Module Descriptor

Title	Construction and Structural Engineering 2		
Session	2025/26	**Status**	Published
Code	ENGG09015	**SCQF Level**	9
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Computing, Engineering and Physical Sciences**		
Module Co-ordinator	S Tennant		

Summary of Module

Construction: 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.

Structural Engineering 2

Deformations

Principles of Virtual and Real Work, Internal Strain Energy and Conservation of Energy. Using Real and Virtual Work methods to calculate deflections of:

Pin-jointed trusses due to external loads, temperature change or lack-of-fit.

Beams and frames due to external loads.

Masonry

Introduction to masonry material - Design to Eurocodes BS EN1996-1-1, BS EN1990 and BS EN771-4 of:

Axially-loaded masonry walls.

Laterally-loaded freestanding masonry walls.

Design Philosophy: Limit States Design, ULS and SLS.

Structural Steelwork Design

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.

Design of steel baseplates for axially-loaded columns; column-to-baseplate connection by welding and holding-down bolts.

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	**On-Campus**[1] ☒	**Hybrid**[2] ☐	**Online**[3] ☐	**Work -Based Learning**[4] ☐
Campuses for Module Delivery	☐ Ayr ☐ Dumfries	☐ Lanarkshire ☐ London ☒ Paisley	☐ Online / Distance Learning ☐ Other (specify)	

Terms for Module Delivery	Term 1	☐	Term 2	☒	Term 3	☐
Long-thin Delivery over more than one Term	Term 1 – Term 2	☐	Term 2 – Term 3	☐	Term 3 – Term 1	☐

Learning Outcomes	
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.
L5	

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:**

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

Knowledge and Understanding (K and U)	**SCQF 9** Demonstrate a broad and integrated knowledge and understanding of the scope, main areas and boundaries of the subjects in the module. Demonstrate detailed knowledge in some areas of the subjects in the module. Demonstrate further knowledge and understanding of essential facts, concepts, theories and principles of the subjects in the module. 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. Demonstrate awareness of CDM regulations. Demonstrate K&U of structural steel construction.
Practice: Applied Knowledge and Understanding	**SCQF 9** Use a selection of the principal skills, techniques, practices and materials associated with the subjects in the module. Use a few skills, techniques, practices and materials that are specialized. Possess knowledge, understanding and practical engineering skills acquired through work carried out in laboratories and through design work. Develop understanding to assist with industrial training in industry.
Generic Cognitive skills	**SCQF 9** Identify and analyse routine professional problems and issues. Draw on a range of sources in making judgements. Be able to apply appropriate quantitative science and engineering tools to the analysis of problems. Ability to use appropriate design codes of practice and industry standards.
Communication, ICT and Numeracy Skills	**SCQF 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.
Autonomy, Accountability and Working with Others	**SCQF 9** Exercise autonomy and initiative in some activities at a professional level. Work under guidance with qualified practitioners. Further develop skills in planning self-learning and improving performance, as the foundation for lifelong learning/CPD.

Prerequisites	**Module Code**	**Module Title**
	Other	
Co-requisites	**Module Code**	**Module Title**

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.

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.

Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture / Core Content Delivery	24
Tutorial / Synchronous Support Activity	12
Independent Study	164
Please select	
Please select	
Please select	
TOTAL	200

Indicative Resources

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, M. and Cotgrove, A., (2014) Construction Technology 2: Industrial and Commercial Building, 3rd. Ed. Bloomsbury Visual Arts.

Emmit, S. and Gorse, A.G., (2014) Barry’s Advanced Construction of Buildings, 3rd. Ed. Wiley-Blackwell.

Joyce, R., (2015) CDM Regulations 2015 explained, ICE publication.

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Brohn, M.D., (2005) Understanding Structural Analysis, New Paradigm.

Ghali, A., (1978) Structural analysis: a unified classical and matrix approach, Methuen.

MacLeod, I.A., (2005) Modern structural analysis: modelling process and guidance, Thomas Telford.

Gulvanessian, H., Calgaro, J-A. and Holicky, M., (2012) Designers’ Guide to EN1990, Eurocode: Basis of structural design, Thomas Telford Publishing.

Gardner, L. and Nethercot, D. A., (2011) Designers' Guide to EN1993-1-1, Eurocode 3: Design of steel structures general rules and rules for buildings, Thomas Telford Publishing.

Arya, C. (2002) Design of Structural Elements, 2nd edition, Spon.

MacGinley, T J. and Hageim, H.A. (2005) Steel Structures – Practical Design Studies, Spon.

Davison, B, and Owens, G.W. (2003) Steel Designers' Manual - The Steel Construction Institute Wiley-Blackwell.

IStructE (2008), Manual for the design of steelwork building structures.

Curtin, W.G, Shaw, S., Beck, J.K., Bray, W.A. and Easterbrook, D. (2008) Structural masonry designers' manual", Wiley-Blackwell. IStructE, "Manual for the design of plain masonry in building structures", SETO, London.

Hendry, A. W. (1998) Structural Masonry", MacMillan.

Westbrook, R. and Walker, D. (1996) Structural Engineering Design in Practice", Longman.

IStructE. (1988) Stability of buildings, I StructE.

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:

The School of Computing, Engineering and Physical Sciences considers attendance and engagement to mean a commitment to attending, and engaging in timetabled sessions. Students will scan their attendance via the attendance scanners each time they are on-campus. Students will have attendance recorded in class and they will be expected to login to the VLE several times per week. Students who are unable to attend a timetabled learning session, due to illness or other circumstance, should notify their Programme Leader. Across the School an 80% attendance threshold is set. Students who fall below this, will be referred to the Student Success Team to see how they can be best supported in their studies.

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.

Aligned with the University's commitment to equality and diversity, this module supports equality of opportunity for students from all backgrounds and learning needs. Using the VLE, material will be presented electronically in formats that allow flexible access and manipulation of content. This module complies with University regulations and guidance on inclusive learning and teaching practice. This module has lab-based teaching and as such students are advised to speak to the Module Co-ordinator to ensure that specialist assistive equipment, support provision and adjustment to assessment practice can be put in place, in accordance with the University's policies and regulations.

(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 Physical Sciences**
Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☐ **Yes** ☒ **No** **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**
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.
Module Appears in CPD catalogue	☒ **Yes** ☐ **No**
Changes / Version Number	2.14 No changes for AY2526 Delivery

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 four questions).
Assessment 3
(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.)

Component 1							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Dissertation/ Project report/ Thesis	☒	☒	☐	☒	☐	40	0

Component 2

Assessment Type	LO1	LO2	LO3	LO4	LO5	Weighting of Assessment Element (%)	Timetabled Contact Hours
Unseen Closed Book Class Test	☒	☒	☒	☒	☐	60	2

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
	☐	☐	☐	☐	☐		
Combined total for all components						100%	hours

Change Control

What	When	Who
AY2324 - AY2425:Changes – change examination assessment component from online (unseen closed book) to the following on-campus (Unseen Closed Book Class Test) / update external examiner.	AY2425	MC