



UNIVERSITI TEKNOLOGI MARA

BCM414: CONSTRUCTION TECHNOLOGY I

Course Name (English)	CONSTRUCTION TECHNOLOGY I APPROVED
Course Code	BCM414
MQF Credit	4
Course Description	The general aims of this course is to provide sufficient knowledge and understanding of the basic principles in building construction and materials. The course covers the element of works to be done at an early stage of construction which include construction industry overview, site and soil investigation, setting out, foundation, concrete framed structure, brick and block walls, emphasis on the technology and installation of the element.
Transferable Skills	Construction technology skill Teamwork skill Communication skill Information management skill
Teaching Methodologies	Lectures, Blended Learning, Lab Work, Studio, Field Trip, Tutorial, Presentation
CLO	CLO1 Determine principles in building construction and materials. CLO2 Present principles in building construction and materials. CLO3 Demonstrate concrete tests CLO4 Display ability to prepare building plans
Pre-Requisite Courses	No course recommendations

Topics	
1. Overview of construction industry	1.1) Introduction to construction industry scenario 1.2) -Category of projects 1.3) -Sectors of the construction industry 1.4) -Stages of a project activity 1.5) -Parties involved and their roles: client, consultant & contractor 1.6) -Contractor structures organization and their roles 1.7) -Contractor scope of works and responsibility 1.8) -Construction team: main contractor, sub contractor, construction manager, contract manager/executive, estimator, site agent, supervisor, foreman 1.9) -Trades: concreter, barbender, carpenter, bricklayer, roofer, plasterer, tiler, joiner, plumber etc. 1.10) -Building element 1.11) -Plants/Machineries/Equipment
2. Site Investigation & Soil Investigation	2.1) Introduction 2.2) -Objective of site investigation 2.3) Types of site investigation: site for new works, defects or failures of existing works, safety of existing work & material for constructional purpose 2.4) -Methods of site investigation: desk study, site reconnaissance, detail examination & special studies and review during construction and monitoring 2.5) -Elements/Factors to be investigated 2.6) -Soil investigation 2.7) -Factors to be considered in planning of soil investigation: type of soil, type of structure, depth of exploration, number of investigation 2.8) -Methods of soil investigation: JKR/Mackintosh probe, trial hole, hand/motorized auger, deep boring, rotary drilling, deep sounding, plate bearing test, geophysical 2.9) -Analysis of soil investigation result.

<p>3. Site Preparation</p> <p>3.1) Introduction</p> <p>3.2) -Site clearing</p> <p>3.3) -Setting out : boundary, building outline, fixing the corners in place setting up a site datum for vertical level</p> <p>3.4) -Site layout : importance of site layouts, planning of site layouts</p>
<p>4. Foundation</p> <p>4.1) Introduction</p> <p>4.2) Function of foundation</p> <p>4.3) Requirement for good foundation</p> <p>4.4) Factors to be considered in foundation selection</p> <p>4.5) Shallow foundation: strip foundation, pad foundation, raft foundation, stepped foundation, combined foundation, continuous foundation, balanced foundation</p> <p>4.6) Deep foundations : Piled foundation , Drilled caisson</p> <p>4.7) Types and selection of pile foundation</p> <p>4.8) Construction method of pile foundation: drive, drive cast in place, injection, vibration, drilling/boring.</p> <p>4.9) Pile caps</p> <p>4.10) Pile load test: static load test, dynamic load test</p> <p>4.11) Sheet piling</p> <p>4.12) Piling plant</p> <p>4.13) Foundation failure & repair</p>
<p>5. Reinforced Concrete Framed Structures</p> <p>5.1) Introduction</p> <p>5.2) -Materials used to make concrete: cement, sand, aggregate</p> <p>5.3) -Concrete mixes and strength</p> <p>5.4) -Reinforcement</p> <p>5.5) -Formwork</p> <p>5.6) -RC column construction</p> <p>5.7) -RC beam construction</p> <p>5.8) -RC floor Construction</p>
<p>6. Brick and block walls</p> <p>6.1) Introduction</p> <p>6.2) -Types of wall</p> <p>6.3) -Characteristics of wall</p> <p>6.4) -Bonding</p> <p>6.5) -Pointing</p> <p>6.6) -Damp proof course / Damp proof membrane</p> <p>6.7) -Openings in brick walls</p> <p>6.8) -Lintels</p> <p>6.9) -Arches</p> <p>6.10) -Pier</p> <p>6.11) -Walls construction</p>
<p>7. Doors & windows</p> <p>7.1) Introduction</p> <p>7.2) -Types of door</p> <p>7.3) -Door frames and linings</p> <p>7.4) -Flush doors</p> <p>7.5) -Paneled doors</p> <p>7.6) -Door construction</p> <p>7.7) -Types of window</p> <p>7.8) -Window frames</p> <p>7.9) -Casement window</p> <p>7.10) -Louvers window</p> <p>7.11) -Glazing</p> <p>7.12) -Window construction.</p> <p>7.13) -Ironmongery</p>
<p>8. Cement</p> <p>8.1) Definition</p> <p>8.2) -Types of cement</p> <p>8.3) -Manufacture</p> <p>8.4) -Chemical composition</p> <p>8.5) -Setting and hardening</p> <p>8.6) -Hydration and strength</p>
<p>9. Aggregate</p> <p>9.1) Definition</p> <p>9.2) -Types</p> <p>9.3) -Grading</p> <p>9.4) -Properties</p>

