Drilling Courses Overview

Pressure control and drilling equipment course offering
# Content

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## Pressure control equipment

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## Rig equipment

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We recognize that each person learns by a different style and technique. Our teaching model promotes a blended learning setting for students to absorb knowledge in an intuitive manner through interactive lectures, animated presentations, and practical hands-on exercises. Our focus is to prepare the participants to effectively operate, maintain, and troubleshoot the Cameron product lines.

**Introduction**

**Prerequisites**
A basic understanding of the oil & gas industry should be acquired before course attendance. We recommend an intermediate level of hydraulic and/or electrical theory knowledge to take full advantage of the Drilling Systems Training learning experience.

**Organization**
These instructor led courses encourage student interaction and feature short quizzes throughout each course to promote discussion points. Instructors are available at the beginning and end class to answer questions and/or review information. The comprehensive final exam requires a score of 70% to receive a certificate of completion.

**Registration**
For course bookings and inquiries, contact drillingtraining@slb.com.
Multiplex (MUX) Control System Overview

One-day course description

Overview
This course provides an overview of the Cameron multiplex (MUX) control system and the electrical, hydraulic, and communication pieces of the control system.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. drillers, assistant drillers, tool-pushers, and assistant tool-pushers).

Mark III Subsea BOP Control System — Electrical

Five-day course description

Overview
This course covers the Mark III subsea BOP control system, discussing how the control system functions and communicates from an electrical perspective.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical technicians and subsea engineers).

COURSE OUTLINE

- Welcome
- Drilling overview
- Controls overview
- Software

COURSE OUTLINE

- Pretest and welcome
- Drilling overview
- Mark III subsea BOP control system software
- Documentation
- Electrical symbols
- Detailed power flow
- Detailed signal
- Fluid flow overview
- Pressure balanced oil filled (PBOF) cables
- Subsea electronics module (SEM)
- Pressure transducer module and solenoid valve module (SVM)
- Riser control box (RCB)
- Surface electrical systems
- Emergency control systems
- Post-test and evaluations
Mark III Subsea BOP
Control System—Hydraulic
Five-day course description

Overview
This course covers the Mark III subsea BOP control system, discussing how the control system functions and communicates from a hydraulic perspective.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. hydraulic technicians and subsea engineers).

COURSE OUTLINE
- Pretest and welcome
- Drilling overview
- Mark III subsea BOP control system software
- Documentation
- Hydraulic symbols
- Valves and regulators
- Fluid flow overview
- Power and signal overview
- Surface hydraulic equipment
- Subsea equipment
- Preventative maintenance
- Emergency control systems
- Post-test and evaluations

Mark III Subsea BOP
Control System—Multi-Discipline
Five-day course description

Overview
This course covers the Mark III subsea BOP control system, discussing how the control system functions and communicates from both an electrical and hydraulic perspective.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. hydraulic technicians, electrical technicians, and subsea engineers).

COURSE OUTLINE
- Pretest and welcome
- Drilling overview
- Mark III subsea BOP control system software
- Documentation
- Valves and regulators
- Fluid flow overview
- Electrical symbols
- Power distribution
- Systems & communications
- Subsea electronics module (SEM)
- Surface & subsea hydraulic equipment
- Emergency systems
- Post-test and evaluations
Mark I and II Subsea BOP Control System—Electrical

Overview
This course covers the Mark I & II subsea BOP control system, discussing how the control system functions and communicates from an electrical perspective.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical technicians and subsea engineers).

COURSE OUTLINE
- Pretest and welcome
- Drilling overview
- Control panel operation
- Documentation
- Electrical symbols
- Power flow
- Signal flow
- Fluid flow overview
- Surface electrical equipment
- Subsea electronics module (SEM)
- Pressure balanced oil filled (PBOF) cables
- Emergency control systems
- Post-test and evaluations

Mark I and II Subsea BOP Control System—Hydraulic

Overview
This course covers the Mark I & II subsea BOP control systems, discussing how the control systems function and communicate from a hydraulic perspective.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. hydraulic technicians and subsea engineers).

