NIRMA UNIVERSITY

Institute:	**Institute of Technology**
Name of Programme:	**B Tech in Civil Engineering**
Course Code:	2CL301
Course Title:	**Transportation Engineering**
Course Type:	(☑Core/□Value Added Course/□Departmental Elective/ □Institute Elective/□University Elective/(□Open Elective Any other)
Year of Introduction:	2023-24

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
2	**-**	**2**	**-**	**-**	**-**	**3**

Course Learning Outcomes (CLOs):

At the end of the course, the student will be able to –

1. analyse traffic systems and design the geometry of roads (BL4)
2. examine pavement materials and evaluate pavement stresses (BL4)
3. apply the fundamental principles of railways (BL3)
4. identify basic requirements of airport and port. (BL3)

Syllabus: **Total Teaching Hours:30**

Unit	**Syllabus**	**Teaching Hours**
Unit-I	**Geometric Design and Traffic Engineering** Geometric Design of Roads: Cross-sectional elements of roads; sight distance, design of horizontal alignment; design of vertical alignment. Traffic Engineering: Elements of road transportation system and their characteristics, traffic studies, traffic flow parameters, road safety.	09
Unit-II	**Pavement Engineering** Pavement materials - properties, tests flexible pavements - factors affecting design and performance, stresses in flexible pavements, rigid pavements - factors affecting design and performance, stresses in rigid pavements.	08
Unit-III	**Railway Engineering** Permanent way, Components of a railway track, Alignment of Railway Track, Points and Crossings, Latest Trends.	06
Unit-IV	**Airport Engineering** Airport Classification, Planning of Airport elements, orientation of runway, runway patterns, Latest Trends.	04
Unit-V	**Port and Harbour Engineering** Classification of Harbours, Principles of harbour Planning, Site selection and layout of harbours, Latest Trends.	03

Self-Study:	The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study contents.
Suggested Readings/ References:	• Khanna, S.K., & Justo, C.E.G., Veeraragavan, A. *Highway Engineering*. Nem Chand & Bros. • Kadiyali, L.R. *Traffic Engineering and Transport Planning,* Khanna Publishers. • Chakraborty, P., & Das, A. *Principles of Transportation Engineering,* PHI Learning. • Chandra, S., & Agarwal, M.M. *Railway Engineering,* Oxford University Press. • Saxena, S.C., & Arora. S.P. *A Text Book on Railway Engineering,* Dhanpat Rai Publications. • Ashford, N., Mumayiz, S., & Wright, P.H., *Airport Engineering: Planning, Design, and Development of 21st Century Airports,* John Wiley & Sons. • Rangwala, S.C., & Rangwala, P.S., *Airport Engineering*, Charotar Publishing House. • Srinivasan, R., *Harbour Dock and Tunnel Engineering,* Charotar Publishing House.
Suggested List of Experiments:	Laboratory work will be based on above syllabus with minimum 04 experiments/exercises to be incorporated.

Sr. No.	Name of Experiments/Exercises	Hours
1.	Tests on Aggregate	12
2.	Tests on Bitumen	12
3.	Traffic Volume Studies	04
4.	Computer Application in Transportation Engineering	02