



## ADVANCED DIPLOMA OF ELECTRICAL AND INSTRUMENTATION (E&I) ENGINEERING FOR OIL AND GAS FACILITIES

### MODULE DETAILS

### MODULE 4: Power Distribution

Nominal duration: 5 weeks (40 hours total time commitment)

This time commitment includes the preparation reading, attendance at each webinar (1 hour plus 15-30 minutes for discussion), and the time necessary to complete the assignments and further study.

### MODULE PURPOSE

This is a practical module in power distribution, focusing on medium voltage (1kV-36kV) power considerations, switchgear, and network studies. It provides technical know-how in these areas that are typically not covered by university or college programs.

### PRE-REQUISITE MODULES/UNIT(S)

Module 1: Fundamentals of Electrical Engineering

### ASSESSMENT STRATEGY

To evaluate the achievement of the learning outcomes; written assignments, group projects and practical exercises are set.

### SUMMARY OF LEARNING OUTCOMES

1. Explain the fundamentals behind power distribution [4.1]
2. Discuss distribution system planning and the sizing of equipment [4.2]
3. Perform short circuit calculations [4.3]
4. Discuss in-plant generation and associated requirements [4.4]
5. Describe the use of diesel engines for standby power [4.5]



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**Learning Outcome 1**                      **Explain the fundamentals behind power distribution**                      **[4.1]**

- Assessment Criteria**
1. Describe the characteristics and components of distribution systems [4.1.1]
  2. Explain the choice of voltage levels in distribution systems [4.1.2]
  3. Describe typical distribution system configurations [4.1.3]
  4. Discuss requirements and practices in distribution for the O&G industry [4.1.4]

**Learning Outcome 2**                      **Discuss distribution system planning and the sizing of equipment**                      **[4.2]**

- Assessment Criteria**
1. Discuss the planning of power distribution systems [4.2.1]
  2. Discuss demand assessment and other studies related to equipment sizing [4.2.2]
  3. Describe the factors involved in arriving at cable sizes [4.2.3]

**Learning Outcome 3**                      **Perform short circuit calculations**                      **[4.3]**

- Assessment Criteria**
1. Describe the fault types and their characteristics [4.3.1]
  2. Perform fault calculations in simple systems [4.3.2]
  3. Discuss the use of fault current calculations [4.3.3]

**Learning Outcome 4**                      **Discuss in-plant generation and requirements**                      **[4.4]**

- Assessment Criteria**
1. Discuss the need for, and types of in-plant generation [4.4.1]
  2. Discuss the integration of emergency sources with plant distribution [4.4.2]
  3. Discuss generation practices in the O&G industry [4.4.3]



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<b>Learning Outcome 5</b>	<b>Describe in-plant generation and associated requirements</b> [4.5]
<b>Assessment Criteria</b>	<ol style="list-style-type: none"><li>1. Discuss options for emergency power generation in the O&amp;G industry [4.5.1]</li><li>2. Explain the basics of diesel engine theory and ratings [4.5.2]</li><li>3. Describe performance enhancement measures for diesel engines [4.5.3]</li><li>4. Describe typical engine packages for diesel-powered generation [4.5.4]</li></ol>

**Delivery Mode**

A combination of asynchronous and synchronous e-learning delivery comprising a judicious mix of interactive online web conferencing, simulation (virtual labs) software, remote online labs, online videos, Power Points, notes, reading and study materials (in pdf, html and word format) accessed through the Moodle Learning Management System (LMS).