CAMERON

# Drilling Courses Overview

TECHNOLOGY

The below prerequisites and course organization description apply to all of the courses included within the Pressure Control and Drilling Equipment sections of this brochure, with the exception of the Multiplex (MUX) Control System Overview One-Day Course, which does not involve any pre- or post-testing.

## Prerequisites

Before participating in this course, each student should have basic product knowledge.

## Organization

This is an instructor-led (lecture-based) course, in which discussions are highly encouraged. Short quizzes are given throughout the course as well as at the end of each module. Instructors are available at the beginning and end of each class to answer questions and/or review information. In order to receive credit for satisfactorily completing this course, students are required to pass the comprehensive final exam with a score of at least 70%. Certificates of Completion are awarded to all students who successfully receive credit for the course.

# PRESSURE CONTROL EQUIPMENT

# Cameron's BOP Stacks

## Four-Day Course Description

## Overview

This course covers Cameron's 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

- Pre-Test and Welcome
- BOP Documentation
- U™ BOP
- FLS™ Gate Valve
- DL Annular
- Subsea BOP Stack Introduction
- TL™ BOP Operations
- TL Ram Change
- ST-Lock Operation
- Ramlock Operation
- TL BOP Maintenance
- EVO® BOP
- Ram Change
- EVO Maintenance
- UII™ Operations
- Wedge Lock Operation
- LMRP and Wellhead Connectors
- MCS Gate Valve
- Post-Test and Evaluations

# Multiplex (MUX) Control System Overview

One-Day Course Description

## Overview

This course provides an overview of Cameron's 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, toolpushers, and assistant toolpushers).

## COURSE OUTLINE

- Welcome
- Drilling Overview
- Controls Overview
- Software

# Mark III Multiplex (MUX) Control System – Electrical

Five-Day Course Description

## Overview

This course covers Cameron's Mark III multiplex (MUX) 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

- Pre-Test and Welcome
- Drilling Overview
- Mark III 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 Multiplex (MUX) Control System – Hydraulic

Five-Day Course Description

## Overview

This course covers Cameron's Mark III multiplex (MUX) 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

- Pre-Test and Welcome
- Drilling Overview
- Mark III 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 I & II Multiplex (MUX) Control System – Electrical

Five-Day Course Description

## Overview

This course covers Cameron's Mark I & II multiplex (MUX) 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

- Pre-Test 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 & II Multiplex (MUX) Control System – Hydraulic

Five-Day Course Description

## Overview

This course covers Cameron's Mark I & II multiplex (MUX) control systems, discussing how the control systems function and communicate from a hydraulic perspective.

## Who Should Attend?

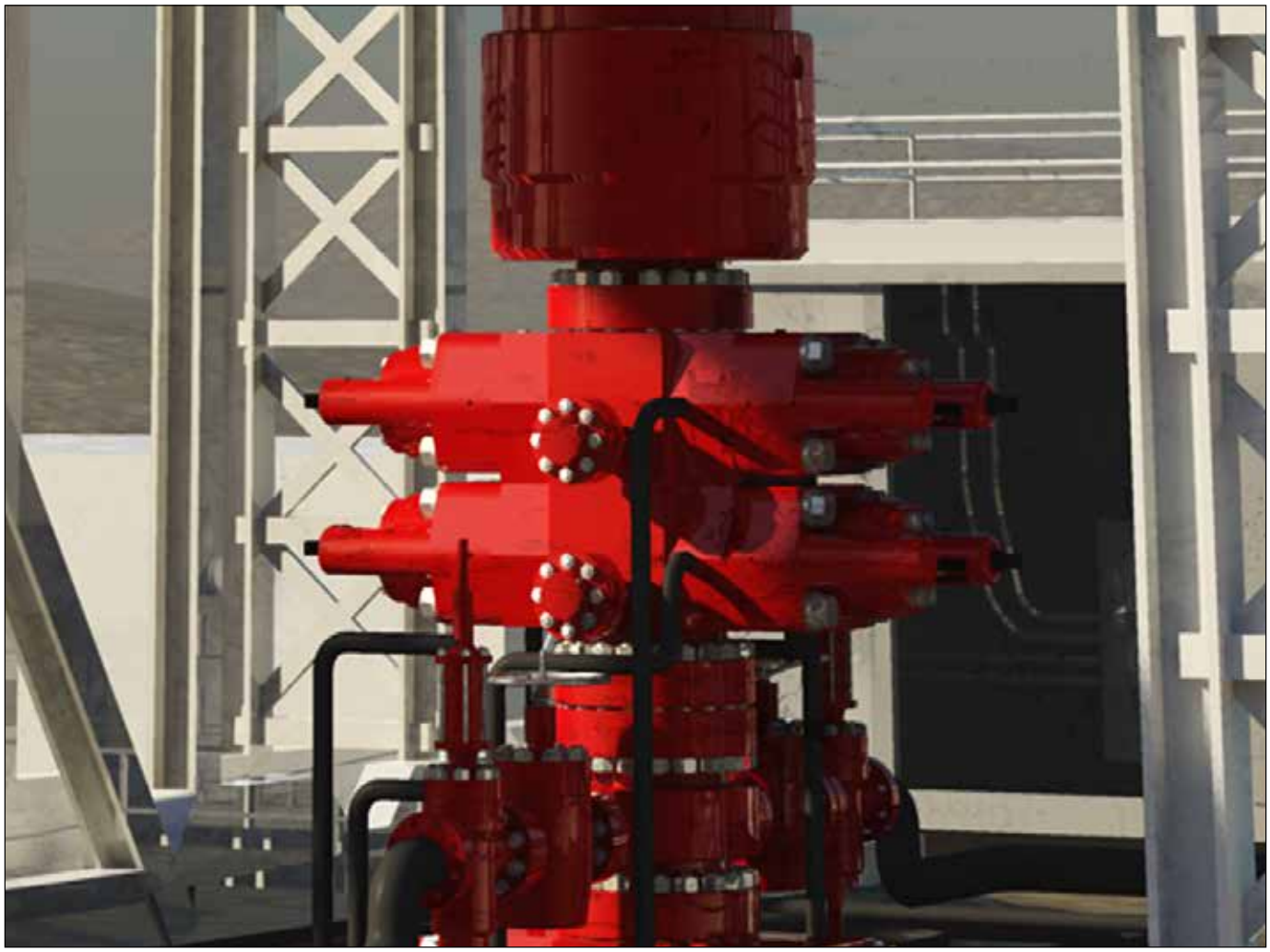
Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. hydraulic technicians and subsea engineers).

