

Module Title:	Build Technology, Materials and Structures III
Language of Instruction:	English
Credits:	10
NFQ Level:	7
Module Delivered In	No Programmes
Teaching & Learning Strategies:	<ul style="list-style-type: none"> • Lecture delivery – 4 hours per week total, varying between Technology, Structures & Materials. Some delivery may be in Technical Design & Detailing 3 • Continuous assessment projects – typically two each for technology, structures & materials, feeding into Technical Design & Detailing 3 plus two specifications • Lab Experiments • Model Making • Tutorials • The key teaching & learning strategy is integration/‘feeding-in’, through content & timing, of Technology, Structures & Materials instruction with Technical Design & Detailing 3 projects, including CA assignments, to allow application of Technology, Structures & Materials theory with formative feedback
Module Aim:	<ul style="list-style-type: none"> • To provide the theoretical and technical background in construction, materials and structures for learners to detail and apply in TD&D3 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, energy performance upgrades to existing buildings & 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	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Research and apply the structural & constructional principles of steel and framed construction to medium to large scale construction projects
LO2	<ul style="list-style-type: none"> • 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 to medium to large scale construction projects
LO3	<ul style="list-style-type: none"> • Research and apply the technological & material principles of energy performance upgrades for existing buildings, including the assessment of non-domestic BER through the use of the iSBEM software
LO4	<ul style="list-style-type: none"> • Allow for the integration of conventional and renewable services with the building fabric of a medium to large scale non-domestic building
LO5	<ul style="list-style-type: none"> • Prepare detailed specifications for a range of construction elements
Pre-requisite learning	
Module Recommendations	
<i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
Incompatible Modules	
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements	
<i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

Module Content & Assessment

Indicative Content

Building Technology

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 Energy performance upgrade of existing buildings: Surveying & analysis of existing buildings, assessment of existing construction including moisture management, breathability etc, existing building defects and remedial work, insulation options for upgrade of floor, walls and roof, airtightness, BER rating and iSBEM, services upgrade and integration 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-wall 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

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. 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

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: Two drawing notebook projects & two specifications (typically) Materials & Structures: two to three projects (typically); at least one from each area	1,2,3,4,5	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

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	30 Weeks per Stage	4.00
Estimated Learner Hours	30 Weeks per Stage	4.00
Total Hours		240.00