COURSE OUTLINE
- Pretest and welcome
- Drilling overview
- Control panel operation
- Documentation
- Hydraulic symbols
- Valves and regulators
- Fluid flow overview
- Power and communications
- Pressure balanced oil filled (PBOF) cables
- Surface hydraulic equipment
- Subsea hydraulic equipment
- Emergency control systems
- General maintenance
- Post-test and evaluations
Mark I and II Subsea BOP Control System—Multi-Discipline

Overview
This course covers the Mark I & II subsea BOP control systems, discussing how the control systems function and communicate from an electric and hydraulic perspective.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. hydraulic technicians, electrical technicians, and subsea engineers).

COURSE OUTLINE
- Pretest and welcome
- Drilling overview
- Control panel operation
- Documentation
- Hydraulic symbols
- Valves and regulators
- Fluid flow overview
- Power and communications
- Surface controls
- Subsea electronics module (SEM)
- Subsea hydraulic equipment
- Emergency control systems
- General maintenance
- Post-test and evaluations

Land BOP Control Systems
Three-day course description

Overview
This course covers Cameron land systems (U BOP, FLS gate valve, and land BOP control systems), discussing equipment operations, testing, assembly, and disassembly procedures.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical, hydraulic, and mechanical technicians).

COURSE OUTLINE
- Pretest and welcome
- U BOP
- FFLS API 6A slab-style gate valve
- DL annular BOP
- Control system documentation
- Electrical symbols
- Hydraulic symbols
- Control unit overview
- Control panels
- Power and signal
- Maintenance, recommended practices, and troubleshooting
- Post-test and evaluations
Jack-up BOP Control Systems
Three-day course description

Overview
This course covers Cameron land systems (U BOP, FLS gate valve, and closing units), discussing equipment operations, testing, assembly, and disassembly procedures.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical, hydraulic, and mechanical technicians).

Direct Hydraulic BOP Control System
Four-day course description

Overview
This course covers the direct hydraulic modular BOP control system, discussing how the control system functions and communicates from both an electrical and hydraulic perspective.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operations of the equipment (i.e. hydraulic technicians, electrical technicians, and subsea engineers).
Cameron BOP Stacks
Three-day course description

**Overview**
This course covers Cameron BOP stacks, discussing equipment operations, testing, assembly, and disassembly procedures.

**Who should attend?**
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. mechanical technicians, hydraulic technicians, and subsea engineers).

**COURSE OUTLINE**
- Pretest and welcome
- BOP documentation
- U* onshore ram-type BOP
- FLS* API 6A slab-style gate valve for extreme sour and subsea applications
- DL* high-pressure annular BOP
- Subsea BOP stack introduction
- TL* offshore ram-type BOP operations
- TL offshore ram-type BOP ram change
- ST-Lock operation
- Ramlock operation
- TL offshore ram-type BOP maintenance
- EVO* compact, offshore ram-type BOP
- Ram change
- EVO BOP maintenance
- Ull* subsea ram-type BOP operations
- Wedge lock operation
- LMRP and wellhead connectors
- MCS gate valve
- Post-test and evaluations
U Ram-Type BOP—Mechanical
One-day course description

Overview
This course covers Cameron land systems (U BOP, FLS gate valve, and closing units), discussing equipment operations, testing, assembly, and disassembly procedures.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical, hydraulic, and mechanical technicians).

Townsend Ram-Type BOP—Mechanical
One-day course description

Overview
This course covers the Townsend product line, discussing equipment configuration, assembly, and maintenance procedures.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. hydraulic and mechanical technicians).

COURSE OUTLINE
- Pretest and welcome
- U BOP
- FLS API 6A slab-style gate valve
- DL annular BOP
- Control system documentation
- Electrical symbols
- Hydraulic symbols
- Control unit overview
- Control panels
- Power and signal
- Maintenance, recommended practices, and troubleshooting
- Post-test and evaluations
Choke & Kill Drilling Manifold—Mechanical
One-day course description

Overview
This mechanical course will focus on the key concepts and mechanics of the Cameron Choke & Kill Manifold and its equipment.