<p>10. Water 10.1) Uses 10.2) -Sources of water for concrete 10.3) -Sources if clean water is not available</p>
<p>11. Admixture 11.1) Workability aids / agents 11.2) -Air-entraining agents 11.3) -Accelerators 11.4) -Retarders 11.5) -Damp proofing admixtures 11.6) -Permeability reducing admixtures</p>
<p>12. Concrete 12.1) Characteristic requirements in engineering structure 12.2) -Sequence of operation; storage, batching, mixing, transportation, compaction, curing & testing</p>
<p>13. Mix design 13.1) Properties of fresh concrete including affecting factors 13.2) -Properties of hardened concrete including affecting factors 13.3) -Concrete defects including affecting factors</p>
<p>14. Materials laboratory work / workshop 14.1) The objectives of laboratory work are to expose the students to common tests on building materials for use in or off site quality control. 14.2) 14.3) -Grading 14.4) -Methods of sampling and sample reduction of aggregate prior to sieve analysis to determine the size distribution of aggregate 14.5) - 14.6) Tests on Fresh Concrete 14.7) -Methods of mixing and sampling fresh concrete before workability tests; the slump test, the compacting factor test and the vebe consistometer test. 14.8) 14.9) Tests on Hardened Concrete 14.10) -Cube test to determine the compressive strength of concrete 14.11) -Beam test to determine the bending strength or indirect tensile strength of concrete 14.12) 14.13) -Tests on Steel Reinforcement of Concrete 14.14) -To determine tensile strength of reinforcement</p>
<p>15. Technical drafting 15.1) Architectural drawing. 15.2) Plan 15.3) Section 15.4) Elevation 15.5) 15.6) Auto Cad Drawings</p>

Assessment Breakdown	%
Continuous Assessment	40.00%
Final Assessment	60.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Lab Exercise	CAD work	10%	CLO4
	Lab Exercise	Concrete tests -slump test -cube -sieve analysis	10%	CLO3
	Presentation	n/a	20%	CLO2

Reading List	Reference Book Resources
	<ul style="list-style-type: none"> • Chudley, R & Greeno, R. 2008, <i>Building Construction Handbook</i>, 7 Ed., Butterworth Heinemann Publication • Chudley, R & Greeno, R. 2008, <i>Advanced Construction Technology</i>, 4 Ed., Pearson Education Limited • Foster J.S 2007, <i>Structure Fabric 1 & 2</i>, 7 Ed., Longman • Mohamed A.H 1996, <i>Penyediaan Tapak dan Struktur Bawah</i>, Dewan Bahasa dan Pustaka • Walton, D. 1995, <i>Building Construction: Principles and Practices</i>, Macmillan Education Limited • Tomlinson M.J. 1993, <i>Pile Design and Construction Practice</i>, E & FN Spoon • Tong T.B. 1990, <i>Teknologi Binaan Bangunan</i>, Dewan Bahasa dan Pustaka • Newman M. 1988, <i>Construction Details for Concrete Construction</i>, McGraw-Hill • Shirley, D.E. 1987, <i>Introduction to Concrete</i>, Cement and Concrete Assoc • Everett, A. 1986, <i>Materials</i>, Batsford • Taylor, G. D. 1985, <i>Materials in Construction</i>, Longman London • Fullerton R.L. 1983, <i>Construction in Warm Climates Vol. 1,2 & 3.</i>, Oxford University Press
Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources