



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Diploma Engineering College
Semester-2

Subject: Construction Material–DETCV12203

Type of course: Minor Stream

Prerequisite: NA

Rationale:

In civil engineering, the choice of building materials is crucial and depends on various factors such as the structural requirements, environmental conditions, budget constraints, and sustainability goals. Students studying civil engineering diplomas learn the selecting specific materials for Structural Integrity, Durability, Cost-Effectiveness, Sustainability, Availability, Workability, Safety and Aesthetics in construction projects. By understanding these factors, civil engineering diploma students develop the expertise needed to make informed decisions about selecting appropriate building materials for diverse construction projects.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
04	00	02	05	60	30	10	20	30	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Sr. No	Course content	Hrs	% Weightage
1	Introduction on construction materials Physical, chemical and engineering properties of building materials, Application of different building materials, Alternative materials for the common items in building construction, Introduction of various Civil Engineering structures, Functions of various components of building and other structures.	12	20



2	Clay products, rocks and stone Classification of clay products, Types of bricks Manufacturing process of bricks, Test on bricks, Standard requirements and grades of bricks as per BIS, Classification of rocks, Rock products, Characteristics of stones, Structure, texture, strength, gravity, porosity, absorption, hardness, durability, weight etc., Standard requirement of building stone, Important stones used in construction with its suitability.	16	27
3	Lime and Pozzolana Sources and classification of Lime, Uses of lime with specific field situation, Types of pozzolanic materials, Advantages of addition of Pozzolonic Material.	08	13
4	Materials of cement, aggregate & concrete Types of cement with their specific use, Grade of cement as per BIS, Engineering properties of cement, Field and laboratory tests of cement as per BIS, Methods of storing the cement, Types of aggregate as per BIS, Requirements of aggregates per BIS, Engineering properties of aggregate Test on aggregate, Ingredients of concrete, Production of concrete, transportation, placing, compaction, curing.	12	20
5	Timber and miscellaneous construction materials Types of timber, Uses and application of timber, Defects in timber and wood, Seasoning, Wood products with specific uses, Plastics and PVC, Ceramic products, Paints and Varnish, materials for damp proofing, water proofing, Materials for anti-termite treatment, Glass and fiber, Steel and iron materials, materials uses for false ceiling, asbestose, Concrete blocks.	12	20

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1.	Material Research Projects: Faculty will assign each student a particular building material for in-depth research, enabling them to generate reports to disseminate their findings within the class, fostering the development of research skills and promoting knowledge sharing. Additionally, students are encouraged to upload their reports on the GMIU web portal for wider accessibility.	10



2.	Recyclability and sustainability of construction materials: Each student is tasked with acquiring knowledge in both conventional and alternative building materials, with a focus on identifying materials that offer a prolonged life span and cost-effectiveness through a comprehensive survey. In addition, students are required to gather various types of waste materials and ingeniously craft new conventional and alternative building materials. Subsequently, they are expected to present their findings, emphasizing the recyclability and sustainability of each material. To ensure wider dissemination, students will upload their results to the GMIU web portal.	10
3.	Construction Site Visit: Embarking on a field visit to an operational construction site, students will actively identify diverse construction materials and processes. Subsequently, they are tasked with compiling an industrial visit report encapsulating their observations and insights. To enhance accessibility and knowledge sharing, students will be required to upload their reports on the GMIU Web Portal.	10
Total		30

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	30%	35%	20%	20%	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Proficiently describe the essential properties of different building materials and articulate the functions of various building components.
CO2	Choose locally available bricks or stones in alignment with specific project requirements.
CO3	Acquire the skill to adeptly choose suitable binding materials, specifically Lime and Pozzolana, for use in building construction based on project needs..

CO4	Demonstrate the ability to selectively choose suitable binding materials and/or concrete for use in building construction according to project specifications.
CO5	Implement the ancillary material(s) such as Timber, Glass, PVC, paints, Varnish etc. as per the requirement.

List of Practical

Sr. No	Descriptions	Unit No	Hrs
1	Conduct local market survey for common civil engineering materials to tabulate cost and quality.	01	02
2	Perform tests on given sample of brick such as <ul style="list-style-type: none"> • Soundness • Water absorption • Compressive strength 	02	04
3	Conduct field test on given sample of brick and cement.	02	06
4.	Conduct field and observe lime and Pozzolana materials	03	02
5	Perform lab tests on given sample of cement <ul style="list-style-type: none"> • Initial and final setting time • Compressive strength 	04	04
6	Perform test on given sample of fine aggregate. <ul style="list-style-type: none"> • Sieve analysis • Silt and clay content. 	04	04
7.	Perform lab on given sample of aggregate <ul style="list-style-type: none"> • Impact test on aggregate • Crushing test on aggregate 	04	04
8	Assess the quality of different types of timber and timber products (please arrange to visit nearby saw mill or timber Mart).	05	04
Total			30Hr.

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory



The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

- [1] Construction Materials, D.N Goshe, Tata McGraw Hill, New Delhi.
- [2] Civil Engineering Construction Materials, S.K Sharma, Khanna Publishing House, New Delhi.
- [3] Building Materials, P.C. Varghese, PHI learning, New Delhi.
- [4] Engineering Materials. S.C. Rangwala, Charotar Publisher, Ahmedabad.
- [5] Engineering Materials, R.K. Rajput, S.Chand and Co. New Delhi.
- [6] Building Materials, S.K Duggal, New International, New Delhi.

