

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
CE-502	Geotechnical Engineering	PCC	4	3	1	0	50	100	150

Course Outcomes:

At the end of the course the students will be able to:	
CO1	Explain stress path diagrams and estimate shear strength for different load Conditions.
CO2	Analyze the active and passive earth pressure for slope failure.
CO3	Analyze bearing capacity and settlement of foundations.
CO4	Apply geosynthetics systems to solve contemporary geotechnical problems.
CO5	Describe a specific method of tunnel driving for a given ground condition.

Detailed Syllabus**Section-A**

Unit 1: Stresses in soils. Influence factors, Isobars, Computation of displacements from elastic theory, Newmark's influence chart. Contact pressure, Shear strength: Mohr and its characteristics, Relation between major and minor principal stresses, Mohr-Coulomb theory, and Shear Strength tests for Different Drainage conditions.

(12 Hrs)

Unit 2: Lateral Earth Pressure: Rankine's Theories. Stability of Slopes- Introduction, types of slopes and their failure mechanisms, analysis of finite and infinite slopes. Friction circle method. Soil Exploration: Scope, Sampling, Methods of soil exploration, Standard penetration and cone penetration tests.

(12Hrs)

Unit 3: Foundation classification; Choices, Necessity, IS code method and Terzaghi's theory for finding Bearing Capacity. Pile Foundations: Classification and Uses, Field test and Bearing Capacity for piles. Well Foundations: Caissons – Types, advantages and disadvantages, Shapes and component parts, Grip length, Bearing capacity and settlement, Forces acting, Sinking of wells, Rectification of Tilts and Shifts.

(12 Hrs)**Section-B**

Unit 4: Geosynthetics: An overview on the development and applications of various geosynthetics - the geotextiles, geogrids, geonets, geomembranes and geocomposites.

(8 Hrs)

Unit 5: Tunneling: Benefits of tunneling, Tunnels for different purposes, Site investigation and geophysical methods adopted for tunneling purposes, Rock rating and classification, Instrumentation on tunnels Tunneling methods: Drill and blast method, Tunnel boring machine, NATM, Application of Geosynthetics in tunneling.

(8 Hrs)**Text Books**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Soil Mechanics	Craig R.F.	Chapman & Hall	3 rd (2017)
2	Fundamentals of Soil Engineering	Taylor,	John Wiley & Sons	5 th (2019)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Soil Mech. & Foundation Engg	K.R.Arora	Standard Publishers	8 th (2020)
2	Geotechnical Engineering	P. Purshotama Raj	Tata Mcgraw Hill	4 th (2016)
3	Soil Mech. & Foundation Engg.	V.N.S.Murthy	CBS Publishers	5 th (2018)