SEMESTER S5

MODERN CONSTRUCTION TECHNOLOGY

Course Code	**PECET522**	**CIE Marks**	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. 30 Min.
Prerequisites (if any)	None	**Course Type**	Theory

Course Objectives:

1. Describe the various sustainable materials and smart materials suitable for Construction
2. Outline the various technologies and equipment used for smart & economic construction

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	**Sustainable Construction Materials**: Wood, bamboo, straw bales, earthen materials, recycled aggregates, recycled plastic products, sustainable concretes, bio composites **Smart & Intelligent materials**: Types - Neoprene, Bridge pads, thermocol - Smart and Intelligent Materials, Special features: - Shape Memory Alloys (SMAs), Magneto strictive materials, Piezoelectric materials, Electrochromic materials, Green materials including biomaterials, biopolymers, bioplastics – Case studies showing the applications of smart and intelligent materials.	9
2	**Equipment for Earth Work:** Fundamentals of earth work operations - earth moving operations - types of earth work equipment - tractors, motor graders, scrapers, front end waders – excavating and earth moving equipment- dozer, excavators, rippers, loaders - trucks and hauling equipment, compacting equipment, finishing equipment. **Erection Equipment**: Cranes, Derrick Cranes, Mobile cranes, Overhead cranes, Traveller cranes, Tower cranes	9
3	**Construction techniques**: Construction joints - movement and expansion joints –Vacuum Dewatering of Concrete Flooring – Techniques of construction for continuous concreting operation in Tall buildings – Slip Form techniques—Erection techniques of Tall structures, large Span Structures -	9

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	Bridge Construction - Construction sequence and methods - Bow string bridges, cable stayed bridges - Launching techniques for heavy decks.	
4	**Cost-effective construction**: Rapid wall construction, soil-cement block masonry, voided slab, filler slab, rat-trap bond, cavity wall, ferrocement and ferro concrete constructions. **Prefabricated construction**: Advantages and disadvantages, prefabricated components. **Pre-Engineered Buildings**: Introduction – Advantages - Pre-Engineered Buildings Vs Conventional Steel Buildings – Applications Basic concept of **prestressing**: Fundamental understanding of pre-tensioned and post-tensioned construction. Construction **3D printing**.	**9**

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

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End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	To identify various sustainable and smart materials for structures	**K2**
CO2	To understand the equipment used in construction	**K2**
CO3	To outline the construction techniques for tall buildings and bridges	**K2**
CO4	To understand the advanced technologies for cost effective construction	**K2**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3					2	2					2
CO2	3					2	2					2
CO3	3					2	2					2
CO4	3					2	2					2

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Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Materials for Civil and Construction Engineers	Michel S. Mamlouk, John P Zaniewski	Prentice Hall	2016
2	Smart Materials and Structures	Gandhi M. V. and B. S. Thompson	Chapmann & Hall, London	1993
3	Construction Planning, Equipment and Methods	Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C	McGraw Hill, Singapore	2006

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Modern Methods of Construction and Innovative Materials	Arthur Lyons	Routledge Taylor & Francis Group	2024

Video Links (NPTEL, SWAYAM…)	
Sl. No.	**Link ID**
1	https://archive.nptel.ac.in/courses/105/106/105106053/
2	https://archive.nptel.ac.in/courses/105/103/105103206/

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