Course Title:	**Control Engineering**
Course Code:	**ENME706**
Descriptor Start Date:	**01/01/2021**
Descriptor End Date:	**31/12/2021**
POINTS:	**15.00**
LEVEL:	**7**
PREREQUISITE/S:	**ENGE501 OR ENGE502, ENME615**
COREQUISITE/S:	**None**
RESTRICTION/S:	**None**

LEARNING HOURS

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

The theory and operation of control systems, equipment, and strategies used in industrial environments for the measurement and control of common physical parameters (eg pressure, temperature, level and flow). It will also introduce digital techniques and the use of computers in control.

LEARNING OUTCOMES

1. Demonstrate understanding of the principles and theory of industrial control and their application to steady state and dynamic control situations.
2. Examine and analyse typical feedback control loops used in industrial control.
3. Describe, analyse and specify control system equipment for industrial process control.
4. Analyse and simplify logic circuits.
5. Create and design simple PLC ladder logic for typical industrial control problems.

CONTENT

- Basic control concepts: definitions, objectives, essential elements
- Principles of control: Open and closed loop control, control modes, Gain and feedback, process properties, inherent regulation, steady state analysis, transient analysis.
- Control Theory: Characterising control systems: time domain equations, response to step, ramp inputs and frequency response of typical systems: first order, second order, dead time, and ramp systems.
- Process measurement: statistics, operating. static and dynamic characteristics of measurement devices. Examples and application of sensors for process measurement including sensors for displacement, velocity, acceleration. Force, flow rate, temperature, pressure and level.
- Process Control: P, I and D control modes, equipment, tuning methods, advanced methods of control.
- Manipulation: actuators and final control elements.
- Digital Techniques: numbering systems, codes, logic circuits and their simplification, PLC's and discrete processes, Ladder logic programming of PLC's Communication in control systems.

LEARNING & TEACHING STRATEGIES

Online or in-person Lectures/Tutorials, in-person Laboratory session.

ASSESSMENT PLAN

Assessment Event	Weighting %	Learning Outcomes
Homework/Quizzes	0.00	1-5
Lab Portfolio (2 Labs)	15.00	1
Mid Semester Assessment	25.00	1-3
Final Assessment	60.00	1-5

Grade Map **MAP1**

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

Overall requirement/s to pass the course:

To pass the course, the student needs to gain a minimum of 50% overall.

LEARNING RESOURCES

Recommended text: (out of print) Bateson, Robert N. 2002. Introduction to Control System Technology. 7th Edition. Prentice Hall. New Jersey, U.S.A.

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

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

Related Programme/s: