



DEPARTMENT OF CIVIL ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	M.Tech. Geotechnical Engineering		
Course Title	Soil Exploration and Field Testing		
Course Code	CE 812	No. of Credits	3
Course Code of Pre-requisite subject(s)	NIL		
Session	II-Sem/Jan/2021	Section (if, applicable)	-
Name of Faculty	Dr. Deendayal	Department	Civil Engineering
Official Email	deendayal@nitt.edu	Telephone No.	0431-2053170
Name of Course Coordinator(s)	-		
Official E-mail	deendayal@nitt.edu	Telephone No.	
Course Type (please tick appropriately)	<input type="checkbox"/> Core course	<input checked="" type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<p>Scope and objectives - planning an exploration program - methods of exploration - exploration for preliminary and detailed design - spacing and depth of bores - data presentation - Geophysical exploration and interpretation - seismic and electrical methods - cross bore hole, single bore hole – up hole - down hole methods.</p> <p>Methods of boring and drilling - non-displacement and displacement methods - drilling in difficult subsoil conditions - limitations of various drilling techniques, stabilization of boreholes - bore logs.</p> <p>Sampling Techniques – quality of samples – factors influencing sample quality - disturbed and undisturbed soil sampling advanced sampling techniques, offshore sampling, shallow penetration samplers, preservation and handling of samples.</p> <p>Field tests - penetration tests - Field vane shear - Insitu shear and bore hole shear test - pressuremeter test - dilatometer test - plate load test – monotonic and cyclic; field permeability tests – block vibration test – Procedure – limitations - correction and data interpretation of all methods.</p> <p>Instrumentation in soil engineering, strain gauges, resistance and inductance type, load cells, earth pressure cells, settlement and heave gauges, pore pressure measurements - slope indicators, sensing units, case studies.</p>			



COURSE OBJECTIVES	
1. To recall the various soil investigation techniques. 2. To identify the appropriate technique for soil exploration. 3. To classify soil strata using direct and in direct methods. 4. To interpret the investigated data to design suitable foundation system.	
MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. To understand the significance of understanding the soil properties at a site conduct a sequential soil exploration according to the site.	1,2,3,4,6,7,8
2. To extract samples as per requirement and perform field and laboratory tests.	4,5,6,7,8,11,12
3. To understand the practical significance of the results obtained from field and laboratory tests	4,7
4. To clearly report the conclusions based on the conducted soil exploration and tests.	2,3,4,7

COURSE PLAN – PART II			
COURSE OVERVIEW			
The course elaborates various ground improvement techniques along with principles, design issues and construction procedures.			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week	Topic	Mode of Delivery
1	Week 1	Scope and objectives - planning an exploration program - methods of exploration - exploration for preliminary and detailed design	PPT & Virtual Mode
2	Week 2	spacing and depth of bores - data presentation - Geophysical exploration and interpretation - seismic and electrical methods	PPT & Virtual Mode
3	Week 3	cross bore hole, single bore hole – up hole - down hole methods.	PPT & Virtual Mode
4	Week 4	Methods of boring and drilling - non-displacement and displacement methods - drilling in difficult subsoil conditions- limitations of various drilling techniques, stabilization of boreholes - bore logs.	PPT & Virtual Mode



5	Week 5	Assessment-1	
6	Week 6	Sampling Techniques – quality of samples – factors influencing sample quality - disturbed and undisturbed soil sampling advanced sampling techniques	PPT & Virtual Mode
7	Week 7	Offshore sampling, shallow penetration samplers, preservation and handling of samples.	PPT & Virtual Mode
8	Week 8	Field tests - penetration tests - Field vane shear – In-situ shear and bore hole shear test	PPT & Virtual Mode
9	Week 9	Pressure meter test-dilatometer test - plate load test – monotonic and cyclic; field permeability tests –	PPT & Virtual Mode
10	Week 10	block vibration test – Procedure limitations -	PPT & Virtual Mode
11	Week 11	correction and data interpretation of all methods.	PPT & Virtual Mode
12	Week 12	Assessment-2	
13	Week 13	Instrumentation in soil engineering, strain gauges	PPT & Virtual Mode
14	Week 14	Resistance and inductance type, load cells-earth pressure cells,	PPT & Virtual Mode
15	Week 15	settlement and heave gauges	PPT & Virtual Mode
16	Week 16	pore pressure measurements	PPT & Virtual Mode
17	Week 17	slope indicators, sensing units, case studies.	PPT & Virtual Mode



18	Week 18	Final Assessment
----	---------	-------------------------

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week	Duration	% Weightage
1	Assessment-I	5 th Week	1/2 hour	20 marks
2	Assessment-II	12 th Week	1/2 hour	20 marks
3	Assignments & Seminars	3 rd , 6 th , 8 th and 10 th week	1 week time	30=15+15 marks
4	CPA-Compensation Assessment*	16 th week	1/2 hour	20 marks
5	Final Assessment *	18 th week	2 hour	30 marks
6	Total			100 marks

*mandatory; refer to guidelines on page 6

ESSENTIAL READINGS : Textbooks, reference books and journals.

References:

1. Bowles, J.E, Physical and Geotechnical Properties of Soil, McGraw-Hill Book Company, 1985.
2. Bowles, J.E, Foundation Analysis and Design, McGraw-Hill International edition, 1997.
3. Dunnicliff, J. and Green, G.E, Geotechnical Instrumentation for Monitoring Field Performance, John Wiley & Sons, 1982.
4. GopalRanjan and Rao, A.S.R, Basic and Applied Soil Mechanics, Wiley Eastern Limited, 1991.
5. Lunne, T., Robertson, P.K. and Powell, J.J.M, Cone Penetration Testing in Geotechnical Practice, Blackie Academic & Professional, 1997.
6. Compendium of Indian Standards on Soil Engineering Parts 1 and II 1987 – 1988
7. All related ASTM codes and Eurocode 7 - Part 2

COURSE EXIT SURVEY

1. Class committee meetings.
2. Online - Feedback forms submission through MIS.

COURSE POLICY (including compensation assessment to be specified)



- Minimum 75% attendance is compulsory for attending the final examination.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.


ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- 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, IF ANY

The Course Coordinator's Room No. : 101 (Civil- Annex Building)
Timings : 10 a.m. to 5 p.m.
Email ID : deendayal@nitt.edu
Telephone No. : 0431-250-3170

FOR APPROVAL


Course Faculty _____


CC- Chairperson _____


Head
Department of Civil Engineering
National Institute of Technology
Tiruchirappalli - 620 015. HOD _____



Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.