Worldwide training programmes 2015

Subsea engineering and training experts

www.jee.co.uk
Welcome to our learning and development guide for 2015.

At Jee, we’re continually developing our courses in response to industry requirements and trends. In this brochure we're excited to showcase our range of courses for 2015, including the new Advanced design and stress analysis of subsea equipment.

Jee courses and training programmes are built on the back of our engineering capabilities. With over 26 years’ experience in delivering integrated subsea engineering and training services to the oil, gas and renewables industries, our expertise ensures that Jee courses are of the highest calibre.

We are committed to being a centre of learning excellence. Our courses are written by practising engineers; consequently all training content remains current and informative, with practical, real-world case studies. Each course is also supported with comprehensive notes that can now be accessed anywhere in the world using our Jeenius app.

We offer a variety of ways to complete our courses – from public and in-company programmes in key locations around the world, to online courses for the ultimate flexibility. We can even create a completely customised course just for your company!

Whatever course you choose, you can be assured it will be an enjoyable learning experience that will help develop your company's capabilities and facilitate your progression in the oil, gas and renewables sector.

Jenny Matthew  
Head of Courses

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Our courses

Courses spanning the whole life-of-field

We have been delivering courses to the oil, gas and renewables industries for nearly 20 years. During that time we have built up an enormous portfolio of knowledge, below are an array of courses we offer that span the whole life-of-field.
Our courses

We recognise the importance of finding the right course to expand your knowledge and meet your current and future learning requirements. Our courses are developed in response to industry needs and segmented into introduction, foundation and practitioner levels, to facilitate easy selection and integration into personal development plans.

The matrix below has been devised to allow you to quickly identify the right course to fulfill all your training needs.

| Not sure which course is for you? Use this matrix to find those most relevant. See pages 10-33 for full details. |
|---|---|---|---|---|---|---|
| Industry overview | Subsea production | Subsea controls | Umbilicals and cables | Risers and Flexibles | Rigid flowlines and pipelines | Landfalls and terminals | Onshore | Cables |
| Code | Course title | Pg | Code | Course title | Pg |
| IO&G | Introduction to the oil and gas industry | 10 | IO&G | Introduction to the offshore wind industry | 30 |
| FA | Flow assurance | 28 | FA | SP | 29 |
| LMT | Landfalls and marine terminals | 32 | LMT | OP | 33 |
| DP | Onshore pipelines | 33 | DP | ICSP | 34 |
| P&C | Polymers and composites | 22 | P&C | IMSP | 35 |
| RUF | Risers, umbilicals and flexibles | 19 | RUF | FDP | 36 |
| SC | Subsea controls | 16 | SC | FDP | 37 |
| SH | Subsea hardware | 17 | SH | IMSP | 38 |
| SP | Subsea pipelines | 11 | SP | ICSP | 39 |
| SS | Subsea systems | 15 | SS | OP | 40 |

Code for Introductory Level Courses: IO&G
Code for Foundation Level Courses: FA, LMT, DP, P&C, RUF, SC, SH, SP, SS
Code for Practitioner Level Courses: IO&G, IOW, FS&S, ICSP, IMSP, OP
Suggested development programmes

For your ease we have put together a selection of training and development pathways which you may find of use. For details on the course content please see pages 10-33.

For full details on putting together a comprehensive individual or group curriculum, please contact our courses operations team on:

+44 1732 371 391 or email courseadmin@jee.co.uk

Subsea pipelines

- Introduction to the oil and gas industry
- Subsea pipelines
- Design of subsea pipelines
  - Advanced design of subsea pipelines
  - Free spans and on-bottom stability
- Construction of pipelines
  - Subsea pipelines
  - Construction of subsea pipelines
    - Installation calculations
    - Reeling design calculations
- Integrity management of pipelines
  - Subsea pipelines
  - Integrity management of subsea pipelines
    - Failure of deepwater pipelines and risers
    - Flow assurance
    - Pigging and plugging

Onshore

- Landfalls and marine terminals
- Onshore pipelines

Cables

- Introduction to the offshore wind industry
- Subsea power cable installation

Subsea architecture

- Subsea systems
- Subsea controls
- Subsea hardware
- Advanced design and stress analysis of subsea equipment

Risers

- Risers, umbilicals and flexibles
- Engineering of flexibles
- Rigid riser design
- Polymers and composites
In-company courses

Bespoke training packages at your location of choice

For larger groups we can send a tutor to you and you can select from our ‘off-the-shelf’ courses, choose to tailor a programme from hundreds of modules or have new topics developed. Our writing and operations teams will create, plan and manage the programme. Our tutors will deliver the course on a date and at a location to suit you.

Our in-company programmes are renowned for the flexibility they afford in both tailoring to meet specific engineering technical practices and project requirements and their convenience and cost-savings. Our courses team will work closely with you to guarantee a first-class course every time.

To ensure we meet your staff development requirements and add real value, we have a huge selection of learning and support materials, and components to choose from.

- 24 Off-the-shelf courses covering the whole life-of-field
- Choose from hundreds of modules
- A technical writing team on-tap to write new content on specific technology, methods or codes at your request
- Access to our library of technical videos – an important learning tool to visualise key learning points
- Real-life case-studies and lessons learned
- A suite of worked examples and exercises designed to put theory into practice
- Assessments to monitor progress
- Site visits to allow access to technology usually only seen on the seabed
- A team of tutors with decades of industry experience (please see pages 34-36 for details)

To find out more, please contact our courses operations team at courseadmin@jee.co.uk.

“This is probably the best course I have attended in 7 years of training. Great instructor, great materials, perfect level of detail.”

Bobby West, Drilling Engineer, Chevron
Public courses

Face-to-face courses in global oil and gas hubs

Our classroom courses are held regularly around the world to accommodate training needs as they arise. The 2014 and 2015 programmes are currently scheduled in Aberdeen and Houston. New for 2015 we are excited to be running courses in Norway.

At Jee we appreciate that course attendance is an investment of time and money in an individual’s progression and personal development. We pride ourselves on maximising every element of the course to add value to every delegate. Our face-to-face courses are created using blended learning techniques and are designed to maximise time away from the office:

✦ Site visits to major manufacturers and suppliers give visual context, enabling participants to see equipment normally only viewable on the seabed
✦ Worked examples, case studies and exercises develop understanding of the engineering principles applied
✦ Videos and sample materials help to visualise the equipment and processes used in the industry
✦ Delegate drinks facilitate networking and knowledge sharing in a less formal environment
✦ Audience participation systems create an interactive, dynamic and fun learning environment
✦ Quizzes and assessments test knowledge retention and aid recall
✦ Tutors relate practical experiences to the subjects taught, giving first-hand experience of projects at every course

every delegate receives a hard copy of our world-renowned course notes, access to download their notes via our Jeenius app and a certificate awarding their Continuous Professional Development (CPD) points or Professional Development Hours (PDH).

Our up-to-date course schedule is available online at www.jee.co.uk where you can also find out more about our early bird and multi-booking discounts.

“ This course is amazing and the tutor was awesome in delivering the course contents.”

Emeka Nwonu, Planning Engineer, Saipem Ltd
Online courses

Online learning, the ultimate in convenience

With all of the content and specialist knowledge of our classroom courses, our online programmes allow for remote learning from anywhere in the world. Guidance and technical input from our range of expert tutors is just a click away.

Our online training is accessible, interactive and provides:

✦ Anytime start dates – ideal for training between projects or during projects as knowledge requirements arise
✦ Accessible 24 hours a day, 7 days a week and from anywhere in the world
✦ A virtual classroom environment where delegates are guided through their learning journey at their own pace
✦ The option to select modules to create a custom course to cater for specific training requirements
✦ The opportunity for our professional co-ordinators to synchronise training for an internationally located team
✦ Online discussion forums to share experiences with worldwide fellow delegates
✦ An online tutorial forum to check on progress or ask questions
✦ Access to download course notes via our Jeenius app
✦ Industry recognised Continuous Professional Development (CPD) points and Professional Development Hours (PDH)

We have developed online training course frameworks which focus on ease of access, socialisation, information exchange, knowledge construction, development and feedback. Maintaining the motivation of the learner for the duration of the course and ensuring engagement and retention of knowledge is the priority of our programmes.

Create your own course

Delegates and companies can create their own online training programmes by selecting specialised topics from more than 70 modules. To gain access to trial a complimentary module and to find out about our multi-booking discounts, contact our Course Co-ordinators at courseadmin@jee.co.uk

Standard online courses

- Introduction to the oil and gas industry CPD and PDH points
- Introduction to the offshore wind industry CPD and PDH points
- Design of subsea pipelines CPD and PDH points
- Onshore pipelines CPD and PDH points
- Subsea pipelines CPD and PDH points
- Construction of subsea pipelines CPD and PDH points
- Risers, umbilicals & flexibles CPD and PDH points
- Advanced design including HP/HT & deepwater pipelines CPD and PDH points
- Subsea systems CPD and PDH points

Request a sample module
email courseadmin@jee.co.uk
Blended learning programmes and course design

Gain the benefits of online and classroom courses in a combined programme

If you like the benefits that online and classroom courses bring to the learning experience, yet can’t decide which delivery method to go for, we can help. Jee has developed a blended learning offering that combines elements from both our online and traditional classroom courses.

