COURSE TITLE- CONSTRUCTION MATERIALS
COURSE CODE **6C202**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Civil Engineering	Second

1. RATIONALE

The primary job of a civil engineer is to design, construct, supervise and maintain structures such as Buildings, Bridges, Dams ,Canals, water Tanks , Roads etc. Construction of these structures involve use of different and large quantity of construction material.Selection of suitable construction materials required for construction and finishing of various parts of structures, is one of the important role of Civil Engineer. Proper selection of materials ensures structure to be strong, durable and cost effective.

This Course enables diploma graduates to acquire knowledge for identification of suitable construction materials with required properties in construction of various structures.

With the advancement in technology, new materials are emerging as better alternatives to traditional materials. Knowledge of new material is also essential for it's identification in appropriate situation.

2. COMPETENCY

At the end of studying this course students will be able to
"**Select suitable construction materials required in the construction of civil engineering structures**".

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (OR)	PA (TW)	50
2	0	2	4	--	--	25	25	
Duration of the Examination (Hrs)				--	--	--	--	

Legends : L-Lecture; **T**-Tutorial/Teacher Guided Theory Practice ; **P**- Practical; C- Credits; **ESE**- End Semester Examination; **PT – Progressive Test, PA**- Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Identify characteristic requirements of various construction materials.
2. Identify suitable traditional/ common construction materials.
3. Conduct Field tests to ascertain the fitness of construction material.
4. Identify new/ special construction materials.
5. Identify suitable construction materials for finishing of civil engineering structures.

5. DETAILED COURSE CONTENT

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit –I Types of of Construction Materials.	1a. Classify various construction materials. 1b. Describe the criteria to select the materials for given situation.	1.1 Broad classification of materials Natural, Artificial, Special, Finishing and Recycled construction materials. 1.2 Criteria for Selection of construction materials on the basis of carrying prescribed load, serviceability,
Unit– II Natural Construction Materials	2a. Classify various Natural construction materials 2b. Select appropriate naturally available construction materials based on properties of materials and requirement of various items of construction.	2.1 Stone – Physical Classification of rocks; Requirements of good building stone, characteristics of stone, Quarrying and dressing of stone. 2.2 Timber – Timber as construction material, structure of timber, properties of good timber, seasoning of timber, defects in timber 2.3 Bituminous materials and mixtures- Terminology, different types of asphalt, bitumen, tar used in Civil Engineering works, their properties and uses 2.4 Lime – Manufacture of lime, classification, field slaking of lime and properties of lime 2.5 Soil –Terminology- sand, silt, clay and their suitability in construction work.
Unit– III Artificial Construction Materials	3a. Classify various artificial construction materials 3b. Identify/select appropriate artificial construction materials based on properties of materials and	3.1 Bricks – Brick earth and its constituents. Conventional bricks and Standard bricks. 3.2 Characteristics of good brick, Classification of burnt clay bricks and their suitability. 3.3 Tiles–flooring & roofing tiles. Characteristic of good tiles. different types of tiles depending upon material

12. LEARNING WEBSITE & SOFTWARE

13. Software/Learning Websites.

The world's leading construction website : **www.building.co.u**

Wikipedia : https://en.wikipedia.org/wiki/Construction

14. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

POs and PSOs assignment and its strength of assignment with each COs of the Course

CO. NO.	Course Outcome	Programme Outcomes										Pr. Sp. Outcomes	
		1	2	3	4	5	6	7	8	9	10	1	2
CO1	Identify characteristic requirements of various construction materials.	--	2	--	--	1	--	--	2	3	--	1	--
CO2	Identify suitable traditional /common construction materials.	1	1	--	--	1	2	--	3	3	1	--	1
CO3	Conduct Field tests to ascertain the fitness of construction material..	2	2	2	1	1	--	--	2	2	--	--	1
CO4	Identify new/ special construction materials.	--	2	--	--	2	2	--	3	3	1	--	1
CO5	Identify suitable construction materials for finishing of civil engineering structures.	1	2	-	--	1	2	--	3	3	1	1	1

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	S.S.Ragte	Lecturer in Civil Engineering
2	K.S.Borde	Lecturer in Civil Engineering

(Member Secretary PBOS) (Chairman PBOS)

