FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

Marwadi University
Marwadi Chandarana Group

Advanced Construction Technology

01CI0614

Objective of the Course:

- To stay informed about emerging construction technologies.
- To promote ethical and sustainable building practices.
- To understand the advancement in construction materials.
- To study and analyze modern construction structures.

Credit Earned: 03

Student's learning outcomes:

After successful completion of the course, it is expected that students will be able to,

1. Identify the key principles and concepts of advanced construction technology.
2. Apply sustainable construction practices and principles.
3. Apply robotics and automation technologies in construction.
4. Identify and evaluate advanced construction materials.
5. Ascertain and analyse real-world construction projects.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (M)	CSE (I)	Viva (V)	Term Work (TW)	
03	00	00	03	50	30	20	25	25	150

Detailed Syllabus

Sr. No.	Title of the unit	Number of Hours
1	**Introduction**	**4**
	1.1 Overview of the construction industry, Importance of advanced construction technology, Emerging trends and challenges	2
	1.2 Green building concepts, LEED certification, Sustainable construction materials, Energy-efficient construction, Waste reduction and recycling in construction	2
2	**Advanced Construction Materials**	**10**
	2.1 High-performance concrete	2
	2.2 Advanced steel and composite materials	2

	2.3 Nanomaterials in construction	2
	2.4 Advanced wood products	2
	2.5 Sustainable and recycled materials	2
3	**Robotics and Automation in Construction**	**10**
	3.1 Robotic construction equipment,	2
	3.2 Drones and their applications,	2
	3.3 Autonomous construction vehicles,	2
	3.4 3D printing in construction,	2
	3.5 Augmented reality (AR) and virtual reality (VR) in construction	2
4	**Advanced Construction Techniques and Building Systems**	**8**
	4.1Construction Techniques: Prefabrication and modular construction, Off-site construction methods, Advanced formwork and false work,	2
	Tunneling and underground construction, Bridge construction techniques	2
	4.2 Building Systems: Smart building systems, Building automation and control,	2
	HVAC and energy management, Fire protection systems, Security systems	2
5	**Pile Foundation, Caisson & Coffer dam**	**10**
	5.1 Pile Foundation: Classifications of piles, Types of piles, Pile accessories and tools, Pile driving methods, Failure or settlement of piles.	4
	5.2 Caisson: Caisson Definition, uses, Types of caisson	3
	5.3 Coffer Dam: Types, requirements, Selection criteria, Design features, Introduction to Caissons	3
	Total	**42**

Suggested Theory Distribution

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve an effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
10%	20%	30%	30%	05%	05%

Instructional Method and Pedagogy:

1. At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
2. Lectures will be taken in class room with the use of multi-media presentations, white board– mix of both.

3. Attendance is compulsory in lectures and laboratory which carries a 5% component of the overall evaluation.
4. Minimum two internal exams will be conducted and average of two will be considered as a part of 15% overall evaluation
5. Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. It carries a weightage of 5%.
6. Surprise tests/Quizzes will be conducted which carries 5% component of the overall evaluation.

Recommended Study Material

1. Sustainable Construction Technologies: Life-Cycle Assessment By Vivian W.Y. Tam; Khoa N. Le, Elsevier; Butterworth-Heinemann, 2019
2. Sustainable Nanomaterials for the Construction Industry By Ghasan Fahim Huseien, Kwok Wei Shah, CRC Press, 2022
3. Building Construction , B.C.Punamia, Charotar Publication, 2007
4. Building Construction by Gurucharan Singh, Amit Publisher and Distributors, 2019