MODULE SPECIFICATION

Part 1: Information			
Module Title	Advanced Control and Dynamics		
Module Code	UFME7F-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 [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

Educational Aims: In addition to the learning outcomes, the educational experience may explore, develop, and practise but not formally discretely assess the following:
Self-management skills.
Progression to independent learning and team work.

Outline Syllabus: Enhanced classical control system analysis and design.

Control mathematics, such as matrix algebra, Laplace transform, z-transformer, differential equations, and difference equations, for control system modelling, analysis, and design.

Use of computational packages, such as Matlab, to analyse and design control systems.

Advanced control concepts such state-space representations, solution of state equations, controllability and observability; state-feedback, (pole placement) control design.

Modelling and analysis of multivariable control systems, to convert from the transfer function model to state space representation, and vice versa. Evaluation of dynamic plant performance in aspect of controllability and observability.

Design of multivariable state-feedback controllers, decoupling control systems, state observers.

Digital control system analysis and design with applications.

Teaching and Learning Methods: The module will be delivered using a combination of lectures and tutorials/lab demonstrations involving example exercises.

Concepts and the scope of a topic will be introduced in lectures. These will be supported by directed reading and experimental simulation laboratory based work. The lab sessions will enhance the understanding of students of real-world applications of the material delivered in the module. The students will learn through applying a variety of analysis methods, mathematical and simulation tools to real system models. Matlab will be incorporated into the module as an integral part of teaching and learning and two hours used to demonstrate the principles.

In the teaching-learning process, the students will have opportunities to exercise both team work and independent effort.

Contact: 36 hours
Assimilation and skill development: 70 hours
Undertaking Coursework: 40 hours
Exam preparation: 24 hours
Total: 150 hours

Part 3: Assessment

There will be a final exam set at the end of the term and a total of 75% marks will be contributed from this element (A). The other 25% marks will be contributed from coursework report (element B) module. In the resit run elements A B will be the same as set in the first run. Assessment feedback will be given on course work reports.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		25 %	Coursework report (1000 words)
Examination - Component A	✓	75 %	Exam (120 minutes)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		25 %	Coursework report (1000 words)
Examination - Component A	✓	75 %	Exam (120 minutes)

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will be able to:

	Module Learning Outcomes
MO1	Show an advanced professional level of knowledge and understanding of critical analysis and design techniques for both analogue and digital control systems
MO2	Demonstrate subject specific techniques with respect to operation and development of suitable computer based simulation software package
MO3	Demonstrate subject specific techniques with respect to the design and simulation of analogue and digital control systems
MO4	Show cognitive capacity with respect to advice and application of suitable techniques for the analysis and design of automatic control systems with regard to engineering processes
MO5	Demonstrate key transferable skills in problem formulation and decision making
MO6	Demonstrate key transferable skills in IT design and consultancy in context

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/ufme7f-15-m.html