Our blended learning programmes are designed by selecting the most appropriate delivery method for each learning outcome. A combination of online modules, videos, podcasts, self-study sessions, tutor-led workshops and group discussions are used to build each programme, which are then managed and accessed via our central online learning platform.

Each programme supports the learner through a structured programme and delivers the benefits of both online and face-to-face tuition:

- Global accessibility and consistency in delivery
- Collaborative peer learning through knowledge sharing
- Learner-paced programmes – participants work through the materials at their own pace around their day-to-day commitments
- Tutor-led sessions focus on complex topics and practical application of what has been learnt
- Group exercises reinforce understanding
- Cost and time efficiencies

We use an established ADDIE-based (Analyse, Design, Develop, Implement and Evaluate) methodology for developing training materials for our classroom, online and blended learning programmes.

Our courses are designed and written using two decades of course writing experience. Our technical content is underpinned by academic learning theories to facilitate retention and application of knowledge learnt.

To find out more about our blended learning programmes or to have a course developed for you, please contact our courses team at courseadmin@jee.co.uk or call +44 1732 371 391.
Introduction to the oil and gas industry

About the course
This course provides a complete overview of the oil and gas industry from its origin, exploration methods and production processes, to commercial trends and technical terms. If you’re new to the industry or ever wondered how it all works, this is the course for you!

Key learning areas
✦ Gain a non-technical overview of the oil and gas industry, the people that work in it and key events that have shaped its development
✦ Build a better understanding of how you and your company fit into the bigger picture
✦ Gain an understanding of industry terms and acronyms
✦ Build an awareness of market drivers and commercial trends

The course was extremely informative.
Fernando Mendez, Project Engineer, Chevron

Did you know
Jee has been in the oil and gas industry for over 26 years

Course information
Level: Introductory
Duration: 1 day
CPD points/PDH points: 7

Course content
Day 1 – Morning
Hydrocarbon formation
• Origin of oil and gas
• Migration of petroleum
• Accumulation of petroleum
• Location of major offshore fields

Exploration methods
• Geological field mapping
• Geophysical prospecting
• Exploratory drilling

Hydrocarbon production
• Onshore production wells
• Offshore platforms
• Offshore production drilling
• Existing offshore infrastructure
• Subsea equipment

Day 1 – Afternoon
Transportation systems
• Offshore transportation systems
• Onshore pipeline spreads
• Pipelines through difficult ground
• Decommissioning

Gas treatment and uses
• Gas processing
• LNG
• Gas distribution
• Power generation

Refining process
• Refining crude oil
• Petroleum products

Commercial trends
• History
• Politics
• Consumption and production
• Reserves
• Prices
• New production
Subsea pipelines

About the course
An essential course for subsea engineers, this course provides an understanding of the lifecycle of a pipeline, from design and construction through to operation. Delegates benefit from a grounding in all key areas including: pipeline design considerations, pipe manufacturing methods and materials selection, as well as a knowledge of flow assurance, installation methods and pipeline integrity management systems.

Key learning areas
- An introduction to pipeline integrity, including flow assurance and inspection
- Discuss instrumental considerations for pipeline design
- Look at manufacturing methods and material selection
- Consider installation processes and construction support
- Study repairs and pipeline decommissioning

"A great balance between coverage of theory, applications and analysis, as well as practical advice and anecdotes from the field."

Ivan Volzhskiy, Engineer, 2H Offshore Engineering

Did you know
Jee has carried out over 1000 projects related to subsea pipelines

Course content

Day 1
Field layouts
- Example layouts
- Subsea equipment
- Platforms and floating production systems
- Riser configurations

Route selection
- Survey techniques
- Soil types
- Routing of pipeline

Pipe manufacture
- Rigid steel and flexible pipe

Pipe design
- Pressure
- Design approaches
- Diameter sizing
- Wall thickness for bursting and hydrostatic collapse
- Global buckling

Day 2
Materials
- Selection for strength
- Selection for corrosion resistance
- Clad and lined pipelines
- Titanium and composites

External coatings
- External corrosion protection
- Cathodic protection
- On-bottom stability
- Thermal insulation
- Pipe-in-pipe systems
- Active heating of lines

Common work
- Construction survey
- Route preparation
- Welding
- Non-destructive testing (NDT)

Day 3
Installation methods
- S-lay
- J-lay
- Reel-lay
- Bundles and towed installations
- Flexibles and umbilicals

Construction support
- Landfalls
- Trenching and burial
- Pre-commissioning

Tie-ins, spools and risers
- Tie-ins and spools
- Rigid steel riser installation
- Flexible riser installations

Day 4
Introduction to pipeline integrity
- Failures: frequency and incidents
- PIMS

Flow assurance
- Operational controls
- Additives
- Pigging

Pipeline inspection
- Risk-based inspection plan
- External survey
- Internal inspection
- Anomaly assessment

Exercises
- 13 scenarios

Repairs, tie-ins and decommissioning
- Hot taps, tees and wyes
- Remedial works
- Decommissioning

Course information
Level: Foundation
Duration: 4 days
Site visit*: ½ day
CPD points/PDH points: 28

*Available in Aberdeen and Houston.

Book a course: www.jee.co.uk  e: training@jee.co.uk  t: +44 1732 371 391
Design of subsea pipelines
(formerly Design of subsea pipelines – Part 1)

About the course
This course covers the techniques for basic subsea pipeline design, including diameter, wall thickness and material selection, plus thermal and concrete weight coating selection and sizing.
Delegates will also benefit from discussions around industry developments and the latest technologies. The tutor will reinforce learning by talking participants through design calculations using codes, as well as pragmatic approaches to analysis techniques. This is a crucial programme to help engineers to understand contractors’ output, design houses to apply calculations to projects, and regulation bodies to follow up-to-date industry codes.

Key learning areas
✦ Understand issues affecting design, to appreciate why pipelines are made the way they are
✦ Practice calculations based on industry codes
✦ Discuss industry developments and new technologies

“This course comprehensively introduces the pipeline engineering practise. Strongly recommend!
Sui Wang, Design Engineer, Wellstream International Limited

Course content

Day 2
Materials specification
✦ Material selection
✦ Review of material properties
✦ Specification of line pipe

Corrosion
✦ Introduction
✦ Types of corrosion
✦ Control measures

Day 3
Strength
✦ Design principles
✦ Bursting
✦ Collapse
✦ Buckling and combined stresses
✦ Strain-based design
✦ Exercise

End expansion and spoolpieces
✦ End force and expansion factors
✦ End expansion
✦ Temperature profile
✦ Exercise
✦ Spoolpieces

Day 4
Stability
✦ Review of fundamentals
✦ Oceanography
✦ Hydrodynamics
✦ Resistance
✦ Stability analysis
✦ Computational fluid dynamics
✦ Exercise

Bottom roughness
✦ Bottom roughness analysis
✦ Spans
✦ Intervention

Jee is currently performing the detailed design for a pipeline project off the shore of Canada

Course information
Level: Practitioner
Duration: 4 day
CPD points/PDH points: 28
Advanced design including HP/HT and deepwater pipelines
(formerly Design of subsea pipelines – Part 2)

About the course
To fast-track your professional development, ensure you consider this course. Our expert tutor will impart decades of knowledge of the more complex design issues affecting pipelines, such as deepwater, high pressure (HP), high temperature (HT) and highly corrosive fluids and gases. Gain an informed approach to conflicting methods of mitigating HP and HT problems.

Participants will expand on their understanding of how to apply the correct codes of practice, carrying out design calculations and worked examples for use in future projects, in addition to learning about solutions to pipeline failures from real-life case-studies.

Key learning areas
- Learn how to apply design codes correctly
- Look at methods to protect subsea pipelines, such as rock dumping and trenching
- Analyse solutions to pipeline failures from real-life case-studies
- Practice with worked design calculation examples

“Very good, would highly recommend the course to others.”
Richard Wyness, Subsea Engineer, JP Kenny Caledonian Ltd

Jee has performed advanced FE analysis to model lateral buckling and pipeline walking

Course information
Level: Practitioner
Duration: 4 days
CPD points/PDH points: 28

Course content

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Did you know
Jee has performed advanced FE analysis to model lateral buckling and pipeline walking
Free spans and on-bottom stability

About the course
Through the use of worked examples, delegates will gain an appreciation of the integrity issues associated with pipeline instability, spans and dents. Delegates will also learn about assessment methods and their application, and review a series of case-studies presenting real-life scenarios and the lessons learned in their solution. This course can be taken independently, or as an extension of the information gained in the Design of subsea pipelines course, to include detailed Level 2 and 3 assessment to DNV RP F105 and F109. These detailed assessments can be used for new pipelines as well as for existing pipelines.

