Course Title:	**Embedded Systems Design**
Course Code:	**ENEL712**
Descriptor Start Date:	**01/01/2021**
Descriptor End Date:	**31/12/2021**
POINTS:	**15.00**
LEVEL:	**7**
PREREQUISITE/S:	**ENEL608, ENEL600**
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 paper is in two parts: microcontroller systems and signals & systems.
The design and development of the hardware and software of an embedded system including a study of the features of a typical microcontroller, some peripheral devices that may be connected, and the communications interfaces it may use. An introduction to signals and systems concepts such as classification of signals, sampling, discrete-time signals and linear time invariant discrete-time systems. An introduction to the core requirements of a modern embedded system design including power requirements and management, real time operating systems, system reliability and embedded systems design methodologies. Both Matlab and C programming will be used.

LEARNING OUTCOMES

1. Determine the input/output signals of an embedded digital systems.
2. Analyse the hardware and software of a microcontroller-based embedded system.
3. Determine the stability and energy consumption issue of an embedded system.
4. Describe the principles of object-oriented programming.
5. Design a graphical user interface for an embedded digital system.
6. Develop an embedded digital system based on a given engineering program specification.

CONTENT

- Fundamental knowledge of signals and systems.
- Elementary time-domain signals and basic operations on digital time-domain signals.
- System as interconnections of signals.
- Block diagram representation of a system.
- System stability analysis.
• Hardware and software design of an embedded system.
• Power consumption optimization.
• Sustainable low power computing.
• Principles of object-oriented programming
• Development of an embedded digital system with graphical user interface using an object-oriented program

LEARNING & TEACHING STRATEGIES

Online lecture classes, computer simulation, laboratory exercises

ASSESSMENT PLAN

Assessment Event	Weighting %	Learning Outcomes
Online Assignment	50.00	1-5
Mini Project	50.00	1-4,6

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

The Firmware Handbook (1st edition) Jack Ganssle (2004). Microsoft Visual C# Step by Step (8th edition), John Sharp (2015).

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

Principal Programme: **AK3751, Bachelor of Engineering (Honours)**

Related Programme/s: