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
19CE5T04	GEOTECHNICAL ENGINEERING	V	CIVIL	05	2021-22	04-10-2021

COURSE OUTCOMES

1	Develop different methods of index properties of the soils and classify the soils. (K3)
2	Compute different engineering properties of the soil such as compaction, permeability.(K3)
3	Relate stress distribution in soils in day-to-day civil engineering practice .(K2)
4	Determine the compressibility of soils. (K3)
5	Develop stress-strain behavior of different sands .(K3)

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
I	Develop different methods of index properties of the soils and classify the soils. (K3)	1.1	**Introduction:** Soil formation	T1,T5	1	Chalk & Talk, PPT, Tutorial
		1.2	soil structure and clay mineralogy	T1,T5	1	
		1.3	Adsorbed water	T1,T5	1	
		1.4	Mass-volume relationship	T1,T5	1	
		1.5	Mass-Density relationships	T1,T2	1	
		1.6	Weight-volume relationship	T1,T2	1	
		1.7	Grain size analysis Sieve	T1,T2	1	
		1.8	Hydrometer methods	T1,T2	1	
		1.9	Consistency limits and indices.	T1,T2	1	
		1.10	**Index Properties of Soils**	T1,T5	1	
		1.11	Various Types of soil Classifications	T1,T5	1	
		1.12	Unified soil classification	T2,T5	1	
		1.13	I.S. Soil classification	T2,T5	1	
		1.14	Relative density	T1,T5	1	

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		1.15	Mechanism of compaction factors affecting	T2,T5	1	
		1.16	Effects of compaction on soil.	T2,T5	1	
		1.17	properties -compaction control	T2,T5	1	
				Total		17
II	Compute different engineering properties of the soil such as compaction, permeability. (K3)	2.1	**Permeability:**			Chalk & Talk, PPT, Tutorial
		2.2	Soil water – capillary rise –	T2,T5	1	
		2.3	one dimensioned flow of water through soils –	T1,T5	1	
		2.4	Darcy's law	T5,T1	1	
		2.5	permeability – Factors affecting permeability	T1,T5	1	
		2.6	laboratory determination of coefficient of permeability by Constant Head Method	T1,T5	1	
		2.7	coefficient of permeability by Variable Head Method	T1,T5	1	
		2.8	Permeability of layered soils in Horizontal Flow condition	T1,T5	1	
		2.9	Permeability of layered soils in Vertical Flow Conditions	T1,T5	1	
		2.10	Total, neutral and effective stress	T1,T5	1	
		2.11	Analysis of effective Stress in different cases	T1,T5	1	
		2.11	Problems on Effective Stresses conditions	T1,T5	1	
		2.12	Capillary Rise in effective stress on soils - problem	T1,T5	1	
		2.13	quick sand condition	T1,T5	1	
		2.14	2-D flow and Laplace's equation	T1,T5	1	
		2.15	Seepage through soils	T1,T5	1	
		2.16	Effect of Seepage on Effective Stresses	T1,T5	1	
		2.17	Flow nets: Characteristics ,Uses	T1,T5	1	
		2.18	Applications of Flow nets- Phreatic line of an Earth Dam	T1,T5	1	
				Total		18
III		3.1	**Stress Distribution In Soils: -**		1	Chalk &
		3.2	Vertical stress distribution	T2,T5	1	

	Relate stress distribution in soils in day-to-day civil engineering practice . (K2)	3.3	Stresses induced by applied loads	T1,T5	1	Talk, PPT, Tutorial
		3.4	Boussinesq's theories for point loads	T1,T5	1	
		3.5	Westergaard's theories for point loads and areas of different shapes	T1,T5	1	
		3.6	Pressure Bulb Concept	T1,T5	1	
		3.7	Newmark's influence chart - 2:1	T1,T5	1	
		3.8	stress distribution methods	T1,T5	1	
		3.9	Problem on Newmark's method	T1,T5	1	
		3.10	Problem on Boussinesq's method	T1,T5	1	
				Total		10
IV	Estimate compressibility of soils. (K4)	4.1	**Consolidation:**			Chalk & Talk, PPT, Tutorial
		4.2	Compressibility of soils	T2,T5	1	
		4.3	- e-σ and e-log σ curves	T1,T2	1	
		4.4	Stress history - Concept of consolidation -	T2,T5	1	
		4.5	Spring Analogy	T1,T2	1	
		4.6	- Terzaghi's theory of one-dimensional Consolidation	T1,T2	1	
		4.7	Time rate of consolidation			
		4.8	Degree of consolidation	T2,T5	1	
		4.9	Determination of coefficient of	T1,T5	1	
		4.10	consolidation (C_v)	T1,T2		
		4.11	Over consolidated and normally consolidated clays	T1,T2	1	
		4.12	Consolidation laboratory experimental Procedure	T1,T5	1	
		4.13	Different Compressibility Effects	T1,T2	1	
				Total		13
V	Develop stress-strain behavior of different sands . (K3)	5.1	**Shear Strength of Soils:**			Chalk & Talk, PPT, Tutorial
		5.2	Basic mechanism of shear strength -	T2,T5	1	
		5.3	The Effective Stress Principal	T1,T5	1	
		5.4	Mohr's Circle Derivation	T2,T5	1	
		5.5	Mohr -Coulomb Failure theories	T1,T5	1	
		5.6	Derivation of Shear Strength of soils	T1,T5	1	
		5.7	Stress-Strain behavior of Sands -	T1,T2	1	

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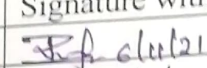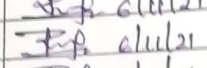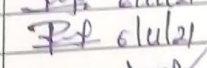| | 5.8 | Critical Void Ratio - Stress- | T1,T2 | I | |
	5.9	Strain behavior of clays	T1,T5	I	
	5.10	- Shear Strength determination	T1,T5		
	5.11	various drainage conditions	T1,T5	I	
		Consolidation test	T1,T5	I	
	5.12	Triaxial Test	T1,T5	I	
	5.13	Field tests Standard Penetration Test	T1,T5	I	
				Total	13

CUMULATIVE PROPOSED PERIODS | 71

Text /Reference Books

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Gopal Ranjan and A.S.R.Rao , 'Basic and Applied Soil Mechanics', New Age International Publishers. 2015
2	R.F.Craig, "Soil mechanics", spon press, Talyor & Francis Group, London Seventh edition. 2014
3	Braja M. Das and Khaled Sobhan, "Principles of Geotechnical Engineering, Cengage Learning-USA, Eight edition 2015
4	Holtz and Kovacs, An introduction to Geotechnical Engineering', Prentice Hall. 2014
5	B.C.Punmia, Ashok Kumar Jain & Arun kumar Jain , 'Soil Mechanics and Foundations', Laxmi Publications, 16th edition 2018

Web Details :
https://nptel.ac.in/courses/105105168/
https://nptel.ac.in/courses/105105185/

		Name	Signature with Date
i.	Faculty	K.Ramya	6/u/21
ii.	Course Coordinator	K.Ramya	6/u/21
iii.	Module Coordinator	K.Ramya	6/u/21
iv.	Programme Coordinator	G V L N MURTHY	

Principal

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