

SYST C2611: Embedded Systems 1

Module Title:		Embedded Systems 1
Language of Instruction:		English
Credits:	5	
NFQ Level:	6	
Module Delivered In		5 programme(s)
Teaching & Learning Strategies:	l	A combination of lectures, class discussion, tutorial, laboratory exercises and demonstrations will be used. Emphasis will be placed on active learning including problem / project bases learning
Module Aim:		To advance the students knowledge in software development using a high-level programming language and to equip them with the skills and techniques required to develop software using an industry standard integrated development environment (IDE) and to utilise with programmable electronics and embedded systems.

Learning Ou	Learning Outcomes			
On successfo	On successful completion of this module the learner should be able to:			
LO1	LO1 Demonstrate an understanding of software development and the building blocks of a high-level programming language.			
LO2	Utilise modular programming, flowcharts, pseudocode and debugging techniques in software development.			
LO3	LO3 Produce clearly documented source code using a neat programming style.			
LO4	Design, develop, and report on the hardware and software elements of a microcontroller-based embedded system project			

Pre-requisite learning

Module Recommendations
This is prior learning (or a practical skill) that is recommended before enrolment in this module.

No recommendations listed

Incompatible Modules

These are modules which have learning outcomes that are too similar to the learning outcomes of this module.

No incompatible modules listed

Co-requisite Modules

No Co-requisite modules listed

This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.

No requirements listed



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Module Content & Assessment

Ind	liaativa	Content

Embedded Systems

Definition of embedded systems.

Introduction to structure of a microcontroller, internal structure, memory, peripherals, I/O, communications, and interrupts.

Embedded Language ProgrammingCross compiler, Program top-down design, flowcharts, variables and constants, I/O, operators and expressions, control statements , functions, pointers, bitwise operators, arrays, and LUTs.

Interfacing and Communications
I/O, Pullup/Pulldown, UART, RS-232, I2C/SPI, Displays/Keyboards , ADC/DAC, Sensors/Motors (On/Off/PWM).

System Development, Testing and Debug
The Integrated Development Environment (IDE) and debugging (breakpoints, single step).

Assessment Breakdown	%
Continuous Assessment	40.00%
Project	40.00%
Practical	20.00%

Continuous Assessment				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Other	Various assessments to reinforce learnings given throughout the semester.	1,2,3,4	40.00	n/a

Project				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	A group/solo (depending on complexity) project based on real-world scenarios.	1,2,3,4	40.00	n/a

Practical				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	A set of practical exercises to complement the theory elements of the module.	1,2,3,4	20.00	n/a

No End of Module Formal Examination

Continuous Assessment				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Other	Various assessments to reinforce learnings given throughout the semester.	1,2,3,4	40.00	n/a

Project	Project				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date	
Project	A group/solo (depending on complexity) project based on real-world scenarios.	1,2,3,4	40.00	n/a	

Practical				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	A set of practical exercises to complement the theory elements of the module.	1,2,3,4	20.00	n/a

No End of Module Formal Examination



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Module Workload

Workload: Full Time				
Workload Type	Frequency	Average Weekly Learner Workload		
Lecture	Every Week	2.00		
Practicals	Every Week	2.00		
	Total Hours	4.00		

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EEBEE_B	Bachelor of Engineering (Honours) in Biomedical Electronics	4	Mandatory
CW_EESYS_B	Bachelor of Engineering (Honours) in Electronic Engineering	4	Mandatory
CW_EEROB_B	Bachelor of Engineering (Honours) in Robotics and Automated Systems	4	Mandatory
CW_EEBEE_D	Bachelor of Engineering in Biomedical Electronics	4	Mandatory
CW_EEROO_D	Bachelor of Engineering in Robotics and Automated Systems	4	Mandatory