TECH H1521: Build Tech, Materials & Struct I

Module Title:	Build Tech, Materials and Struct
Language of Instruction:	English

Credits:	10

NFQ Level:	6

Module Delivered In	No Programmes

Teaching & Learning Strategies:	Lectures Case studies Visiting lecturers Site visits Lab Work Tutorials

Module Aim:	The aims of the subject are: (1) to familiarise students with building materials, both traditional and new, in order to make the correct choices when detailing buildings and to develop an understanding of the functions of the various elements within a structure; (2) to familiarise students with quality buildings and provide them with the ability to use and manipulate materials giving innovative and effective solutions to building problems and an awareness of the impact of current legislation and building regulations; (3) to develop an understanding of the applications for different structural materials and forms and the need for structure in building;

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	to research and evaluate options in resolving constructional details and to describe and illustrate basic domestic buildings, their foundations, external envelopes, internal components, floor structures, roof structures and coverings;
LO2	to assess, through research, the properties and qualities of materials used in construction and to explain the importance of good building principles in the care of the environment and the durability of the building (i.e. sustainable development);
LO3	to choose appropriate structural materials and to discuss structural form and the impact of structure on space;
LO4	to explain the concepts of loads, load types and load paths and to describe the behaviour of simple structural elements such as beams, slabs columns and triangulated structures.
LO5	To describe the role of the primary structural elements and to size timber floor joist and cut-roof members for domestic house construction using standard tables
LO6	to describe the basic concepts for structural behaviour of materials including stress, strain, elasticity, strength and factors of safety.

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
Overview Examination of traditional and new methods of construction relative to domestic scale buildings.
Architectural Working Details: • The use of research and drawing in combining the functional requirements of various building types and components with detailed study of simple structures and materials. • The compilation of good specification and use of international drawing conventions in production information for the construction of buildings. • Working drawings detailing a simple building from foundation to roof with full annotation.
Materials: • Concrete o Cement o Aggregates o Properties of fresh concrete o Properties of hardened concrete o Standard tests on fresh and hardened concrete o Use of Admixtures o Durability • Masonry o Brick manufacture; properties o Stone quarrying; properties; finishes • Timber o Growth and structure of trees. o Classification of wood. o Moisture content and seasoning. o Natural and handling defects. o Insect and fungal attack. o Preservation. o Stress grading. o Timber products. • Glass o Manufacture o Properties o Treatments • Metal Products o Steel – manufacture and corrosion o Galvanising o Properties of sheet lead and its use in weathering details.
Structural Materials: • Material Structural Behaviour o Load and Deflection o Elasticity o Stress o Strain o Hooke's Law o Ductility and Brittleness o Strength, Factor of Safety and Allowable stress • Timber • Masonry o Concrete blocks – sizes and strengths o Mortars o Stretcher bond pattern o Cavity Walls
Structural Form: • Bending moments and shear forces • Bending moment diagrams and shear force diagrams o 2nd moment of area • Strain and Stress distributions due to bending moment • Stress distributions due to shear force • Rule of thumb for sizing timber floor joists • Introduction to structural stability • Truss Timber roof simple overview • Foundations • Load take-down for domestic house foundation • Simple design of water cistern timber bearers • Soil behaviour and allowable bearing pressure • Soil types • Spread foundations – strip, pad, raft • Introduction to soft ground engineering
Loading • Concept of loads o Definition of mass o Gravity and converting mass to vertical gravity force. o Dead loads and live loads o Wind loads o Water pressure, Accidental Loads, • Typesof loads • Load paths o Action and Reaction o Linear forces and moments o Equilibrium o Reactions to Beams o Load paths for vertical loads through a multilevel structure. o Load path for wind loads on a motorway sign structure.
Laboratory and Model Making: • Laboratory Experiments o Stress and Strain tensile test o Crushing a concrete cube o Moment equilibrium using a simple see-saw mechanism • Model Making o Building a tower using newspapers o Building a roof truss using cardboard o Building beams using balsa wood.

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

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	No Description	1,2,3,4,5,6	40.00	n/a

No Project

No Practical

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	No Description	1,2,3,4,5,6	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	30 Weeks per Stage	3.73
Laboratory	30 Weeks per Stage	0.27
Estimated Learner Hours	30 Weeks per Stage	4.33
	Total Hours	250.00