UNIVERSITY OF WARWICK

Proposal Form for New or Revised Modules (MA1 - version 7 - April 2014)

Approval information	
Approval Type	☒ New module ☐ Revised module ☐ Discontinue module
Date of Introduction/Change	01/10/2018
If new, does this module replace another? If so, enter module code and title:	No
If revised/discontinued, please outline the rationale for the changes:	n/a
Confirmation that affected departments have been consulted:	School of Engineering and WMG have been consulted via CMAC.

Module Summary	
1. Module Code (if known)	ES1A1
2. Module Title	Engineering Mathematics
3a. Lead department:	School of Engineering
3b. Teaching Split (if known):	100% School of Engineering
4. Name of module leader	Prof. Toby Mottram
5. Level	UG: ☒ Level 4 (Certificate) ☐ Level 5 (Intermediate) ☐ Level 6 (Honours) PG: ☐ Level 7 (Masters) ☐ Level 8 (Doctoral) See Guidance Notes for relationship to years of study
6. Credit value(s) (CATS)	15
7. Principal Module Aims	To present, in context, and provide skills in the application of fundamental mathematics and systems modelling concepts that underpin all of Engineering. To encourage the development of problem solving and modelling skills as required in other Year 1 modules and in order that more advanced material can be tackled in modules taught in later years.

Module Summary	
	Within the context of the syllabus, students should be able to manipulate mathematical formulae, to follow mathematical argument, to formulate engineering problems in mathematical form and to solve these. In particular, this module provides the necessary mathematical background for the technical modules in year 1 for those students without 'A' level, or equivalent, Mathematics.
8. Principal Learning Outcomes	By the end of the module the students should be able to: • Recognise and be able to apply mathematical tools and techniques to solve engineering based problems. • Recognise and be able to apply probabilistic and statistical tools and techniques to solve engineering based problems. • Develop mathematical models of engineering based systems via the physical laws that they obey. • Make structured assumptions to simplify and thus model real-life Engineering problems. • Analyse models using basic mathematical techniques including statistical and numerical techniques. • Demonstrate an understanding of mathematics and mathematical processes consistent with the syllabus. Reason logically and recognise incorrect reasoning.
9. Timetabled Teaching Activities (summary)	Learning activity is scheduled as 24 weeks, comprising of formally timetabled sessions and student-led activities. Intensive timetabled activity comprising of: 24 hours of flipped lectures 5 hours of face-to-face tutorials (with Personal Tutor) 2 hours of revision lectures 1x1 hour of computer-based test Student-led learning comprising of: 10 hours of online tutorials (with VLE use) **Total of 42 hours** 20 hours of online extra support for foundation maths (with VLE use). **Total of 62 hours with additional maths support.**
10. Departmental Web-link	http://moodle.warwick.ac.uk/course/

Module Summary	
11. Other essential notes	Advice and feedback are available on the lecture material and examination questions, via online web-forum based in module support Moodle pages.
12. Assessment methods (summary)	70% written examination (3 hours). 30% computer-based test (1 hour)

For use by Strategic Planning and Analytics Office only - Do not fill in this section

Level	JACS3 Code	Teaching Split
		If not provided in 3b above

External Credit Level		Scheme	

Module Context

13. Please list all departments involved in the teaching of this module. If taught by more than one department, please indicate percentage split.

School of Engineering (100%).

14. Availability of module

Degree Code	Title	Study Year	C/OC/ A/B/C	Credits
TBC	BEng Civil and Infrastructure Engineering	1	CORE	15

15. Minimum number of registered students required for module to run

1 (core module).

16. Pre- and Post-Requisite Modules

None.

Module Content and Teaching

17. Teaching and Learning Activities *(totals for module – please see guidance)*

Module duration (weeks)	24
Lectures	24 hours
Seminars	None
Tutorials	5 hours face-to-face (with Personal Tutor) 10 hours of online tutorial (with VLE use)
Project Supervision	None
Demonstration	None
Practical Class/Workshops	None
Supervised time in studio/workshop	None
Fieldwork	None
External visits	None
Work based learning	None
Placement	None
Year abroad	None
Other activity *(please describe): e.g. distance-learning, intensive weekend teaching etc.*	2 hours of revision lectures 1x1 hour of computer-based test 20 hours of online extra support for foundation maths 83 hours of guided independent learning (including VLE use and support from Employer)

Module Content and Teaching

18. Assessment Method (Standard)

Type of assessment	Length	% weighting
Written Examinations	3 hours	70
Practical Examinations	1 hour Computer-based test	30
Assessed essays/coursework		
18a. Final chronological assessment *(please see guidance*)	Written examination.	

