteeism or dropout), 100% of the enrolment fee will be charged by IFP Training. In case of an unforeseen departure, justified by the Client, the participant may be authorized to take part in a later session with the prior consent of IFP Training.

By IFP Training: IFP Training reserves itself the right to cancel or postpone a session, especially if there are an insufficient number of participants. The Client will be notified by telephone at least 2 weeks before the session was due to begin. The cancellation will be confirmed in writing. The payments received will be fully refunded. No compensation on behalf of IFP Training will be given to the Client due to cancellation or postponement of a session.

4.2 Modification of services

Any modification of the training services requires an amendment to the Training Order. IFP Training must be given prior written notification of any change of the number of session participants, such changes being subject to the following conditions:

- Any downward adjustment of the number of the Client’s session participants can be considered by IFP Training as a partial cancellation of the session in question and will thereby be managed according to the rules listed in article 4.1 (i) that will be applied to the unit cost per participant indicated in the commercial proposal (or, failing that, by dividing the total Training Order amount by the number of Client’s participants).

- Any additional participant will be subject to prior approval of IFP Training and to an additional commercial proposal.

- Any request for a change of the number of participants must be submitted to IFP Training no later than one (1) week before the concerned session date. Client can replace a participant with another, after notifying IFP Training.

5. Conditions for performance of the services

To fulfill the Training Order, IFP Training will perform the services proposed at the commercial proposal accepted by Client through qualified trainers.

- Performance site:

The site where the training services will be performed is indicated in the Training Order. Should the training be provided outside of an IFP Training site, the Client will ensure the access of IFP Training and its trainers to the premises where the sessions will be held, and will provide them with all material and equipment (i.e. computer, projector, screen...) needed for the performance of the services on the site in accordance with IFP Training specifications.

The delivery of services can also be carried out through virtual classes.

- Client’s information and obligations:

Client will provide IFP Training with the information and data specified in IFP Training commercial proposal, as well as all information needed to facilitate the services’ performance.

In case of late delivery of said needed information, IFP Training may decide to defer the concerned sessions and shall so inform the Client. In this case, IFP Training and the Client will jointly agree on new dates for these sessions. All data and information provided by the Client will be kept confidential by IFP Training. At the Client’s written request, such data and information can be returned to the latter at the end of the Training Order. The Client bears sole responsibility for the data and information that it provides to IFP Training for the performance of services. The data and information provided by the Client remain its property.

For virtual classroom training, the Client will have to ensure beforehand, and throughout the training session, that its technical environment is permanently compatible with IFP Training’s distance learning platform. After the first connection test, the Client may not claim any incompatibility or defect in access to the service. Moreover, the Client states to be aware of and accept the characteristics and limits of the transmission of information via the Internet network, as well as the costs involved in connecting to this network. In addition, the Client acknowledges that it is his/her responsibility to ensure that the technical characteristics of the equipment he/she uses allow him/her access to the training session under good conditions and to take all appropriate measures to be protected from contamination by possible malicious programs.

The Client is entirely responsible for the management and use of the identifiers and passwords communicated by IFP Training for the training session and is responsible for the safekeeping of these identifiers and passwords. Consequently, it is up to the Client to implement all precautionary measures necessary for their protection and conservation. The Client is responsible for the consequences of their use. IFP Training shall in no case be held responsible for any fraudulent use of the Client’s login and password. The Client undertakes to inform IFP Training of any fraudulent use of the username and password as soon as he or she becomes aware of it.
General Terms of Sale

The Client may under no circumstances make the training session available to a third party and strictly refrains from any other use, in particular any adaptation, modification, translation, arrangement, distribution, decompilation, without this list being exhaustive.

For the certifying courses: the issuance of the certification will be subject to full payment of the price of the training session.

In the case of short-term training course (training course of a maximum duration of three (3) days), the payment will be made when signing the Contract.

6. Information technology and freedoms

Information of a personal nature provided by the Client to IFP Training for the performance of the session may be communicated to the contractual partners of IFP Training and to the trainers for the purposes of the services.

Pursuant to the provisions of French law No. 78-17 of January 6th 1978, the persons in question can at any time exercise their rights to access, oppose and rectify said information within the IFP Training files.

7. Property rights to the pedagogical documents

Parties shall be bound by an obligation of confidentiality with regard to all documents and information specified as confidential during the training session, whatever their format. The Parties undertake to ensure compliance with this obligation by all their personnel and, more generally, by any person put in contact with the other Party by one Party during the training session.

