

University of the West of Scotland

Module Descriptor

Session: 2024/25

Title of Module: Advanced Construction Materials			
Code: ENGG100016	SCQF Level: 10 (Scottish Credit and Qualifications Framework)	Credit Points: 20	ECTS: 10 (European Credit Transfer Scheme)
School:	School of Computing, Engineering and Physical Sciences		
Module Co-ordinator:	John Hughes		
Summary of Module			
<p>The Module is to further extend students' knowledge/understanding of construction materials and particularly to help them to develop an in-depth understanding of the behaviour and characteristics of special and high-performance concrete, stone masonry and repair/conservation materials. It is also to make them aware of the recent advances & development trends in the materials and sustainable construction domain, and to illustrate it on practical examples. These include use of natural renewable/low-carbon engineering materials, nanomaterials and multifunctional materials, waste/recycled materials, etc in the construction industry and the built environment, and material compatibility issues in conservation of built heritage, and the significance in terms of sustainability and the environment. Much of the module is research informed teaching.</p> <p>The Module will consist of a balanced programme of lectures by experts in the field, supported by a number of laboratory/practical work including demonstrations and exercises, where students will learn the relevant standards, and specialist, state-of-the-art testing and building condition surveying techniques.</p> <p>Main Content: Special and high-performance concrete materials: modern constituent materials, self-compacting concrete, fibre reinforced concrete, high strength/durability/performance concrete, environmental impact and sustainability issues, use of waste/recycled/alternative materials, performance-based design, etc. Built Heritage: historic materials and new materials for conservation and repair. Stone masonry: deterioration and effects of repair and cleaning. Nanotechnology application in construction materials: current development and future potentials.</p> <p>This module will work to develop a number of the following key 'I am UWS' graduate attributes: Critical thinker, Inquiring, Collaborative, Research-minded, Knowledgeable, autonomous, innovative and driven.</p>			
Module Delivery Method			

Face-To-Face	Blended	Fully Online	HybridC	Hybrid 0	Work-Based Learning
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
See Guidance Note for details.					

Campus(es) for Module Delivery						
The module will normally be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit) (tick as appropriate)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Add name

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1		Term 2		Term 3	
	<input type="checkbox"/>		<input checked="" type="checkbox"/>		<input type="checkbox"/>

Learning Outcomes:	
At the end of this module the student will be able to:	
L1	Competently assess the latest advances & developments in the construction materials domain. Demonstrate critical awareness of current problems and/or trends associated with the developments.
L2	Develop comprehensive and practical understanding of several important test standards and common techniques for building condition surveying for stone masonry.
L3	Further understand the key characteristics and behaviour of the existing and new construction materials and their main differences, hence apply them most appropriately in the construction industry.

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	During completion of this module, there will be an opportunity to achieve core skills in:
Knowledge and Understanding (K and U)	<p>SCQF Level 10</p> <ul style="list-style-type: none"> Gain and consolidate knowledge and understanding of some more advanced aspects of construction materials and sustainability issues.

	<ul style="list-style-type: none"> Develop critical awareness of some of the recent important developments in construction materials, their benefits, potentials and limitations. 	
Practice: Applied Knowledge and Understanding	<p>SCQF Level 10</p> <ul style="list-style-type: none"> Use a range of specialised skills, techniques, practices and/or materials that are at the forefront of, or informed by forefront developments- through group laboratory work and demonstrations Use a significant range of the principal professional skills, techniques, practices and/or materials associated with the subject/discipline/sector – through coursework. 	
Generic Cognitive skills	<p>SCQF Level 10</p> <ul style="list-style-type: none"> Apply critical analysis, evaluation and synthesis to forefront issues, or issues that are informed by forefront developments in the subject/discipline/sector – through coursework. Critically review, consolidate and extend knowledge, skills, practices and thinking in a subject/discipline/sector – through coursework. Apply appropriate quantitative methods to the experiment and results analysis. 	
Communication, ICT and Numeracy Skills	<p>SCQF Level 10</p> <ul style="list-style-type: none"> Develop practical engineering and ICT skills through group project work and individual coursework/report. Undertake critical evaluations of a range of numerical and graphical data. 	
Autonomy, Accountability and Working with others	<p>SCQF Level 10</p> <ul style="list-style-type: none"> Further develop skills in planning self-learning and improving performance. Exercise substantial autonomy and initiative in lab/practical activities. Take responsibility for own work and/or significant responsibility for the work of others. 	
Pre-requisites:	Before undertaking this module, the student should have undertaken the following:	
	Module Code:	Module Title:
	Other:	
Co-requisites	Module Code:	Module Title:

*Indicates that module descriptor is not published.

