STUDENT AND ACADEMIC SERVICES

UWE Bristol | University of the West of England

MODULE SPECIFICATION

Part 1: Information			
Module Title	Introduction to Robotics and Electronics		
Module Code	UFMFJ3-30-1	Level	Level 4
For implementation from	2019-20		
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		
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. You will have to pass both Component A and Component B to pass the module.

Component A consists of one examination. The examination is summative and assesses students' understanding of basic concepts and techniques and their ability to apply them to relatively straightforward problems. This strategy has been chosen to ensure that basic engineering principles are assessed under controlled conditions.

Component B consists of two equally weighted pieces of coursework:

The first assessment is made of the student's log book, in which they record their lab practice and experimentation.

The second assessment is an individual report of a project in which students work in groups to design and build a robot.

Additionally, there will be opportunities for formative assessment (which do 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 %	Individual Report (2000 words)
Portfolio - Component B		25 %	Lab-based logbooks
Examination - Component A	✓	50 %	Final assessment: Examination (2 hours)
Resit Components	Final Assessment	Element weighting	Description
Portfolio - Component B		50 %	Individual assignment (based on lab work) and written report (2000 words) submissions
Examination - Component A	✓	50 %	Examination (2 hours)

Part 4: Teaching and Learning Methods	
Learning Outcomes	On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	Reference
Demonstrate knowledge and understanding of facts and theories concerning electronics components, analogue circuits, and electromagnetism	MO1
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	MO2
Demonstrate knowledge and understanding of facts and theories concerning sensors, effectors and actuators and their application in simple robots	MO3
Demonstrate cognitive and intellectual skills in interpreting requirements and creating innovative solutions to robotics problems using engineering skills	MO4
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	MO5
Demonstrate management of information through finding, assessing and using technical literature and other information sources	MO6

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
		4
	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	

Part 5: Contributes Towards
This module contributes towards the following programmes of study: Automation and Robotics Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2018-19 Robotics {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2018-19 Robotics {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19 Automation and Robotics Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2018-19