Course Title:	**Digital Control**
Course Code:	**ENEL809**
Descriptor Start Date:	**14/07/2025**
POINTS:	**15.00**
LEVEL:	**8**
PREREQUISITE/S:	**ENEL702**
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

This course provides comprehensive knowledge of multivariable and digital control systems.

LEARNING OUTCOMES

1. Develop state space models of physical systems.
2. Analyse the response of continuous and discrete-time control systems.
3. Design and tune multivariable control systems to satisfy desired dynamic characteristics.
4. Design state observers
5. Model and implement multivariable digital control systems using MATLAB and benchtop equipment.

CONTENT

- Analysis of Discrete-time control systems: The z-transform and inverse z-transform, conversion methods
- Time response analysis of discrete systems: Step response characteristics, steady-state errors.
- Digital PID controllers: Positional and velocity PID algorithms, digital controllers and introduction to digital filters.
- Analysis of control systems in state space: State space models, canonical forms.
- Design of control systems in state space: Pole placement design, state feedback controller, Ackermann's formula.
- State observers: Full-order observer,

LEARNING & TEACHING STRATEGIES

Online delivery. Includes Panopto videos, discussions and formative problem solving

ASSESSMENT PLAN

Assessment Event	Weighting %	Learning Outcomes
Assignment : Discrete controller design and analysis for single-input/single output systems	50.00	1,2,5
Final Exam	50.00	1,2,3,4,5

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 this course, students must attempt all summative assessments and achieve a minimum overall grade of C-.

LEARNING RESOURCES

Prescribed text: “Modern Control using Matlab”, AUT, Wilson, D.I.. (2023)

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

Principal Programme:	**AK3751, Bachelor of Engineering (Honours)**
Related Programme/s:	**AK1296** **AK1325** **AK3566** **ICE1** **INEXCH1** **SABRD1**