

GANPAT UNIVERSITY				
FACULTY OF DIPLOMA ENGINEERING				
Programme	Diploma in Civil Engineering			
Semester	IV	Version	1.0.0.0	
Effective from Academic Year	2026-27	Effective for the batch Admitted in	JULY 2025	
Course code	1CI4106	Course Name	Emerging Trends in Civil Engineering	

I. TEACHING-LEARNING AND ASSESSMENT SCHEME																			
Course Type	Course code	Course Title	Teaching & Learning Scheme									Examination Scheme							
			Credit				Actual Contact Hrs/week			SLH	Total Learning Hrs/Week	TH			PR			SLA	Total
			CL	TL	LL	Total	CL	TL	LL			CE	SEE	Total	CE	SEE	Total		
DSC	1CI4106	Emerging Trends in Civil Engineering	2	0	0	2	2	0	0	2	4	40	60	100	0	0	0	20	120

Abbreviation:	CL- Classroom Learning	TL - Tutorial Learning	LL - Laboratory Learning
	SLH - Self Learning Hours	NLH - Notional Learning Hours	SLA - Self Learning Assessment
	FA - Formative Assessment (Term work +Mid Sem Exam +Attendance)		SA - Summative Assessment

II. PRE-REQUISITES				
Basic knowledge of Civil Engineering Subjects.				
III. INDUSTRY / EMPLOYER EXPECTED OUTCOMES				
Suggest the relevant emerging techniques for the given civil engineering works.				
IV. COURSE LEARNING OUTCOMES				
Students will be able to achieve & demonstrate the following COs on completion of course based learning				
CO1. - Suggest the relevant softwares for given construction projects.				
CO2. - Select the relevant advance materials for given civil engineering work.				
CO3. - Propose the suitable advance construction equipments for the given work situation.				
CO4.- Adopt the relevant techniques for sustainable construction.				
CO5. - Suggest the relevant advance techniques for given construction activity.				
V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT:				
Name of Unit	Theory Learning outcomes (TLO's) aligned to CO's	Learning Content mapped with Theory Learning outcomes (TLO's) & CO's	Marks	Hours
Unit-1 Softwares in Civil Engineering	TLO 1.1 Describe merits and demerits of soft computing techniques. TLO 1.2 Suggest the suitable software/s for the given purpose in construction activity.	1.1 Merits and Demerits of soft computing technique. 1.2 Applications of Civil Engineering softwares : Build Master, HEC-RAS, STRAP, Water GEMS, ArcGIS, STAAD-Pro, RISA-Connection, MIDAS, Building Information Modeling (BIM), Procore, Primavera Pro, Virtual Reality Software-VR, MX Road Software, Building Planning & Management System (BPMS), Plaxis 3D, Autodesk Construction Cloud, Powerplay, Geo5.	12	06
Unit-2	TLO 2.1 Suggest the advanced construction	2.1 Properties and applications of building materials: Pollution absorbing bricks, Cooling bricks,	12	06

Advance Construction Materials	material for given type of construction. TLO 2.2 Enumerate the properties of given construction material. TLO 2.3 Use the relevant advance construction material for the given purpose in construction activity.	3D printed bricks, Interlocking bricks, Translucent wood, Sound proofing walls, Epoxy flooring. 2.2 Properties and applications of road materials: Recycled asphalt shingles, Self healing asphalt, Precast Pre-stressed Concrete Panels (PPCP) 2.3 Properties and applications of concrete materials: Synthetic concrete, New admixtures: Masterglanium, Polycarboxylic Ether, Nano concrete, Light transmitting concrete, Foam concrete, Bendable concrete or Engineered Cementitious Composite (ECC), Concrete Fabric, Hydrophobic concrete, Green concrete, Timbercrete, Ferrock		
Unit-3 Advance Construction Equipments	TLO 3.1 Suggest the relevant survey equipment for specified purpose. TLO 3.2 Propose the relevant type of construction equipment for given purpose. TLO 3.3 Suggest the relevant advance material handling equipment in given situation.	3.1 Survey equipments: LiDAR, Direct Reading Grade Rods, 3D Laser scanning, Robotic Markout, Google Earth. 3.2 Construction equipments: Earth moving equipment: Skid and crawler loaders, Trenchers, Scrappers, Wheeled loading shovels, Advanced plastering machine, Bridge girder launcher. 3.3 Material handling equipments: Types of cranes: Floating crane, Rough terrain crane, Bridge Over head crane, Conveyors, Hoists, Types of Forklifts: Telehandler forklift, Rough Terrain forklift, Types of paver: Tracked pavers, Hybrid offset paver, Side feeders, Road header, and Types of Tunnel boring machine: Horizontal boring, Vertical boring, Line boring.	16	08
Unit-4 Sustainability in Construction	TLO 4.1 Explain the necessity of energy audit with relevant methods. TLO 4.2 Propose the relevant recyclable material for the given construction activity. TLO 4.3 Explain the term Sustainable Drainage System	4.1 Energy Audit: Necessity and methods. 4.2 Properties of renewable,recyclable material and recycling of construction debris with its applications 4.3 Sustainable Drainage system(SuD) : Principles, Components and Benefits of SuDs.	08	04

