MODULE SPECIFICATION

Part 1: Information			
Module Title	Robotic Fundamentals		
Module Code	UFMF4X-15-M	Level	Level 7
For implementation from	2018-19		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Contributes towards	Robotics and Autonomous Systems [Sep][FT][Frenchay][1yr] PhD 2018-19 Robotics [Jan][PT][Frenchay][2yrs] MRes 2018-19 Robotics [Sep][FT][Frenchay][1yr] MRes 2018-19 Robotics [Sep][PT][Frenchay][2yrs] MRes 2018-19 Robotics [Jan][FT][Frenchay][1yr] MRes 2018-19		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
Overview: This module focuses on three fundamental aspects of robots: The mechanics of robot bodies; kinematic properties and algorithms Programming **Educational Aims:** See Learning Outcomes

Outline Syllabus: Topics will include:

Forward and Inverse kinematics solutions for manipulators with multiple degrees of freedom, Denavit Hartenberg notations

Parallel manipulators

Manipulator trajectories, velocities and forces. Jacobians

Forward and Inverse dynamics

Programming in MATLAB

Teaching and Learning Methods: Scheduled learning:
Sessions will include tutorials (2 hours per week) and intensive workshops - practical sessions (1-2 hours per week).

Independent learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. You'll be expected to spend about 75 hours outside of the scheduled time in these activities.

Contact Hours:

Lectures : 12 hours

Practical / Facilitated Group Work : 24 hours

Self-directed learning : 72 hours

Summative assessment : 42 hours

Total hours : 150

Part 3: Assessment

This module is composed of two components: a 3000 word coursework on kinematics and one exam.

Component A consists of one assessment, worth 50% overall.
There will be one examination of three hours' duration in controlled conditions.

Component B
Coursework is a group assignment of 3000 recommended words. Additionally, there will be opportunities for formative assessment (which does not contribute to the module mark). Feedback will be given on students' work each week in the lab sessions.

Second Assessment Opportunity.
There will be one exam of the same duration and an individual coursework assignment exploring the same topics but using a different robotic architecture. and requiring 2000 recommended words. No further attendance at classes is required.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Laboratory Report - Component B		50 %	Group lab report 3000 words (kinematics)
Examination - Component A	✓	50 %	Examination 180 minutes

Resit Components	Final Assessment	Element weighting	Description
Laboratory Report - Component B		50 %	Individual Lab Report (2000 words)
Examination - Component A	✓	50 %	Examination 180 minutes

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 theories and techniques required to analyse and synthesise a robot manipulator for variety of tasks including serial manipulators
MO2	Demonstrate algorithm development in the context of robotic systems
MO3	Apply commonly used tools and techniques to enable the efficient solutions of different robotic kinematic architectures and design problems
MO4	Create and critically evaluate the design of serial robotic architectures from underlying principles of robot dynamics
MO5	Explore, develop, and practise team working through sharing the work

Contact Hours

Contact Hours	
Independent Study Hours:	
Independent study/self-guided study	114
Total Independent Study Hours:	114
Scheduled Learning and Teaching Hours:	
Face-to-face learning	36
Total Scheduled Learning and Teaching Hours:	36
Hours to be allocated	150
Allocated Hours	150

Reading List

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

https://uwe.rl.talis.com/modules/ufmf4x-15-m.html