Students will gain an understanding of equipment operations, testing, and assembly procedures using Cameron best practices.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. hydraulic and mechanical technicians).

COURSE OUTLINE
- Pretest and welcome
- Introduction to manifolds
- Choke control panel
- Drilling chokes
- F-series gate valves
- Post-test and evaluations

LoadKing Riser System - Mechanical
One-day course description

Overview
The Riser Systems course will be designed around the Cameron Load King Riser system.

The course will provide introductory knowledge into the purpose and function of the riser system, API requirements for riser systems, assembly/disassembly procedures, as well as operation and maintenance.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. hydraulic and mechanical technicians).

COURSE OUTLINE
- Pretest and welcome
- Riser systems overview
- Telescoping joint and ring
- Diverter system
- Running the BOP
- Post-test and evaluations
Overview
This multi-disciplined training course presents in-depth knowledge on the configuration, mechanics, and controls of the Deep water MPD Integrated Solution.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical technicians, hydraulic technicians, and subsea engineers)

### COURSE OUTLINE

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Operator Course

Overview
This course presents the construction, overall system understanding, and purpose of the Cameron rig equipment deliverable. The content delves into how to safely and efficiently operate the equipment as well as perform the necessary maintenance and inspections.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment.

Simulator Course

Overview
This course focuses on the safe and effective operation of machinery in the product delivery. Instruction is centered around the XCOM simulator to recreate real life scenarios which will reduce operator error. This course can be also used as a refresher for personnel already working with the equipment.

Who should attend?
The Operator course is a prerequisite to this course so each student has a solid foundation of theoretical understanding on system functionality and machinery operations.

COURSE OUTLINE

Pretest and welcome
Describe the product, its usage and interactions
Locating useful and necessary information in the User Manual and documentation
Main systems of the product (mechanical, hydraulic, electric and control system)
Sub systems of the product (structural, hydraulic and control system)
Safety hazards related to the equipment
Normal start / stop procedures
Set-up preferences & automated sequences
Emergency procedures and systems
Safe and effective operation of equipment
Navigate through necessary screens on the HMI
Running normal sequences and operation modes
Know what to do when getting an alarm
Safety hazards during maintenance
Operator maintenance & inspections
Post-test
Basic OnTrack PLC 1.0 or 2.0

Overview
This course presents the Siemens PLC arrangement featured in the Cameron scope, with focus on arrangement and functionality. The participants are introduced to basic programming languages of the PLC with use of the Function Block Diagram (FBD) language. This is a practical based course with short theoretical presentations included. Work tasks will be performed on PLC training stations and handouts. This course is conducted in Kristiansand, Norway.

Who should attend?
Personnel who will perform the electrical maintenance and repair of the equipment as well as personnel designated to oversee and supervise electrical maintenance of the equipment. A fundamental electrical knowledge is recommended to attend this course. For the best learning experience, it is helpful for the participants’ rig to include the OnTrack remote help solution.

**Maximum capacity of 6 participants

Advanced OnTrack PLC 1.0 or 2.0

Overview
This practical-based course delivers comprehensive information on the Cameron software residing within a Siemens PLC. The content explores program navigation and signal tracing as well as troubleshooting practices. This course is conducted in Kristiansand, Norway.

Who should attend?
The Basic OnTrack PLC course is a prerequisite to this course so each student has a solid foundation of theoretical understanding on software functionality. The establishment of fundamental electrical knowledge is recommended before attending this course. For the best learning experience, it is helpful for the participants’ rig to include the OnTrack remote help solution.

**Maximum capacity of 6 participants

COURSE OUTLINE

- Pretest and welcome
- Introduction to PLC functional design
- Identify the different Siemens modules used in the OnTrack PLC rack
- Module communication
- Replacement and set-up of modules
- Common data types
- Simatic step 7 program structure/ TIA Portal (2.0)
- Common programming blocks functions
- Program lab exercises to control machines in a simple manner
- Locating specific signals in Cameron data blocks
- Basic PLC Troubleshooting
- Post-test
Electro-Technical

Overview
This course presents the construction, overall system understanding, and purpose of the Cameron rig equipment deliverable. The content delves into electrical system of the machines and troubleshooting techniques.

