Module Definition Form (MDF)

Module code: MOD007949	**Version:** 2 **Date Amended:** 09/Dec/2022

1. Module Title
Robotics Software Development and Modelling

2a. Module Leader
Mohammed Khan

2b. School
School of Engineering and the Built Environment

2c. Faculty
Faculty of Science and Engineering

3a. Level
5

3b. Module Type
Standard (fine graded)

4a. Credits
15

4b. Study Hours
150

5. Restrictions

Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:	None		

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

In this module, you will focus on the area of smart robotic and mechatronics software programming and modelling. You will gain a comprehensive overview of the technical aspects and state-of-the-art methods in design and modelling, acquiring knowledge and concepts for Robotic programming. You will also explore your adaptability to change of settings, looking at the capabilities, limitations and future trends in robotic systems and programming methods and modelling.
This module will extend your skills across essential areas in the field of programming for robots and automation applications. You will use your existing knowledge of engineering theory and practice as the base to build new skills in the fields of robotics modelling and programming.

6b. Outline Content

- Robotic Modelling and Simulation
- Motors and Sensors in Robotics
- Robotic technology and applications
- Robotic Programming (Matlab/Simulink, C)
- Current and future challenges in developing Robotic systems
- Microcontrollers application in Robotics

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources

MATLAB/Simulink, sensors, Robots

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Demonstrate advanced knowledge of mathematical modelling and analytical skills for complex Robotic applications.
2	Knowledge and Understanding	Demonstrate in-depth knowledge of structure, functionality, scope, and limitations of programming in robotic applications and current trends in robotics.
3	Intellectual, practical, affective and transferrable skills	Select and apply appropriate programming, computational, and experimental techniques for the effective modelling of complex robotics problems and recognise their limitations.
4	Intellectual, practical, affective and transferrable skills	Illustrate in-depth skills in using software to model sensors and robotic hardware for industrial automation and control applications.

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2026/7	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	12	1-3	Lecture 1 hr x 12 weeks
Other teacher managed learning	24	4	Lab 2 hrs x 12 weeks
Student managed learning	114	1-3	Self-directed learning
TOTAL:	150		

9. Assessment for the above Module Occurrence

The assessment for some modules includes a presentation (see below for details on how this particular module is assessed). We recognise that presenting, especially to a large group, can cause significant anxiety or distress for some students. If this may affect you, please contact your Module Leader or the Disability and Neurodiversity Service as early as possible. We will work with you to consider appropriate reasonable adjustments. Depending on your individual needs, these might include, for example, presenting to a smaller group or presenting only to a member of academic staff.

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	3-4	50 (%)	Fine Grade	30 (%)
Coursework (max 1500 words), maps to Engineering Council Learning Outcome C3					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
011	Examination	1-2	50 (%)	Fine Grade	30 (%)
Exam (1.5 hours), maps to Engineering Council Learning Outcome C1					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]