Module Code	MEU44B09
Module Name	Control Engineering 1
ECTS Weighting[1]	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Asst. Prof. Siyuan Zhan
Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline	On successful completion of this module, students should be able to: • LO1. Draw a block diagram for a control system from a schematic and determine the overall transfer function of the system. • LO2. Identify and analyse the performance of a linear system in both time and frequency domains. • LO3. Use the root locus as a design tool to alter system response through compensator design. • LO4. Use MATLAB and Simulink to analyse and design control systems. • LO5. Understand how to design and apply PID to a physical system to meet the design requirements. **Graduate Attributes: levels of attainment** To act responsibly - Enhanced To think independently - Enhanced To develop continuously - Enhanced To communicate effectively - Enhanced
Module Content	This module introduces students to the principles of continuous-time control systems applied to electrical, electronic, mechanical, and combined systems. It covers system modelling using transfer functions and block diagram algebra, including the representation and reduction of complex systems. Time-domain analysis is introduced through the study of first- and second-order systems, with approximate methods for higher-order systems and consideration of transient response specifications such as rise time, settling time, and overshoot. Stability and steady-state performance are explored using methods such as the Routh–Hurwitz criterion and steady-state error analysis. Frequency-domain techniques, including Bode and Nyquist plots, are applied to assess system behaviour and margins of stability. Design approaches focus on the use of root locus methods, frequency response design, and the design and tuning of PID controllers. Throughout the module, MATLAB and Simulink are used extensively to model, simulate, and analyse control systems, with applications drawn from a range of engineering disciplines.

Teaching and Learning Methods

This module uses Blackboard, podium lectures, self learning, a laboratory session and tutorials to help students achieve the required learning outcomes.

- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	LO Addressed	% of total	Week due (provisional)
Written Examination	End-of-Semester Examination	LO1-LO4	80%	Exam Period
In-class Assessment	Mid-semester	LO1-LO4	5%	Set by the lecturer
Laboratory Exercise	Staggered throughout the semester	LO4-LO5	15%	Staggered throughout the Semester
Self Learning Exercise	Entire Semester	LO1-LO4	0	No submission required

Reassessment Requirements

Written Examination

Contact Hours and Indicative Student Workload[2]

Contact hours: 46 (33 Lectures, 11 tutorials, 1 Lab)
Independent Study (preparation for course and review of materials): 30
Independent Study (preparation for assessment, incl. completion of assessment): 40

Recommended Reading List

Control Systems Engineering by Norman S. Nise, Wiley.

Modern Control Engineering by Kazuhiro Ogata,

Pearson.

E-books are available via the College Library

Module Pre-requisite

None

Module Co-requisite

None

Module Website	Blackboard
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	No
Module Approval Date	
Approved by	
Academic Start Year	
Academic Year of Date	