Key learning areas
✦ Learn about integrity issues associated with pipeline instability, spans and dents
✦ Assess the methods and application
✦ Gain an understanding of when remediation is required and the options available
✦ Look at example assessments, based on industry codes and standards
✦ Review case-studies with real-life problems, solutions and lessons learned

Did you know
Jee has developed and field-tested a span monitoring system which is proven to reduce span remediation costs

Course content

Day 1
External inspection
✦ What to look for
✦ Inspection methods
✦ Inspection examples
On-bottom stability
✦ Fundamentals of pipeline stability
✦ Analysis methods
✦ Data requirements
✦ Force balance approach
✦ DNV RP F109 approach
✦ Stabilisation options
✦ Exercise
✦ Case-study

Day 2
Buoyant span case study
✦ Background to the problem
✦ Buoyant span
✦ Remedial works
✦ Lessons learned
Dent assessment
✦ Dent properties and behavior
✦ Causes of dents in subsea pipelines
✦ Methods of assessment
✦ Worked example
✦ Exercise
✦ Protection methods
✦ Case-study
Spans
✦ Span detection
✦ Assessment of spans
✦ Stress and buckle checks
✦ Vortex-induced vibrations
✦ Remediation

Day 3
Span assessment software
✦ DNV FatFree
✦ Plus-One
✦ SAGE Profile
✦ FEA
✦ Calculations
✦ Comparison
Span assessment exercise
✦ Typical span assessment problem
✦ Span assessment exercise
✦ Scope for remedial action

Jee has always been there for me as a reliable technical resource in my training needs.

Michael Knudsen, Subsea Engineer, Chevron

Course information
Level: Practitioner
Duration: 3 days
CPD points/PDH points: 21
Subsea systems

About the course
Subsea systems are integral in fitting all the elements of the subsea puzzle together. Focussing on subsea systems from design and installation through to operation, this course explains how the whole system works in conjunction. Gain an awareness of the equipment used and the drivers behind equipment selection. Delegates will get to grips with industry terminology, learn about market drivers and discuss issues affecting subsea production.

Various teaching techniques are applied including a site visit* to maximise your learning experience through seeing equipment first hand.

Key learning areas
✦ Gain an appreciation of issues affecting subsea production
✦ Learn about the structures and equipment involved in a system
✦ Analyse the design and installation of subsea equipment
✦ Discuss decommissioning regulations
✦ Get to grips with industry terminology

“A great course that provides extensive knowledge.”
Lee Tae-hwan, Associate, Daewoo Shipbuilding & Marine Engineering

Did you know
Jee designed all the subsea structures for the Davy East field in the North Sea

Course content
Day 1
History of subsea production
✦ Introduction
✦ Onshore development
✦ Offshore development
✦ Subsea development
✦ Future development
Drilling and completing a subsea well
✦ Introduction
✦ Drilling sequence and components
✦ Well logging and testing
✦ Completion sequence and components
Subsea system configurations
✦ Template configuration
✦ Cluster configuration
✦ Daisy chain configuration
✦ Hybrid configuration
✦ Satellite configuration

Day 2
Spoolpieces
✦ Design considerations
✦ Metrology and construction
✦ Connection methods
Subsea production control equipment
✦ Introduction
✦ Subsea trees
✦ Subsea control systems
✦ Umbilicals
✦ Subsea manifolds
✦ System vulnerabilities
Subsea processing
✦ Subsea multiphase flow meters
✦ Subsea pumps and compressors
✦ Subsea separation and water reinjection
✦ Subsea HIPPS

Day 3
Structural design
✦ Template design
✦ Seabed interface
✦ Fabrication and testing
✦ Case studies
Installation and commissioning
✦ Installation issues
✦ Installation methods
✦ At the seabed
✦ Installation videos
✦ Commissioning
✦ New technology
Intervention
✦ Diving and saturation diving
✦ ROV types and tools
✦ ROV operations and deployment
✦ ROV manufacture
✦ AUVs

Day 4
Workover
✦ Workover equipment and vessels
✦ Minor workover operations
✦ Major workover operations
Subsea abandonment
✦ Subsea abandonment regulations
✦ History and future of subsea abandonment
✦ Abandonment of subsea wells

Jee designed all the subsea structures for the Davy East field in the North Sea

Did you know

Course information
Level: Foundation
Duration: 4 days
Site visit*: ½ day
CPD points/PDH points: 28

*Available in Aberdeen and Houston.
Subsea controls

About the course
An in-depth approach looking at how control systems operate, the engineering principles involved and identifying the key areas that are often overlooked, such as managing availability and the reliability of controls.
Delegates will have the opportunity to see what different parts of the system look like, get an independent comparison of the kit and equipment available, and gain a greater insight into this specialist area.

Key learning areas
✦ Differentiate the types of subsea control systems and identify different subsea equipment and functionality
✦ Gain an in-depth understanding of how subsea control systems operate
✦ Understand the issues when overseeing the design and manufacturing of subsea controls equipment
✦ Take a look at future technologies

A professionally raw course with relevant up-to-date material presented with examples and enthusiasm.
David Kinnear, Technical Engineer, Bifold Fluidpower Ltd

Course content

Day 1
Design Criteria
• Oil or gas
• Type of platform
• Water depth
• Reservoir pressure and temperature
• Number of functions
• Project life expectancy
Selection of system
• Direct hydraulic
• Piloted hydraulic
• Sequence hydraulic
• Electro hydraulic
• Multiplex electro hydraulic
• All electric
Topside equipment
• Master control station (MCS)
• Remote operator workstation
• Electrical power unit

Systems equipment
• Umbilical
• Subsea umbilical termination unit (TUTU)
• Chemical injection unit (CIU)

Day 2
Operation of system
• System options
• Hydraulic
• Electrical
• Communications
• Redundancy
• Signal commands
• DCV operation
System interfaces
• Supervisory control and data acquisition (SCADA)
• Screen mimics
• Logging on/off
• Valve opening/closing
• Valve foot printing
• Page selection
• Trending and reports
• Calculations and interlocks
Fluid types
• Synthetic fluid
• Water-based fluid

Did you know
Jee provides integrated engineering services spanning the whole life-of-field
Subsea hardware

About the course
As an independent company, we are in a unique position to provide completely impartial training on hardware. Our subsea hardware programme provides a comprehensive and complete understanding of the equipment used in subsea production systems. You will distinguish why trees are not all the same and get to grips with interactions. Each piece of equipment is covered in detail, explaining the evolution of design, current best practice and the differences between each proprietary design.

Key learning areas
+ Independent overview of subsea equipment
+ Analyse the components of subsea equipment and how they interface with one another
+ Pros and cons of equipment from each original equipment manufacturer (OEM)
+ Participate in a site visit* to see some of the equipment being discussed

Jee’s Subsea hardware course is excellent training that provides a detailed overview of subsea hardware used in today’s Oil and Gas industry.

Rodrigo Braceras, Quality Team Leader, BP

Did you know
Jee is independent from any manufacturers, banks or contractors meaning we provide completely impartial engineering services

Course content
Day 1
Overview of subsea equipment
- Subsea components
- Subsea configurations

Subsea wellhead assemblies
- Selection considerations
- Wellhead design
- Casing string design
- Proprietary designs
- Design considerations for intervention

Blow-out preventers
- Overview
- Annular type blow-out preventer
- Ram type blow-out preventer
- Proprietary design

Completions
- Overview
- Tubing hangers

- Tubing design
- Downhole safety valves
- Intelligent completions
- Gas lift valves
- Downhole chemical injection
- Fibre optic sensors

Day 2
Subsea trees
- Overview
- Dual-bore vertical tree
- Mono-bore vertical tree
- Horizontal tree
- Tree selection
- Valve functions
- Proprietary designs
- Injection of chemicals
- Flow meters
- Retrievable components
- Tree installation

Controls
- Overview
- Equipment
- Proprietary designs
- Fail-safe shutdown
- Regulations

Manifolds
- Manifold types
- Manifold piping design
- Manifold structural frame design
- Manifold foundations
- Injection manifold design
- Retrieval of components
- Proprietary designs
- Installation

Day 3
Subsea valves
- Overview
- Choke valves
- Gate valves
- Ball valves
- Check valves
- Multi-port valve blocks
- Valve position indicators
- Valve testing

Jumpers and connectors
- Rigid jumpers
- Flexible jumpers
- Flanges
- Other mechanical connections
- Actuated connections
- Hydraulic and electrical connections
- Systems ‘integration’ testing

*Available in Aberdeen and Houston.
Advanced design and stress analysis of subsea equipment
Also known as Designing to API 6A/16A/17D requirements

About the course
New course for 2015, this course provides an intensive overview for design engineers working to the rules of API specifications 6A, 16A and 17D (ISO 10423, ISO 13533 and ISO 13628-4). These codes are the standard approach for the design of valve bodies, hubs, clamps, wellhead and tree equipment for both normal and HT/HP usage.
The tutor begins with basic stress analysis principles and reviews standard and non-standard materials used for these specifications. Topics covered include the concepts of membrane and bending stress, as well as primary, secondary, and peak stresses. To add context to your knowledge base, the history and logic of the specifications are covered, in addition to techniques and formulas for analysis of stresses from pressure, external loads, and thermal gradients. Linear and non-linear finite-element analysis and the interpretation of finite-element results are incorporated.

