Module Specification

Advanced Control Engineering

Version: 2021-22, v3.0, 26 Apr 2022

Contents

Part 1: Information

Module title: Advanced Control Engineering

Module code: UFMFUL-15-M

Level: Level 7

For implementation from: 2021-22

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Delivery locations: Frenchay Campus

Field: Engineering, Design and Mathematics

Module type: Standard

Pre-requisites: Control Engineering 2021-22

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

Educational aims: See Learning Outcomes

Outline syllabus: Introduction of discrete time methods of description, difference equations and the z transform.

State variable based control strategies and controller layout and strategy.

Coping with non-linearities – piecewise linearization, Lyapunov etc.

Design of multivariable state feedback controllers, decoupled systems, observers.

Introduction to alternative algorithms – for example fuzzy controllers, neural networks etc.

The use of software packages to analyse and design control systems (for example Matlab, Simulink).

Part 3: Teaching and learning methods

Teaching and learning methods: Large group teaching session supported by small group tutorial sessions to ensure that students have a sound grasp of fundamental concepts. Students will be expected to cover new material and practice example problems and exercises as part of their independent study.

Scheduled learning includes teaching sessions and tutorials.

Independent learning includes hours engaged with essential reading and assessment preparation. These sessions constitute an average time per level as indicated in the table below. Scheduled sessions may vary slightly depending on the module choices you make.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Show an advanced professional level of knowledge and understanding of critical analysis techniques for advanced control systems.

MO2 Demonstrate subject specific knowledge in the development of appropriate control strategies for real systems.

MO3 Analyse and compare techniques for the design of control systems suitable for real world problems.

MO4 Demonstrate techniques in the simulation of control systems using industry standard software packages.

MO5 Recognise and analyse difficulties associated with system control such as non-linearity and the discretisation of time and use techniques to minimise the impact of such difficulties.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/ufmful-15-m.html

Part 4: Assessment

Assessment strategy: Component A

To reflect the requirements of a professional in industry, the assessment will be in the form of an examination, with questions based on actual problem solving techniques used in industry.

This would include providing such data as appropriate, to allow the assessment of decision making processes and design expertise rather than generating a test of memory of facts.

Support for this type of work would be provided by the use of example case study

material in the tutorial sessions and problem based learning sessions to develop a suitable level of skill.

Assessment components:

Examination (Online) - Component A (First Sit)

Description: Online Examination: 5 hours

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Examination (Online) - Component A (Resit)

Description: Online Examination: 5 hours

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechanical Engineering [Sep][FT][Frenchay][4yrs] MEng 2018-19