SRI VIDYA COLLEGE OF ENGINEERING & TECHNOLOGY

COURSE PLAN (THEORY)

ACADEMIC YEAR: 2018-2019(Even)

Subject Code	CE8491	**L**	**P**	**T**	**C**
Subject Title	SOIL MECHANICS	3	0	0	3
Year / Dept / Sem	II / CIVIL / IV	Regulation Year	2017		
Faculty Name / Desg / Dept	Mr.K.KALIRAJAN M.E., / Assistant Professor / CIVIL				
Course Prerequisite	1. The students must have details about fundamental applications of fluid mechanics in geotechnical engineering. 2. They have more details about properties of soils properties				

SYLLABUS

CE8491 SOIL MECHANICS L T P C

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UNIT I SOIL CLASSIFICATION AND COMPACTION 9

History – formation and types of soil – composition - Index properties – clay mineralogy structural arrangement of grains – description – Classification – BIS – US – phase relationship – Compaction – theory – laboratory and field technology – field Compaction method – factors influencing compaction.

UNIT II EFFECTIVE STRESS AND PERMEABILITY 9

Soil - water – Static pressure in water - Effective stress concepts in soils – Capillary phenomena– – Permeability – Darcy's law – Determination of Permeability – Laboratory Determination (Constant head and falling head methods) and field measurement pumping out in unconfined and confined aquifer – Factors influencing permeability of soils – Seepage - Two dimensional flow – Laplace's equation – Introduction to flow nets – Simple problems Sheet pile and wier.

UNIT III STRESS DISTRIBUTION AND SETTLEMENT 9

Stress distribution in homogeneous and isotropic medium – Boussines of theory – (Point load, Line load and udl) Use of Newmarks influence chart –Components of settlement – Immediate and consolidation settlement – Factors influencing settlement – Terzaghi's one dimensional consolidation theory – Computation of rate of settlement. – √t and log t methods. e-log p relationship consolidation settlement N-C clays – O.C clays – Computation.

UNIT IV SHEAR STRENGTH 9

Shear strength of cohesive and cohesion less soils – Mohr-Coulomb failure theory – shear strength - Direct

shear, Triaxial compression, UCC and Vane shear tests – Pore pressure parameters – Factors influences shear strength of soil.

UNIT V SLOPE STABILITY 9

Infinite slopes and finite slopes –– Friction circle method – Use of stability number –Guidelines for location of critical slope surface in cohesive and c - soil – Slope protection measures.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Murthy, V.N.S., "Text book of Soil Mechanics and Foundation Engineering", CBS Publishers Distribution Ltd., New Delhi. 2014
2. Arora, K.R., "Soil Mechanics and Foundation Engineering", Standard Publishers and Distributors, New Delhi, 7th Edition, 2017(Reprint).
3. Gopal Ranjan, A S R Rao, "Basic and Applied Soil Mechanics" New Age International Publication, 3rd Edition, 2016.
4. Punmia, B.C., "Soil Mechanics and Foundations", Laxmi Publications Pvt. Ltd. New Delhi, 16th Edition, 2017.

REFERENCES:

1. McCarthy, D.F., "Essentials of Soil Mechanics and Foundations: Basic Geotechnics". Prentice-Hall, 2006.
2. Coduto, D.P., "Geotechnical Engineering – Principles and Practices", Prentice Hall of India Pvt. Ltd. New Delhi, 2010.
3. Braja M Das, "Principles of Geotechnical Engineering", Cengage Learning India Private Limited, 8th Edition, 2014.
4. Palanikumar.M., "Soil Mechanics", Prentice Hall of India Pvt. Ltd, Learning Private Limited Delhi, 2013.
5. Craig.R.F., "Soil Mechanics", E & FN Spon, London and New York, 2012.
6. Purushothama Raj. P., "Soil Mechanics and Foundations Engineering",2nd Edition, Pearson Education, 2013.
7. Venkatramaiah.C., "Geotechnical Engineering", New Age International Pvt. Ltd., New Delhi, 2017

Course Objectives (CO)	CO1: To impart knowledge to classify the soil based on index properties and to assess their engineering properties based on the classification. CO2: To familiarize the students about the fundamental concepts of compaction, flow through soil, stress transformation and stress distribution of soils. CO3: To impart knowledge of design of both finite and infinite slopes CO4: To introduce students about the fundamental concepts of consolidation and shear strength of soils. CO5: To impart knowledge of soil settlements and its types.

Expected Course Outcomes (ECO)	At the end of the course, the students should be able to: ECO1. Understand the stress concepts in soils ECO2. Understand and identify the settlement in soils. ECO3. Determine the shear strength of soil ECO4. Analyze both finite and infinite slopes.

