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	01/10/2017
If new, does this module replace another? If so, enter module code and title:	
If revised/discontinued, please outline the rationale for the changes:	
Confirmation that affected departments have been consulted:	Changes were made in consultations between the School of Engineering and WMG.
Module Summary	
1. Module Code (if known)	ES3B6
2. Module Title	Geotechnical Engineering
3a. Lead department:	School of Engineering
3b. Teaching Split (if known):	100% Engineering
4. Name of module leader	Dr Mohaddeseh Mousavi Nezhad
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)	30
7. Principal Module Aims	All Civil Engineers require a sound understanding of geotechnical engineering. This module gives a basic geological knowledge base and introduces a number of fundamental principles and key applications appropriate to the level of the module and the framework of the Warwick courses.
8. Principal Learning Outcomes	By the end of the module the student should be able to.... • Identify the importance and role of geotechnical engineering within the Civil Engineering profession.

Approval information	
	• Construct and interpret geological maps, extending their skills of graphical and spatial interpretation. • Compare a range of soil and rock types, adopting professionally recognised systems for categorisation and description. • Apply the Principle of Effective Stress to a range of typical geotechnical problems in order to predict the ground response under different conditions of loading, soil type and groundwater states. • Select appropriate tests and strength criteria for rocks and soils. Use these to predict their behaviour under loading. Explain the processes active within these materials when loaded. • Analyse problems of enclosed and open groundwater seepage to predict the performance of structures and associated risks. • Analyse problems of instability in soil and rock slopes to predict their performance and associated risks. • Design simple earth retaining structures • Assess the type of foundation required and design in terms of bearing capacity and settlement. • Communicate in a professional and scientific manner. • Apply numerical skills to the solution of geotechnical engineering problems.
9. Timetabled Teaching Activities (summary)	45 hrs lectures, 15 hours of examples classes, 32 hrs of residential fieldwork, 3 hr laboratory **Total 95 hours**
10. Departmental Web-link	http://www2.warwick.ac.uk/fac/sci/eng/eso/modules/year3/es3b6
11. Other essential notes	Advice and feedback hours are available for answering questions on the lecture material (theory and examples).
12. Assessment methods (summary)	Unseen examination 50% and coursework (Geological Map Assignment 15%, Factual SI Report 10 pages 15%, Interpretative SI Report 15 pages 20%). Students must pass the examination, and the pass the coursework overall.

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**	

Approval information

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

14. Availability of module

Degree Code	Title	Study Year	C/OC/ A/B/C	Credits
H211	MEng Civil Engineering	3	C	15
H212	MEng Civil Engineering with Intercalated year	3	C	15
H213	MEng Civil Engineering with a Year in Research	3	C	15
H210	BEng Civil Engineering	3	C	15
H106	BEng Engineering	3	O	15
H107	MEng Engineering	3	O	15
H109	MEng Engineering with Intercalated Year	3	O	15
H110	MEng Engineering with a Year in Research	3	O	15

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

1 (core module)

16. Pre- and Post-Requisite Modules

Post: ES4D8 Advanced Geotechnical Engineering

Module Content and Teaching

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

Module duration (weeks)	20
Lectures	45x1 hours
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Class/Workshops	3x1 hours
Supervised time in studio/workshop	
Fieldwork	32 hours Residential Field Course
External visits	

Module Content and Teaching		
Work based learning		
Placement		
Year abroad		
Other activity *(please describe): e.g. distance-learning, intensive weekend teaching etc.*	205 hours of guided independent learning 15x1 hours Examples Classes	
18. Assessment Method (Standard)		
Type of assessment	**Length**	**% weighting**
Written Examinations	3 hrs	50
Practical Examinations	Hours	
Assessed essays/coursework	Geological Map Assignment Factual SI Report 10 pages Interpretative SI Report 15 pages	15% 15% 20%
18a. Final chronological assessment *(please see guidance*)	Examination	

