B. Tech. Civil Engineering				
Course code: Course Title	**Course Structure.**			**Pre-Requisite**
CE 314: Theory of Elasticity and Plasticity in Soil	L	T	P	CE 206 Soil mechanics
	3	1	0	

Course Objective:

- To analyse stress and strain in two-dimensional and three-dimensional soil problems.
- To apply constitutive laws, equilibrium equations, and compressibility relations in soil mechanics.
- To evaluate drained and undrained loading conditions and failure mechanisms in soils.
- To study critical state soil mechanics, plastic flow, and anisotropic compression behaviour.
- To apply elasto-plastic and rheological models in soil-structure interaction and stability analysis.

S. No	Course Outcomes (CO)
CO1	To perform the analysis of stress and strain for analysis of 2D and 3D problems.
CO2	To apply the constitutive law equilibrium equations and compressibility equations.
CO3	TO do failure analysis of soil.
CO4	To apply critical soil mechanics to engineering structures.
CO5	To perform the analysis of earth retaining structures and slopes.

S. No	Contents	Contact Hours
UNIT 1	Stresses and strains, elastic equilibrium analysis for plane and three-dimensional cases.	8
UNIT 2	Effective stress, analysis of deformation and strain, state of stress and strain, constitutive relations, equilibrium and compatibility, general theorem	8
UNIT 3	Drained and Undrained loading, state boundary surface, plastic flow, yield and hardening, failure theorem for soils.	8

UNIT 4	Failure and plastic flow at critical state, associative and non-associative flow, residual strength, and anisotropic compression. Ideal elastic behavior: two- and three-dimensional system, theorem of plastic collapse.	8
UNIT 5	Application to soil interaction, elasto-plastic theory of soil, rheological models, nonlinear viscoelasticity, problem, and solution.	10
	TOTAL	**42**

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REFERENCES

S. No.	**Name of Books/Authors/Publishers**	**Year of Publication / Reprint**
1	ME Harr, 'Fundamentals of Theoretical Soil Mechanics': (ISBN 978-0-070267411).	1966
2	HG Poulus and EH Davis, 'Elastic Solutions for Soil and Rock Mechanics', (ISBN 9780471695653).	1974
3	SP Timoshenko & JN Goodier, 'Theory of Elasticity & Plasticity' (ISBN 978-0-9791865-0-9).	1982
4	AN Schofield & CP Wroth, 'Critical State Soil Mechanics' (ISBN 978-0641940484).	1968
5	DM Wood, 'Geotechnical Modelling' (ISBN-978-0419237303).	2004