Module Specification

Control Systems Design

Version: 2021-22, v2.0, 17 Feb 2022

Contents

Part 1: Information

Module title: Control Systems Design

Module code: UFMFW7-15-3

Level: Level 6

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, Global College of Engineering and Technology (GCET), Northshore College of Business and Technology

Field: Engineering, Design and Mathematics

Module type: Standard

Pre-requisites: Signal Processing and Circuits 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.

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: You will cover:

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.
Basic mechanism on dynamic system modelling and identification from principles and data fitting.

Part 3: Teaching and learning methods

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.

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

A1 Analysis and design techniques for both analogue and digital control systems

B1 Selection and application of suitable techniques for the analysis and design of automatic control systems with regard to engineering processes

C1 Operation and use of suitable computer based simulation software package

C2 The design and simulation of analogue and digital control systems

D1 Problem formulation and decision making

D2 IT skills in context

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/ufmfw7-15-3.html

Part 4: Assessment

Assessment strategy: 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 coursework (element B) is course work based report. Element B will contribute 25% marks to the final marks of the module.

In the resit run elements A and B will be the same as set in the first run.

The GCET delivery of this exam is a 2 hour face-to-face/invigilated exam. It was agreed that GCET can deliver the exam in a different way to UWE for in-country reasons for 2021/22 and 2022/23 providing there is no change to the UWE assessment during this time.

Assessment components:

Examination (Online) - Component A (First Sit)
Description: Online Exam
Weighting: 75 %
Final assessment: Yes
Group work: No
Learning outcomes tested: A1, B1, C2, D1, D2

Report - Component B (First Sit)
Description: Coursework report
Weighting: 25 %
Final assessment: No
Group work: No
Learning outcomes tested: A1, B1, C1, C2, D1, D2

Examination (Online) - Component A (Resit)
Description: Online Exam
Weighting: 75 %
Final assessment: Yes
Group work: No
Learning outcomes tested:

Report - Component B (Resit)
Description: Coursework report
Weighting: 25 %
Final assessment: No
Group work: No
Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electronic Engineering (Nuclear) {Apprenticeship-UCW} {Top-Up} [Sep][FT][MOD][2yrs] BEng (Hons) 2021-22

Electronic Engineering {Apprenticeship-UCW} {Top-Up} [Sep][FT][Frenchay][2yrs] BEng (Hons) 2021-22

Electronic Engineering (Nuclear) {Top-Up} [Sep][PT][MOD][2yrs] - Not Running BEng (Hons) 2021-22

Electrical and Electronic Engineering [Feb][FT][AustonSingapore][1yr] BEng (Hons) 2021-22

Electrical and Electronic Engineering [May][FT][AustonSriLanka][12months] BEng (Hons) 2021-22

Electrical and Electronic Engineering [May][FT][AustonSingapore][1yr] BEng (Hons) 2021-22

Electrical and Electronic Engineering [Oct][FT][[AustonSingapore][1yr] BEng (Hons) 2021-22

Electrical and Electronic Engineering [Oct][FT][AustonSriLanka][1yr] BEng (Hons) 2021-22

Electrical and Electronic Engineering [Feb][FT][AustonSriLanka][1yr] BEng (Hons) 2021-22

Electrical and Electronic Engineering [May][PT][AustonSriLanka][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [Feb][PT][AustonSriLanka][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [Feb][PT][AustonSingapore][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [May][PT][AustonSingapore][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [Oct][PT][AustonSingapore][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [Oct][PT][AustonSriLanka][16months] BEng (Hons) 2020-21

Electronic Engineering [Sep][FT][Frenchay][4yrs] MEng 2019-20

Electronic Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Electronic Engineering [Sep][SW][Frenchay][5yrs] MEng 2018-19

Electrical and Electronic Engineering [Sep][SW][Northshore][5yrs] MEng 2018-19

Instrumentation and Control Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2018-19

Instrumentation and Control Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2018-19

Electronic Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19

Electronic Engineering {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2018-19

Electronic and Computer Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Electronics and Telecommunication Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2018-19

Electronics and Telecommunication Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2018-19

Electronic and Computer Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2019-20