

## UNIVERSITY OF WARWICK

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

Approval information	
<b>Approval Type</b>	<input type="checkbox"/> New module <input checked="" type="checkbox"/> Revised module <input type="checkbox"/> Discontinue module
<b>Date of Introduction/Change</b>	01/10/2018
<b>If new, does this module replace another? If so, enter module code and title:</b>	
<b>If revised/discontinued, please outline the rationale for the changes:</b>	Updated Teaching and Learning Hours with introduction of tutorials. Minor amendments to module aims, first learning outcome and syllabus, chiefly to reflect environmental content of module. Updates to bibliography.
<b>Confirmation that affected departments have been consulted:</b>	Changes were made in consultations between the School of Engineering and WMG.

Module Summary	
<b>1. Module Code (if known)</b>	ES94Y
<b>2. Module Title</b>	Health, Safety and Environmental Considerations in Tunnelling
<b>3a. Lead department:</b>	School of Engineering (100%)
<b>3b. Teaching Split (if known):</b>	100% Engineering
<b>4. Name of module leader</b>	Dr Alan Bloodworth
<b>5. Level</b>	UG: <input type="checkbox"/> Level 4 (Certificate) <input type="checkbox"/> Level 5 (Intermediate) <input type="checkbox"/> Level 6 (Honours) PG: <input checked="" type="checkbox"/> Level 7 (Masters) <input type="checkbox"/> Level 8 (Doctoral)  See Guidance Notes for relationship to years of study
<b>6. Credit value(s) (CATS)</b>	15

<b>Module Summary</b>	
<b>7. Principal Module Aims</b>	Practicing engineers have a legal and moral responsibility to ensure the health and safety of their colleagues, workforce and the general public, as well as observing environmental laws and best practice. This module outlines the legal framework, identifies the key hazards in tunnelling and underground works and discusses strategies for managing environmental risk and H&S.
<b>8. Principal Learning Outcomes</b>	By the end of the module students should be able to: <ul style="list-style-type: none"> <li>• Demonstrate a comprehensive understanding of the current legislative, ethical and social context pertaining to health, safety and the environment as applied to construction works associated with underground projects</li> <li>• Evaluate potential health, safety and environmental hazards met in the construction and operation of underground spaces.</li> <li>• Apply sound management strategies to the mitigation of health, safety and environmental risks.</li> </ul>
<b>9. Timetabled Teaching Activities (summary)</b>	30 hrs lectures, 3 hrs tutorials.  <b>Total of 33 hours.</b>
<b>10. Departmental Web-link</b>	<a href="http://www2.warwick.ac.uk/fac/sci/eng/eso/modules/year4/es94y/">http://www2.warwick.ac.uk/fac/sci/eng/eso/modules/year4/es94y/</a>
<b>11. Other essential notes</b>	The module is taught in a five-day intensive block (excluding Wednesday afternoon). Pre reading is required before the module with an unseen written test during the module. A feedback session is included on this test. Case studies are presented including by external lecturers to aid understanding of the module content. Advice and feedback hours are available for answering questions on the lecture material.
<b>12. Assessment methods (summary)</b>	Written test 20% 3-hour Written examination 80%

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

<b>Level</b>	<b>JACS3 Code</b>	<b>Teaching Split</b>
		<i>If not provided in 3b above</i>

<b>External Credit Level</b>		<b>Scheme</b>	

Module Context				
<b>13. Please list all departments involved in the teaching of this module. If taught by more than one department, please indicate percentage split.</b>				
School of Engineering, 100%				
<b>14. Availability of module</b>				
Degree Code	Title	Study Year	C/OC/A/B/C	Credits
H214	MSc Tunnelling and Underground Space FT	M1	C	15
H214	MSc Tunnelling and Underground Space PT	M1	OC	15
H214	MSc Tunnelling and Underground Space PT	M2	OC	15
<b>15. Minimum number of registered students required for module to run</b>				
1				
<b>16. Pre- and Post-Requisite Modules</b>				
None				

Module Content and Teaching	
<b>17. Teaching and Learning Activities</b> ( <i>totals for module – please see guidance</i> )	
<b>Module duration (weeks)</b>	1
<b>Lectures</b>	30 hours
<b>Seminars</b>	
<b>Tutorials</b>	3 hours (2hr advice and feedback and 1hr revision)
<b>Project Supervision</b>	
<b>Demonstration</b>	
<b>Practical Class/Workshops</b>	
<b>Supervised time in studio/workshop</b>	
<b>Fieldwork</b>	
<b>External visits</b>	
<b>Work based learning</b>	
<b>Placement</b>	
<b>Year abroad</b>	
<b>Other activity</b> ( <i>please describe</i> ): e.g. distance-learning, intensive weekend teaching etc.	117 hours of guided independent learning

