

Module Title:	Building Technology, Materials and Structures II
Language of Instruction:	English

Credits:	10
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NFQ Level:	6
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Module Delivered In	No Programmes
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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 2 • Continuous assessment projects – typically two each for technology, structures & materials, feeding into Technical Design & Detailing 2, 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 2 projects, including CA assignments, to allow application of Technology, Structures & Materials theory with formative feedback
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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&D2 projects, through introducing them to the characteristics of the main internal & external building materials/finishes used in small to medium scale non-domestic construction • To familiarize learners with the materials, principles, typical details and implementation of timber structures, sustainable site development & ground-works; non-domestic masonry cross-wall construction; concrete structures both pre-cast & cast in-situ and 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 small to medium scale non-domestic buildings, including glazing, curtain walling, cladding, roofing and partitioning • To develop learners’ understanding of the integration of services with small to medium scale non-domestic buildings • To develop learners’ understanding of specification
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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 blockwork, cross-wall, precast & insitu concrete and timber construction to small to medium scale construction projects
LO2	Research and apply the technological & material principles of non-structural completions, including glazing, curtain walling, cladding, roofing and partitioning to small to medium scale construction projects
LO3	Allow for the integration of basic services with the building fabric of a small to medium scale non-domestic building
LO4	Prepare a detailed specification for a given construction element

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

Technology

Timber structures & construction: framed & panel timber structures, timber partitions, timber cladding, high-performance timber & composite windows, rooflights, engineered timber, fire-retardant finishes, moisture management (vapour barrier, breather membrane, DPM, DPC), services integration Sustainable site planning & construction: Construction of paving & other hard landscaping surfaces, sustainable drainage, soft landscaping and street furniture Apartment building & cross-wall construction: Building envelope & structure, walls (415mm cavity & external insulation), precast concrete floor & stair construction, curved metal & green roofs, thermally broken balcony details, construction for lifts, high performance windows & doors Concrete construction: insitu & precast: Advantages & disadvantages of insitu & precast concrete, insitu structures, types and factors affecting formwork, insitu concrete finishes internal & external, reinforcement, insitu concrete remedial work, insitu stairs, junctions with other materials, precast concrete structures, components, tolerances, precast concrete details, precast concrete cladding Building envelope: factors affecting selection of a structural solution, framed & panel structures, principles of primary, secondary & tertiary structures, framed building envelope, characteristics & concepts of cladding, cladding types, metal, stone, blockwork/brickwork, ceramics / terracotta, timber, lining to cladding, moisture management (vapour barrier, breather membrane, DPM, DPC), services integration Roofing types: membranes, metal, asphalt. Glazing & curtain-walling.

Materials

Materials: Non-domestic building materials both internal and external: Glass: Manufacture, properties, treatment, types and uses Timber: Moisture contents, stress grading, connections, preservative treatment, sheets and engineered timber products; Moisture & creep movements, Concrete: In-situ, precast, reinforced, pre-stressed. Precast flooring systems, Concrete finishes (floor slab, formed finishes, exposed aggregate) Concrete Block Paving: Blocks and flags, sizes, bond patterns, surface finishes, PPV values, pavement make up, edge restraint details, vehicular usage. Thermal Insulating materials: Conduction, Convection, Radiation, Thermal properties of materials, Forms of insulation, Materials, Factors in selection, How insulation works and aging factors. Bitumen and Asphalt Roofing Materials: Mastic Asphalt – manufacture, properties, roof construction, finishes. Bituminous Sheets – manufacture, sheet classification, performance, construction, finishes. Polymeric Single Ply Roof Membranes Masonry products: Bricks and Blocks, clay, concrete, calcium silicate, mortars, properties, durability, dimensional changes, bed joint reinforcement, lintels, wind posts. Plastics and products; polymers, sheeting, fittings and paint systems Metal and products; ferrous and non ferrous, use in building

Structures

Masonry • Vertical Load Bearing • Lateral Load Bearing • Bed Joint Reinforcement • Lintels Concrete. • RC slab – span arrangements, typical span/depth ratios • Precast Slabs – types, span ranges, typical span/depth ratios • RC Beams – framing arrangements, typical span/depth ratios • RC Columns – sizing guidelines. • Precast Frames – beam column frames, o • Steel Single Storey Frames • Framing Arrangements • Lateral Stability • Framing around opening • Column base details Cladding • Structural Support Details for cladding systems to meet requirements of projects. Overall Structural Behaviour Building Load Paths Lateral Stability of Buildings, Shear Walls, Bracing Structural Timber • Timber Frame structural systems • Approx Sizing timber members for scheming stage • Lateral stability systems in timber frame buildings Material Laboratory Sessions • Timber – density, moisture content, examination of timber slides under microscope, examination of timber samples, • Concrete – slump test, concrete cube tests, density, • Steel – tensile test

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	• Two Technology projects & two specifications • Two Materials projects • Two Structures projects • Or as appropriate	1,2,3,4	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 formal exam	1,2,3	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	6.00
Total Hours		300.00

