

Liverpool John Moores University

Title: Dynamics and Control
Status: Definitive
Code: **6513USST** (126453)
Version Start Date: 01-08-2021

Owning School/Faculty: Engineering
Teaching School/Faculty: University of Shanghai For Science and Technology

Team	Leader
Dan Stancioiu	Y
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Academic Level: FHEQ6
Credit Value: 10
Total Delivered Hours: 41
Total Learning Hours: 100
Private Study: 59

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	22
Practical	6
Tutorial	11

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70	2
Portfolio	AS2	Portfolio	30	

Aims

To develop knowledge and experience of analytic and simulative methods applied to modelling of open and closed loop engineering systems with multi-physics dynamics.

Learning Outcomes

After completing the module the student should be able to:

- 1 Assess and apply modelling methods to derive the dynamic equations governing mechanical systems, thermal systems and fluid systems.
- 2 Derive dynamic system models in State-Space or Transfer Function notation.
- 3 Apply modern computer aided methods to simulate system dynamics.
- 4 Design and implement open and closed loop control systems using frequency domain methods.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	2	3	4
Portfolio	1	2	3	4

Outline Syllabus

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Use classical modelling methods to derive the differential equations for a dynamic system.

Apply Laplace methods to convert the governing differential equations into their Frequency Domain representations.

Apply simulation methods to solve the dynamic systems differential governing equations in the time and frequency domains.

Demonstrate an understanding about the differences between open loop and closed loop dynamic systems strategies.

Discuss the conversion of the open loop systems into their respective closed loop system formalisms.

Validate using simulation methods how this leads to improve system dynamics.

Learning Activities

Lectures, practicals and tutorials.

Notes

In this module the student develops knowledge and experience of analytic and simulative methods applied to modelling of open and closed loop engineering systems with multi-physics dynamics. The module exposes the student to modern object orientated simulation.