Who should attend?
Personnel that will perform electrical maintenance and repair of the equipment as well as personnel designated to oversee or supervise electrical maintenance of the equipment.
The establishment of electrical knowledge is recommended before attending this course as well as basic PLC knowledge.

Hydraulic-Mechanical Maintenance

Overview
Participants in the course shall gain knowledge about the construction, overall system understanding and purpose of the Cameron rig equipment scope.
During the course, the participants will gain an understanding of how to operate the equipment in order to perform maintenance, repairs, inspections and troubleshooting.

Who should attend?
Personnel that will perform hydraulic mechanical maintenance on the equipment or personnel designated to oversee or supervise maintenance of the equipment.
Before participating in this course, each student should have basic product knowledge as well as an understanding of hydraulics.
JiM 10 Advanced Practical Troubleshooting

Overview
This course delivers a detailed scope of troubleshooting at an advanced level in a blended learning approach. Through classroom lectures and practical exercises, the participants build insight on fault finding techniques to reduce downtime and determine which discipline is responsible for each job.

Who should attend?
Personnel that will troubleshoot the equipment and personnel designated to oversee or supervise repair of the JiM 10.

Before participating in this course, each student should have proficient knowledge and/or broad experience in working on the machine. The course assumes that the participant has advanced hydraulic, electric and mechanical knowledge.

**Maximum capacity of 4 participants

Advanced Electro-Technician Practical

Overview
This course focuses on the maintenance, troubleshooting, and electro-technical repairs on the JiM 10 models through theoretical and practical delivery.

Who should attend?
Electro Technical personnel that will maintain and troubleshoot the electrical equipment or personnel designated to oversee or supervise maintenance of the electrical equipment.

Before participating in this course, each student should have basic product knowledge as well as basic electro-technical knowledge.

**Maximum capacity of 4 participants

COURSE OUTLINE

- Pretest and welcome
- JiM 10 System Understanding
- Component interaction
- Testing power, speed, and direction
- Control of components
- Normal modes of operation
- Locating root problems
- Reviewing known issues
- Post-test
Advanced Hyd/Mech Technician Practical

Three-day course description

Overview
This course focuses on the maintenance, troubleshooting, and hyd/mech technical repairs on the JiM 10 models through theoretical and practical delivery. The course will encompass a thorough review of the most important mechanical and hydraulic components structure and function, interaction within the mechanical and hydraulic system as well as the symbols and flow diagrams in accordance to the ISO 1219-1 standard.

Who should attend?
Personnel that will maintain and troubleshoot the equipment and personnel designated to oversee or supervise maintenance of the equipment.
Before participating in this course, each student should have basic product knowledge as well as basic hydraulic and mechanical knowledge.
**Maximum capacity of 4 participants

COURSE OUTLINE
- Pretest and welcome
- Basic hydraulic and mechanical principles
- Identifying components and their functionality
- Hydraulic and mechanical system understanding
- Hydraulic and mechanical component interactions
- Controlling power, speed, and direction
- Interacting with the drive ring, make up tong, and brake out tong
- Post-test

On-site Practical Course

Overview
This purely hands-on course is intended for maintenance personnel on installations in operation. It provides useful information regarding safe and effective operation and maintenance procedures regarding safe and effective operation and maintenance procedures.
A skilled instructor or service engineer visits the rig and spends time with the maintenance personnel during operation.
This course can be either electro or hydraulic/mechanic focused and can be also used as a refresher for personnel already working with the equipment.

Who should attend?
Personnel that will maintain the equipment or personnel designated to oversee or supervise maintenance of the equipment.
A basic product and discipline knowledge is recommended before attending this course.

COURSE OUTLINE
- Pretest and welcome
- Equipment familiarization prior to entering rig operation
- Define various modes, interlocks, alarms, responses
- HSE Procedures
- Learn critical and rarely faced situations (manual modes, BOP disconnect, shut down, kick)
- Maximize equipment performance
- PLC software verification
- Post-test
Basic ServiceLab
One-day course description

Overview
This practical course presents in-depth knowledge on how to use ServiceLab for monitoring and logging data from a wide range of Cameron equipment, and for troubleshooting purposes.