## COURSE OUTLINE

- Pre-Test 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

# U BOP – Mechanical

One-Day Course Description



## Overview

This course covers Cameron's U BOP, D and DL annular BOPs, and FLS gate valve, 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. hydraulic and mechanical technicians).

## COURSE OUTLINE

- Pre-Test and Welcome
- U BOP
- FLS Gate Valve
- Documentation
- DL Annular
- Post-Test and Evaluations

# Land Systems

## Three-Day Course Description

## Overview

This course covers Cameron's land systems (U BOP, FLS gate valve, and land 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).

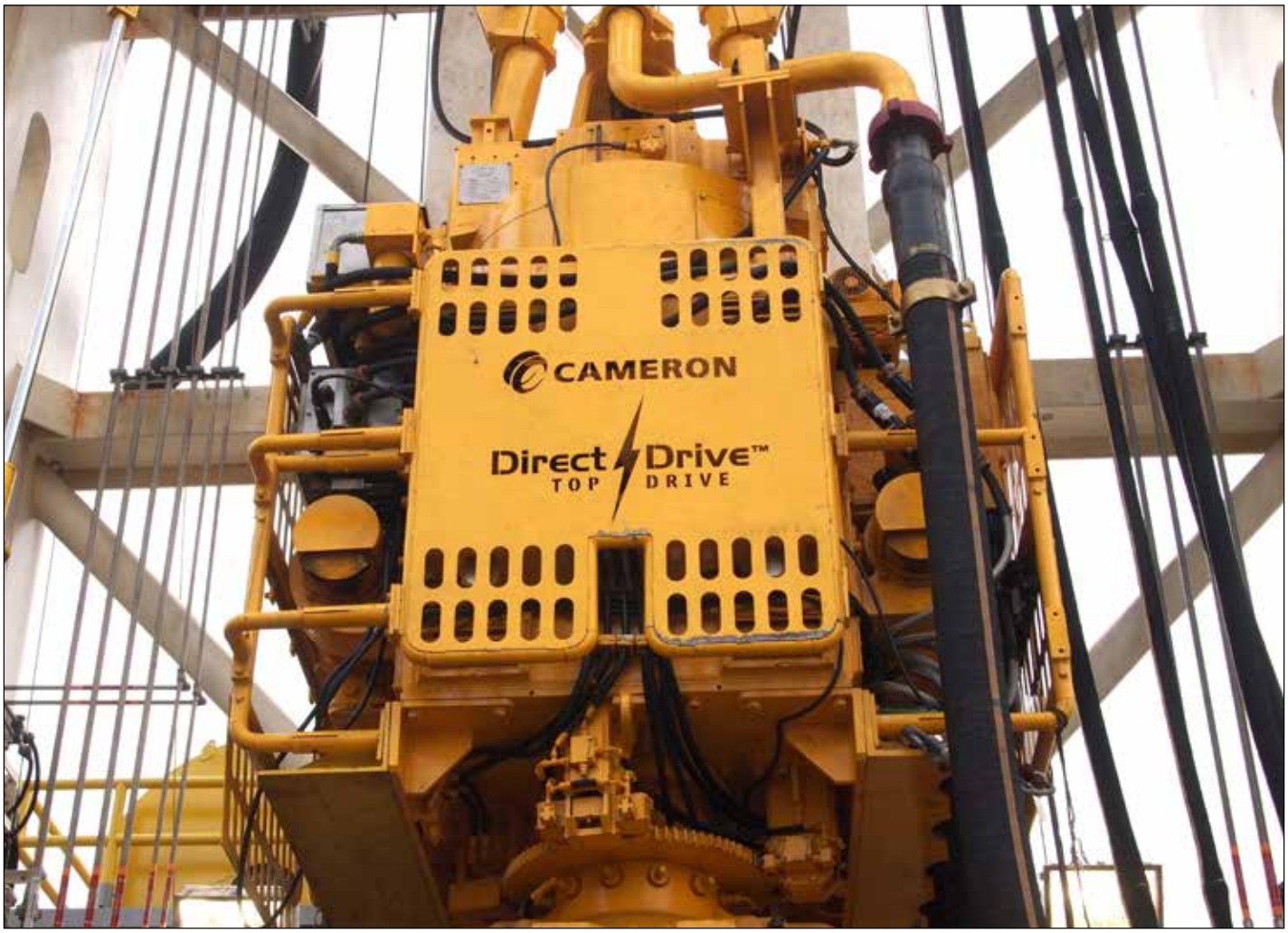
## COURSE OUTLINE

- Pre-Test and Welcome
- U BOP
- FLS Gate Valve
- DL Annular
- Control System Documentation
- Electrical Symbols
- Hydraulic Symbols
- Control Unit Overview
- Control Panels
- Power and Signal
- Maintenance, Recommended Practices, and Troubleshooting
- Post-Test and Evaluations

# DRILLING EQUIPMENT

# 750-ton Top Drive

## Two-Day Course Description




## Overview

This course focuses on the operation and configuration of Cameron's 750-ton 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, toolpushers, and assistant toolpushers).

### COURSE OUTLINE

- Pre-Test and Welcome
- Top Drive Overview
- Power and Communications
- Hydraulic Fluid Flow
- Maintenance
- Operation System Control
- Software
- Post-Test and Evaluations

# Digital Drilling Control System

Four-Day Course Description

## Overview

This course focuses on the operation and configuration of Cameron's 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, toolpushers, and assistant toolpushers).

## COURSE OUTLINE

- Pre-Test and Welcome
- System Configuration
- Initial Screens
- Drill Screen
- Driller's Control Console (DCC) Screen
- Top Drive Screen
- Trending Screen
- Alarms and Faults
- Calibration Screen
