



MODULE SPECIFICATION

Part 1: Information			
Module Title	Microcontrollers Applications Group Lab		
Module Code	UFMFKA-30-2	Level	Level 5
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:	Project		
Pre-requisites	Practical Electronics 2019-20		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
<p>Overview: Pre-requisites: Students must take UFMFN7-15-1 C programming and UFMFCA-15-1 Practical Electronics, or equivalent</p> <p>Educational Aims: In Introduction to Electronics for Robotics students learn about the components of robots and basic programming using simple microcontrollers in the first year. In this module the learning outcomes are broadened to give students more understanding about interfacing more complex components and designing software to integrate them into one robotic platform. This module focuses on four things:</p> <p>Embedded software design using advanced microcontrollers</p> <p>Building and testing hardware</p> <p>Implementing control algorithms on the developed robotic platform Developing an AI algorithm to solve the robot's navigation</p> <p>In addition to Learning Outcomes, the educational experience explores, develops, and practises (but does not necessarily asses) the following:</p> <p>Group working</p>

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Time and project management

Budget organisation

Outline Syllabus: The syllabus includes:

Sensors and Actuators for mobile robots

Embedded programming

Navigation strategies for mobile robots

Control design:

Introduction to control: need for automatic control

Using microcontrollers for real time control

Feedback control design

Teaching and Learning Methods: Contact Hours:

Lectures : 18 hours

Practical / Facilitated Group Work : 48 hours

Self-directed learning : 160 hours

Summative assessment : 78 hours

Total hours : 300

Scheduled Learning.

The module will be delivered through workshops, tutorials and laboratory sessions. At the start of the course, students are divided into groups of four and are helped to develop an interesting and original mobile robot they could expect to complete within the time allotted for the course.

Students keep individual log books as documentary support.

Groups make presentations to the rest of the class during and at the end of the project, and write a group report at the end of the course. The course leader assigns a total mark to the group on the basis of the group report, and students can decide how to apportion those marks based on their agreed understanding of the relative effort of the members of the team. This is then moderated by the course leader.

Independent learning includes hours engaged with essential reading, building and testing , 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.

Part 3: Assessment

Your achievements in the module will be assessed in two components, each consisting of a report and a presentation.

First Assessment Opportunity (Sit)
Component A

Description of each element:

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Presentation 1 - 15 min presentation with questions

Group Report 4000 words group project report.

Presentation 2 (final assessment) – 15 min presentation with questions

Second Assessment Opportunity (Resit) (further attendance at taught classes is not required)
Component A

Description of each element:

Element weighting

Individual Report: 70

Oral Examination: 30

Additionally, there will be opportunities for formative assessment (which does not contribute to the module mark. Each week we will explore new topics and you will be given feedback on how your work from the previous weeks is developing.

First Sit Components	Final Assessment	Element weighting	Description
Report - Component A		70 %	Final Group Report (4,000 words)
Presentation - Component A		15 %	Presentation 1 (15 min presentation with questions)
Presentation - Component A	✓	15 %	Presentation 2 (15 min presentation with questions)
Resit Components	Final Assessment	Element weighting	Description
Report - Component A		70 %	Final Report
Presentation - Component A	✓	30 %	

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Part 4: Teaching and Learning Methods																	
Learning Outcomes	<p>On successful completion of this module students will achieve the following learning outcomes:</p> <table border="1"> <thead> <tr> <th style="text-align: left;">Module Learning Outcomes</th> <th style="text-align: left;">Reference</th> </tr> </thead> <tbody> <tr> <td>Explain the potential and limitations of current robot technology</td> <td>MO1</td> </tr> <tr> <td>Understand and implement the process of designing and constructing a mobile robot</td> <td>MO2</td> </tr> <tr> <td>Understand and implement control of linear systems</td> <td>MO3</td> </tr> <tr> <td>Implement navigation strategies for mobile robots</td> <td>MO4</td> </tr> </tbody> </table>	Module Learning Outcomes	Reference	Explain the potential and limitations of current robot technology	MO1	Understand and implement the process of designing and constructing a mobile robot	MO2	Understand and implement control of linear systems	MO3	Implement navigation strategies for mobile robots	MO4						
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Reading List	<p><i>The reading list for this module can be accessed via the following link:</i></p> <p>https://uwe.rl.talis.com/modules/ufmfka-30-2.html</p>																

Part 5: Contributes Towards
<p>This module contributes towards the following programmes of study:</p> <p>Electronic Engineering [Sep][SW][Frenchay][5yrs] MEng 2018-19</p> <p>Robotics [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19</p> <p>Robotics [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19</p> <p>Electronic Engineering [Sep][FT][Frenchay][4yrs] MEng 2018-19</p> <p>Electronic Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19</p> <p>Electronic Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19</p> <p>Electrical and Electronic Engineering [Sep][SW][Northshore][5yrs] MEng 2018-19</p>