

25UMCET401	MODERN CONSTRUCTION TECHNOLOGY	Category	L	T	P	R	Credit	Year of Introduction
		VAC	4	0	0	0	4	2025

Preamble: This course introduces modern construction techniques including prefabrication, automation, smart materials, and digital tools such as BIM. It emphasizes innovative, efficient, and sustainable approaches that enhance productivity, quality, and safety in contemporary construction.

Prerequisite: Nil

Course Outcomes: After the completion of the course, the student will be able to:

CO	Course Outcomes	Knowledge Level
CO1	Explain modern construction techniques and prefabricated building systems.	K2 Understand
CO2	Describe automation and mechanization in construction.	K2 Understand
CO3	Explain sustainable and smart construction technologies and practices.	K2 Understand
CO4	Describe digital construction tools and advanced project delivery approaches.	K2 Understand

Mapping of course outcomes with program outcomes and program specific outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	2	–	1	1	–	–	–	–	1
CO2	1	1	–	-	3	–	–	–	–	1	1
CO3	1	1	2	–	–	2	-	–	–	–	1
CO4	1	1	1	–	2	–	–	–	-	2	1
Avg	1.25	1	1.25	-	1.5	1.5	-	-	-	1.5	1

Mapping of course outcomes with Knowledge and Attitude Profile (WK)

	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
CO1	*	*	*	*	*	*	*	*	
CO2	*	*	*	*		*		*	
CO3	*	*	*	*	*		*	*	
CO4	*	*	*	*	*	*		*	

Wks Mapped with the course

WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
*	*	*	*	*	*	*	*	

Mark Distribution:

Total Marks	CIE Marks	ESE Marks	ESE Duration
100	40	60	2.5 hrs

Continuous Internal Evaluation Pattern:

Attendance : 5 marks
 Continuous Assessment Test : 20 marks
 Continuous Assessment Assignment/Activity : 15 marks

SYLLABUS**Module 1 (14 hrs)**

Modern Construction Methods ; Evolution of construction technologies-Prefabrication and modular construction concepts-Precast concrete systems and components- Industrialized building systems and advantages- Formwork systems and advanced scaffolding techniques-Basic concept of prestressing: Fundamental understanding of pretensioned and post-tensioned construction.

Module 2 (14 hrs)

Mechanization and Automation in Construction ; Construction equipment and mechanization trends -Automation and robotics in construction-3D printing in construction and additive manufacturing- Drones and digital surveying techniques- Lean construction principles and productivity improvement.

Module 3 (14 hrs)

Sustainable and Smart Construction : Green construction materials and technologies-Energy-efficient building systems- Smart materials and intelligent infrastructure- Waste minimization and circular construction- Green building rating systems and certification.

Module 4 (14 hrs)

Digital Construction and Project Delivery: Building Information Modelling (BIM) concepts and applications- Digital twins and IoT in construction- Virtual and augmented reality in construction planning- Integrated project delivery and collaborative platforms- Safety management using digital technologies

Recommended Activity(Suggested topics)

1. Case study on prefabricated / modular buildings
2. Demonstration of BIM software or digital modelling

Seminar on 3D printing or robotics in construction

Text Books:

1. K. K. Chitkara. (2012). Construction project management. Tata McGraw-Hill.
2. Smith, R. E. (2016). Prefab architecture: A guide to modular design and construction. Wiley.
3. Eastman, C., et al. (2018). BIM handbook. Wiley.

Reference Books:

1. Gandhi, M. V., & Thompson, B. S. (1992). Smart materials and structures. Chapman & Hall, London.
2. Mamlouk, M. S., & Zaniewski, J. P. (2016). Materials for civil and construction engineers (4th ed.). Prentice Hall.
3. Kibert, C. J. (2016). Sustainable construction. Wiley.

END SEMESTER EXAMINATION – MODEL QUESTION PAPER

Course Code	25UMCET401
Course Name	MODERN CONSTRUCTION TECHNOLOGY
Max. Marks: 60	Duration: 2.5 Hours

Part A (Answer all questions. Each question carries 3 marks)				
Qn No.	Question	Marks	CO	BL
1	Differentiate between prefabrication and modular construction.	3	1	L2
2	Explain the functions of formwork in construction.	3	1	L2
3	Explain the role of automation in construction.	3	2	L2
4	Summarize the principles of lean construction.	3	2	L2
5	Explain the benefits of green buildings.	3	3	L2
6	Explain circular construction.	3	3	L2
7	Describe digital twin.	3	4	L2

8	Outline the benefits of digital construction methods.	3	4	L2
Part B				
<i>(Answer any one full question from each Module. Each carry 9 marks)</i>				
Module I				
Qn No.	Question	Marks	CO	BL
9	Describe the evolution of modern construction technologies and their significance.	9	1	L2
OR				
10	Explain the basic principles of prestressing and compare pretensioned and post-tensioned construction.	9	1	L2
Module II				
Qn No.	Question	Marks	CO	BL
11.a	Describe the principles and advantages of 3D printing in construction.	5	2	L2
11.b	Summarize the commonly used construction equipment in modern projects.	4	2	L2
OR				
12.a	Explain the applications of drones and digital surveying techniques in construction management.	5	2	L2
12.b	Explain digital surveying techniques.	4	2	L2
Module III				
Qn No.	Question	Marks	CO	BL
13	Explain waste minimization techniques and the principles of circular construction.	9	3	L2
OR				
14	Explain the features and benefits of energy-efficient building systems.	9	3	L2
Module IV				
Qn No.	Question	Marks	CO	BL
15	Describe the concepts and applications of Building Information Modelling (BIM) in construction projects.	9	4	L2
OR				
16	Explain the role of digital twins and IoT in improving construction performance.	9	4	L2