Learning and Teaching	
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours.	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	Student Learning Hours (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture/Core Content Delivery	28
Laboratory/Practical Demonstration/Workshop	16
Tutorial/Synchronous Support Activity	4
Independent Study	152
	200 Hours Total

****Indicative Resources: (eg. Core text, journals, internet access)**

The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

Various handout materials, resources available on VLE, Construction Information Services data base.

Extension Resources: Consultation of the undernoted resources is recommended and material from these resources may be of benefit to the student in the assessment process:

- A.M. Neville: "Properties of Concrete", 4th Edition, Longman, 1995.
- A.Bentur: "Fibre reinforced Cementitious Composites", London, Elsevier, 1990.
- EFNARC, et al, "The European Guidelines for Self Compacting Concrete", 2005, <http://www.efnarc.org/pdf/SCCGuidelinesMay2005.pdf>.
- NRMCA: "Self-consolidating Concrete", 2006, <http://www.selfconsolidatingconcrete.org/default.htm>
- Forster, A., "Building conservation philosophy for masonry repair: part 1 – "ethics"", Structural Survey, Vol. 28 No. 2, 2010, pp. 91-107
- Fitzner, Bernd , (2004), "Documentation and evaluation of stone damage on monuments", 10th International congress on deterioration and conservation of stone, Stockholm, p 677-690
- Hyslop, Ewan K.; Albornoz-Parra, Luis J.; Fisher, Lydia C.; Hamilton, Sarah L.. 2006 "Safeguarding Glasgow's stone built heritage skills and materials requirements : facade surveys and building stone analysis." Nottingham, UK, British Geological Survey, 52pp. (CR/06/077N) (Unpublished)
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- Warke, P., Curran, J.M., Turkington, A.V. & Smith, B.J. (2003). "Condition assessment for building stone conservation: a staging system approach." *Building and Environment*, 38(9-10), 1113–1123. doi:10.1016/S0360-1323(03)00085-4
- ICOMOS-ISCS : Illustrated glossary on stone deterioration patterns Glossaire illustré sur les formes d'altération de la pierre - available at https://www.icomos.org/publications/monuments_and_sites/15/pdf/Monuments_and_Sites_15_ISCS_Glossary_Stone.pdf

(**N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance and Engagement Requirements

In line with the [Student Attendance and Engagement Procedure](#): Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time.

For the purposes of this module, academic engagement equates to the following: As above

Equality and Diversity

The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: [UWS Equality, Diversity and Human Rights Code](#).

Please ensure any specific requirements are detailed in this section. Module Co-ordinators should consider the accessibility of their module for groups with protected characteristics..

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	Engineering
Assessment Results (Pass/Fail)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

School Assessment Board	Civil Engineering and Quality Management
Moderator	Wenzhong Zhu
External Examiner	Jonathan Oti
Accreditation Details	This module is accredited by the Joint Board of Moderators as part of BEng (Hons) Civil Engineering & GA-BEng (Hons) Civil Engineering.
Changes/Version Number	2.14

Assessment: (also refer to Assessment Outcomes Grids below)
Assessment 1 – Unseen online open book examination (60%)
Assessment 2 – Coursework (40%) (Two reports, worth 20% each)
(N.B. (i) Assessment Outcomes Grids for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An indicative schedule listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

Assessment Outcome Grids (See Guidance Note)

Component 1					
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Unseen open book examination	✓	✓	✓	60	2

Component 2					
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Report of practical/field/clinical work	✓	✓	✓	40	0

Combined Total for All Components				100%	2 hours
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