Key learning areas
❖ A comprehensive overview of API specifications 6A, 16A and 17D
❖ Learn about stress analysis principles and review their importance in context with their development
❖ Review and gain an understanding of the specialist techniques involved

Very interesting course, global view on onshore pipeline design from routing to repair.

Pierre Baptiste, Project Engineer, Doris Engineering

Did you know
Jee has executed over 0.6 million engineering man-hours

Course content

Day 1
- Basic requirements of design
- Introduction to API design requirements
- Appropriate material selection
- API design rules
- Analysis of wall thickness criteria
- Membrane stress intensity
- Bolting and screw threads
- Bearing and direct shear stresses
- Bending stress
- Primary and secondary stresses
- Bending stress calculations

Day 2
- Procedure for stress categorisation
- Thermal stress
- Fatigue design
- Stress concentrations
- Fatigue analysis
- High temperatures design
- Finite-element analysis
- Linearizing stress distributions from linear elastic models
- Interpreting post-processor output
- Non-linear finite-element analysis

Day 3
- Subsea equipment design
- Designing for external pressure
- Mudline equipment
- Structural components and lifting devices
- Design documentation principles
- Design verification files
- Traceability
- Design report contents
Risers, umbilicals and flexibles

About the course
As one of Jee’s most popular courses, this programme provides a comprehensive understanding of risers, umbilicals and flexibles, and how they operate within the subsea environment. Utilising different teaching techniques including a site visit,* to enable delegates to see equipment normally only viewable on the seabed.

This extensive course covers all the different types of risers, umbilicals and flexibles, their uses and design, installation and operational considerations. Delegates will also learn about FPSOs and how they impact on the design and layout of risers and umbilicals.

Key learning areas
✦ Identify design, installation and operational considerations
✦ Learn about the latest developments in riser systems
✦ Understand how FPSOs impact on the design and layout of risers and umbilicals
✦ Get to grips with key industry terms and confidently apply them to projects
✦ An introduction to riser integrity management

“A great course for developing a deeper understanding of riser, umbilical and flexible system components”

Peter Schaefferkoeetter, Subsea Engineer, ExxonMobile

Course content

Day 1
Riser types and uses
✦ Introduction
✦ Production vessel selection
✦ Production risers
✦ Export risers
✦ Drilling risers
✦ Completion and work-over risers
✦ Generic issues and exercises

Introduction to FPSOs
✦ Overview of FPSOs
✦ Types of FPSOs
✦ Mooring and turret arrangement

FPSO vessel motions
✦ Components of motion
✦ Types of vessel motion
✦ Wave frequency motion
✦ Drift and higher order motions

FPSO interfaces
✦ Overview of FPSO interfaces
✦ Risers and umbilicals
✦ Processing and storage
✦ Offloading and export

Day 2
Flexible design and manufacture
✦ Riser configurations
✦ Design
✦ Components
✦ Manufacture

Umbilical design and manufacture
✦ Cross-section design
✦ Manufacture
✦ Fittings

Flexible and umbilical system design and installation
✦ System design
✦ Storage and load out
✦ Flexible and umbilical installation
✦ Riser installation
✦ Pre-commissioning

Day 3
Flexible and umbilical integrity management
✦ Monitoring
✦ Inspection
✦ Damage assessment
✦ Repair

Rigid riser design
✦ Design approaches
✦ Riser sizing design
✦ Dynamic loading
✦ Analysis methods
✦ Fatigue loadings
✦ Design for fatigue

Day 4
Steel catenary risers
✦ Design
✦ Manufacture
✦ Installation

Hybrid risers
✦ Types of hybrid riser
✦ Fabrication and installation

Drilling and top-tensioned risers
✦ Monitoring
✦ Inspection
✦ Damage assessment
✦ Repair

Jee designed the replacement rigid risers for the Forties Charlie platform in the North Sea

*Available in Houston only.
Engineering of flexibles
(formerly Flexibles, risers and flowlines)

About the course
This programme provides a specialist level of understanding of flexible risers and flowlines. The tutor will teach you the skills required to write accurate specifications for flexibles, and enable you to develop an understanding of how the different wire profiles affect the performance of a flexible, as well as how flexibles are affected by installation and operational loads.

We have gained permission from Orcina to facilitate the use of OrcaFlex during this course, to allow delegates to get hands-on with the software.

Key learning areas
- Gain a comprehensive understanding of flexible flowlines and risers
- Build knowledge of the materials and equipment used
- Understand how FPSO and SPM design affects the choice of riser system
- Apply theories to real-life projects through case-studies and group discussions
- Understand the different types of software available

More than a year of work in a subsea engineering office hasn't given me as much as 4 days of this course.
Francesco Fuganti Pedoni, Engineer, GE

Did you know
Jee has a team of engineers that perform installation and in-place analysis using OrcaFlex

Course content

Day 1
Flexibles introduction
- Flexible risers
- Application of flexibles

Materials selection
- Polymers
- Insulation
- Metals
- Composites
- Material specification

Design
- Code requirements
- Carcass and pressure armour design
- Tensile armour

Design of ancillary equipment
- Bend stiffeners and restrictors
- Bell-mouths
- Mid-water arches
- Buoyancy modules

Day 2
Manufacturing and testing
- Manufacture
- Testing

Oceanography and hydrodynamics
- General overview
- Waves
- Currents
- Hydrodynamics

Vessels
- Vessel configuration and motion
- FPSO moorings
- Swivel stack
- RAOs

Day 3
Flexible analysis
- Static analysis
- Installation analysis
- Extreme analysis
- Fatigue analysis

Flexible analysis software
- Introduction
- Software available
- OrcaFlex walkthrough
- OrcaFlex dos and don’ts
- OrcaFlex exercise

Case study
- Background
- Theory
- Analysis
- Conclusions

Day 4
Installation of flexibles
- Storage and handling
- Flexible flowline installation
- J-tube installation
- Riser installation

Post-lay trenching and burial
- Soils and seabeds
- Trenching considerations and spec
- Trench transitions
- Trenching analysis
- Backfilling

Integrity of flexibles
- Inspection techniques
- Monitoring and testing methods
- Design and installation incidents
- Operational deterioration and damage
Rigid riser design

About the course
With the increase in deepwater developments, more and more deepwater rigid riser systems are required. This course teaches delegates about the design of various types of rigid risers, including steel catenary risers (SCRs), hybrid risers and more conventional shallow water risers.

Key learning areas
✦ Identify the different riser types and uses, from drilling risers to hybrid risers
✦ Understand the engineering principles and approaches to riser design
✦ Learn how to recognise fatigue, assess it and improve fatigue life
✦ Gain an understanding of riser behaviour, failure theories and which sections are most at risk

Excellent! A must do to understand risers, pipelines and flowlines.

Lionel Richard, Engineer, 2H Offshore Engineering Ltd

Did you know
Jee performs riser design and analysis using a variety of different software packages including Abaqus, FS2000 and OrcaFlex

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**Course information**

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<th>Level:</th>
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<tr>
<td>Duration:</td>
<td>3 days</td>
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<td>CPD points/PDH points:</td>
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Polymers and composites

About the course
Polymers and composites offer the benefits of being lightweight and corrosion resistant and are being increasingly used offshore. This one day course provides an understanding of polymers and composites, from the manufacturing process right through to failure, and includes real-life examples for delegates to analyse.

