

Subject Description Form

Subject Code	CSE20308
Subject Title	Construction Materials
Credit Value	3
Level	2
Exclusion	CSE308 Construction Materials
Objectives	To introduce the science of concrete and steel technologies commonly used in civil engineering construction.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. Able to analyse and interpret different behaviours of construction materials subjected to a variety of environments/conditions; b. Able to design and conduct experimental studies of concrete and steel, and then relate their bearing on theoretical concepts; c. Able to draw on the properties and behaviour of common materials in construction to evaluate and formulate appropriate solutions; d. Able to communicate logically and lucidly through writing of essay and project reports; and e. Able to recognize the need for, and to engage in a life-long learning through lectures, on-line learning and seminars.
Subject Synopsis/ Indicative Syllabus	<p>1. <u>Concrete</u> (8 weeks)</p> <p>Introduction- advantages of concrete, types of structural concrete, constituent materials of concrete and production of concrete.</p> <p>Cements - chemical composition, fineness, hydration, setting, hardening and types.</p> <p>Aggregates – types, physical properties, shapes, surface texture and grading.</p> <p>Admixtures – benefits, mineral and chemical admixtures.</p> <p>Properties of fresh concrete - workability, factors affecting workability and stability.</p> <p>Properties of hardened concrete - strength, factors affecting strength and control of strength.</p> <p>Concrete mix design - required concrete properties: workability, strength and durability, concrete mix design</p>

	<p>methods: DOE and absolute volume approach.</p> <p>Durability – permeability, physical and chemical attacks, corrosion of reinforcement and fire resistance.</p> <p>2. <u>Steel</u> (5 weeks)</p> <p>Iron and Steel: Manufacturing of steel, heat treatments of steel, cast iron. Behaviour in Service: Stress-strain curve, tensile and compressive strength, brittle and ductile fracture, creep, fatigue.</p> <p>Durability: corrosion and its prevention, performance at high temperature, fire protection.</p> <p>Mechanical Testing: Tensile test, hardness test, impact test, fatigue test, creep test.</p> <p>3. On-line laboratory sessions Tests for properties of fresh concrete, Tests for properties of hardened concrete, Tests for mechanical properties of concrete, Non-destructive testing of concrete, Mechanical testing of steel.</p>																																	
<p>Teaching/Learning Methodology</p>	<p>Basic knowledge of construction materials will be provided in lectures. Tutorials will be conducted mainly in the form of example class and problem-solving session to enhance students' understanding of the subject matter. On-line laboratory sessions provide information for performance testing of metals and concrete.</p>																																	
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1" data-bbox="516 1402 1365 1776"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="5">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> </tr> </thead> <tbody> <tr> <td>Coursework: Essays, seminar report and on-line lab quizzes</td> <td>30</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Final Examination</td> <td>70</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>100 %</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Students must attain at least grade D in both coursework and final examination (whenever applicable) in order to attain a</p>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					a	b	c	d	e	Coursework: Essays, seminar report and on-line lab quizzes	30	√	√	√	√	√	Final Examination	70	√	√	√			Total	100 %					
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	passing grade in the overall result.	
Student Study Effort Expected	Class contact:	Average hours per week
	▪ Lectures / Tutorials / Laboratory	3 Hrs.
	Other student study effort:	
	▪ Reading / Study / Reports / Seminar	6 Hrs.
	Total student study effort	9 Hrs.
Reading List and References	<p><u>Essential Textbooks</u></p> <p>G.D. Taylor, Materials in Construction, An Introduction , Pearson, 2000.</p> <p>A.M. Neville & J.J. Brooks, “Concrete Technology 2nd Edition”, Prentice Hall, 2010.</p> <p><u>Reference</u></p> <p>A.M. Neville, "Properties of Concrete", 4th Edition, Longman Group Limited, 1995.</p>	