

Course Title:	<b>Industrial Measurement and Control</b>
Course Code:	<b>ENEL510</b>
Descriptor Start Date:	<b>13/06/2024</b>
Descriptor End Date:	<b>31/12/2024</b>
POINTS:	<b>15.00</b>
LEVEL:	<b>5</b>
PREREQUISITE/S:	<b>ENEL501</b>
COREQUISITE/S:	<b>None</b>
RESTRICTION/S:	<b>None</b>

## LEARNING HOURS

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Hours may include lectures, tutorials, online forums, laboratories. Refer to your timetable and course information in Canvas for detailed information.

**Total learning hours: 150**

## PRESCRIPTOR

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Provides an intermediate knowledge of the concepts used in measurement and control systems for engineers.

## LEARNING OUTCOMES

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1. Explain the basic control concepts and terminology (a).
2. Apply measurement system performance terminology and standards (c).
3. Analyse first and second-order systems dynamic characteristics (b).
4. Understand the basic control strategies in accordance with industry practice (a, b, c).
5. Apply tuning methods for finding suitable controller parameters (c, d).
6. Interpret and accurately report on the behaviour of industrial measurement and control systems (b, d, j).
7. Consider sustainability aspects in the design of systems (a, b, c, d, f, i, k).

**Disclaimer: Course descriptors may be amended between teaching periods/semesters**

## CONTENT

- Introduction to control systems
- Process control terminology and basic control concepts
- Instrumentation symbols and identifications
- Industrial measurement terminology and characteristics
- Error analysis in feedback systems
- Industrial measurement standards
- Primary and secondary standards, calibrations, signal conditioning
- Transmitters, transducers and sensors
- Standard transmission signals, process variable sensors
- P, I, PI, PD, PID,  $\mu$ P based, controllers
- Process dynamics
- Control systems response characteristics, first and second-order
- Tuning control systems
- Sustainability aspects of design: Efficient use of energy & power consumption, minimum use of precious materials, waste limitation/management options, threats to the environment/conservation

### Key to Graduate Capabilities Profile:

- a. Engineering knowledge
- b. Problem analysis
- c. Design/development of solutions
- d. Investigation
- e. Modern tool usage
- f. The engineer and society
- g. Environment and sustainability
- h. Ethics
- i. Individual and team work
- j. Communication
- k. Project management and finance
- l. Lifelong learning

## LEARNING & TEACHING STRATEGIES

Asynchronous lecture classes, tutorial classes, online or live, computer simulation using MATLAB, video demos given.

## ASSESSMENT PLAN

Assessment Event	Weighting %	Learning Outcomes
Assignment	20.00	1,2,3,7
Mid Semester Test	30.00	4,5,6,7
Final Controlled Assessment	50.00	1,2,3,4,5,6,7

### Grade Map

#### MAP1

A+ A A- Pass with Distinction  
B+ B B- Pass with Merit  
C+ C C- Pass  
D Fail

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### **Overall requirement/s to pass the course:**

To pass the course, students must satisfy the stated learning outcomes and achieve a minimum overall grade of C-.

### **LEARNING RESOURCES**

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Moir, T.J Feedback, Springer-Nature 2020.

**For further information, contact:** Te Ara Auaha - Faculty of Design & Creative Technologies

**Principal Programme:** **AK3719, Bachelor of Engineering Technology**

**Related Programme/s:**

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