<b>Module Content and Teaching</b>		
<b>18. Assessment Method (Standard)</b>		
Type of assessment	Length	% weighting
Written Test	1 hr	20%
Written Examinations	3 hrs	80%
Practical Examinations		
Assessed essays/coursework		
<b>18a. Final chronological assessment</b> ( <i>please see guidance</i> )	Examination	
<b>19. Methods for providing feedback on assessment.</b>		
<p>In Class Written Test: 1h feedback session for the whole class after test completed.            Examination: publication of recent past examination papers and model solutions or mock paper and solutions where past papers do not exist. Cohort level feedback on examinations.</p>		
<b>20. Outline Syllabus</b>		
<ul style="list-style-type: none"> <li>• The body of legislation, guidance and standards with which designers and particularly contractors must comply</li> <li>• Health, safety and environmental (HSE) considerations at concept planning stage for different tunnel types / uses</li> <li>• Reducing / eliminating hazards to health, safety and the environment by good planning and design</li> <li>• Identification of HSE hazards in tunnel construction and operation, technical knowledge of the hazard, followed by strategies to mitigate these hazards by good design practice</li> <li>• Occupational health and environmental risk during construction and its mitigation</li> <li>• Requirements, tunnel layout and services for road, rail and utility tunnels</li> <li>• Hazard types and safety measures (e.g. Fire, Ventilation, Transport, Machines, etc.)</li> <li>• Risk assessment processes for design, construction, operation and decommissioning Best practice in risk assessment, control and management.</li> <li>• Modern approach to the improvement of safety standards (including Behavioural Based Safety) Safety by design, CDM, risk assessment and competence.</li> <li>• Issues related to working in compressed air.</li> <li>• HAV considerations linked to limitations on the use of hand mining.</li> <li>• Working in confined spaces.</li> <li>• Emergency procedures / planning related to tunnel operations (Tunnel Operators Forum).</li> <li>• Site waste and materials management</li> </ul>		
<b>21. Illustrative Bibliography</b>		
<p>ITA 2008. <i>Guidelines for good occupational health and safety practice in tunnel construction</i>, International tunnelling Association report No.001. ISBN 978-2-9700624-0-0.</p>		

**Module Content and Teaching**

BS 6164:2001. *Code of practice for safety in tunnelling in the construction industry*. BSI, London.

BTS Compressed Air Working Group 2012. *A guide to the Work in Compressed Air Regulations 1996*.

International Tunnelling Insurance Group 2012. *ITIG code of practice for risk management of tunnel works*.

CIRIA 2015. *Environmental good practice on site guide (fourth edition)*. CIRIA Report C741 (Charles, P., Edwards, P., eds.). London: CIRIA.

**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**

<b>24. Module leader's signature</b>	Dr Alan Bloodworth
<b>25. Date of approval</b>	25 April 2018
<b>26. Name of Approving Committee (include minute reference if applicable)</b>	School of Engineering and WMG Course and Module Approval Committee (CMAC), Minute 262-17/18
<b>27. Chair of Committee's signature</b>	Professor Gillian Cooke
<b>28. Head of Department(s) signature</b>	Professor David Towers

Examination Information		
<b>A1. Name of examiner (if different from module leader)</b>		
<b>A2. Indicate all available methods of assessment in the table below</b>		
<b>% Examined</b>	<b>% Assessed by other methods</b>	<b>Length of examination paper</b>
<b>80</b>	<b>20% Written Test</b>	<b>3h</b>
<b>A3. Will this module be examined together with any other module (sectioned paper)? If so, please give details below.</b>		
No		
<b>A4. How many papers will the module be examined by?</b>	<input checked="" type="checkbox"/> 1 paper <input type="checkbox"/> 2 papers	
<b>A5. When would you wish the exam take place (e.g. Jan, April, Summer)?</b>	May	
<b>A6. Is reading time required?</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>A7. Please specify any special exam timetable arrangements.</b>		
None		
<b>A8. Stationery requirements</b>		
<b>No. of Answer books?</b>	1	
<b>Graph paper?</b>	No	
<b>Calculator?</b>	No	
<b>Any other special stationery requirements (e.g. Data books, tables etc)?</b>	None	
<b>A9. Type of examination paper</b>		
<b>Seen?</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>Open Book?</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>Restricted?</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>If restricted, please provide a list of permitted texts:</b>		

<b>LEARNING OUTCOMES</b>		
<b>(By the end of the module the student should be able to....)</b>	<b>Which teaching and learning methods enable students to achieve this learning outcome? (reference activities in section 17)</b>	<b>Which summative assessment method(s) will measure the achievement of this learning outcome? (reference activities in section 18)</b>
Demonstrate a comprehensive understanding of the current legislative, ethical and social context pertaining to health, safety and the environment as applied to construction works associated with underground projects	Lectures, case studies	Written Test, Written examination
Evaluate potential health, safety and environmental hazards met in the construction and operation of underground spaces	Lectures, case studies	Written Test, Written examination
Apply sound management strategies to the mitigation of health, safety and environmental risks	Lectures, case studies	Written Test, Written examination