

**DEPARTMENT OF CIVIL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

COURSE PLAN – PART I			
Name of the programme and specialization	M.Tech Civil Engineering		
Course Title	GEOSYNTHETIC ENGINEERING		
Course Code	CE 826	No. of Credits	3
Course Code of Pre-requisite subject(s)			
Session	Jan, 2021	Section (if, applicable)	Elective
Name of Faculty	Dr. Jeevan Joseph	Department	Civil Engineering
Email	jeevan@nitt.edu	Telephone No.	9619474630
Name of Course Coordinator(s) (if, applicable)	Dr. K. Muthukkumaran		
E-mail	kmk@nitt.edu	Telephone No.	
Course Type	<input type="checkbox"/> Core course <input checked="" type="checkbox"/> Elective course		

Syllabus (approved in BoS)

Background of reinforced earth, mechanism and concepts, Basics of reinforced earth wall design - Geosynthetics - classifications, functions, applications, raw materials used. Different types of Geosynthetics, manufacturing, system, Design and sustainability - Various properties of Geosynthetics, physical properties, mechanical properties, hydraulic properties & endurance properties. Nano material - Different types of facing elements, construction procedure, cost, design of Geosynthetics wrap around faced wall, geogrid reinforced soil walls, geocell wall, gabion wall - Model for single and multi-layer reinforced slopes, guidelines for design of reinforced slopes, Design of basal reinforced embankment, placement of Geosynthetics, construction procedure, widening of existing road embankments. Consolidation techniques, Development of design chart for prefabricated vertical drains, ground instrumentation and monitoring, Design of encased stone columns, geocell/geofoam systems. Bearing capacity of Geosynthetics reinforced soil system; geocell reinforced sand overlaying soft clay.

References

1. P. T. Sherwood, Alternative Materials in Road Construction, Thomas Telford Publication, London, 1997.
2. RRL, DSIR, Soil Mechanics for Road Engineers, HMSO, London, 1995
3. Koerner, R. M. Designing with Geosynthetics, Prentice Hall, Englewood Cliffs, New Jersey, U.S.A.

COURSE OBJECTIVES
<ol style="list-style-type: none"> 1. To comprehend different types of Geosynthetics and their functions. 2. To compare the manufacturing methods and properties of Geosynthetics. 3. To compare conventional and reinforced earth retaining structures. 4. To apply design principles of Geosynthetics in Geotechnical applications.

COURSE OUTCOMES (CO)											
Course Outcomes	Aligned Programme Outcomes (PO)*										
	a	b	c	d	e	f	g	h	i	j	k
To understand the significance of Geosynthetics and classify them.	H	L	L		M	L					
To classify Geosynthetics based on its manufacturing method and properties.	H	L	L	M	M	H					
To recommend conventional and reinforced earth retaining structures.	H	M	H		M	H	M	L	M	L	
To apply the design principles of Geosynthetics for Geotechnical applications.	H	H	H	M	L	M	M	L	H	M	L
* a: Scholarship of Knowledge; b: Critical Thinking; c: Problem Solving; d: Research Skill; e: Usage of modern tools; f: Collaborative and Multidisciplinary work; g: Project Management and Finance; h: Communication; i: Life-long Learning; j: Ethical Practices and Social Responsibility; k: Independent and Reflective Learning											

COURSE PLAN – PART II			
COURSE OVERVIEW			
The course is designed in such a way to impart the significance of geo-environmental issues pertaining to the contemporary engineering practises.			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1.	Week 1	Geosynthetics - classifications, functions, applications, raw materials used.	Online Lecture
2.	Week 2	Different types of Geosynthetics, manufacturing, system,	Online Lecture
3.	Week 3	Various properties of Geosynthetics, physical properties, mechanical properties,	Online Lecture
4.	Week 4	hydraulic properties & endurance properties.	Online Lecture
5.	Week 5	Different types of facing elements, construction procedure, cost,	Online Lecture
6.	Week 6	Design of Geosynthetics wrap around	Online Lecture

		faced wall, geogrid reinforced soil walls,	
7.	Week 7	geocell wall design and gabion wall	Online Lecture
8.	Week 8	Model for single and multi-layer reinforced slopes, guidelines for design of reinforced slopes	Online Lecture
9.		Mid Semester Examination	
10.	Week 10	Design of basal reinforced embankment, placement of Geosynthetics, construction procedure,	Online Lecture
11.	Week 11	widening of existing road embankments.	Online Lecture
12.	Week 12	Case study Presentation	Online Lecture
13.	Week 13	Consolidation techniques, Development of design chart for prefabricated vertical drains,	Online Lecture
14.	Week 14	ground instrumentation and monitoring	Online Lecture
15.	Week 15	Design of encased stone columns, geocell/geofoam systems.	Online Lecture
16.	Week 16	Bearing capacity of Geosynthetics reinforced soil system; geocell reinforced sand overlaying soft clay.	Online Lecture

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment-1	3 rd Week of Feb	1 week time for submission	10
2	Assignment-2	1 st week of May		10
3	MID SEM	3 rd Week of March	2 hr	20
4	Quiz	4 th week of April		15
5	Case study Presentation	3 rd Week of April	10 min/person	15

CPA	Compensation Assessment*	1 st Week of Dec	2 hour	
6	Final Assessment *	3 rd week December	2 hours	30
<p>*A minimum of 30 % for the Final assesment and a cumulative of 40 % (summing up all the mode of assesment) is mandatory for passing the subject.</p>				
<p>COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)</p> <p>It is proposed to take feedback from the students, at the end of the semester to evaluate the execution of the course.</p>				
<p>COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)</p>				
<p><u>MODE OF CORRESPONDENCE (email/ phone etc)</u></p> <ul style="list-style-type: none"> • Mode of correspondence would be through Email and phone calls • • <u>COMPENSATION ASSESSMENT POLICY</u> • Compensatory assessment shall be given for students providing genuine reasons (reported with in a weeks' time from the actual date of assessment) for their absentia during the regular assessments. • Written examination for a time duration of 2 hr, covering the entire syllabus would be compensatory assessment policy for students missing Mid Semester. • Students missing Assessment 1,2,4 and 5 may have to undergo the same assessment methodology scheduled in the actuals. 				
<p><u>ATTENDANCE POLICY</u> (A uniform attendance policy as specified below shall be followed)</p> <ul style="list-style-type: none"> ➤ At least 75% attendance in each course is mandatory. ➤ Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade. 				
<p><u>ACADEMIC DISHONESTY & PLAGIARISM</u></p> <ul style="list-style-type: none"> ➤ Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark. ➤ The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office. The above policy against academic dishonesty shall be applicable for all the programmes. 				

ADDITIONAL INFORMATION

- The Course instructor would be available for discussions, if any, during office hours, at Room No:18; Civil Dept.
- Students are free to post any queries or clarifications to jeevan@nitt.edu.

FOR APPROVAL

Dr. Jeevan Joseph
Course Faculty



Dr. S. Moses Santhakumar
CC-Chairperson




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Dr. G. Swaminathan
HOD