Certificate Course

on

Testing of Building Materials

Scheme and Syllabus

Batch 2023

Course Details

Certificate Course on Testing of Building Materials		
Sr. No.	**Course Duration**	**6 months**
1	**Required Qualification**	**Students passed in matriculation examination are eligible for the course**
2	**Course Fee**	**15000/-**
3	**Number of Seats**	**30**

Study Scheme

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Maximum Marks		Total Marks
				L	T	P	Internal	External	
1	Certificate Course	CCCE101A	Introduction to Building Materials	4	0	0	40	60	100
2	Certificate Course	CCCE102A	Concrete Testing Lab	0	0	3	60	40	100
3	Certificate Course	CCCE103A	Soil Testing Lab	0	0	3	60	40	100
4	Certificate Course	CCCE104A	Highway Material Testing Lab	0	0	3	60	40	100
Total				**4**	**0**	**9**	**220**	**180**	**400**

Syllabus

Sr. No.	Category	Subject Code	Course Title	Contact Hours		
1.	Certificate Course	CCCE101A	Introduction to Building Materials	L	T	P
				4	0	0
Internal Marks: 40, External Marks: 60, Total Marks: 100						

Course Objectives: The course should enable the students to:
1. Develop knowledge of material science and behaviour of various building materials used in construction.
2. Identify the construction materials required for the assigned work.

UNIT-I

Bricks: General terms, Classification of bricks, Composition of good brick earth, Harmful ingredients in brick earth, Qualities of good bricks, Tests for bricks.

Timber: Definition, Classification of trees, Structure of a tree, Seasoning of timber, Defects in timber, Market forms of timber.

UNIT-II

Cement: Different types of cement, Constituents of cement, Manufacturing of Portland cement, Tests for cement, Uses of different types of cement.

Concrete: Introduction, Constituents of concrete, Batching of materials, Manufacturing process of cement concrete, Workability and factors affecting it, Methods to determine workability, Segregation and bleeding of concrete, Strength of concrete and factors affecting it, Tests for concrete.

UNIT-III

Soil: Definition of soil, Origin of Soils, Formation of Soils, Transportation of Soils, Major Soil Deposits of India, Terminology of different types of soils.

UNIT-IV

Highway: Materials used in Highway Construction, Soil, Stone Aggregates, Bituminous binders, Bituminous paving mixes, Modified Binders Materials, Concrete road materials.

Course Outcomes: Upon completion of this course the student shall be able to:
1. understand the concept of various methods of manufacture of bricks.
2. obtain differentiate the fine aggregates and coarse aggregates under various views.
3. explain various types of cements and their applications in construction. Various field and laboratory tests on cement.
4. understanding the concept of soil properties.
5. understanding the concept of highway materials.

Books Recommended :
1. Shetty, M.S. “Concrete Technology”, S. Chand Publication.
2. Bindra, S.P. and Arora, S.P. “Building Construction”, DhanpatRai Publication.
3. Duggal, S.K. “Building Materials”, New Age International Publishers.
4. Rangwala, ‘Engineering Materials’, Charotar Publication House.
5. Punmia, B.C. “Building construction”, Laxmi Publication.
6. Singh,P. “Civil Engineering Materials”, S K Kataria and Sons

Shaheed Bhagat Singh State University, Ferozepur

Certificate Course Scheme and Syllabus Batch 2023

Sr. No.	Category	Subject Code	Course Title	Contact Hours		
1.	Certificate Course	CCCE102A	Concrete Testing Lab	L	T	P
				0	0	3
Internal Marks: 60, External Marks: 40, Total Marks: 100						

Course Objectives: The practical work should enable the students to:

1. understand the relevance of different properties of constituent materials on properties of concrete.
2. understand the behaviour and durability aspects of concrete under different loading and exposure conditions
3. understand various testing methods for concrete and their applicability.

List of Experiments:

1. Tests on cement:
   - i. Fineness
   - ii. Consistency
   - iii. Setting time
   - iv. Soundness
   - v. Specific gravity
   - vi. Strength
2. Tests on aggregates (fine and coarse)
   - i. Specific gravity
   - ii. Bulk Density
   - iii. Fineness Modulus
   - iv. Moisture content
   - v. Water Absorption
   - vi. Bulking of sand
3. Workability tests on concrete`
   - i. Slump test
   - ii. Compaction Factor test
   - iii. Vee-Bee test
4. Strength tests on concrete
   - **i.** Compressive strength (Cube and Cylinder)

Course Outcomes: Upon completion of this practical work the student shall be able to:

1. evaluate properties of building materials, such as cement and aggregates.
2. conduct experiments and check the acceptance criteria (if any).
3. analyze the properties of concrete in fresh and hardened state.

Manuals Recommended :

1. Concrete Lab Manua', M. L. Gambhir, Dhanpat Rai & Sons, New Delhi.
2. Concrete Lab Manual, TTTI Chandigarh.

Sr. No.	Category	Subject Code	Course Title	Contact Hours		
1.	Certificate Course	CCCE103A	Soil Testing Lab	L	T	P
				0	0	3
Internal Marks: 60, External Marks: 40, Total Marks: 100						

Course Objectives: The practical work should enable the students to:

1. understand their fundamental, index and engineering properties.
2. investigate and write the laboratory reports for soil.

List of Experiments:

1. To determine particle size distribution of given soil specimen.
2. To determine moisture content of given soil sample.
3. To determine insitu density of soil sample.
4. To determine liquid limit and plastic limit of given soil sample.
5. To determine specific gravity of given soil sample.
6. To determine the compaction characteristics of given soil sample by Proctor's Test.

Course Outcomes: Upon completion of this practical work the student shall be able to:

1. determine particle size distribution, moisture content, specific gravity and liquid/ plastic limit of soil.

Manuals Recommended :

1. Soil testing engineering, Manual by Shamsher Prakash and P.K. Jain. Nem Chand & Brothers

Sr. No.	Category	Subject Code	Course Title	Contact Hours		
1.	Certificate Course	CCCE104A	Highway Material Testing Lab	L	T	P
				0	0	3
Internal Marks: 60, External Marks: 40, Total Marks: 100						

Course Objectives: The practical work should enable the students to:

1. know about the highway materials.
2. know about the types of bituminous.

List of Experiments:

1. To find grain size analysis on sub grade soil.
2. To find out consistency limit on subgrade soil.
3. To find CBR value of subgrade soil.
4. To determine impact value of road aggregate.
5. To determine the abrasion value of road aggregate.
6. To findout the aggregate crushing value.
7. To determine the shape of road aggregate by flankiness and elongation index.

8. To determine the penetration value of bituminous.

Course Outcomes: Upon completion of this practical work the student shall be able to:
1. characterize the pavement materials as per the Indian Standard guidelines.
2. evaluate the strength of subgrade soil by CBR test.
3. conduct experiments to evaluate aggregate properties.
4. determine properties of bitumen material and mixes

Manuals Recommended :
1. Khanna S.K., and Justo, C.E.G. "Highway Material & Pavement Testing", NemChand and Brothers, Roorkee.