

Module Title:	Concrete Technology
Language of Instruction:	English
Credits:	5
NFQ Level:	6
Module Delivered In	1 programme(s)
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	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	prepare, interpret, carry out &/or supervise: - (a) aggregates grading curves; (b) standard concrete mixes; (c) standard concrete workability tests; (d) standard tests on hardened concrete and to evaluate the results; (e) the mixing, placing and compacting of a batch of concrete.
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/sustainability 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	use appropriate software tools to present findings from standard tests;
LO5	verbally present basic technical information on concrete, its constituents &/or concrete properties.

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

(1) Aggregates

(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

(a) Cement types (b) Hydration (c) Latent binders (d) Safety

(3) Concrete mixes

(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

(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

(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

(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

(7) Sustainability of Concrete

(a) Cement Replacements; (b) Reduce, reuse, recycle of concrete constituents, life cycle assessments; (c) embodied carbon;

Assessment Breakdown	%
Project	100.00%

No Continuous Assessment

Project

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	No Description	1,2,3,4,5	100.00	n/a

No Practical

No End of Module Formal Examination

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	12 Weeks per Stage	2.00
Practicals	12 Weeks per Stage	2.00
Estimated Learner Hours	12 Weeks per Stage	6.50
Total Hours		126.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_CMCIV_D	Bachelor of Engineering in Civil Engineering	4	Mandatory