



ADVANCED DIPLOMA OF MECHANICAL ENGINEERING TECHNOLOGY

MODULE DETAILS

Module 20: Measurement and Control Systems

Nominal duration: 5 weeks (60 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

Over the last few decades, dependency on instrumentation equipment has increased tenfold. All of the major industries (mining, oil and gas, chemical plants, etc.) have benefited from this technology, with noticeable improvements in quality, production and recordkeeping. Unfortunately, due to the rapid expansion of instrumentation technology, many people have started to review this as a grey area, understandable only to the select few. This module aims to demystify the field of instrumentation, and to eliminate a lot of the myths that are out there. Furthermore, it aims to promote closer synergy between non-instrumentation and instrumentation personnel, which can only be to the benefit of each and every operation. It is not an in-depth module, but one covering a wide range of topics in Industrial Automation to give you an overview and practical understanding of the key concepts. Nevertheless, a significant amount of material is covered, with the intent to provide an overview and practical understanding of the concepts and equipment, and how they all converge to create an efficient and safe control environment in instrumentation, process control, SCADA, PLCs and control valves.

PRE-REQUISITE MODULES/UNIT(S)

Module 19: Industrial Automation

ASSESSMENT STRATEGY

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

SUMMARY OF LEARNING OUTCOMES

1. Describe the fundamentals of process instrumentation
2. Apply the basics of loop tuning
3. Perform control valve sizing and selection



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Learning Outcome 1	Describe the fundamentals of process instrumentation
Assessment criteria	<ul style="list-style-type: none">1.1 Describe the methods used for measuring (a) pressure, (b) level, (c) temperature and (d) flow1.2 Describe the process to convert sensor information to displayed SCADA values1.3 Describe the effects of filtering1.4 Describe the aliasing problem
Learning Outcome 2	Apply the basics of loop tuning
Assessment criteria	<ul style="list-style-type: none">2.1 Describe the fundamentals of loop tuning2.2 Tune a loop using the Ziegler Nichols methods:2.3 Describe the method used for tuning valves2.4 Outline good practice for loop tuning
Learning Outcome 3	Perform control valve sizing and selection
Assessment criteria	<ul style="list-style-type: none">3.1 Compare the different types of control valves on the basis of their characteristics3.2 Select control valves for given applications3.3 Describe the issues related to high pressure drop applications3.4 Perform control valve sizing, both (a) manually and (b) with software3.5 Describe the various control valve actuators3.6 Describe the various control valve positioners3.7 Discuss the materials used for control valve construction3.8 Discuss control valve installation and maintenance issues

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).