Key learning areas
- Learn about the latest materials, manufacturing methods and project costings
- Gain an understanding of relevant industry codes and standards
- Build knowledge of materials selection, testing and installation considerations
- Study real-life case-studies

The course is amazing and the tutor was awesome in delivering the course content.
Emeka Nwonu, Planning Engineer, Saipem Ltd

Course content
Day 1 – Morning
Material production
- Fibres and resins
- Manufacturing methods
- Prices
Properties
- Strength and stiffness
- Fatigue, creep and impact resistance
- Chemical resistance
- Thermal properties
- Electrical properties
- Fire resistance

Day 1 – Afternoon
Design and fabrication
- Standards and codes
- Materials selection
- Effect of anisotropy
- Fire and static electricity
- Parts consolidation
- Jointing
- Non-destructive examination
- Installation considerations
Case studies
- Whole topsides in composites
- Repair and strengthening
- Downhole tubing and casing
- Development of flexibles
- Subsea structures and protection
- Composite risers

Course information
Level: Foundation
Duration: 1 day
CPD points/PDH points: 7
Construction of subsea pipelines

About the course
This practitioner course delivers an expert level of understanding of the processes, equipment and vessels involved in offshore pipe-lay, and the different pipe-lay methods used.

Improve your appreciation of the size and nature of the latest offshore pipe-lay vessels and equipment, and gain confidence in identifying the best choice for pipe-lay.

Areas covered include trenching, hydrotesting, surveys and tie-ins, making this course a ‘must’ for delegates whom wish to speak technically about pipeline construction.

Key learning areas
- Understand how to identify the best pipe-lay options via comparing methods
- Discuss issues affecting pipeline installation
- Gain the confidence to talk technically about pipeline construction
- Acquire an understanding of trenching, hydrotesting, surveys and tie-ins

Offshore projects are very complex and Jee’s courses help engineers to get global vision of their complexity.

Tomislav Niksic, Offshore Field Engineer, Saipem Croatia

Course content

Day 1
S-lay
- S-lay vessel types
- S-lay process
- S-lay market and vessels
- Insulated lines
- Lay curve control

Pipe supply, welding, NDT and ECA
- Line pipe supply and specifications
- Welding methods and procedures
- NDT and ECA

J-lay
- J-lay sequence, projects and vessels
- Rapid pipe welding
- Mechanical connectors
- J-lay from drilling rig

Bundles and towed installation
- Bundle design and fabrication

Day 2
Reel-lay
- Reel-lay process
- Reel-lay market and vessels
- Special considerations
- Technical analysis supplement

Installation of flexibles
- Unbonded flexibles installation process
- Umbilical cables
- Bonded hoses

Pre-commissioning
- Gauging and flooding
- Hydrotesting
- Dewatering, air and vacuum drying
- Testing of valves and controls

Management systems
- Law, QA and Commercial
- Health, safety and environment

Survey
- Survey methods and operations

Day 3
Landfalls
- Pull ashore into cofferdam
- Pull offshore
- Directionally – drilled landfalls

Tie-ins
- Flanged connection by diver
- Hyperbaric welding
- Diverless tie-ins

Day 4
Seabed modification
- Sweeping
- Rock removal

Protection
- Rock dump
- Concrete mattresses
- Protection structures
- Crossings

Post-lay trenching and burial
- Ploughing
- Jetting
- Cutting
- Cable trenching
- Trench transitions
- Backfilling

Diving and ROV operations
- Diving and equipment
- ROV operations

Decommissioning and abandonment
- Legislation
- Decommissioning in-situ
- Recovery and re-use
- Costs

Did you know
Jee has carried out extensive studies into rock berm optimisation for many clients

Course information
Level: Practitioner
Duration: 4 days
CPD points/PDH points: 28
Installation calculations for subsea pipelines

About the course
Installation calculations can be daunting. This course provides detailed knowledge of the installation calculations required for all stages of a pipeline’s lifecycle, from pipe-lay to abandonment and recovery.

Delegates have the opportunity to practice installation calculations, with tutor support, using worked examples. This hands-on experience is the perfect platform to boost understanding of industry standards and codes. Learn how they are applied in real-life scenarios and gain the confidence to independently assess and verify calculations used in subsea projects.

Key learning areas
- Understand industry standards and codes and how they are applied to pipeline installation
- Practice installation calculations using worked examples
- Assess and verify calculations used in subsea projects
- Gain an awareness of the American Institute of Steel Construction (AISC) methodology

Relevant topics, excellent course notes, very informative class.

Adeolu Ariyo, Installation Team, Chevron Upstream Europe

Did you know
Jee performs a variety of installation activities such as the lifting analysis of structures and pipework, the recovery and redeployment of damaged umbilicals, and the dynamic installation analysis of flexibles using OrcaFlex

Course content

Day 1
Catenaries
- Catenary curves
- Pipe lay catenary equations
- Pipe stresses
- Exercise
- Control by tension

Bending
- Bending during S-lay
- Exercise
- Break-over lengths
- Concrete-coated pipe
- Horizontal lay curve radii

Reeling
- Reeling operations
- Strain concentration
- Material qualification
- Ovalisation and buckling
- Exercise

Day 2
Sagbend buckling
- Local buckling criteria
- Prediction of buckling in catenary
- Exercise
- Buckle propagation

Barge stability
- Stable floating bodies
- Determining vessel stability
- Free liquid surfaces and suspended loads
- Modular craft and local barges
- Exercise
- Background information

Dynamics
- Vessel motions
- Dynamics during pipe-lay
- Code criteria
- Software
- Exercise
- Output analysis
- Fatigue assessment

Day 3
Lifting
- Static and dynamic loads
- Lifting in air
- General wave parameters
- Lifting through wave zone
- Lowering through water column
- Lowering onto seabed
- Exercise

Rigging design and analysis
- Rigging equipment
- Rigging analysis
- Exercise

Lugs, deck layouts and sea fastenings
- Lugs and stiffeners
- Exercise
- Foundations and deck fittings
- Deck layouts and sea fastenings

Day 4
Pipe pull forces
- Landfall setup
- Exercise
- Alternative pull set ups
- Background information

Anchors and piles
- Anchors
- Exercise
- Piles
- Sheet pile anchorage
- Exercise

Abandonment and recovery
- A&R overview
- A&R equipment
- Case study
- A&R analysis
- Exercise

Jee performs a variety of installation activities such as the lifting analysis of structures and pipework, the recovery and redeployment of damaged umbilicals, and the dynamic installation analysis of flexibles using OrcaFlex
Reeling design calculations

About the course
Detailing the engineering behind reel-lay installation, this is an in-depth, technical course which demystifies this complex field. This course explains key design aspects such as the implications of cumulative plastic strain, ovalisation and weld defects. In addition, delegates will receive guidance on codes and patents, learn about the reeling market and understand lessons learned from past successes and failures.

Key learning areas
- Learn about the latest developments, including SENT (single-edge notch tensile) test assessments, the use of lined pipe and lines installed partially pressurised
- Understand key design aspects such as the implications of cumulative plastic strain, ovalisation and weld defects
- Gain knowledge to facilitate assessment of a vessel’s capability in reel-laying
- Take on board lessons learned from published case-studies

Very educational and detailed presentation.
Madamiedon Weyimi, Offshore Construction Engineer, Chevron Nigeria

Did you know
Jee has a detailed knowledge of the issues associated with reeling of clad pipe and pipe-in-pipe systems and has undertaken finite element analysis of the reeling of internally-lined pipe for a clad linepipe manufacturer

Course information
Level: Practitioner
Duration: 4 days
CPD points/PDH points: 28

Course content
Day 1
Reel lay process
- Reel-lay system configuration
- Spooling
- Installation
- Lay down
Reeling history and current market
- History and development of reeling
- Reeling ships and companies around the world
Case studies: failures and successes
- Canapu pipe-in-pipe success
- Åsgard field joint buckling failure
- Foinaven twisting problem
- Tambar stress cracking failure
- Nile insulation success
- Dahlia spool site set-up success

Day 2
Key technical aspects
- Strain concentration
- Material qualification
- Weld defects
- Ovalisation
- Reeling forces
- 13% Chrome pipe
- Clad pipe
- Plastic-lined pipe
Codes and patents
- Codes relating to reeling
- Around the world
- Patents relating to reeling
Reeling forces
- Force to reel-on
- Stresses once reeled-on
- Exercise
- Elastic energy in reel
- Force needed to straighten
- Gripping force
- Worked example
- Exercise
- Stationary versus traversing straightener

Day 3
Strain concentration effects
- Stress-strain curves
- Effect of strain on material properties
- Plastic behaviour during reeling
- Exercise
- Geometric discontinuities
- Material strength discontinuities
- Lay process control methods
- Strain concentrations at discontinuities
- Exercise
- Safeguards

Day 4
Materials and weld defects
- Welding methods
- Welding procedures
- Inspection methods for welds
- Defect assessment methods
- Worked example – crack growth during reeling
- Exercise – effect of load cycling on root crack weld fatigue life
- DNV ECA methodology

Ovalisation
- Ovalisation and recovery
- Collapse pressure and combined loading
- Worked example
- Exercise
Integrity management of subsea pipelines
(formerly Integrity management of subsea pipelines – Part 1)

About the course
Integrity management is paramount to the success and long life of a pipeline. This course offers a thorough understanding of the engineering principles behind successful integrity management.