- Rig Communications
- Post-Test and Evaluations

# Drawworks

## Two-Day Course Description


### Overview

This course focuses on the operation and configuration of the AC motor driven LEWCO™ 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, toolpushers, and assistant toolpushers).

### COURSE OUTLINE

- Pre-Test and Welcome
- Overview
- Major Assemblies
- Lubrication System
- System Control
- Braking System
- Auxiliary Braking System
- Maintenance
- Post-Test and Evaluations

# Mud Pump

## Two-Day Course Description

### Overview

This course focuses on the operation and configuration of the AC motor driven LEWCO™ mud pump.

### 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, toolpushers, and assistant toolpushers).

### COURSE OUTLINE

- Pre-Test and Welcome
- Overview
- Power End
- Fluid End
- Lubrication System
- Software
- Maintenance
- Post-Test and Evaluations

# MV 3000 AC Drive

Three-Day Course Description


## Overview

This course explores the details of Cameron's MV 3000 AC Drive by providing students with an in-depth view of the drive components, control modes, and system interfacing.

## Who Should Attend?

Personnel who will operate the equipment or personnel designated to oversee operation of the equipment (i.e. electrical technicians, drillers, and assistant drillers).

## COURSE OUTLINE

- Pre-Test and Welcome
- AC Motor and Drive Theory
- Drive Components
- System Interfacing
- Control Modes
- System Commissioning
- Control Connections and Flags
- Parameters
- Drive Programming
- Post-Test and Evaluations

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Learn more about Cameron's drilling courses at:
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**HSE Policy Statement**
**At Cameron, we are committed ethically, financially and personally to a working environment where no one gets hurt and nothing gets harmed.**