Who should attend?
The Basic OnTrack PLC course is a prerequisite to this course so each student has a solid foundation of theoretical understanding on software functionality. The establishment of fundamental electrical knowledge is recommended before attending this course.

For the best learning experience, it is helpful for the participants’ rig to include the OnTrack remote help solution.

Maximum capacity of 6 participants

COURSE OUTLINE

- Pretest and welcome
- Signal location
- Setting up a simple ServiceLab log
- Utilize different trigger tools for troubleshooting purposes
- Saving and opening logs
- Post-test

eLearning Solutions
Web based training

Overview
Cameron E-Learning modules are designed to give the participant a general introduction into the machinery or process. Modules explain how the machine or process functions on a basic level. Interactive quizzes throughout the modules will engage the user and strengthen the learner’s knowledge.

Advantages
Self-paced - Participants can take modules when it suits them
Flexible - Participants can learn wherever they wish.
Pedagogic - Courses are made with a pedagogic plan with the end user always in perspective.
Interactive - Interactivity as well as 3D models, images and video content are used to engage the participant.

COURSE MODULES

- X-COM™/ OnTrack*
- Top Drive
- SmartRacker*
- JiM 10 Hydraulic Roughneck
- JiM 20 Hydraulic Roughneck
- Drawworks
- Catwalk Machine
- HPU (Hydraulic Power Unit)
- BOP Handling Equipment for Jack-ups
- Basic Hydraulics
DirectDrive* 750 Ton Top Drive

Two-day course description

**Overview**
This course focuses on the operation and configuration of the Cameron TD 750 top drive.

**Who should attend?**
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical technicians, hydraulic technicians, drillers, assistant drillers, tool-pushers, and assistant tool-pushers).

**COURSE OUTLINE**
- Pretest and welcome
- Top drive overview
- Power and communications
- Hydraulic fluid flow
- Maintenance
- Operation system control
- Software
- Post-test and evaluations
LDW Gear Driven Drawworks
Two-day course description

Overview
This course focuses on the operation and configuration of the LDW® AC gear-driven drawworks.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical technicians, hydraulic technicians, drillers, assistant drillers, tool-pushers, and assistant tool-pushers).

COURSE OUTLINE

- Pretest and welcome
- Overview
- Major assemblies
- Lubrication system
- System control
- Braking system
- Auxiliary braking system
- Maintenance
- Post-test and evaluations

LDW Chain Driven Drawworks
Two-day course description

Overview
This course presents in-depth knowledge on the configuration, mechanics, and controls of the heavy duty chain driven LDW 3000® and LDW 4500® drawworks models.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical technicians, hydraulic technicians, drillers, assistant drillers, tool-pushers, and assistant tool-pushers).

COURSE OUTLINE

- Pretest and welcome
- Overview
- Transmission
- Braking Systems
- Lubrication system
- Operation
- Maintenance
- Post-test and evaluations
Mud Pumps
Two-day course description

Overview
This course focuses on the operation and configuration of the AC motor driven W-Series* offshore and WH-Series* onshore mud pumps.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical technicians, hydraulic technicians, drillers, assistant drillers, tool-pushers, and assistant tool-pushers).

Digital Drilling Control System
Four-day course description

Overview
This course focuses on the operation and configuration of the Cameron digital drilling control system (DDCS) and driller’s chair.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. drillers, assistant drillers, tool-pushers, and assistant tool-pushers).
Rotary Table
One-day course description

Overview
This course focuses on the operation and configuration of the AC motor driven LRT Rotary Table series. It gives students an in-depth view of the Rotary Table gear set and lubrication system in addition to common maintenance procedures.

Who should attend?
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e., electrical technicians, hydraulic technicians, drillers, assistant drillers, tool-pushers, and assistant tool-pushers).

COURSE OUTLINE
- Pretest and welcome
- Overview
- Arrangement and functionality
- Lubrication System
- Operations
- Maintenance
- Post-test and evaluations