



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

MODULE DETAILS

MODULE 15: Process Control Basics

Nominal duration: 4 weeks (32 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 covers the essentials of process control as well as tools to optimize the operation of plants and processes, including the ability to perform effective loop tuning. The module is aimed at engineers and technicians who wish to have a clear, practical understanding of the essentials of process control and loop tuning, as well as how to optimize the operation of their particular plant or process.

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. Explain the basics of process control [15.1]
2. Examine and discuss issues related to stability, algorithms and cascade control [15.2]
3. Examine and discuss controller action, feedforward control and long dead time [15.3]
4. Perform loop tuning [15.4]



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Learning Outcome 1	Explain the basics of process control	[15.1]
Assessment Criteria	1. Outline the reasons for process control	[15.1.1]
	2. Define (a) PV, (b) SP, (c) CV, (d) Gain, (e) Lag, and (f) DT	[15.1.2]
	3. Outline the types of feedback control	[15.1.3]
	4. Explain set point tracking	[15.1.4]
	5. Explain Proportional (Gain) action in PID control	[15.1.5]
Learning Outcome 2	Examine and discuss issues related to stability, algorithms and cascade control	[15.2]
Assessment Criteria	1. Examine and discuss control loop stability	[15.2.1]
	2. Compare ideal and real control algorithms	[15.2.2]
	3. Describe cascade control	[15.2.3]
	4. Explain Integral (Reset) action in PID control	[15.2.4]
Learning Outcome 3	Examine and discuss controller action, feedforward control and long dead time	[15.3]
Assessment Criteria	1. Distinguish between direct and indirect action of a controller	[15.3.1]
	2. Explain Derivative (Reset) action of a controller	[15.3.2]
	3. Discuss feedforward control	[15.3.3]
	4. Explain the concept of combined feedforward and feedback control	[15.3.4]
	5. Examine the effects of dead time o a controlled process	[15.3.5]



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Learning Outcome 4	Perform Loop Tuning	[15.4]
Assessment Criteria	1. Outline the objectives of tuning	[15.4.1]
	2. Simulate the following:	
	(a) Open loop tuning	[15.4.2]
	(b) Closed loop tuning	[15.4.3]
	(c) Tuning with some overshoot	[15.4.4]
	(d) Tuning with no overshoot	[15.4.5]

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).