B. Tech. Civil Engineering				
Course code: Course Title	**Course Structure,**			**Pre-Requisite**
CE 332: Transportation Geotechniques	**L**	**T**	**P**	**CE:206 Soil Mechanics; CE305: Transportation Engineering**
	3	**1**	**0**	

Course Objectives:

- To understand the geotechnical aspects of railway engineering, including track substructure, subgrade evaluation, and embankment design.
- To study the behaviour of railway subgrades under cyclic and dynamic loading.
- To analyse the settlement, stability, and drainage requirements in railway track foundations.
- To explore the use of geosynthetics in railway track design for reinforcement and filtration.
- To apply geotechnical engineering principles for the safe design and maintenance of railway embankments, tunnels, and bridges.

S. No.	Course Outcomes (COs)
CO1	To evaluate the geotechnical properties of railway track subgrades and their significance.
CO2	To analyse the dynamic loading effects on railway track foundation stability.
CO3	To design railway embankments considering settlement, drainage, and slope stability.
CO4	To study the role of geosynthetics in railway engineering for track reinforcement.
CO5	To assess track maintenance, rehabilitation, and stabilization techniques in railway geotechniques.

S. No.	Contents	Contact Hours
UNIT 1	Introduction to railway geotechniques, track substructure components (subgrade, ballast, formation), geotechnical properties of railway track materials, testing methods for railway subgrades.	7
UNIT 2	Dynamic behaviour of railway track subgrade, effect of cyclic loading, settlement and stability of railway track foundation, field and laboratory evaluation of track deformation characteristics.	7
UNIT 3	Design and construction of railway embankments, ground improvement techniques for weak subgrades, drainage and filtration requirements in railway track systems.	7
UNIT 4	Use of geosynthetics in railway track stabilization, functions of geotextiles and geogrids in railway foundation, design of reinforced track embankments and ballast layers.	7

UNIT 5	Railway track failures, maintenance and rehabilitation of railway subgrades, case studies on geotechnical challenges in railway infrastructure, emerging trends in railway track geotechniques.	6
TOTAL		**34**

References		
S. No.	**Name of Books/Authors/Publishers**	**Year of Publication / Reprint**
1	Satish Chandra & M.M. Agarwal (*Railway Engineering* (ISBN: 978-0198083535), Publisher: Oxford	2013
2	M. M. Agarwal, *Indian Railway Track 2nd Edition*, Publisher: Prabha & Co.	2018
3	S. C. Saxena & S. P. Arora, *A Textbook of Railway Engineering* (ISBN: 978-8189928834), Publisher: Dhanpat Rai	2010
4	J S Mundrey, *Railway Track Engineering, 4th Edition.* (ISBN: 9780070680128) Publication Date & Copyright: 2009. McGraw-Hill Education (India) Private Limited.	2009