All educational documents and information transmitted by a Party within the framework of the training sessions belong to the said Party and/or its contractual partners and/or trainers and their use, disclosure or copy is prohibited unless prior written agreement has been obtained from the disclosing Party.

Under no circumstances may these GTS be interpreted as conferring, expressly or implicitly, on the recipient Party the grant by the disclosing Party of a license right, or a promise to grant a license right, for any direct or indirect reproduction, adaptation, modification, representation or dissemination by the recipient Party, in any form whatsoever, of all or part of the documents (in particular educational documents produced by IFP Training) transmitted by the disclosing Party, its partners and/or its trainers, as the case may be, transmitted by the disclosing Party as part of the training sessions.

The Client agrees not to remove any proprietary notices present on educational documents sent by IFP Training as part of the services.

8. Advertising

Any use by Client of the “IFP Training” name for promotional or advertising purposes must have received the prior written approval of IFP Training.

IFP Training reserves the right to mention the Client as being one of the IFP Training Clients for advertising purposes, on any support and medium.

9. Undeclared labor - Subcontracting

IFP Training fully complies with French labor, fiscal and social laws pertaining to its trainers.

IFP Training may subcontract the performance of part of the training services to qualified partners, who shall also comply with French labor, fiscal and social laws pertaining to their trainers. In no way does subcontracting release IFP Training from its obligations and liabilities pursuant to the present General Terms of Sale.

10. Force majeure

For the purposes of this GTC, the term force majeure (hereinafter referred to as “Force Majeure”) shall have the definition provided for in Article 1218 paragraph 1 of the Civil Code.

The Parties agree to consider as a Force Majeure event notably extreme weather conditions, lightning or fire, any requirement demanded for the protection of public safety, strikes, social movements from the personnel of the prevented Party or from the personnel of its subcontractor(s).

The Party that is prevented from executing its obligations under the present Training Order because of the occurring of a Force Majeure event shall inform the other Party(ies), as quickly as possible by any means, confirmed in writing by the dispatching of registered letter with an acknowledgement of receipt, within a five (5) working days period following the occurrence of said event, indicating the nature of its circumstances and, as far as possible, its estimated duration and the extent of the impediment.

This Force Majeure event shall result in the suspension for the prevented Party and/or any other Party which is directly impacted by said event of its obligations under the Training Order. Therefore, no Party shall be held liable for the delay in the execution, or for the inexecution of all or part of its obligations under the Training Order is this delay or this inexecution is due to the occurrence of a Force Majeure event.

The Party having invoked the Force Majeure event shall:
- make its best efforts in order to limit and/or mitigate as much as possible its consequences in order to timely resume the execution of the Training Order;
- continue the execution of the contractual obligations that are not affected by the Force Majeure event;
- inform the other Party(ies) in writing of its termination.

The suspended obligations shall be executed again as soon as the Force Majeure event has ceased. The contractual deadlines shall be extended by the duration of said event. Should the effects of the Force Majeure event continue beyond a thirty (30) working days period from its occurrence, the Parties shall seek to reach agreement in order to decide on the further course of action for the execution of the Training Order.

In case of a Force Majeure occurrence lasting more than thirty (30) consecutive days, the Party faced with such Force Majeure occurrence can immediately terminate, by the dispatching of registered letter with an acknowledgement of receipt, the Training Order, without compensation to the other Party.

11. Termination

The Training Order may be terminated by either of the Parties in the event of non-performance by the other Party of one or more of its obligations in accordance with the Training Order. Termination shall only become effective one (1) months after the dispatching by the Party claiming non-performance of a registered letter with acknowledgement of receipt unless the breaching Party has cured its non-performance.

12. Liability - Insurance

Except in case of wilful misconduct, IFP Training and the Client will respectively deal with the consequences of accidents that may occur during the performance of the Training Order and involving their own personnel, including the session participants that they directly or indirectly employ as well as their property or any property in their custody, irrespective of the author of the damages.

For the training courses carried out via virtual classes, the impossibility of using the purchased service for any reason whatsoever, in particular due to incompatibility with the Client’s equipment, can under no circumstances give rise to compensation or cancellation of the training session with IFP Training.

Accordingly, each party waives any recourse against the other for any damages caused to persons and property, except in case of wilful misconduct.
Each Party shall be solely liable for any loss, damage or injury to third parties resulting from the performance of the said Party’s obligations by it or on its behalf under the Training Order.

Moreover, under no circumstances can IFP Training be held liable for any financial, commercial or other damage directly or indirectly caused by the use of any information provided by IFP Training within the framework of the training sessions.

