TECH H2511: Concrete Technology

Module Title:	Concrete Technology
Language of Instruction:	English

Credits:	5

NFQ Level:	6

Module Delivered In	No Programmes

Teaching & Learning Strategies:	Lectures Laboratory practicals Project work Private study

Module Aim:	The aims of this module are: (1) to provide students with a working knowledge of concrete as a material; (2) to instruct students in the discipline of standard testing of concrete.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	prepare & interpret: - (a) aggregates grading curves; (b) standard concrete mixes.
LO2	describe, identify & evaluate: - (a) the properties of aggregates & the importance of grading of aggregates in concrete; (b) the different compounds of cement, types of binders & the factors that affect the Heat of Evolution of Cement; (c) the environmental impact of concrete & its constituents; (d) the different types of defects in concrete, how to prevent them &/or repair them; (e) the methods of finishing & importance of curing concrete.
LO3	identify the factors that affect the properties of both fresh & hardened concrete;
LO4	carry out &/or supervise: - (a) standard concrete workability tests; (b) standard tests on hardened concrete and to evaluate the results; (c) the mixing, placing and compacting of a batch of concrete.
LO5	use appropriate software tools to present findings from standard tests;
LO6	verbally present basic technical information on concrete, its constituents &/or concrete properties.

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
(1) Aggregates (10 hours lectures, 6 hours practicals) (a) Processing (b) Grading (c) Influences of particle size (d) Recycled aggregates (e) Physical properties. (i) Particle Size analysis (ii) Bulk Density (iii) Flakiness Index (iv) LA Abrasion (f) Laboratory on Aggregates (i) Sampling (ii) Quartering & Riffling (iii) Particle Size analysis (iv) Bulk density (v) Flakiness index (vi) Fines Content (vii) Moisture Content (viii) LA Abrasion
(2) Cement (4 hours lectures) (a) Cement types (b) Hydration (c) Latent binders (d) Safety
(3) Concrete mixes (8 hours lectures, 2 hours practicals) (a) Waters & Admixtures (b) Water/ cement ratios (c) Workability (d) Cohesion & Segregation (e) Volume change in concrete (f) Mix design (g) Production criteria (h) Sampling and quality testing of fresh concrete
(4) Durability of Concrete (8 hours lectures, 2 hours practicals) (a) Factors affecting durability (b) Permeability (c) Porosity (d) Chlorides (e) Carbonation (f) Acid attack (g) Sulphate attack (h) Sampling and testing of hardened concrete
(5) Strength of Concrete (8 hours lectures, 2 hours practicals) (a) Compressive/ tensile strength (b) Characteristic strength (c) Factors influencing strength (d) Strength testing (e) Laboratory on Hardened Concrete (i) Destructive Testing of Concrete • Measuring Cubes • Crushing Cubes – 7, 28, 56 day Tests • Modulus of Rapture Test • Effects on Concrete o Curing – 0, 3, 7, 28 days in water o Compaction – Not compacted in both stiff & wet mix and properly compacted
(6) Concrete Practice (8 hours lectures, 2 hours practicals) (a) Mixing and transporting (b) Placing, compacting and finishing (c) Curing (d) Defects (e) Formwork and moulds (f) Reinforcement (g) Joints (h) Weather conditions (i) Safety (j) Laboratory on Fresh Concrete (i) Workability – Slump Test, Flow Table Test, Compaction Test, Vebe Test (ii) Making Cubes (iii) Demoulding Cubes (iv) Curing Cubes

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	No Description	1,2,3,4,5,6	40.00	n/a

No Practical

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	No Description	1,2,3	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	1.50
Practicals	30 Weeks per Stage	0.50
Estimated Learner Hours	30 Weeks per Stage	2.00
	Total Hours	120.00