

MODULE DESCRIPTOR

Module Title

Advanced Robotics			
Reference	ENM280	Version	1
Created	July 2024	SCQF Level	SCQF 11
Approved	June 2023	SCQF Points	15
Amended		ECTS Points	7.5

Aims of Module

To provide students with the ability to understand, design, analyse and evaluate theories of advanced robotic systems.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Analyse fundamental principles and essential concepts of advanced robotic systems.
- 2 Design robotic system-based solutions using fundamental principles and concepts.
- 3 Evaluate performance and functioning of advanced robotic systems and solutions.

Indicative Module Content

Introduction and ethical considerations, Kinematics, homogeneous transformations matrices, quaternions, manipulators, mobile robots, mobile manipulators. Dynamics of multibody systems, manipulators, mobile robots, friction, backlash, stiffness, dynamics equations for simulation and control. Design: task requirements, kinematic configuration, joint types, actuators, sensors, navigation and path planning of mobile robots, Control: Joint space, task space, Trajectory, force.

Module Delivery

This module will be delivered by means of lectures, tutorials and self-guided study, integrated with computer-based applications.

Indicative Student Workload

	Full Time	Part Time
Contact Hours	30	N/A
Non-Contact Hours	120	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	N/A
<i>Actual Placement hours for professional, statutory or regulatory body</i>		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type: Coursework Weighting: 100% Outcomes Assessed: 1, 2, 3

Description: The coursework consists of a written technical report to examine, critique, design and implement advanced robotic tools and techniques.

MODULE PERFORMANCE DESCRIPTOR**Explanatory Text**

Component 1 comprises 100% of the module grade. To pass the module, a D grade is required.

Module Grade	Minimum Requirements to achieve Module Grade:
A	A
B	B
C	C
D	D
E	E
F	F
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	None.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

- 1 B. Siciliano, O. Khatib eds., ?Springer Handbook of Robotics?, Springer-Verlag, Berlin, 2016
- 2 J. J. Craig, ?Introduction to Robotics: Mechanics and Control?, 4th edition, Pearson Prentice Hall, USA, 2017
- 3 P. Corke, ?Robotics and Control?, Springer-Verlag, Berlin, 2022