Birla Institute of Technology & Science, Pilani
Hyderabad Campus

INSTRUCTION DIVISION
FIRST SEMESTER 2016-2017
Course Handout Part II

Date: 01-08-2016

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : CE F214
Course Title : CONSTRUCTION MATERIALS
Instructor-in-Charge : Sridhar Raju

Scope and Objective of the Course:
The course deals with properties of materials, their characterization, testing, selection and quality control. Understanding the suitability of materials for construction in civil engineering structures is imperative for its economical, durable and high performance. This course would briefly discuss traditional as well as current materials used. The course would focus mainly on materials and admixtures used in concrete, quality control and acceptance criteria of concrete. Other materials that would be discussed are bricks, blocks, tiles, timber, paints, bitumen & emulsion, steel, non-ferrous metals, polymeric materials, geo-synthetics, low cost and waste materials in construction. Latest BIS, IRC and ASTM specifications and guidelines of all above mentioned material, construction equipments, classification, selection and economics will be dealt in this course.

Text Books:
T1. Duggal, S. K. (2008) Building Materials, New Age International Pvt. Ltd., New Delhi.
T2. Gambhir, M. L. (2009), Concrete Technology, Tata McGraw-Hill Publishing Company Ltd., New Delhi

Reference Books:
R1. Varghese P.C. (2011) Building Materials, PHI Learning Private Ltd, New Delhi
R2. Shetty M.S (2013) Concrete Technology, Theory and Practice, S. Chand and Company Ltd, New Delhi
R3. Mehta P.K and Monteiro P.J.M (2006) Concrete: Microstructure, properties and materials, TMH
R4. Neville A.M. (2004) Properties of Concrete, Pearson India
R5. Zongjin Li (2011) Advanced Concrete Technology, WILEY
R6. Peurifoy R.L, Ledbetter W.B, Schexnayder .C (1995) Construction Planning, Equipment and Methods, McGraw Hill, Singapore
R7. A. M. Neville and J. J. Brooks, Concrete Technology, Pearson India

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1-2	Introduction to Construction Materials	Introduction, Physical properties, Mechanical properties and Characteristic behavior under stress	1-T1
3	Building Mortars	Classification, Characteristics, Types, Special mortars, Testing and application techniques	12-T1,10-R1
4	Structural Clay Products	Bricks, advanced bricks, Manufacturing-Classification-Tests on bricks- Refractory bricks, Specifications	2-T1, 2-R1
5	Wood and Timber Products	Timber - Market forms - Classification, Characteristics, Seasoning, Testing, Defects and Preservation	4-T1, (15,16)- R1
6-7	Cementious Material- Cement, flyash, Lime	Different types, Chemical Composition, Properties, Tests - IS Specifications, application	5-T1,2-T2; 8-T1,(4,5)-R1
8-10	Concrete making materials	Introduction to Cement Concrete; aggregate grading, gap grading and quality of water	10-T1,1-T2; 6-T1,3-T2; 7-T1, 4-T2
11-13	Admixture and Additives	Accelerators-Retarders- Plasticizers- Super plasticizers. Puzzolanas their function and applications. Fly Ash, Silica Fume, Ground Granulated Blast Furnace Slag, viscosity modifier etc.	9-T1,5-T2
14-16	Special Concretes	Types of Special Concrete - Fiber Reinforced Concrete, High Performance Concrete, Self-Compacting Concrete, Light Weight aggregate Concrete etc.	20-T1, 14-T2, (12, 13)-R2, 6-R5
17-21	Concrete mix design	Principles of Mix Proportioning- Properties of concrete related to Mix Design-BIS Method of Mix Design- Examples	11-T1, 10-T2, 13-R1 and 11-R2
22-31	Production and properties of concrete	Steps, Equipment and Tools and Techniques in Concrete Production; Property of fresh concrete: Workability-Tests for workability of Concrete - Segregation and Bleeding Properties of Hardened Concrete-Compressive, Tensile and Shear Strength - Modulus of Rupture- Stress-Strain curve for concrete- Determination of Young's Modulus, Shrinkage, Creep and Durability	10-T1,10-R3; 9-R4
32-33	Quality Control and acceptance criteria of Concrete	Nondestructive testing, acceptance criterion, Quality Control and Challenges	10-T1,13-T2, R2-11
34	Paints, Enamels and Varnishes	Paints-Varnishes-Distempers- Classifications, Testing	17-T1, 22-R1
35-36	Bitumen and bitumen Emulsion	Classification, Tests, Applications	18-T1, 25-R1, Notes

37-38	Steel and Non- Ferrous Metals	Different type of Ferrous and Non-Ferrous metals, Properties, Testing, Applications	(13, 14)-T1, (18,19,20,21)-R1
39	Polymeric Material and Geo-synthetics	Ceramics, polymers and Geo-synthetics - Functions, Applications and Testing	(15,16, 21)-T1, (23,24,27,29)-R1
40-41	Low Cost and Waste Material in Construction	Natural fibers, waste plastic, industrial waste and novel construction material	Lecture Notes
42	Construction Equipment	Classification, Selection and Economics - commonly used Construction Equipment	(8,16)-R6,

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Test-I	60	15	8/9, 2.30--3.30PM	Closed Book
Test-II	60	15	25/10, 2.30--3.30PM	Closed Book
Assignments	TBA	15		Open Book
Design Project	TBA	15		Open Book
Comprehensive Exam	180	40	06/12 AN	Closed Book

Chamber Consultation Hour: Will be announced in the class

Notices: Notices will be displayed on CMS and few important notices will also be displayed on the notice board of civil engineering department

Make-up Policy:

1. Make-up will be granted only on genuine reasons (medical emergencies). However, prior permission is a must.
2. Applications received 24 hours after the test will not be entertained. Applications on informal forums like Face Book will be ignored
3. For medical cases, a certificate from the concerned physician of the Medical Centre must be produced. Cross verification will be done with Hostel Superintendent / Warden before proceeding further with the application

INSTRUCTOR-IN-CHARGE
CE F214