

University of the West of Scotland

Module Descriptor

Session: 2024/25

Title of Module: Construction and Structural Engineering 2			
Code: ENGG09015	SCQF Level: 9 (Scottish Credit and Qualifications Framework)	Credit Points: 20	ECTS: 10 (European Credit Transfer Scheme)
School:	School of Computing, Engineering and Physical Science		
Module Co-ordinator:	Stuart Tennant		
Summary of Module			
<p><u>Construction:</u> The construction technology theme will review fundamental functional and performance requirements of buildings. Principal areas to be addressed include site investigation, site set-up and management of the building process. Substructure will evaluate site conditions, stability, foundation types and basement construction. Superstructure examines framed building techniques, evaluating structural steel, in situ RC and pre-cast concrete frame construction. Construction performance requirement integrates Health & Safety practice and management.</p> <p><u>Structural Engineering 2</u></p> <p><u>Deformations</u></p> <ul style="list-style-type: none"> • Principles of Virtual and Real Work, Internal Strain Energy and • Conservation of Energy. Using Real and Virtual Work methods to calculate deflections of: <ol style="list-style-type: none"> a. Pin-jointed trusses due to external loads, temperature change or lack-of-fit. b. Beams and frames due to external loads. <p><u>Masonry</u></p> <ul style="list-style-type: none"> • Introduction to masonry material - Design to Eurocodes BS EN1996-1-1, BS • EN1990 and BS EN771-4 of: <ol style="list-style-type: none"> a. Axially-loaded masonry walls. b. Laterally-loaded freestanding masonry walls. <p>Design Philosophy: Limit States Design, ULS and SLS.</p> <p>•</p> <p><u>Structural Steelwork Design</u></p> <ul style="list-style-type: none"> • Design to Eurocode BS EN1993-1-1. • Taking-off permanent and variable characteristic loads. • Flexural members, lateral-torsional buckling of equal-flanged unrestrained • sections, buckling resistance moment. • Design for shear and deflection control. • Column behaviour and Euler theory; columns subject to combined axial and • bending loads; buckling parameters, slenderness, buckling lengths and • compression resistance. <p>Design of steel baseplates for axially-loaded columns; column-to-baseplate connection by welding and holding-down bolts.</p>			

General

- Sustainability: with reference to construction technology, material selection and structural design.

This module aims at supporting students to develop their UWS graduate attributes, namely: Academic (critical and analytical thinking, inquiring, knowledgeable, innovation, and problem-solving); Personal (effective communicator, creative, imaginative); Professional (Collaborative, research-minded, and socially responsible).

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	<input type="checkbox"/>	Term 2	<input checked="" type="checkbox"/>	Term 3	<input type="checkbox"/>
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Learning Outcomes: (maximum of 5 statements)

These should take cognisance of the SCQF level descriptors and be at the appropriate level for the module.

At the end of this module the student will be able to:

L1	To determine the performance requirements and construction processes required in site logistics, ground works, basements, foundations, floors and building superstructures.
L2	To determine the appropriate application of Construction Health & Safety, Construction Regulations and CDM Regulations (2015)
L3	To analyse structural beams and frames using a range of methods, and to design masonry elements.

L4	To design a range of elements of a steelwork building.
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 9 Demonstrate a broad and integrated knowledge and understanding of the scope, main areas and boundaries of the subjects in the module.</p> <p>Demonstrate detailed knowledge in some areas of the subjects in the module.</p> <p>Demonstrate further knowledge and understanding of essential facts, concepts, theories and principles of the subjects in the module.</p> <p>Demonstrate K&U of design and construction of foundations, concrete ground floors, basements, pipelines, roads and temporary works and construction plant. Cavity wall, cross wall, fin wall and diaphragm wall masonry construction.</p> <p>Demonstrate awareness of CDM regulations.</p> <p>Demonstrate K&U of structural steel construction.</p>
Practice: Applied Knowledge and Understanding	<p>SCQF Level 9 Use a selection of the principal skills, techniques, practices and materials associated with the subjects in the module.</p> <p>Use a few skills, techniques, practices and materials that are specialized.</p> <p>Possess knowledge, understanding and practical engineering skills acquired through work carried out in laboratories and through design work.</p> <p>Develop understanding to assist with industrial training in industry.</p>
Generic Cognitive skills	<p>SCQF Level 9 Identify and analyse routine professional problems and issues.</p> <p>Draw on a range of sources in making judgements.</p> <p>Be able to apply appropriate quantitative science and engineering tools to the analysis of problems.</p> <p>Ability to use appropriate design codes of practice and industry standards.</p>
Communication, ICT and Numeracy Skills	<p>SCQF Level 9 Use a wide range of routine skills and some advanced and specialised skills in support of established practices in the subject, for example: Interpret, use and evaluate numerical and graphical data to achieve goals/targets.</p>

