ADVANCED DIPLOMA OF
MECHANICAL ENGINEERING TECHNOLOGY

MODULE DETAILS	**Module 12: Pumps and Compressors** Nominal duration: 6 weeks (72 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 module focuses on the fundamentals. Students have an opportunity to discuss pump/compressor construction, design applications, operations, maintenance and management issues and be provided with the most up-to-date information and best practice in dealing with the subject. They will develop the skills and ability to recognize and solve simple pump/compressor problems in a structured and confident manner.
PRE-REQUISITE MODULES/UNIT(S)	NONE
ASSESSMENT STRATEGY	To evaluate the achievement of the learning outcomes; written assignments, group projects and practical exercises are set.
SUMMARY OF LEARNING OUTCOMES	1. Examine and discuss centrifugal pumps 2. Describe the operational characteristics of pumps 3. Discuss methods for appropriate pump selection 4. Examine and discuss pump control, commissioning and performance measurement 5. Examine and discuss the construction and operation of reciprocating compressors 6. Examine and discuss the construction and operation of centrifugal compressors
Learning Outcome 1	**Examine and discuss centrifugal pumps**
Assessment criteria	1.1 Examine and discuss centrifugal pump construction 1.2 Describe the axial and radial forces acting on a pump 1.3 Discuss pump-related hardware

Learning Outcome 2	**Describe the operational characteristics of pumps**	
Assessment criteria	2.1	Describe the hydraulic properties of pumps
	2.2	Explain the use of QH and PQ curves
	2.3	Discuss the effect of speed changes on the pump curves
Learning Outcome 3	**Discuss methods for appropriate pump specification and selection**	
Assessment criteria	3.1	Outline the procedure for performing a system analysis
	3.2	Interpret pump data sheets
	3.3	Outline the steps involved in bid requests, reviews and analysis
	3.4	Discuss general pump selection criteria
	3.5	Discuss the pump material selection based on process fluid parameters
	3.6	Discuss the selection of an appropriate pump drive
Learning Outcome 4	**Examine and discuss pump control, commissioning and performance measurement**	
Assessment criteria	4.1	Discuss pump controls and instruments, including safety and volume controls
	4.2	Discuss issues related to pump installation
	4.3	Outline procedures for pump testing and commissioning
	4.4	Explain how condition monitoring is performed
	4.5	Discuss the optimization of pump performance

Learning Outcome 5	**Examine and discuss the construction and operation of reciprocating compressors**	
Assessment criteria	5.1	Outline compressor definitions
	5.2	Discuss the principles and mechanics of reciprocating compressor operation
	5.3	Identify the parts of a reciprocating compressor
	5.4	Describe the maintenance and performance of reciprocating compressors
	5.5	Discuss the mechanical forces involved in a reciprocating compressor
Learning Outcome 6	**Examine and discuss the construction and operation of centrifugal compressors**	
Assessment criteria	6.1	Discuss the principles of operation of centrifugal compressors
	6.2	Examine and discuss centrifugal compressors in terms of (a) their construction, (b) performance, (c) characteristics and (d) controls

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).