Unit-5 Advance Construction Techniques	TLO 5.1 Use the relevant building construction techniques for the specified purpose in construction activity. TLO 5.2 Suggest the relevant road construction technique in given situation. TLO 5.3 Undertake the relevant ground improvement technique in the given situation.	4.1 Building construction techniques: Pre-engineered building using Mivan technology, Façade Technology, Fire protection buildings, 3D printing. 4.2 Road construction techniques: Road Printer, Smart roads, Anti-icing roads, Piezoelectric roads, Hyper loop construction, Precast arch bridge construction. 4.3 Ground improvement techniques: Advanced piling techniques Mono piling, Micro Piles, Soil Nailing, Sand Drains, Pre-Fabricated Vertical Drains, and Thermal Methods: Soil heating and Soil freezes.	12	06
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**VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL:
NOT APPLICABLE.**

**VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF
LEARNING / SKILL DEVELOPMENT (SELF LEARNING)**

Micro projects

- Prepare a report on Zero Energy Building and Green Building stating its case study mentioning material required, advantages and disadvantages and applications etc.
- Prepare a report on advanced tools/equipments for the site safety.
- Prepare the charts showing different types of safety rules and regulations of site.
- Prepare a report on Techniques of Earthquake Resistant Structures mentioning methods, merits, practical difficulties, applications etc.
- These are optional activities, which can be preferred by students for extra learning.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD

1	Computer system (Any computer system with appropriate configuration)
2	LCD Projector with accessories

IX. LIST OF REFERENCE BOOKS			
Sr.No.	Title	Author	Publication
1	Learning Manual of Emerging Trends in Civil Engineering	MSBTE, Mumbai.	MSBTE, Mumbai
2	Advanced Construction Techniques and Equipment	Dr. Manoranjan Samal	S.K. Kataria & Sons, 2022, ISBN: 978-93-5014-751-1
3	Advanced Construction and Equipment	Dr. R. P. Rethaliya	Atul Prakashan, Ahmedabad, 1 January 2019, ISBN: 978-93 81518.94-6

X. LINK OF LEARNING WEB RESOURCE	
1	https://www.engineeringcivil.com/softwares .
2	https://www.nbmcw.com/tech-articles/concrete/3725-new-construction-materials-for-modern-projects.html
3	https://geniebelt.com/blog/10-innovative-construction-materials
4	https://www.viatechnik.com/blog/modern-construction-machines-theyre-used
5	https://www.academia.edu/28172313/ADVANCED_BUILDING_CONSTRUCTION_EQUIPMENT
6	https://theconstructor.org/construction/sustainability-construction-civil-engineering/9492/
7	https://www.susdrain.org/delivering-suds/using-suds/suds-components/suds-components
8	https://www.designingbuildings.co.uk/wiki/Advanced_construction_technology
9	https://www.constructionjunkie.com/blog/2018/1/7/the-16-most-interesting-advances-in-construction-technology-of-2017
10	https://mysubs.in/buy/recent-trends-in-civil-engineering-and-technology-journal-subscription?gclid=Cj0KCQjw6If0BRCiARIsAF6q06scZ5teDIexIYz_j85yy2ZH_v1kiQcytNvYf3AelfE3LcZndTbhrOwaAqv2EALw_wcB
11	https://www.nobroker.in/blog/mivan-construction-technology-explained/

XI. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE							
Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	Softwares in Civil Engineering	CO1	6	5	5	2	12
2	Advance Construction Materials	CO2	6	6	4	2	12
3	Advance Construction Equipments	CO3	8	6	8	2	16
4	Sustainability in Construction	CO4	4	2	4	2	8
5	Advance Construction Techniques	CO5	6	5	5	2	12
Grand Total			30	24	26	10	60

XII. COs AND POs AND PSOs MAPPING										
Course outcome (Cos)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	3	2	3	0	0	3	2	2
CO2	3	3	2	2	1	0	1	3	3	2
CO3	2	3	3	2	2	0	0	3	2	3
CO4	2	2	2	1	1	2	3	2	2	2

CO5	2	3	3	2	2	0	1	3	3	3
Legends: -3- High 2-Moderate/Medium 1-Slight/Low 0-None										