MODULE SPECIFICATION

Part 1: Information			
Module Title	Introduction to Robotics and Electronics		
Module Code	UFMFJ3-30-1	Level	Level 4
For implementation from	2018-19		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Contributes towards	Robotics [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19 Robotics [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Educational Aims: Robots, like so many other smart gadgets, are machines which change their behaviour upon sensing changes in their environment and making decisions based upon these data. In order to build such systems, students need to develop an understanding of electronics components and circuits, and appreciate the properties of sensors, actuators and effectors so that they can choose appropriate components and techniques to solve problems. The Introduction to Robotics module seeks to equip students with that knowledge as well as some of the underpinning theory behind components and simple mechatronic systems, and practice of using this knowledge and practical skills to build a robot.

In addition to Learning Outcomes, the educational experience may explore, develop, and practise but not formally discretely assess the following:

Group working

Outline Syllabus: Components; Resistors, Capacitors, Inductors, Diodes, Transistors. Amplifiers.

Linear Circuits and Circuit Analysis. Designing and testing circuits.

Electricity, Magnetism and Electromagnetic Theory.

Types, theory and function of actuators, effectors and sensors

Basic Robot Kinematics

Processing data from sensors, A/D conversion and basic control.

Integrating sensors, actuators and effectors by designing and building appropriate electronic circuits to interface with a microcontroller prototyping environment, for example, the Arduino.

Design and build your first robot.

Choosing components to solve particular problems based upon their characteristics.

Teaching and Learning Methods: Lectures : 24 hours

Practicals : 48 hours

Self-directed learning : 150 hours

Summative assessment : 78 hours

Total hours : 300

Scheduled Learning.
Sessions will include lectures and practical sessions. You will typically work in teams within the lab.

Independent learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. You'll be expected to spend about 100 hours outside of the scheduled time in these activities, and we expect that you and your fellow students will want to work long hours outside the scheduled sessions as it gets nearer to the time to demonstrate what your robot can achieve.

Part 3: Assessment

Your achievements in the module will be assessed in two components. The first component consists of two exams and the second component comprises of logbooks submission/group assignment/a report. You will have to pass both Component A and Component B to pass the module.

Component A consists of two assessments, each worth 25% overall. There will be an examination of two hours' duration in controlled conditions (referred as EX1 - to assess the Electrical and Electronic Principles part of the content) after the first term.

At the end of the second term, there will be another examination of two hours' duration in controlled conditions (referred as EX2 - to assess the Introduction to Robotics part of the content).

Component B consists of two assessments, each worth 25% overall.

The first coursework (referred as CW1 and it will be carried out in the first term) is in two parts; (a) a lab-based logbooks submission and (b) a group assignment. Both will carry equal marks.

The second coursework (referred as CW2 and it will be conducted in the second term). You will be required to submit a report of not more than 2000 words based upon your practical work.

Additionally, there will be opportunities for formative assessment (which does not contribute to the module mark. For example, you may be asked to give a live demo of your robot, or to compete against other teams' robots to assess its relative performance.

Feedback will be given on your work each week in the lab sessions.

Second Assessment Opportunity.

There will be an exam for component A. In component B, there will be an individual work assignment submission. No further attendance at classes is required.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		25 %	Report submission (2000 words)
Portfolio - Component B		12 %	Lab-based logbooks submission
Group work - Component B		13 %	Group assignment
Examination - Component A		25 %	Examination Semester 1
Examination - Component A	✓	25 %	Examination Semester 2
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Portfolio - Component B		50 %	Individual assignment (based on lab work) and written report (2000 words max)
Examination - Component A	✓	50 %	

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will be able to:

	Module Learning Outcomes
MO1	Demonstrate knowledge and understanding of facts and theories concerning electronics components, analogue circuits, electromagnetism
MO2	Show skills in analysing circuits in steady state and transient conditions using a variety of common laboratory equipment such as power supplies and test equipment
MO3	Demonstrate knowledge and understanding of facts and theories concerning sensors, effectors and actuators and their application in simple robots
MO4	Demonstrate cognitive and intellectual skills in interpreting requirements and creating innovative solutions to robotics problems using engineering skills
MO5	Show growing autonomy in selecting appropriate materials, the practical skills needed to integrate them, and an experimental approach to minimising technical risk arising from uncertainty
MO6	Demonstrate management of information through finding, assessing and using technical literature and other information sources

Contact Hours

Contact Hours	
Independent Study Hours:	
Independent study/self-guided study	228
Total Independent Study Hours:	228
Scheduled Learning and Teaching Hours:	
Face-to-face learning	72
Total Scheduled Learning and Teaching Hours:	72
Hours to be allocated	300
Allocated Hours	300

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/modules/ufmfj3-30-1.html