19. Methods for providing feedback on assessment.
Coursework: individual feedback returned. Feedback in class after submission deadline. Model solutions to recent past papers. Cohort level feedback on examinations.
20. Outline Syllabus
Introduction to geo-hazards, Soil & Rock description and classification, Geological Structures and Maps, Principle of Effective Stress, Permeability and Groundwater flow. Filters. Compressibility and consolidation, Strength of Soils & Rock, Critical State Soil Mechanics Bearing capacity of shallow and deep footings, Settlement of structures, Tolerance limits of settlement. Lateral pressures on retaining structures, Design of anchors and anchorages. Stability of earth-retaining structures. Reinforced soil. Classification & Analysis of Slope Instability in Soil and Rock. Stability of earth dams including end-of-construction, long term and sudden draw down conditions. Slope Stabilisation Techniques Site investigation: Sampling and in-situ testing of rocks and soils. Geotechnical instrumentation.

21. Illustrative Bibliography

Barnes G., Soil Mechanics: Principles and Practice, Palgrave, 3rd ed. 2010
Blyth, F.G.H. & de Freitas, M.H., Geology for Engineers, Butterworth-Heinemann, 2004
Craig, R.F., Soil Mechanics, 8th Ed., Spon Press, 2012
Smith, G.N. & Smith I.N., Elements of Soil Mechanics, 9th Ed., Wiley Blackwell, 2014

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	Dr Mohaddeseh Mousavi Nezhad
25. Date of approval	Teaching Policy Committee Chair's Action 17 August 2017
26. Name of Approving Committee (include minute reference if applicable)	School of Engineering and WMG Teaching Policy Committee
27. Chair of Committee's signature	Professor Gillian Cooke
28. Head of Department(s) signature	Professor Nigel Stocks

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	Geological Map Assignment 15% Factual SI Report (10 pages) 15% Interpretative SI Report (15 pages) 20%	3 hrs
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)?	**N/A**	
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

Examination Information	
If restricted, please provide a list of permitted texts:	N/A

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 17)**	**Which summative assessment method(s) will measure the achievement of this learning outcome? (reference activities in section 18)**
Identify the importance and role of geotechnical engineering within the Civil Engineering profession.	Lectures, www, private study and design work within associated modules.	SI Reports (S).
Construct and interpret geological maps, extending their skills of graphical and spatial interpretation.	Lectures, private study, examples classes.	Maps assignment (S).
Compare a range of soil and rock types, adopting professionally recognised systems for categorisation and description.	Lectures, private study, use of CAL software, laboratory work. Field course.	Laboratory assessment (F). SI Reports (S)
Apply the Principle of Effective Stress to a range of typical geotechnical problems in order to predict the ground response under different conditions of loading, soil type and groundwater states.	Lectures, private study, laboratory work.	Unseen examination (S).
Select appropriate tests and strength criteria for rocks and soils. Use these to predict their behaviour under loading. Explain the processes active within these materials when loaded.	Lectures, private study, Field course.	Laboratory assessment (F). Unseen examination (S). SI Reports (S)
Analyse problems of enclosed and open groundwater seepage to predict the performance of structures and associated risks.	Lectures, private study.	Unseen examination (S).
Analyse problems of instability in soil and rock slopes to predict their performance and associated risks.	Lectures, private study, Fieldwork.	SI Reports (S). Unseen examination (S).
Design simple earth retaining structures	Lectures, private study.	Unseen examination (S).

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 17)**	**Which summative assessment method(s) will measure the achievement of this learning outcome? (reference activities in section 18)**
Assess the type of foundation required and design in terms of bearing capacity and settlement.	Lectures, private study.	Unseen examination (S).
Communicate in a professional and scientific manner.	Geological maps Field Course Reports	Assignments (S)
Apply numerical skills to the solution of geotechnical engineering problems.	Self-study examples questions set on the material covered (see syllabus).	Self-marking against published answers (F). Unseen examination (S).