Mapping of CO & PO(Specify the PO's) - *(Fill the col.s with the legend given below)*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	1	2	-	-	-	-	-	-	-	-
CO2	-	1	-	-	-	-	-	2	2	-
CO3	-	2	-	-	-	-	-	-	1	-
CO4	1	-	2	-	-	-	-	2	-	1
CO5	-	1	1	-	-	-	-	-	1	2

Bridging the Curriculum Gap (Additional Topics beyond syllabus/Seminars/Assignments)	BCG1: Components of settlements & plate load test. BCG2: Various test to find Bearing capacity of soil. BCG3: Sampling techniques & site investigation methods
Related Website URLs	W1: *http://nptel.ac.in/courses/105107118/9* W2: *www library.ctr.utexas.edu/ctr-publications/0-5931-3.pdf* W3: www.e-periodica.ch/cntmng?pid=bse-cr-001:1838:8::203
Related Video Course Materials (min. 3 no.s)	*V1: https://youtu.be/UzuVARqd4DII* *V2: https://www.youtube.com/watch?v=qjwrXLWhISE* *V3:* https://www.youtube.com/watch?v=HLnV-fdf8k

S.No	Topic Name	Book – P. No	Teaching Aids	No of hrs	Cumulative hrs
UNIT I SOIL CLASSIFICATION AND COMPACTION					
1.	History – formation and types of soil	**T4 1-8**	Class room teaching	**1**	**1**
2.	composition - Index properties	**T4 37-87**	Class room teaching	**2**	**3**
3.	clay mineralogy structural arrangement of grains- description	**T4 133-142**	Assignments	**1**	**4**
4.	Classification – BIS – US	**T4 111-132**	Class room teaching	**1**	**5**
5.	phase relationship	**T4 9-30**	Class room teaching	**2**	**7**

6.	Compaction – theory	**T4 407**	Class room teaching	**2**	**9**
7.	laboratory and field technology	**T4 407-412**	Seminars	**1**	**10**
8.	field Compaction method	**T4 413**	Class room teaching	**1**	**11**
9.	Factors influencing compaction.	**T4 414**	Assignments	**1**	**12**
UNIT II EFFECTIVE STRESS AND PERMEABILITY					
1.	Soil - water – Static pressure in water	**T4 147**	Class room teaching	**1**	**13**
2.	Effective stress concepts in soils – Capillary phenomena	**T4 149-157**	Class room teaching	**1**	**14**
3.	Permeability – Darcy's law	**T4 177-178**	Assignments	**2**	**16**
4.	Determination of Permeability – Laboratory Determination (Constant head and falling head methods) and field measurement pumping out in unconfined and confined aquifer	**T4 179-198**	Class room teaching	**2**	**18**
5.	Factors influencing permeability of soils – Seepage	**T4 183&223**	Class room teaching	**2**	**20**
6.	Two dimensional flow – Laplace's equation	**T4 230-231**	Class room teaching	**2**	**22**
7.	Introduction to flow nets – Simple problems Sheet pile and wier.	**T4 232-249**	Class room teaching	**2**	**24**
UNIT III STRESS DISTRIBUTION AND SETTLEMENT					
1.	Stress distribution in homogeneous and isotropic medium	**T4 295**	Class room teaching	**1**	**25**
2.	Boussines of theory – (Point load, Line load and udl) Use of Newmarks influence chart	**T4 296-312**	Class room teaching	**2**	**27**
3.	Components of settlement – Immediate and consolidation settlement	**T4 680**	Assignments	**2**	**29**
4.	Factors influencing settlement	**T4 686**	Class room teaching	**1**	**30**
5.	Terzaghi's one dimensional consolidation theory	**T4 346**	Class room teaching	**2**	**32**
6.	Computation of rate of settlement. – $\sqrt{t}$ and log t methods.	**T4 355**	Class room teaching	**1**	**33**
7.	e-log p relationship consolidation settlement N-C clays –	**T4 348-370**	Class room teaching	**2**	**35**
8.	O.C clays – Computation.	**T4 395**	Seminars	**1**	**36**
UNIT IV SHEAR STRENGTH					
1.	Shear strength of cohesive and cohesion less soils	**T4 427**	Class room teaching	**2**	**38**
2.	Mohr-Coulomb failure theory	**T4 430-432**	Class room teaching	**2**	**40**

3.	shear strength - Direct shear	**T4 434-435**	Class room teaching	**2**	**42**
4.	Triaxial compression, UCC and Vane shear tests	**T4 436-452**	Class room teaching	**2**	**44**
5.	Pore pressure parameters	**T4 452**	Class room teaching	**2**	**46**
6.	Factors influences shear strength of soil.	**T4 465**	Class room teaching	**2**	**48**
UNIT V SLOPE STABILITY					
1.	Infinite slopes and finite slopes	**T4 603-608**	Class room teaching	**2**	**50**
2.	Friction circle method	**T4 611**	Class room teaching	**2**	**52**
3.	Use of stability number	**T4 621**	Class room teaching	**2**	**54**
4.	Guidelines for location of critical slope	**T4 615**	Class room teaching	**2**	**56**
5.	surface in cohesive and c – soil	**T4 611**	Class room teaching	**2**	**58**
6.	Slope protection measures.	**T4 632**	Seminars	**2**	**60**

	Prepared by	***Approved by***
Signature		
Name	Mr.K.KALIRAJAN	Prof.P.GANESAN
Designation	Assistant Professor / CIVIL	HOD /CIVIL
Signed date		

LEGEND:

METHODOLOGY TO MAP OBJECTIVE WITH OUTCOME

Course outcomes are achieved through

- **a.** Suitable Analogies.
- **b.** Class room teaching.
- **c.** Assignments.
- **d.** Tutorials
- **e.** Weekly, monthly and model exams.
- **f.** Brain storming.
- **g.** Group discussion and role play.
- **h.** Seminars