Liverpool John Moores University

Title:	SIGNALS AND SIMULATION
Status:	Definitive
Code:	**5536ENGIOM** (117271)
Version Start Date:	01-08-2016
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
Russell English	Y

Academic Level:	FHEQ5	**Credit Value:**	20	**Total Delivered Hours:**	50
Total Learning Hours:	200	**Private Study:**	150		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Practical	16
Tutorial	8

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam		60	2
Essay	Essay		20	
Essay	Essay		20	

Aims

To introduce the application of advanced mathematical techniques to the analysis of signals and systems, appropriate to electronics, communications, control and linear systems.

Learning Outcomes

After completing the module the student should be able to:

1	Employ standard discrete and continuous transform techniques to analyse electrical signals and systems
2	Employ numerical techniques to solve linear systems
3	Design FIR filters to specifications

Learning Outcomes of Assessments

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

Exam	1	2	3
Essay 1	2		
Essay 2	3		

Outline Syllabus

Numerical methods: Euler and Runge-Kutta methods for the solution of linear systems.
Signal definition: continuous and discrete. Sampling and sampling theorem. Systems properties: linearity, time invariance, causality, and stability. Continuous and discrete convolution. Use of Fourier analysis and z-transforms. Applications: signal processing, types of fitness, frequency response of FIR structure, filter coefficients from desired frequency response, introduction to windowing. System modelling and dynamics: models of standard electrical systems (e.g. switched circuits, DC motor); transient (impulse, step), steady-state and frequency responses; transfer functions, use of Laplace transforms.

Learning Activities

A series of lectures and computer based laboratory sessions. Mathematical software packages, e.g. MATLAB, SIMULINK, will be used for analysis and simulation.

Notes

This module applies advanced mathematical techniques required for the analysis, design and simulation of electrical signals and systems.