Control System

Module Information

2022.01, Approved

Summary Information

Module Code	5502ICBTEL
Formal Module Title	Control System
Owning School	Engineering
Career	Undergraduate
Credits	15
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
International College of Business and Technology

Learning Methods

Learning Method Type	Hours
Lecture	45
Practical	9
Tutorial	6

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
APR-PAR	PAR	April	12 Weeks

JAN-PAR	PAR	January	12 Weeks
SEP-PAR	PAR	September	12 Weeks

Aims and Outcomes

Aims	This module introduces the basic techniques for analysis and design of feedback control systems.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Demonstrate an understanding of the basic concepts of control systems and their applications.
MLO2	2	Examine and analyse the elements, structure and behaviour of a typical, high-level control system.
MLO3	3	Solve problems related to block diagrams, system mathematical modelling, time response, frequency response, s plane, PID, Routh-Hurwitz stability criterion.
MLO4	4	Demonstrate the knowledge of application for control systems using software simulation.

Module Content

Outline Syllabus	Basic concepts:Brief history of control systems and their industrial relevance, control systemTerminology and identification, including plant, process, system, disturbances,Inputs and outputs and real world applications.Simple mathematical models of electrical, mechanical and electro-mechanicalSystemsBlock diagram representation of simple control systemsIntroduction of Laplace transform and its properties, simple first and secondOrder systems and their dynamic responsesSystem behaviour:Transient and steady behaviour of simple open loop and closed loop controlSystems in response to a unit step input.Frequency response and bode plots.Poles and zeros and their role in the stability of control systems, steady-stateError. Routh-Hurwitz stability criterionS-plane, root locus.Control parameters and optimum performance:Introduction to the three-term PID controller, the role of a ProportionalController (P), Integral controller (I) and the Derivative controller (D).Solve the relevant problems using PID and PID tuning.Software simulation:Modelling and simulation of simple first and second order control system usingMATLAB and Simulink.
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Exam	Examination	70	2	MLO3, MLO2
Report	Coursework	30	0	MLO1, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Karl Jones	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings