Module Specification

Module Summary Information

1	**Module Title**	Mathematical Modelling 2
2	**Module Credits**	20
3	**Module Level**	4
4	**Module Code**	ENG4125

5	**Module Overview**

This module will focus on introducing and building on well-established techniques for mathematically modelling dynamic systems (systems of interest for engineering) for contextualised engineering applications. The module will include an introduction to sophisticated signal analysis technique, Fourier series which is used to transform time-domain signals into their frequency spectra. The module is structured to include a mixture of lectures, tutorials and PC-based laboratories. The lectures will formally introduce material, in tutorials students will work through questions with tutor. The PC laboratories will involve using mathematical modelling software packages to implement mathematical operations.

6	**Indicative Content**

Solving differential equations by separating the variables.
Solving differential equations by integrating factor method;
Solving 1st order and 2nd order differential equations by trial functions; Solving 2nd order differential equations using matrices; Fourier series.

7	**Module Learning Outcomes** **On successful completion of the module, students will be able to:**	
	1	Recall techniques to solve 1st and 2nd order linear differential equations (homogeneous and non-homogeneous).
	2	Recall techniques used to solve arithmetic and/or differential equation problems using matrices.
	3	Convert and analyse signals from the time domain to frequency domain and vice versa.
	4	Explain and/or debug basic data structures and algorithms as applied to mathematical modelling of dynamic systems.

8	**Module Assessment**		
Learning Outcome			
	Coursework	**Exam**	**In-Person**
1-4	**X**	**X**	

9	Breakdown Learning and Teaching Activities
Learning Activities	**Hours**
Scheduled Learning (SL) includes lectures, practical classes and workshops, peer group learning, Graduate+, as specified in timetable	48
Directed Learning (DL) includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning, as directed on VLE	0
Private Study (PS) includes preparation for exams	152
Total Study Hours:	200