Learn about the activities required to run subsea pipelines in optimum conditions, how to identify issues and assess a range of integrity threats using screening tools to undertake detailed evaluations. Case-studies and worked examples help facilitate learning in key topic areas. A site visit* is included to allow delegates insight into machinery and equipment otherwise only viewable on the seabed.

Key learning areas
- Learn how to identify issues and assess a range of integrity threats
- Look at the different detailed calculations required and screening tools available
- Identify cost optimisation methods
- Discuss end of design life options

This course is really fundamental for pipeline engineering [to] understand the complex assessment of the pipeline integrity process.

Carlos Cardoso, Civil Engineer, Petrobras

Did you know
Jee perform a variety of integrity analysis tasks, including the review or creation of pipeline integrity management strategies (PIMS), data analysis and reporting, designing and monitoring pigging campaigns

Course content

Day 1
Pipeline Integrity Management System (PIMS)
- What does a PIMS involve?

Stability
- Pipeline instability
- Sources of data
- Analysis methods
- Stabilisation options
- Case studies

Thermal buckling
- What is a thermal buckle?
- Why are they a problem?
- Assessment
- Mitigation and remediation

Spans
- Span detection
- Assessment of spans
- Stress and buckle checks
- Vortex-induced vibrations
- Remedial measures

Day 2
Flow assurance
- Flow regime
- Causes of flow restriction
- Flow control methods

Pigging
- Types of pigs and suitability
- Piggability of pipeline
- Launching and receiving

Corrosion overview
- Types of corrosion
- Corrosion rate modelling and monitoring
- Control measures
- Case studies

Internal inspection
- Gauge pig
- Calliper pig
- Magnetic flux pig
- Ultrasonic pig
- Inspection of flexibles
- Other pigs
- Case study

Day 3
External inspection
- Inspection methods
- Riser and flexible inspection
- Pig trap inspection
- Risk-based inspection

Defect assessment
- Defect types and loadings
- Corrosion defect assessment levels
- Corrosion defect assessment codes
- Corrosion defect interaction

Day 4
Dent assessment
- Dent properties and behaviour
- Causes of dents in subsea pipelines
- Methods of assessment
- Worked example
- Protection measures
- Case study

Isolation
- Operations issues
- Tethered isolation plugs
- Remote set isolation pigs
- Remote set spheres
- Pipe freezing
- High friction pigs
- Hot tap and stopple
- Environment and safety

Offshore repairs
- Composite repairs
- Clamp repairs
- Spool repairs
- Mechanical connectors
- Hyperbaric welding
- Others

Life extension
- Ageing assets and KP4
- Pipeline design life
- Pipeline life extension

*Available in Aberdeen only.
Failure of deepwater pipelines and risers –
A masterclass in risk mitigation
(formerly Integrity management of subsea pipelines – Part 2)

About the course
Designed to build delegates in-depth technical knowledge of integrity management issues affecting deepwater risers and flowlines. This course utilises case-studies of real pipeline failures, reviewing why the failures occurred and how lessons learned can be applied to your pipelines. Also included is a site visit* to facilitate learning by viewing components normally only visible on the seabed.

Delegates will acquire efficient methods to perform integrity assessments and manage corrosion defects in order to ‘build’ integrity into all phases of offshore pipeline projects, to improve operating costs and reduce the risk of pipeline failure.

Key learning areas
✦ Investigate the root causes behind failure
✦ Understand efficient methods to perform integrity assessments
✦ Manage corrosion defects to improve operating costs
✦ Learn how to reduce the risk of pipeline failure
✦ Apply lessons learned to your pipeline and riser projects

A fantastic course, presented well by a very experienced professional engineer.

Euan Elphinstone, Asset Integrity Engineer, EnQuest

Did you know
Jee has carried out root cause analysis for a number of failures in the UK and Netherlands

Course information
Level: Practitioner
Duration: 4 days
Site visit*: ¾ day
CPD points/PHD points: 28

Course content
Day 1
Integrity management systems
✦ Integrity management strategy
✦ Plan
✦ Execute
✦ Measure
✦ Improve
✦ Document management and reporting
✦ Risk-based inspection
✦ Emergency response
✦ Incident investigation and learning
✦ Integrity management standards

Integrity management during design and installation
✦ Rigid pipeline design aspects
✦ Rigid riser design aspects
✦ Rigid pipeline installation aspects
✦ Rigid riser installation aspects
✦ Commissioning aspects

Day 2
Case study 1: West of Shetlands pipeline installation failure
✦ Failure investigation
✦ Pipeline repair
✦ Lessons learned

Integrity during operation
✦ Flow assurance
✦ Operation and remediation
✦ Inspection methods

Day 3
Case study 2: Deepwater GoM pipe-in-pipe installation and operational failure
✦ Field development options
✦ Flowline design decisions
✦ Flowline installation issues
✦ Riser installation options
✦ Failure detection
✦ Failure causes and consequences
✦ Repair options
✦ Lessons learned

Day 4
Flexible integrity management
✦ Codes and standards issues
✦ Materials aspects
✦ Inspection techniques
✦ Monitoring and testing methods
✦ Design and installation incidents
✦ Operational deterioration and damage

Case study 3: HPHT pipe-in-pipe failure during operation
✦ Pipeline design considerations
✦ How the failure happened
✦ Pipeline repair options
✦ New pipeline design
✦ Lessons learned

Case study 4: Floating pipelines
✦ How it happened
✦ Damage assessment
✦ Remedial works
✦ Lessons learned

Case study 5: Flow-induced pulsations
✦ FLIP – theory and dependencies
✦ Potential problems
✦ Corrective actions
✦ Lessons learned

Integrity management of umbilicals
✦ Introduction
✦ Umbilical failure statistics
✦ Integrity management in design
✦ Integrity management in manufacture
✦ Integrity management in installation
✦ Integrity management in operation

Case study 6: Hudson umbilical failure
✦ Introduction to Hudson Field
✦ Blockage in inhibitor hoses
✦ Blockage in methanol hose
✦ Lessons learned

* Available in Houston only
Flow assurance

About the course
Flow assurance is often seen as a ‘black box’ by engineers, however this need not be the case. This course provides a rounded introduction to the subject to dispel the myths and explain the general principles.

Key learning areas
- Understand fluid flow principles for liquid, gas and multi-phase flow
- Learn about the causes of flow restriction and methods for managing flow control
- Gain a comprehensive understanding of pigging and the importance of design considerations for pigging operations
- Build knowledge on the types of corrosion and how to predict corrosion problems
- Assess the subsea equipment that can be used to improve flow performance

One of the best courses I have attended.
Loan Venkatapen, Engineer, Total E&P France

Course information
Level: Foundation
Duration: 2 days
CPD points/PDH points: 14

Course content
Day 1
 Fluid flow principles
  - Flow fundamentals
  - Liquid flow
  - Gas flow
  - Multiphase flow
  - Turn-down over field life
 Fluid composition
  - Fluid properties
  - Well bore fluids
  - Export lines
 Causes of flow restriction
  - Waxes
  - Asphaltenes
  - Scales
  - Hydrates
  - Sand
  - Emulsions
  - Foams

Flow control methods
  - Chemical additive control
  - Thermal control
  - Pressure control
  - Mechanical intervention
  - Other control methods
 Thermal design
  - Need for thermal design
  - Fundamentals
  - Thermal profile analysis
  - Cool-down during shut-in
  - Insulation design

Day 2
 Pigging
  - Cleaning pigs
  - Inspecting pigs
  - Design for pigging
 Corrosion and erosion
  - Types of corrosion
  - Control measures
  - Corrosion rate modeling
  - Corrosion monitoring
  - Erosion
  - Case-studies
 Subsea equipment
  - Gas lift
  - Subsea pumps and compressors
  - Subsea separation and water re-injection

Did you know
Jee uses a range of flow assurance software to perform its engineering work
Pigging and plugging

About the course
A fantastic opportunity to gain an understanding of how to use pipeline pigs and plugs to perform a variety of operations. The tutor will talk you through how to safely achieve results without getting a stuck pig or plug. You will also gain an overview on the latest theories on improving the reliability and accuracy of pigging, for both cleaning and inspection purposes.

