

SWARNANDHRA

COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by
NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956,
Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF CIVIL ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement of Semester
23CE6E01	GROUND IMPROVEMENT TECHNIQUES	VI	CIVIL	5	2025-26	10-12-2025

COURSE OUTCOMES

Students are able to

1	Explain various methods of Ground improvement and their suitability to different field situations. [K2]
2	Describe the Dewatering techniques of Ground improvement. [K2]
3	Express different methods of Soil stabilization and applications of Grouting. [K2]
4	Know the Design principles of Reinforced earth embankment and check its stability. [K2]
5	Discuss various functions of Geosynthetics and their applications in Civil Engineering practice. [K2]

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
1	Explain various methods of Ground improvement and their Suitability to different field situations. [K2]	I. In-situ Densification methods				Chalk & Board, PPT
		1.1	Introduction	T1	01	
		1.2	In-situ densification of granular soils	T1	01	
		1.3	Vibration at ground surface and at depth	T1	01	
		1.4	Impact at ground and at depth	T1	01	
		1.5	In-situ densification of cohesive soils	T1	01	
		1.6	Preloading	T1	01	
		1.7	Pre-fabricated Vertical drains	T1	01	
		1.8	Sand drains and Stone columns	T1	02	
		1.9	Deep compaction.	T1	01	
Total					10	
II. Dewatering						
2	Describe the Dewatering techniques of Ground improvement . [K2]	2.1	Introduction	T1	01	Chalk & Board, PPT, video
		2.2	Sumps and Interceptor ditches	T1	02	
		2.3	Single and Multi stage Well points	T1	02	
		2.4	Vacuum Well points	T1	01	
		2.5	Horizontal Wells	T3	01	
		2.6	Criteria for choice of Filler material around drains	T3	02	
		2.7	Electro Osmosis.	T3	01	
Total					10	



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		III. Stabilization of Soils				
3	Express Different methods of Soil stabilization and Applications of Grouting [K2]	3.1	Introduction	T2	01	Chalk & Board, PPT, video
		3.2	Methods of soil stabilization	T2	01	
		3.3	Mechanical Stabilization	T2	02	
		3.4	Cement and Lime Stabilization	T2	02	
		3.5	Bitumen Stabilization	T2	01	
		3.6	Polymer Stabilization	T2	01	
		3.7	Use of Industrial wastes Fly ash and Granulated Blast Furnace slag in Stabilization	T2	02	
		3.8	Grouting – objectives of Grouting	T1	01	
		3.9	Grouts and their applications	T1	01	
		3.10	Methods of Grouting	T1	01	
		3.11	Stages of Grouting	T1	01	
		3.12	Hydraulic fracturing in soils and rocks	T1	01	
		3.13	Post grout tests	T1	01	
		3.14	Introduction to Liquefaction and its effects & applications.	T2	01	
Total				17		
		IV. Reinforced Earth				
4	Know the design principles of reinforced earth embankment and check its stability. [K2]	4.1	Introduction	T2	01	Chalk & Board, PPT, video
		4.2	Principles of Reinforced earth	T2	01	
		4.3	Components of Reinforced earth	T2	01	
		4.4	Design Principles of Reinforced earth walls	T3	02	
		4.5	Stability checks for Reinforced earth walls	T3	01	
		4.6	Soil nailing.	T2	01	
		4.7	Case studies	T2	01	
Total				08		
		V. Geosynthetics and Grouting				
5	Discuss various functions of Geosynthetics and their applications in Civil Engineering practice. [K2]	5.1	Introduction	R2	01	Chalk & Board, PPT, video
		5.2	Geo textiles types and Functions	R1	01	
		5.3	Geo textiles properties and Applications	R1	01	
		5.4	Geo grids properties and Applications	R1	01	
		5.5	Geo membranes properties and Applications	R1	01	
		5.6	Gabions properties and Applications	R2	01	
Total				06		
CUMULATIVE PROPOSED PERIODS					51	



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Text Books:

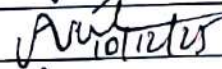
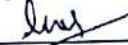
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Purushotham Raj 'Ground Improvement Techniques', Laxmi Publications, New Delhi, 2018.
2	Nihar Ranjan Patro , 'Ground Improvement Techniques' , Vikas Publishing House (P) Limited, New Delhi, 2015.
3	Jie Han, Principles and practice of ground improvement, Wiley publications, 1 st edition, 2015.

Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	G.L.Siva Kumar Babu , 'An introduction to Soil Reinforcement and Geosynthetics', Universities Press, 2000.
2	Shukla. S. K , "Handbook of Geosynthetic Engineering". ICE Publishing, London, UK, 2012.
3	MP Moseley , 'Ground Improvement' , Blackie Academic and Professional, USA, 2013.
4	RM Koerner , 'Designing with Geosynthetics', Prentice Hall, 2002.

Web Details

1	https://nptel.ac.in/courses/105108075
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	Name	Signature with Date
i. Course Coordinator	Dr.V.Gajendra	
ii. Module Coordinator	Dr.A. Venkata Krishna	
iii. Programme Coordinator	Dr.G.V.L.N.Murthy	


Principal