



## Principles of Power Systems in Oil and Gas Applications - Part 2

### MODULE

#### About the Skill Module

This skill module is the second of two skill modules intended for those with little or no background in electrical theory or the practical application of those principles to power systems in typical oil and gas or industrial facilities. We strongly encourage taking Principles of Power Systems in Oil and Gas Applications Core (Part 1) prior to this skill module.

The skill module avoids the typical academic approach and instead focuses on explaining complex concepts using easy-to-understand analogies. These analogies are then immediately extended to describe how the concepts are used in the design of industrial power systems. Once the basic equipment principles are described, examples are given of how they are applied to affect the safety, reliability, efficiency, and cost of power systems.

By the end of these two modules, the learner should be able to interpret the basic elements of simple one-line diagrams, identify the equipment voltage, power, and current ratings, relate them to the physical equipment installed and understand facility power consumption and energy cost factors. This skill module covers the following topics:

- Three-phase Power Systems and Harmonics
- Conductor Design
- Overview of Industrial Power Distribution Systems
- Grounding (Earthing) and Bonding



[See demo online learning module](#)

### **Target Audience**

Facilities and Project Engineers as well as newly graduated Electrical, Controls and Instrument Engineers (0-5 years) with a need to improve basic understanding of instrumentation and control systems within oil and gas facilities.

### **You Will Learn**

Participants will learn how to:

- Describe 3-phase power systems, their characteristics, applications, and advantages
- List the basic equations used for DC, AC single phase, and 3-phase power systems
- Describe Harmonics, their sources, and their impact on power systems
- Explain the basics of conductor construction, selection, and sizing
- List the factors influencing system voltage selection and the implications
- Describe the materials used and basic properties of insulating materials used in cable systems

- Describe the differences between aluminum and copper conductors, and the advantages/disadvantages of each
- Describe how conductor cross-sectional area is measured around the world and its relation to cable sizing
- Summarize the relationship between conductor current carrying capacity, cross-sectional area, insulation design, ambient conditions, and installation methods
- Explain how heat management is related to electrical system design and influences equipment design such as conductors, transformers, motors, and generators
- Describe the causes and issues associated with voltage drop, and the typical design limits used
- Describe the basic components and function of a power transformer
- Describe the role of power distribution equipment, typical construction, and common types used in industrial power systems
- Describe a typical power distribution system in an oil and gas facility, the equipment used, and the purpose of each
- Interpret a single-line diagram
- Define Reliability and Availability targets, and the impact on power system design
- Describe the basic purpose of grounding and bonding systems
- Differentiate between an equipment grounding conductor and a grounded (neutral) conductor
- Describe the hazards associated with Touch and Step potential and how bonding and grounding reduce the risks
- Describe the components used in grounding and bonding systems and their basic characteristics
- Describe the performance measures for grounding and bonding systems
- Describe the grounding and bonding issues associated with control systems
- Explain how independent bonding and grounding of separate systems are connected

## Product Details

Categories: Upstream

Disciplines: Instrumentation, Controls & Electrical

Levels: Basic

Product Type: Individual Skill Module

Format: On-Demand

Duration: 2.75 hours (approx.)

**\$395.00**