



Principles of Power Systems in Oil and Gas Applications - Part 1

MODULE

About the Skill Module

This skill module is the first 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 both skill modules.

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:

- Basics of Electricity
- Generating Electricity



[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 electricity and its role in energy
- Explain the general structure of a power system
- Describe the roles and materials used for conductors, insulators, and semiconductors
- Describe how magnetic fields and electric fields are related
- Define the common electrical properties of Voltage, Current, Resistance, and Power
- Describe how these properties impact electrical equipment design such as conductors, transformers, motors, and generators

- Describe a basic AC and DC electrical circuit and its components
- Use Ohm's Watt's and Kirchhoff's Laws to solve basic electrical problems
- Describe how basic series and parallel circuits behave and how they are wired
- List the ways in which Voltage can be produced
- Describe how static electricity is generated and the hazards associated
- Explain equipment power ratings for power sources and consumers
- Define power system efficiency and its effects
- Describe the power requirements of typical power source and distribution equipment
- Define power usage and demand and their impact on electricity costs
- Differentiate DC and AC power systems, and their typical applications
- Describe how AC power is generated using rotating equipment
- Describe the basic characteristics of AC power including sine waves, frequency, and RMS values
- Describe the function of Inductors, Capacitors and their impact on Reactance and Impedance
- Describe Power Factor, its causes, and impact on power system
- List the basic equations used in DC and AC circuits

Product Details

Categories: Upstream

Disciplines: Instrumentation, Controls & Electrical

Levels: Basic

Product Type: Individual Skill Module

Format: On-Demand

Duration: 3.5 hours (approx.)

\$395.00