

ADVANCED DIPLOMA OF PLANT ENGINEERING

<p>MODULE DETAILS</p>	<p>Module 3: Electrical Equipment and Technology</p> <p>Nominal duration: 8 weeks (64 hours total time commitment)</p> <p>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.</p>
<p>MODULE PURPOSE</p>	<p>The purpose of this module is to enable participants to understand the essentials of power generation, the principles of operation of prime movers and variable speed drives, as well as the design aspects of power transmission, distribution and protection systems.</p>
<p>PRE-REQUISITE MODULE(S)</p>	<p>Module 2: Facility Management</p>
<p>ASSESSMENT STRATEGY / CONDITIONS OF ASSESSMENT</p>	<p>To evaluate the achievement of the learning outcomes; written assignments, group projects and practical exercises are set. The Training and Assessment Matrix (TAM) documents the assessment criteria included in these assessments, based on the learning outcomes. The Training and Assessment Strategy (TAS) documents the overall training strategy for this Advanced Diploma course. The conditions of assessment are outlined in the Assessment Guidelines, TAM and TAS. Written assignments, group projects and practical exercises are required to meet assessment criteria outlined in the Assessment Guidelines, TAM and TAS.</p>
<p>SUMMARY OF LEARNING OUTCOMES</p>	<ol style="list-style-type: none"> 1. Examine and discuss the fundamentals of ac power, dc power and power generation 2. Examine and discuss the attributes of single phase power, three-phase power and prime movers 3. Assess the application, operational parameters and maintenance requirements of Variable Speed Drives 4. Examine and discuss the application, construction and programming of Programmable Logic Controllers 5. Describe the salient characteristics of power

ADVANCED DIPLOMA OF PLANT ENGINEERING

	transmission and distribution systems 6. Outline the design requirements for electrical protection and earthing systems 7. Discuss the requirements for explosion protected equipment and lightning protection 8. Outline the procedures for troubleshooting electrical systems	
Learning Outcome 1	Examine and discuss the fundamentals of ac power, dc power and power generation	
Assessment Criteria	1.1	Discuss the basics and application of ac and dc power
	1.2	Examine power generation methods
Learning Outcome 2	Examine and discuss the attributes of electrical power, electric motors, and prime movers	
Assessment Criteria	2.1	Outline the fundamentals and application of single- and three phase electric power
	2.2	Describe the (i) operating principles, (ii) maintenance and (iii) selection of single- and three phase ac motors
	2.3	Discuss the (i) selection criteria, (ii) operational parameters and (iii) maintenance requirements for prime movers
Learning Outcome 3	Assess the salient attributes of Variable Speed Drives	
Assessment Criteria	3.1	Examine and discuss VSDs in terms of (i) components, (ii) operating parameters, (iii) energy conversion, (iv) constant vs. variable speed, (v) application, and (vi) maintenance
	3.2	Perform VSD efficiency calculations
Learning Outcome 4	Examine and discuss the attributes of electrical power,	

ADVANCED DIPLOMA OF PLANT ENGINEERING

	electric motors, and prime movers	
Assessment Criteria	4.1	Examine and discuss PLCs in terms of (i) concepts, (ii) hardware, and (iii) their role in automation
	4.2	Develop a basic PLC ladder program
Learning Outcome 5	Examine the salient characteristics of power transmission and distribution systems	
Assessment Criteria	5.1	Describe the technology and components related to power transmission
	5.2	Discuss the construction, design and operation of power distribution systems
	5.3	Examine the concept of Power Factor and the improvement thereof
Learning Outcome 6	Outline the design requirements for electrical protection and earthing systems	
Assessment Criteria	6.1	Discuss the design and maintenance of protection systems
	6.2	Describe the purpose and methods of earthing protection
Learning Outcome 7	Examine and discuss protection against explosions and lightning	
Assessment Criteria	7.1	Discuss the identification and classification of hazardous areas
	7.2	Describe the protection concepts and techniques related to hazardous areas
	7.3	Outline the requirements, standards and codes of practice related to hazardous areas
	7.4	Examine the risks related to lightning and lightning protection
	7.5	Describe the design, installation and operation of a lightning protection system

ADVANCED DIPLOMA OF PLANT ENGINEERING

Learning Outcome 8	Outline the procedures for troubleshooting electrical systems	
Assessment Criteria	8.1	Identify the various types of electrical systems
	8.2	Select the appropriate fault-finding technique
	8.3	Describe typical electrical system faults
	8.4	Discuss the procedure for identifying failures
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, PowerPoint slides, notes, reading and study materials (in PDF, HTML and Word format) accessed through the Moodle Learning Management System (LMS).		