

## UNIVERSITY OF WARWICK

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

Approval information	
Approval Type	<input type="checkbox"/> New module <input checked="" type="checkbox"/> Revised module <input type="checkbox"/> Discontinue module
Date of Introduction/Change	02/10/2018
If new, does this module replace another? If so, enter module code and title:	
If revised/discontinued, please outline the rationale for the changes:	Changes in the phrasing of the Learning Outcomes. Assessed work grouped to weight overall 30%.
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)	ES4B6
2. Module Title	Global Water and Sanitation Technologies
3a. Lead department:	School of Engineering
3b. Teaching Split (if known):	100% School of Engineering
4. Name of module leader	Dr Terry Thomas
5. Level	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
6. Credit value(s) (CATS)	15 credits
7. Principal Module Aims	Civil Engineers and those with an interest in appropriate technology require some exposure to Public Health engineering. 'Water' is chosen for its high engineering content and because other development technologies were briefly addressed in earlier modules. This module covers the economically significant applications of hydraulic engineering to agriculture (irrigation) - a field of particular employment opportunity for engineering graduates.

Approval information	
<b>8. Principal Learning Outcomes</b>	<p>By the end of the module the student should be able to...</p> <ul style="list-style-type: none"> <li>• Critically analyse common water supply and sanitation technologies and the biological and physical processes underlying them</li> <li>• Show knowledge of economics, engineering and social organisation the best choice between competing technologies for any specific site</li> <li>• Design simple irrigation, water supply and sanitation schemes and size component</li> <li>• Appreciate the significance of approaching global water shortages and possible responses</li> <li>• Understand the basics of process engineering, as illustrated by practices in the water industry</li> <li>• Review a technical case study and present it effectively to a technical audience.</li> </ul>
<b>9. Timetabled Teaching Activities (summary)</b>	28x1 hrs lectures; 2x1 hours revision classes. <b>Total of 30 hours.</b>
<b>10. Departmental Web-link</b>	<a href="http://www2.warwick.ac.uk/fac/sci/eng/eso/modules/year4/es4b6/">www2.warwick.ac.uk/fac/sci/eng/eso/modules/year4/es4b6/</a>
<b>11. Other essential notes</b>	Advice and feedback hours are available for answering questions on the lecture material (theory and examples) and past examination questions.
<b>12. Assessment methods (summary)</b>	70% examination (3 hrs) 30% coursework comprising of: 20% essay (individual; 2000 words); 10% oral presentation.

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

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

External Credit Level	Scheme

<b>Module Context</b>				
<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
H211	MEng Civil Engineering (and variants)	4	A	15
H212	MEng Civil Engineering with Intercalated Year	5	A	15
H213	MEng Civil Engineering with a Year in Research	5	A	15
H21A	MEng Civil Engineering with Exchange Year	4	A	15
H107	MEng Engineering (and variants)	4	A	15
H109	MEng Engineering with Intercalated Year	5	A	15
H110	MEng Engineering with a Year in Research	5	A	15
New	MEng Engineering with Exchange Year	4	A	15
<b>15. Minimum number of registered students required for module to run</b>				
10				
<b>16. Pre- and Post-Requisite Modules</b>				
ES3D5 Water Engineering for Civil Engineers.				

<b>Module Content and Teaching</b>	
<b>17. Teaching and Learning Activities</b> ( <i>totals for module – please see guidance</i> )	
<b>Module duration (weeks)</b>	10
<b>Lectures</b>	28x1 hours
<b>Seminars</b>	None
<b>Tutorials</b>	None
<b>Project Supervision</b>	None
<b>Demonstration</b>	None
<b>Practical Class/Workshops</b>	None
<b>Supervised time in studio/workshop</b>	None
<b>Fieldwork</b>	None

