STRU: Build Technology, Materials and Structures 5

Module Title:	Build Technology, Materials and Structures 5
Language of Instruction:	English

Credits:	5

NFQ Level:	7

Module Delivered In	2 programme(s)

Teaching & Learning Strategies:	• Lecture delivery – 4 hours per week total, varying between Technology, Structures & Materials. Some delivery may be in Studio 5 • Continuous assessment projects – typically one each for Technology, Structures & Materials, overlapping with Studio 5 assessment • Lab Experiments • Model Making • Tutorials • The key teaching & learning strategy is integration/'feeding-in', through content & timing, of Technology, Structures & Materials instruction with Studio 5 thesis project, to allow application of Technology, Structures & Materials theory with formative feedback

Module Aim:	• To provide the theoretical and technical background in construction technology, materials and structures for learners to detail and apply in Studio 3 projects, through familiarizing them with the characteristics of the main internal & external building materials/finishes used in medium to large scale non-domestic construction • To familiarize learners with the materials, principles, typical details and implementation of commercial fit-outs & steel structures, including primary, secondary and tertiary structures as they affect architectural technology • To familiarize learners with the technologies, principles, materials, span characteristics, support requirements and typical details required for the non- structural completion of medium to large scale non-domestic buildings, including a comprehensive range of glazing, curtain walling, cladding, roofing and internal fit-out components and systems • To develop learners' understanding of the accommodation for and integration of services within medium to large scale non- domestic buildings • To develop learners' comprehensive understanding of specification

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	• Research and apply the structural & constructional principles of steel framed construction in medium to large scale construction projects
LO2	• Research and apply the technological & material principles of non-structural completions, including a comprehensive range of glazing, curtain walling, cladding, roofing and internal fit-out components and systems in medium to large scale construction projects
LO3	• Research and apply the technological & material principles of NZEB and energy performance for non-domestic buildings, including the assessment of non-domestic BER through the use of the iSBEM/IES software
LO4	• Allow for the integration of conventional and renewable services with the building fabric of a medium to large scale non-domestic building
LO5	• Prepare detailed specifications for a range of construction elements

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
No requirements listed

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Module Content & Assessment

Indicative Content
Building Technology Medium to large scale steel-framed building with basement: steel structures, including primary, secondary and tertiary structures as required to support the building fabric, basement construction options including RC and sheet piling, floor/roof plate options including precast and structural steel decking, dry construction external wall including Metsec type systems, rainscreen cladding systems, metal and membrane roof finishes, structural glazing, curtain-walling and high-performance aluminium windows, internal completions, fit-out & finishes suitable to a particular building use, site finishes & services, achieving required fire safety performance, comprehensive services integration. Commercial fit-out: Partitioning, raised floors, suspended ceilings, custom joinery design & detailing, floor & wall finishes, paints and surface finishes, internal doors and screens, achieving required fire safety performance, services integration. Part L compliance through NZEB detailing, BER rating and iSBEM/IES evaluation.
Materials Non-domestic building materials both internal and external: Glass: Advanced glass & glazing properties, including structural use of glass & associated sealants, frameless and bolt-fixing, glass safety, self-cleaning glass, glass coatings, energy and acoustic performance of glass. Glass and glazing in existing buildings. Timber: Timber for joinery applications: machining & preparation of timber for joinery, characteristics of timber for joinery, species, veneers, use of board products in joinery. Finishes for timber in joinery, stains, varnishes & lacquers, fire treatments. Non-domestic building materials both internal and external: Glass: Advanced glass & glazing properties, including structural use of glass & associated sealants, frameless and bolt-fixing, glass safety, self-cleaning glass, glass coatings, energy and acoustic performance of glass. Glass and glazing in existing buildings. Timber: Timber for joinery applications: machining & preparation of timber for joinery, characteristics of timber for joinery, species, veneers, use of board products in joinery. Finishes for timber in joinery, stains, varnishes & lacquers, fire treatments. Timber in existing buildings, including defects & agents of deterioration. Concrete: In-situ, precast, reinforced, pre-stressed as used in conjunction with steel structures. Precast flooring systems, In-situ, precast, reinforced, pre-stressed as used in conjunction with steel structures, concrete topping to structural metal decks. Concrete & masonry in existing buildings, including defects and agents of deterioration. Metals & products: Ferrous & non ferrous, use in building, steel, galvanizing, stainless steel, copper, zinc, brass, aluminium, galvanic reactions, durability, protection methods, steel and aluminum for decking, roofing, cladding & flashings. Metals in existing buildings, including defects and agents of deterioration. Plastics and products: Polymers, sheeting, fittings and paint systems: uPVC roofing membranes, polycarbonate sheeting for roofing and wall glazing, ETFE for building envelopes, PVC and PTFE for fabric structures, plastics for fixings & connections, specialist paints & coatings. Recycled materials and products: Plastics, metals, paper, glass, brick, lifecycle and re-use of materials.
Structures Structural Steel • Floor Grids • Vertical Coordination • Lateral Stability Options • Floor Systems o Integrated beams and deep composite slab o Integrated beams with precast slabs o Composite beams and slab o Fabricated beams with web openings o Cellular composite beams o Metal deck composite floor options & details • Services Integration • Initial scheming of steel framed structure • Bolted and welded connections • Handling Tolerances • Fire Protection Basement Construction • Retaining Wall Options • Tying and Propping of retaining walls • Buoyancy Issues • Ground movements and adjacent buildings • Groundwater issues Foundations • Foundation options for framed buildings • Piling, pile caps & ground beams Cladding • Structural Support Details for cladding systems to meet requirements of projects Structures: Structural Steel • Floor Grids • Vertical Coordination • Lateral Stability Options • Floor Systems o Integrated beams and deep composite slab o Integrated beams with precast slabs o Composite beams and slab o Fabricated beams with web openings o Cellular composite beams o Metal deck composite floor options & details • Services Integration • Initial scheming of steel framed structure • Bolted and welded connections • Handling Tolerances • Fire Protection Basement Construction • Retaining Wall Options • Tying and Propping of retaining walls • Buoyancy Issues • Ground movements and adjacent buildings • Groundwater issues Foundations • Foundation options for framed buildings • Piling, pile caps & ground beams Cladding • Structural Support Details for cladding systems to meet requirements of projects Structural Behaviour • Building Load Paths • Lateral Stability of Buildings, Shear Walls, Bracing

Assessment Breakdown	%
Project	40.00%
End of Module Formal Examination	60.00%

No Continuous Assessment

Project

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Technology: specification associated with Studio 3 project (typically) Materials & Structures: two to three projects (typically); at least one from each area	1,2,4,5	40.00	n/a

No Practical

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	3 hour exam; 50% for Technology and 25% each for Materials & Structures	1,2,3,4	60.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	4.00
Estimated Learner Hours	12 Weeks per Stage	6.42
	Total Hours	125.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_CMARC_B	Bachelor of Science (Honours) in Architectural Technology	6	Mandatory
CW_CMART_D	Bachelor of Science in Architectural Technology	6	Mandatory