GOVERNMENT POLYTECHNIC शासकीय तंत्रनिकेतन औरंगाबाद AURANGABAD

	requirement of various items of construction.	used, sizes of tiles, uses of tiles, wall cladding 3.4 Materials for making concrete- 3.5 Cement – definition, types of cements – ordinary Portland, white cement color cement and their suitability. Different brand name of cement, common field tests on cement- lumps visible, color, hand feeling , water float test 3.6 Artificial sand – properties and advantages, suitability 3.7 Pre cast concrete products – concrete blocks- hollow, solid concrete blocks, pavement blocks, balustrades, their properties and uses. 3.8 Plywood, particle board and veneers their properties and uses. 3.9 Glass – properties- thickness and weight, thermal conductivity, light and heat translation, durability sound insulation, types of glass- soda lime glass, lead glass and borosilicate glass. Glass used for cladding.
Unit– IV Special Construction Materials	4a. Classify various special type of construction materials 4b. Identify/select appropriate special type of construction materials based on properties of materials and requirement of various items of construction.	4.1 Water proofing and damp proofing materials – Brand names, packings available properties and uses. 4.2 Termite proofing materials -need ,names and uses 4.3 Thermal insulating materials- properties, names and situations where used . 4.4 Sound insulating materials- properties, names and situations where used 4.5 Fibers – Types –Jute, Coir, Steel Fibers, Carbon Fibers, Glass Fibers, Plastic Fibers, Asbestos Fibers properties and uses 4.6 Miscellaneous materials – artificial timber, ferrocrete, adhesives, epoxy and Geosynthetic materials, ceramic materials -properties and uses.
Unit – V Finishing Materials	5a. Classify various type of finishing construction materials 5b. Identify/select appropriate finishing	5.1 Plastering Materials – Mortars: Lime Mortar, Cement Mortar, 5.2 Special Mortars – Properties, proportion, situations where used Plaster of Paris – Constituents, properties and uses POP finishing

	materials	boards, sizes, purpose. 5.3 Paints, Distempers and Varnishes – types, properties and uses. 5.4 Cladding materials – properties, names of different cladding materials and uses. 5.5 Linoleum- properties, sizes, use, method of fixings to floor

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	Types of of Construction Materials.	4	---	---	---	---
II	Natural Construction Materials	8	---	---	---	---
III	Artificial Construction Materials	8	---	---	---	---
IV	Special Construction Materials	6	---	---	---	---
V	Finishing Construction Materials	6	---	---	---	---
I	Over view of Construction Materials	4	---	---	---	---

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	II	Identify natural and artificial construction materials used in building construction through observation of substructure/superstructure , and enumerate the characteristic properties of the identified materials.	4
2	III	Conduct Field tests on Bricks and enumerate physical & Engineering properties of Bricks.	2
3	III	Conduct field test on Fine aggregate(sand) and enumerate physical & engineering properties of sand.	2
4	III	Conduct field tests on Cement and enumerate physical & engineering properties of sand.	2
5	II	Assess the quality of different types of timber and timber products (Arrange to visit nearby saw mill or timber mart)	4
6	V	Identify finishing construction materials used in building construction through observation of substructure/superstructure , and enumerate the characteristic properties of the identified materials.	4

7	II/III	Collect samples Natural and Special Construction Materials' samples , and prepare report regarding its need, suitability/use , its physical properties & cost	6
8	III/IV	Undertake a micro project identifying all types of materials used in a building and submit a report on the same. (Micro Project)	6
			30

8. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular students activities which need to be undertaken to facilitate the attainment of various course outcomes of this course.

a) Prepare a list of natural / artificial construction materials available in market
b) Collect catalogue of various construction materials during leisure time.
c) Collect various construction materials available in near by vicinity.
d) Prepare price list of natural / artificial construction materials.
e) Collect catalogue of various special / new construction materials.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Guided Market Surveys
b. Collection of materials under guidance of Course faculty.
c. Guidance to prepare reports of visits.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Construction Materials D. N. Ghose Tata McGraw – Hill	Construction Materials D. N. Ghose Tata McGraw – Hill	Construction Materials D. N. Ghose Tata McGraw – Hill
2.	Civil Engineering Materials	Shan Somayaji	Pearson
3	Construction Materials	Rangwala	Charotar

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Display unit for display of Naturally available construction materials.	A Show case for Display of size approx 5'X3'X1'with with glass on top
2.	Display unit for display of artificial construction materials.	A Show case for Display of size approx 5'X3'X1'with with glass on top
4	Display unit for display of finishing construction materials.	A Show case for Display of size approx 5'X3'X1'with glass on top