<b>Module Content and Teaching</b>		
<b>External visits</b>	None	
<b>Work based learning</b>	None	
<b>Placement</b>	None	
<b>Year abroad</b>	None	
<b>Other activity</b> <i>(please describe): e.g. distance-learning, intensive weekend teaching etc.</i>	<ul style="list-style-type: none"> <li>• 2x1 hours revision classes</li> <li>• 120 hours of guided independent learning</li> </ul>	
<b>18. Assessment Method (Standard)</b>		
<b>Type of assessment</b>	<b>Length</b>	<b>% weighting</b>
<b>Written Examinations</b>	3 Hours	70
<b>Practical Examinations</b>		
<b>Assessed essays/coursework</b>	Coursework comprising of: essay (individual; 2000 words) 20%, Oral presentation 10%	30
<b>18a. Final chronological assessment</b> <i>(please see guidance)</i>	Written Examination.	

<b>19. Methods for providing feedback on assessment.</b>
Written individual feedback on essay submissions and cohort level feedback on the oral presentation and written exam.
<b>20. Outline Syllabus</b>
<p>Water Supply: engineering of urban systems entailing water treatment; design and dissemination of village-scale systems involving rainwater catchment, pumping or gravity feed from protected sources.</p> <p>Biological and physical processes in water treatment, waste treatment and quality testing.</p> <p>Water and health.</p> <p>Water lifting with special reference to developing countries.</p> <p>Sanitation: choice of technology for urban and rural applications in developing countries, design of sanitation programmes.</p> <p>Irrigation and water control: Inter-relationships between irrigation, hydropower generation, flood and erosion control.</p> <p>Irrigation technology: water requirements of plants, water in soil. Water balances; technical comparison of methods of transporting and distributing water; water harvesting.</p> <p>Irrigation systems: irrigation as a development strategy, roles of farmers, agronomists, engineers and managers, choice of scale in construction and management, environmental and social impacts, success and failure of irrigation schemes in developing countries, case studies.</p>
<b>21. Illustrative Bibliography</b>

"Basic Water Treatment", Binnie, C, 2009, 9780727736086, TD 430.S6  
 "Water Technology", Gray, N.F, 2005, 9780750666336, TD 345.G7  
 "Controlling the Water: Matching Technology and Institutions in Irrigation Management in India and Nepal", Oxford University Press, 2013, ISBN 0198082924  
 "The Management of Water Quality and Irrigation Technologies", Taylor & Francis, 2012, ISBN 1136553223  
 "Water, Sanitation and Hygiene in Humanitarian Contexts: Reflections on Current Practice", Practical Action Publishing, 2015, ISBN 1853398845  
 "Advances in Water Supply, Sanitation and Environmental Management: A Water, Sanitation and Hygiene (Wash) Perspective for Developing Countries", 2014, ISBN-13 9789966720511

## 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 Terry Thomas
<b>25. Date of approval</b>	21 March 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 200-17/18
<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>
70%	30% coursework comprising of: essay (2000 words) 20% and oral presentation 10%	3 hours
<b>A3. Will this module be examined together with any other module (sectioned paper)? If so, please give details below.</b>		
N/A		
<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>	Summer	
<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>		
N/A		
<b>A8. Stationery requirements</b>		
<b>No. of Answer books?</b>	1	
<b>Graph paper?</b>	Yes	
<b>Calculator?</b>	Yes	
<b>Any other special stationery requirements (e.g. Data books, tables etc)?</b>		
<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>	N/A	

<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>
Critically analyse common water supply and sanitation technologies and the biological and physical processes underlying them	Lectures.	Examination
Show knowledge of economics, engineering and social organisation the best choice between competing technologies for any specific site	Lectures.	Examination, essay, oral presentation
Design simple irrigation, water supply and sanitation schemes and size component	Lectures.	Examination
Appreciate the significance of approaching global water shortages and possible responses	Lectures.	Examination, essay, oral presentation
Understand the basics of process engineering, as illustrated by practices in the water industry	Lectures.	Examination, essay, oral presentation
Review a technical case study and present it effectively to a technical audience.	Lectures.	Essay, oral presentation