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)	ES1A4
2. Module Title	Statics and Structures
3a. Lead department:	School of Engineering
3b. Teaching Split (if known):	100% School of Engineering
4. Name of module leader	Mr Elia Gironacci
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

Module Summary	
7. Principal Module Aims	The aim of this module is to build fundamental knowledge of statics and behaviour of structures. This will provide the knowledge required for further study in the design and analysis of structures from buildings to bridges, tunnels and other infrastructures. The module will increase the students' ability with mathematical analysis and in particular its application to solving problems in structures. The module will further help in developing experimental skills and awareness of health and safety issues applicable to working in a supervised laboratory.
8. Principal Learning Outcomes	By the end of the module the student should be able to: • Demonstrate knowledge and understanding of basic theory, concepts and methodology necessary to solve problems related to structures under static loading. • Become familiar with mathematical analysis and its application to solving engineering problems related to the behaviour of structures under static loading. • Record and interpret the results of observed practical experiments. • Demonstrate experimental skills. • Show awareness of health and safety issues applicable to working in a supervised laboratory. • Make structured assumptions to simplify and thus model real-life civil engineering problems.
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: 17 hours of lectures, 7 hours of examples classes, 2 hours of revision lectures, 1x1 hour of laboratory preparation, 1x4 hours of laboratory exercises (pin-jointed frame), 1x2 hours of computer-based test, 3x2 hours of laboratory exercises (strain gauge, polariscope, beam bending). Student-led learning comprising of: 2 hours of online tutorials (supporting pre-reading), **Total of 41 hours.**
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)	50% written examination (2 hours) 30% laboratory report (6 pages length) 20% computer-based test.

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	17 hours
Seminars	None
Tutorials	None
Project Supervision	None
Demonstration	None
Practical Class/Workshops	1 x 1 hr of laboratory preparation 3x2 hours of laboratory exercises (strain gauge, polariscope, beam binding). 1x4 hours of laboratory exercises (pin-jointed frame)
Supervised time in studio/workshop	
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 online tutorials (supporting pre-reading) 7 hours of example classes 2 hours of revision lectures 1 x 2 hours of computer-based test

Module Content and Teaching	
	109 hours guided independent learning (including VLE use and support from Employer)

18. Assessment Method (Standard)
Plus, guided independent learning.

Type of assessment	Length	% weighting
Written Examinations	2 hours	50
Practical Examinations		
Assessed essays/coursework	Laboratory report (6 pages length). Computer-based test	30 20
18a. Final chronological assessment *(please see guidance*)	Written examination.	

19. Methods for providing feedback on assessment.

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

20. Outline Syllabus

Part A: Equilibrium and Reactions
1. Forces
2. Moments
3. Friction
4. Hydrostatic pressure
5. Equilibrium
6. Support conditions
7. Reactions

Part B: Truss structures
1. Basic principles; Building with triangles
2. Method of joints
3. Method of sections

Part C: Statically determinate beams and frames
1. Free body diagrams
2. Internal forces and moments in statically determinate beams
3. Internal forces in statically determinate frames

Part D: Deformation of statically determinate beams
1. Bending of elastic beams (elastic curve; moment-curvature relation)

2. Bernoulli beam theory

Part E: Stresses and Strains

1. Stress
2. Strain
3. Stress and strain transformations
4. Principal stresses and strains in a plane
5. Mohr's circle

Part F: Bending, Shear and Torsion of beams

1. Stresses and strains
2. Cross-section analysis (neutral axis; second moment of area; deflection line)

Part G: Elastic buckling, Failure criteria (Tresca, von Mises, Mohr) and Design of structural components

The module will include 4 laboratory exercises.

21. Illustrative Bibliography

Bedford, A. & Fowler, W., 2003, "Engineering Mechanics: Statics & Dynamics Principles", Prentice-Hall. ISBN 9780130082091.

Cain, J.A. & Hulse, R., 2000, "Structural Mechanics", 2nd Ed., Palgrave Macmillan. ISBN 978-0333804575

Hibbeler, R.C., 2014, "Statics and Mechanics of Materials", 4th Ed., Pearson Prentice Hall. ISBN-13: 978-0133451603.

Krenk, S. & Høgsberg, J., 2013, "Statics and Mechanics of Structures". ISBN: 978-94-007-6112-4.

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	Mr Elia Gironacci
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 177-17/18
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**
50%	30 % laboratory report (6 pages length). 20% computer-based test	2 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

Examination Information		
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)**
Demonstrate knowledge and understanding of basic theory, concepts and methodology necessary to solve problems related to structures under static loading.	Lectures, examples classes, laboratory exercises, and computer-based test.	Examination, computer-based test.
Become familiar with mathematical analysis and its application to solving engineering problems related to the behaviour of structures under static loading.	Lectures, examples classes, laboratory exercises, and computer-based test.	Examination.
Record and interpret the results of observed practical experiments.	Laboratory exercises.	Laboratory report.
Demonstrate experimental skills.	Laboratory exercises.	Laboratory report.
Show awareness of health and safety issues applicable to working in a supervised laboratory.	Laboratory exercises.	Laboratory report.
Make structured assumptions to simplify and thus model real-life engineering problems.	Lectures, examples classes, laboratory exercises, and computer-based test.	Examination, computer-based test.