Key learning areas
✦ Increase your understanding of the operation of pipeline pigs and isolation plugs
✦ Learn about the different types of pigs and plugs that are available, when and how they are used
✦ Investigate problems that can occur when pigging and how they can be resolved
✦ Build your comprehension of related industry terms and acronyms
✦ Discuss industry lessons learned

“A well-rounded overview of pipeline integrity management.”
Rob Falconer, Discovery Technology Project Leader, Tracerco

Did you know
Jee project managed the intelligent pigging campaign for Block 31 in Angola

Course content

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Course information
Level: Foundation
Duration: 2 days
CPD points/PDH points: 14
Introduction to the offshore wind industry

About the course
If you are new to this industry and wonder how it all works, this is the course for you! Introduction to the offshore wind industry provides a complete overview from the origins and the principles of power generation, through to the design, construction and operation of a modern day offshore wind farm.

Key learning areas
- Learn about the offshore wind market and state of the industry
- Gain insight into the principles of engineering used for an offshore wind farm project
- Understand step-by-step how offshore wind farms are designed, built, operated and maintained
- Discuss future trends and developments in the industry
- Get to grip with industry terms and acronyms

“I was looking for a basic understanding of the offshore wind industry and I’m very happy with the information I received.”

Peter Mullen, Independent Mechanical Project Engineer

Course information
- Level: Introductory
- Duration: 1 day
- CPD points/PDH points: 7

Course content
Day 1 – Morning
Offshore wind market overview
- History
- Market drivers and policy
- Technological trends
- Today’s marketplace

Design
- Consenting
- Principles of power generation and transmission
- Major components of an offshore wind farm
- Field layouts
- Wind turbine generators
- Cables and offshore substations

Day 1 – Afternoon
Construction
- Manufacture of main components
- Logistics
- Installation of major components

Operations and maintenance
- Availability and reliability
- Accessibility
- Planned and unplanned maintenance

Future trends
- Deeper water
- Further offshore
- New technologies

Did you know
Jee’s experience in the offshore wind industry includes installation planning and analysis, analysis and monitoring of power cable spans, and cable pull in analysis
Subsea power cable installation

About the course
This is an in-depth, technical course detailing the engineering for power cable installation using surface laying, ploughing and ROV burial, including pull into offshore structures and landfalls.

Gain a detailed understanding of the engineering principles behind cable installation and learn how to identify and solve issues related to subsea cable laying from case-studies and worked examples.

Key learning areas
- Recognise how to select the correct route for a cable
- Discuss ways to ensure cable protection is optimised
- Learn about a variety of installation methods
- Use worked examples to learn principles of installation analysis
- Understand how to minimise the risk of failure

The tutor’s knowledge of the subject area was excellent, I gained a lot from the course.

Gerard Aden, Senior Pipeline Engineer, J. Ray McDermott Middle East

Did you know
Jee has carried out extensive installation analysis to ensure safe installation of offshore cables between wind turbines

Course information
Level: Practitioner
Duration: 2 days
CPD points/ PDH points: 14

Course content

Day 1
Project overview
- Typical project structure
- Feasibility studies
- Consenting
- Environmental impact studies
- Geophysical surveys
- Geotechnical surveys
- Route selection
- Cable production
- Installation
- Post-lay activities

Cable routing
- Selection of route corridor
- Geophysical survey
- Route determination
- Charting
- Geotechnical survey
- Burial methods
- Burial performance prediction

Cable design
- Cable types for array
- Export and interconnectors
- Design qualification
- Cable performance characteristics
- Hauling devices and joints

Day 2
Cable installation
- Pre-installation design and analysis
- Types of vessel
- Deck layouts and key installation equipment
- Surface laying
- Plough burial
- ROV burial

Offshore structure connection
- Cable entry types
- Entry protection
- Internal cable management
- Pull-in analysis
- Installation equipment and methods

Landfalls
- Landfall selection
- Horizontal directional drilled installation process
- Surface lay and trenched process
- Landfall joint bay
Landfalls and marine terminals

About the course
This specialist area of pipeline engineering is not fully understood by many engineers, yet it is critical knowledge for anyone working on onshore and offshore pipeline projects.

This course provides a clear and comprehensive understanding of landfalls and marine terminals and explains how offshore pipeline systems are connected to shore.

Key learning areas
- Understand the process to select a site, design and operate a marine terminal
- Study how landfalls and outfalls help get oil and gas to shore
- Find out about the different types of single point moorings (SPMs)
- Learn about the marine structures required at a marine terminal
- Analyse terminal incidents and how to avoid them

Great structure, very interactive. Knowledge of presenter was first class.
Alan McGurk, Technology Development Engineer, Oceaneering Umbilical Solutions

Did you know
Jee has created cost models to assess the suitability of landfall options, and has performed integrity analysis of marine terminal systems, such as the analysis of a system experiencing unusually corrosive conditions

Course content

Day 1
Overview of marine terminals
- Overview of items and interactions
- Different types of terminals

Site selection for marine terminals
- Geographical considerations
- Site soil survey
- Environmental considerations
- Environmental and social impact studies (EIA and EIS)
- Site civil works

Tanker operations
- Berthing at a jetty
- Berthing at a buoyed mooring
- Transfer of hydrocarbons
- Transfer of other items
- Safety systems

Day 2
Jetties, trestles and offloading systems
- Environmental forces on tankers
- Types of quayways, trestles and jetty berths
- Design of trestles and jetty structures
- Equipment requirements
- Product pipework
- Marine incidents, safeguards and mitigation

Single point and multi-buoy moorings
- Types of SPM and CBM
- SPM design considerations
- Bonded hoses
- Anchor, chain and buoy design
- Construction

Day 3
Landfalls, intakes and outfalls
- Landfall design
- Pull from shore
- Directional drilling
- Pipeline pulls from laybarge
- Trenching
- Connections

Storage tanks
- Types of hydrocarbon storage tanks
- Design considerations
- Loss of containment protection
- Fire protection
- Security

Marine terminal design and operation
- Terminal equipment
- Incidents
- Ignition control
- Terminal layout
- Terminal operation
Onshore pipelines

About the course
This course provides a comprehensive understanding of onshore pipelines from design, planning and installation, through to operation. Delegates will gain an appreciation of pipe manufacturing methods and materials selection and expand their knowledge of corrosion, fitness for purpose, the importance of integrity management systems, defect assessment and repair methods.

Key learning areas
- Understand pipe manufacturing methods and processes for material selection
- Investigate the construction of long distance pipelines
- Explore risk management and mitigation
- Discuss the challenges of installing pipelines in difficult terrains

“Very interesting course, global view on onshore pipeline design from routing to repair.”

Pierre Baptiste, Project Engineer, Doris Engineering

Course information
- Level: Foundation
- Duration: 3 days
- CPD points/PDH points: 21

Did you know
Many of Jee’s engineers also have a background in onshore pipelines

Course content

**Day 1**
- Pipeline routing and planning
  - Route selection
  - Environmental impact assessments
  - Geological hazards
  - Crossing design
  - Planning
  - Exercise
- Pipe manufacture and components
  - Pipe manufacture
  - Bends
  - Valves and actuators
  - Instrumentation
  - Pumps and compressors
- Pipeline hydraulic design
  - Liquid pipelines
  - Gas pipelines
  - Multi-phase pipelines
- Pipeline wall thickness design
  - Design methods
  - Design for bursting
  - Design for impact protection
  - Risk management
  - Exercise

**Day 2**
- Pipeline corrosion design
  - Corrosion mechanisms
  - External coatings
  - Cathodic protection
  - Internal coatings
- Pipeline construction
  - Site preparation and stringing
  - Welding and NDT
  - Excavation, lowering and reinstatement
  - Pre-commissioning
  - Costs
- Pipeline crossings
  - Crossing types
  - Crossing construction methods

**Day 3**
- Construction in difficult terrains
  - Mountainous regions
  - Swamps and marshes
  - Arctic
  - Deserts
  - Forests
- PIMS and routine operations
  - Principles of PIMS
  - Code requirements
  - Routine operations
- Inspection
  - Leak detection
  - External inspection
  - Internal inspection
- Defect assessment and repair
  - Corrosion defect assessment
  - Dent assessment
  - Repair techniques
  - Section replacement methods
Meet our tutors

Our courses are written by engineers, for engineers. We understand what you need to know to do your job which is why our tutors are all practising engineers with decades of experience in the subsea industry - you really are learning from the subsea experts.

**Mike Hawkins**  
Btech (Hons) CEng FIMechE  
**Technical Director**  
Mike is Jee’s Technical Director and his knowledge is based on 30 years in the industry. He has particular expertise in conceptual and detailed design, buckling, verification, freespan, VIV, and FE analysis and fatigue assessment. Mike is actively involved in Jee’s engineering projects and is the pipeline competent person for Perenco’s North Sea assets.

**Dr Phil Medlicott**  
BSc PhD CEng MIMechE  
**Principal Engineer**  
Phil has over 30 years’ experience in the oil and gas industry and is a knowledgeable presenter and chartered mechanical engineer. His expertise focuses on integrity management including FEED studies, pipeline piggability, verification, fatigue, corrosion and stability analysis.