Autonomy, Accountability and Working with others	<p>SCQF Level 9</p> <p>Exercise autonomy and initiative in some activities at a professional level.</p> <p>Work under guidance with qualified practitioners.</p> <p>Further develop skills in planning self-learning and improving performance, as the foundation for lifelong learning/CPD.</p>	
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	
<p>The module delivery framework is a balance of in-person events, synchronous events and asynchronous activities. The learning and teaching engagement for this module include the following; Lecture / core content delivery (24 hours), Tutorial /synchronous activity (12 hours) and Independent study (164 hours). Independent study includes the following: Courseworks, Problem Based Learning, Self-Study including consolidation week, examination and feedback & reflection.</p> <p>Formative feedback will be provided for academic activities. Formative feedback may take the form of question-and-answer sessions undertaken within lectures / delivery of core content; through worked examples, design exercises, feedback on presentations and/or discussion groups during tutorials. Additional forums include submitting coursework and receiving formative reports for feedback; comments on the tutorial/practical work during the session, response to emails and the use of online Forums on VLE, Aula and Turnitin Gradebook for the assessments. All students will receive formative and summative feedback.</p>	
<p>Learning Activities</p> <p>During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:</p>	<p>Student Learning Hours (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)</p>
Lecture/Core Content Delivery	24
Tutorial/Synchronous Support Activity	12
Independent Study	164
	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:

McKenzie I., "Part Set of Course Notes & Tutorial Problems": available from the Printing Shop.

Tooth C.J., "Steel Design Notes & Tutorials": available from Moodle. Selected Extracts from Eurocodes:- EN 1990, & Eurocodes 1 & 3.

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:

Construction:

Riley&Cotgrove; Construction Technology 2.

Emmit, Gorse; Barry's Advanced Construction of Buildings.

CDM Regulations 2015

Structural Engineering 2

Brohn, D., "Understanding Structural Analysis", New Paradigm.

Ghali, A., Neville, A. & Brown, T., "Structural analysis: a unified classical and matrix approach", Spon Press.

MacLeod, I., "Modern structural analysis: modelling process and guidance", Thomas Telford.

Gulvanessian, H., Calgaro, J-A., and Holicky, M., "Designers' Guide to EN1990, Eurocode: Basis of structural design", Thomas Telford Publishing.

Gardner, L., & Nethercot, D. A., "Designers' Guide to EN1993-1-1, Eurocode 3: Design of steel structures general rules and rules for buildings", Thomas Telford Publishing.

Arya, C., "Design of Structural Elements" 2nd edition, Spon.

MacGinley, T J., "Steel Structures – Practical Design Studies", Spon.

Steel Construction Institute, Davison, B, Owens, G.W. "Steel Designers Manual", Wiley-Blackwell.

IStructE, "Manual for the design of steelwork building structures".

McKenzie, W, "Design of Structural Steelwork to BS5950 and EC2", MacMillan.

Curtin, Shaw, Beck, Bray, Easterbrook, "Structural masonry designers' manual", Wiley-Blackwell. IStructE, "Manual for the design of plain masonry in building structures", SETO, London.

Hendry, A. W., "Structural Masonry", MacMillan.

Westbrook, R., "Structural Engineering Design in Practice", Longman. IStructE, "Stability of buildings".

SOFTWARE Oasys GSA (General Structural Analysis), by Arup.

(**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: Please refer to the UWS Academic Engagement Procedure.

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	Andrzej Wrzesien
External Examiner	Marina Bock
Accreditation Details	This module is accredited by the Joint Board of Moderators as part of BEng (Hons) Civil Engineering.
Changes/Version Number	Changes – change examination assessment component from online (unseen closed book) to the following on-campus (Unseen Closed Book Class Test) / update external examiner. Version: Previous Version 2.13 Current Version 2.14

Assessment: (also refer to Assessment Outcomes Grids below)

Assessment 1: Assessment 1 contributes 40% to the final mark and is made up of two sub-components; (1) a report-based exercise exploring construction technology and construction health and safety management and (2) a design-based assessment evaluating structural design and analysis.

Assessment 2: Assessment 2 is a 2-hour unseen closed book class test that contributes 60% to the final mark (section A and Section B – attempt all five questions).

(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)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Dissertation/ Project report/ Thesis + Design/ Diagram/ Drawing/ Photograph/ Sketch/	✓	✓		✓	40	0

Component 2						
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Unseen Closed Book Class Test	✓	✓	✓	✓	60	2

Combined Total for All Components					100%	2 hours
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