19. Methods for providing feedback on assessment.

- Model solutions to questions for exam preparation.
- Cohort-level feedback to computer-based test.
- Cohort level feedback on examination.
- Support through advice and feedback hours.

20. Outline Syllabus

Functions, Algebra and Algebraic Manipulation, Co-ordinate Geometry, Differentiation, Vector Algebra, Matrices and Determinants, Matrix Algebra and Linear equations, Complex Numbers, Integration, Applications of Integration, Solution of 1st and 2nd Order Ordinary Differential Equations, Laplace Transforms, Probability Theory, Discrete and Continuous Probability Distributions. Partial Differentiation

21. Illustrative Bibliography

"Mathematics for Engineers: A Modern Interactive Approach (fourth Edition)" by Anthony Croft and Robert Davison, Pearson/Prentice Hall, 2015, ISBN 978-0-13-205156-9

22. Learning outcomes

Successful completion of the module leads to the learning outcomes. The learning outcomes identify the knowledge, skills and attributes developed by the module.

Learning Outcomes should be presented in the format "By the end of the module students should be able to..." using the table at the end of the module approval form:

Resources

23. List any additional requirements and indicate the outcome of any discussions about these.

N/A

Approval	
24. Module leader's signature	Professor Toby Mottram
25. Date of approval	21 March 2018
26. Name of Approving Committee (include minute reference if applicable)	School of Engineering and WMG Course and Module Approval Committee (CMAC) Minute 174-17/18
27. Chair of Committee's signature	Professor Gillian Cooke
28. Head of Department(s) signature	Professor David Towers

Examination Information		
A1. Name of examiner (if different from module leader)		
A2. Indicate all available methods of assessment in the table below		
% Examined	**% Assessed by other methods**	**Length of examination paper**
70%	30% Computer-based test (1 hour).	3 hours
A3. Will this module be examined together with any other module (sectioned paper)? If so, please give details below.		
No.		
A4. How many papers will the module be examined by?	☒ 1 paper	☐ 2 papers
A5. When would you wish the exam take place (e.g. Jan, April, Summer)?	Summer	
A6. Is reading time required?	☐ Yes	☒ No
A7. Please specify any special exam timetable arrangements.		
N/A		
A8. Stationery requirements		
No. of Answer books?	1	
Graph paper?	Yes	
Calculator?	Yes	
Any other special stationery requirements (e.g. Data books, tables etc)?	Engineering Data Book	
A9. Type of examination paper		
Seen?	☐ Yes	☒ No
Open Book?	☐ Yes	☒ No
Restricted?	☐ Yes	☒ No
If restricted, please provide a list of permitted texts:		

LEARNING OUTCOMES		
(By the end of the module the student should be able to....)	**Which teaching and learning methods enable students to achieve this learning outcome? (reference activities in section 15)**	**Which summative assessment method(s) will measure the achievement of this learning outcome? (reference activities in section 16)**
Recognise and be able to apply mathematical tools and techniques to solve engineering based problems.	Lectures Tutorials (face-to-face and virtual)	Written examination, Computer-based test.
Recognise and be able to apply probabilistic and statistical tools and techniques to solve engineering based problems.	Lectures Tutorials (face-to-face and virtual)	Written examination, Computer-based test.
Develop mathematical models of engineering based systems via the physical laws that they obey.	Lectures Tutorials (face-to-face and virtual)	Written examination.
Make structured assumptions to simplify and thus model real-life Engineering problems.	Lectures Tutorials (face-to-face and virtual)	Written examination.
Analyse models using basic mathematical techniques including statistical and numerical techniques.	Lectures Tutorials (face-to-face and virtual)	Written examination.
Demonstrate an understanding of mathematics and mathematical processes consistent with the syllabus. Reason logically and recognise incorrect reasoning.	Lectures Tutorials (face-to-face and virtual)	Written examination, Computer-based test.