



TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Moradabad (U.P.)

PhD PROGRAMME

SYLLABUS FOR DISCIPLINE SPECIFIC COURSE CIVIL ENGINEERING

Course Code: PDS240129	Advances in Civil Engineering	L	T	P	C
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Objective:	To familiarize the research scholar with the fundamentals of scientific research.				
Course Outcomes:	On completion of the course, the students will be able:				
CO 1:	To understand the fundamentals of matrix method, materials, and geospatial Techniques				
CO 2:	To analyze the complex structures, quantification of solid waste				
CO 3:	To design special concrete mixes				
CO 4:	To analyze Traffic characteristics, Generation of solid waste				
CO 5:	To evaluate the various features of earth's surface using geospatial techniques				
Course Content:					
Unit 1:	Matrix concepts and Matrix analysis of structures: Matrix; vector; basic matrix operations; rank; solution of linear simultaneous equations; eigenvalues and eigenvectors. Introduction; coordinate systems; displacement and force transformation matrices; Contra-gradient principle; element and structure stiffness matrices; Element and structure flexibility matrices; equivalent joint loads; stiffness and flexibility approaches				
Unit 2:	Materials: Aggregates classification IS Specifications, Properties, Grading, Methods of combining aggregates, specified grading, Testing of aggregates - Cement, Grade of cement, Chemical composition, Testing of concrete, Hydration of cement, Structure of hydrated cement, special cement - Water - Chemical admixtures, Mineral admixture.				
Unit 3:	Municipal Solid Waste: Generation, Rate Variation, characteristics (Physical, Biological and Chemical); Management Options for Solid Waste				
Unit 4:	Geospatial Overview: Introduction to Geospatial Technology, why to study, Geospatial Technology, Importance of Geospatial Technology.				
Unit 5:	Components of Traffic System: Introduction to Traffic Engineering, Human-Vehicle-Road User Environment system, Characteristics of road users, characteristics of vehicles, Characteristics of Pedestrians.				
Textbooks:	<ol style="list-style-type: none"> 1. Devdas Menon, "Advanced Structural Analysis", Narosa Publishing House, 2009. 2. Neville, A.M., Properties of Concrete, Prentice Hall, 1995, London. 3. David, L., Verbyla 1995. Satellite remote sensing of natural resources, CRC Press 				

	4. L.R. Kadiyali, Traffic Engineering and Transportation Planning, Khanna Publishers, 2024, Ninth Edition.
Reference Books:	<ol style="list-style-type: none"> 1. C. Jotin Khisty, B. Kent Lall; Transportation Engineering: An Introduction, Pearson Education India, 2016, Third Edition 2. Amin Ghali, Adam M Neville, and Tom G Brown, "Structural Analysis: A Unified Classical and Matrix Approach", Sixth Edition, 2007, Chapman & Hall. 3. Shetty M.S., Concrete Technology, S. Chand and Company Ltd. Delhi, 2019 <p>Referred Journal/Conference publications</p>
Additional Electronic Reference Material:	1. https://www.youtube.com/watch?v=4D-DWddkdpA&list=PLZ9FJ4fQQFZv1INassIbYzttrru8ifZWm