**Stan Stirton**  
HNC FIMarEST  
**Principal Engineer**  
Stan has worked in the industry for over 35 years and has extensive subsea engineering experience in both project and IMR roles. His past experience is in subsea control systems and installation, and testing of flexible flowlines and umbilical systems. He has substantial knowledge of a wide range of disciplines from his 28 years with Shell Exploration and Production.

**Alan G Knowles**  
BSc (Hons) CEng Eur Ing MICE AMICE  
**Civil and Construction Specialist**  
Alan has not only presented over 40 Jee courses, but has also assisted in the production of a selection of courses. Alan has over 30 years’ experience in the oil and gas industry and has been involved in numerous major projects. Alan specialises in the installation and design of pipelines, flowlines and landfalls and is an expert in finite element analysis.

**Stuart Joyson**  
ONC BSc (Hons) MICE  
**Offshore Construction Specialist**  
Stuart has presented various technical papers and his expertise includes trenching, flowline bundle fabrication, landfall construction, installation, marine outfalls, tanker terminals, renewables and decommissioning activities. Stuart has over 35 years’ experience and specialist knowledge in design and construction.

**John Hammond**  
A. Met MSc CEng Eur Ing MIMMM F.WeldI  
**Principal Engineer**  
John has over 40 years’ experience in the oil and gas industry and has particular expertise in material development and testing, pipe-lay, gap analysis and construction. He also has in-depth knowledge of industry standards and codes, representing a number of major operators on standards committees in the past.
Meet our tutors

Mark Murawiecki
BSc (Hons) CEng FIMechE
Chartered Engineer
Mark’s expertise is in production systems, field architecture optimisation, offshore drilling systems as well as an appreciation of topsides process plant and equipment. Mark also has significant project and integrity management experience and has worked in the industry for over 30 years.

Nigel Wright
BSc MSc HND CEng Eur Ing MIGEM MIMechE
Pipeline Consultant
Nigel is a chartered engineer and has worked in the oil and gas industry for 27 years. He has extensive knowledge in remote seabed excavation, concrete weight coating removal, mechanical and emergency repair systems, safety legislation, inspection of pressure vessels and design. He has also lectured at a number of conferences.

Bob Summers
Training and Development Consultant
Bob has substantial experience of developing training programmes built around competencies, as well as over 18 years’ experience in the oil and gas industry specialising in control systems and training. This knowledge, combined with his subsea controls expertise enables him to deliver technical courses using innovative presentation and facilitation techniques.

Alan Smith
BSc (Eng) (Hons) PhD CEng FIMechE MWeld I
Courses Specialist
Alan is a chartered engineer with over 18 years’ experience in the industry. Alan’s specialist area of expertise is integrity management including: fatigue, corrosion, fitness for purpose and defect assessment. Alan also has experience in structural analysis, lifetime extension and design, and has contributed to a number of procedures and standards.

Alan Lowdon
BSc (Hons) MSc PhD MBA CEng FIMechE
Courses Specialist
Alan has worked in the energy and utilities industry for over 25 years. His areas of expertise include mechanics and fluid dynamics, wind operations, maintenance and cables. Alan has run MBA modules and professional development courses in the past, and is an advisor to the UK Government and the US Department of Energy on offshore wind.

Clive Ward
BSc MInst. MDT
Principal Consultant
Clive is an experienced subsea engineer with more than 30 years’ experience in the industry. He has expert knowledge of integrity management, risk management and in-line inspection technologies and has practical experience of developing and delivering training. He has also presented and authored a number of industry publications.
Meet our tutors

Grant Adam  
BSc PgDip CEng CMarEng MIMarEst  
Principal Subsea Integrity Engineer  
Grant is an experienced chartered engineer and has worked in the field for 20 years. Grant has worked closely with major operators on a number of notable projects such as West Brae and Cygnus, and provides on-going integrity management support to Perenco in the North Sea, using his specialist integrity management skills.

Graham Wilson  
MEng (Hons) CEng MIMechE  
Lead Engineer  
Graham is a chartered mechanical engineer and has been a Jee engineer for 10 years. His expertise is in design including wall thickness, stability, fatigue and corrosion assessment. Graham has in-depth knowledge of integrity management, fishing interaction studies and verification and has worked on a number of major design projects.

Paul Marshall  
iEng MIMarEST MILM  
Marine and Subsea Specialist  
Paul is a marine and offshore engineer with a 25 year history in the marine and offshore construction industry. His expertise includes equipment, HSE planning and tools, personnel competencies, survey, FPSO systems, project management and marine and subsea project planning and execution.

Russell Thornton  
BSc MInst. MDT  
Lead Engineer  
Russell has spent over 30 years’ in the oil and gas industry and has extensive expertise in hardware design and subsea controls. In the past he has acted as a mentor for staff on a wide range of projects and has extensive knowledge of project, system and design roles.

Dem Demetriou  
BEng MSc DIC MBA FCMI  
Principal Engineer  
Dem is a specialist in project management, facilities engineering, materials engineering and general management and strategy. With more than 20 years’ experience in the oil and gas industry, including direct worldwide experience in FEED, detailed and conceptual design, procurement, topsides and construction.

Murray McKay  
BSc (Hons) ONC  
Subsea Consultant  
Murray has over 30 years’ experience of working in the subsea industry and has particular expertise in subsea production control systems, umbilicals and subsea surveillance. Murray brings his significant project experience and technical knowledge to the classroom, bringing the subject to life with real-life examples.

Graham Wilson  
MEng (Hons) CEng MIMechE  
Lead Engineer  
Graham is a chartered mechanical engineer and has been a Jee engineer for 10 years. His expertise is in design including wall thickness, stability, fatigue and corrosion assessment. Graham has in-depth knowledge of integrity management, fishing interaction studies and verification and has worked on a number of major design projects.

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Principal Engineer  
Dem is a specialist in project management, facilities engineering, materials engineering and general management and strategy. With more than 20 years’ experience in the oil and gas industry, including direct worldwide experience in FEED, detailed and conceptual design, procurement, topsides and construction.
Share your in-depth knowledge with the next generation

Become a Jee technical trainer

Knowing that people are benefitting from your expertise is a fantastic feeling. It means that your knowledge is being passed on, creating the next generation of industry experts. What’s more, when you become a Jee tutor, it’s possible to work flexibly and from any location, without the commitment of a full-time role.

If you’re an authority in the subsea area, we can give you the freedom to work on a flexible contract basis, sharing your specialist experience. As well as an in-depth understanding of our field, you’ll need to be professional and authoritative, with a passion to share knowledge. If you’ve got the confidence and credibility, there’s no limit to what you could achieve – or what others might discover.

Highlights of joining the Jee training team

✦ The opportunity to represent a prestigious brand whilst imparting your knowledge and giving back to the industry
✦ Receive a sustainable stream of work on a part-time or full-time basis, enabling you to combine engineering work with training
✦ Travel worldwide to familiar locations where you can keep in touch with old colleagues, friends or family
✦ Benefit from full training in course facilitation and Jee course delivery
✦ Be part of a team that is truly passionate about delivering great courses and working together to do so
✦ If you are considering retiring, you can work beyond retirement and keep your engineering brain active, whilst maintaining a positive work-life balance

To find out more please visit www.jee.co.uk/careers or email recruitment@jee.co.uk
Subsea engineering experts

Engineering services covering the whole life-of-field

FEASIBILITY STUDIES
CONCEPT DESIGN
DETAILED DESIGN
VERIFICATION
INSTALLATION
OPERATIONS READINESS
INTEGRITY MANAGEMENT
LIFETIME EXTENSION
DECOMMISSIONING

GLOBAL LEADER IN: PIGGING ASSURANCE | FISHING INTERACTION | PIPELINE CONNECTORS | SPAN MONITORING | FLOW-INDUCED VIBRATIONS
Global engineering experience

Delivering the best to our clients worldwide

Jee is the UK’s leading independent multi-discipline subsea engineering and training firm with extensive experience of integrated subsea projects across the whole life-of-field, from concept through to installation and decommissioning.

In the past 26 years we have built our global reputation on our technical expertise, our insistence on high standards, and the exceptional care we take on all projects.

Contact Jee

Engineering enquiries
Jee provides whole life-of-field engineering services to the oil, gas and renewables industries. To find out more about our services contact us on:

  t: +44 1732 371 371
  engineering@jee.co.uk
  www.jee.co.uk/oilandgas
  www.jee.co.uk/renewables

Course enquiries and bookings
Jee provides a variety of high calibre courses worldwide. To find out more about our courses contact us on:

  t: +44 1732 371 391
  courseadmin@jee.co.uk
  www.jee.co.uk/training

Information is correct at time of print, please note course content is subject to change.