In all other cases, Client acknowledges that the liability of IFP Training is strictly limited, for direct damages, to the price of the Training Order and excludes any indirect damages.

In view of the above provisions, IFP Training and the Client shall ensure that their respective insurers waive any subrogation rights against the Parties. Should IFP Training or Client fail to ensure this waiver, the defaulting party will bear the financial consequences.

Client undertakes to obtain and maintain, for the duration of the session and at its own expenses, the validity of all insurance policies needed in order to cover the risks, liabilities, direct or indirect damages and illnesses that could be suffered by the participant(s), its personnel or its property, obtained from duly solvent insurance companies.

At its expenses, IFP Training undertakes to subscribe and maintain the validity of the insurance needed for the coverage of its liabilities under the Training Order.

13. Personal data
As the person responsible for processing its personnel file, the Customer undertakes to inform each employee (hereinafter referred to as the User) that:

- personal data concerning him/her are collected and processed by IFP Training for the purposes of conducting and monitoring training and prospecting and promotion;
- the connection, the training path and the follow-up of the Users’ knowledge are data accessible to its services and in particular to the staff;
- in accordance with the provisions of the French Data Protection Act of 6 January 1978 in its version in force at the time of the Order, as well as the provisions of the General Data Protection Regulation (EU Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 applicable as from 25 May 2018), the User has a right to access, modify, rectify and delete his personal data (hereinafter “Rights”) concerning him and that for this purpose, an online request specifying the identity and e-mail address of the applicant can be addressed to IFP Training.

The Rights provided for in the preceding paragraph may be exercised by contacting customer service at the following email address: rgpd@ifptraining.com or by writing to IFP Training Service Marketing 232 avenue Napoléon Bonaparte, 92852 Rueil-Malmaison Cedex - France.

The Client is responsible for the conservation and confidentiality of all personal data concerning the User to which he has had access.

The personal data collected by IFP Training are necessary for the execution of the training referred to in the GTC and may be used for prospecting and promotion purposes. They are kept as long as the User has an Account not closed and within three months following the closing date. IFP Training nevertheless reserves the right to archive any personal data it may have collected in execution of the Order, for the duration of the limitation of liability actions. In this case, IFP Training will ensure the security and confidentiality of the archived data storage to which only IFP Training will be able to access for the exclusive purpose of a possible litigation whose resolution requires the judicial communication of said data.

14. Miscellaneous provisions - Litigation
14.1 The fact that a Party does not invoke the benefit of a clause of the Order does not entail a waiver by it of the benefit of that clause.

If one or more of the provisions hereof were to prove null and void under an applicable law or decree or a final judicial decision, it (they) would then be deemed unwritten. However, the other provisions would remain in full force and effect.

A notification by registered letter with acknowledgement of receipt shall be deemed to have been sent on the date appearing on the stamp affixed by the postal services.

Upon completion of the training session and/or in the event of early termination of the Order for any reason whatsoever, the provisions of Articles 6, 7, 8, 12 and 13 shall remain in effect.

The present General Terms of Sale are subject to French law. Any dispute, not resolved amicably between the Parties within one (1) month, and relating to the validity, performance or interpretation of these General Terms of Sale shall be subject to the jurisdiction of the Commercial Court of Nanterre, including in cases of multiple defendants.

14.2 Fight against corruption
IFP Training and the Client undertake to fight against corruption in all its forms, public or private, active or passive both vis-à-vis their suppliers or subcontractors and vis-à-vis their principals.

In this respect, the Client undertakes to comply with French anti-corruption legislation, similar legislation applicable at the place of execution of the Order when all or part of the Order is carried out outside France, as well as IFP Training’s charter of good conduct, which can be accessed on its website at the following address: www.ifptraining.com

For all matters relating to the Order, the Parties state and guarantee that they do not and will not give or offer to give, directly or indirectly, any sum of money or any other pecuniary or non-pecuniary benefit to anyone for the purpose of obtaining the Order or facilitating its execution.

The Parties undertake to keep all accounting documents and other evidence of payments made or received and expenses incurred by them in connection with the Order during its term and at least three (3) years from the date of expiry or termination of the Order. Each Party or a third party appointed by it shall have the opportunity to audit such documents, subject to reasonable notice to ensure compliance by the other Party with the provisions of this clause.

In case of violation of this clause by one of the Parties, the other Party reserves the right to suspend, for a period not exceeding three (3) months; and/or terminate the Order automatically, without any formality, and at the sole discretion of the said Party.