Program : **Diploma in Civil Engineering**	
Course Code : **5017**	Course Title: **Transportation engineering lab.**
Semester : **5**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3** (**L:0, T:0, P:3**)	Periods per semester: **45**

Course Objectives:

- To provide hands-on experience for the students with different tests on road materials used in the construction of roads and railways.

Course Prerequisites:

Topic	Course code	Course name	Semester
Knowledge of basic Mathematics		Mathematics-I	1
Knowledge of construction engineering materials		Building Construction & Construction Materials	3

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive level
CO1	Perform different tests on aggregates for its suitability as road construction material.	12	Applying
CO2	Perform different tests on bituminous material for its suitability as road construction.	10	Applying
CO3	Prepare reports of defects and remedial measures of existing roads.	9	Applying
CO4	Prepare reports of defects and remedial measures of existing railway track.	10	Applying
	Lab tests	4	

CO- PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1				3			
CO2				3			
CO3				3			
CO4				3			

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**To perform different tests on aggregates for its suitability as road construction material**.		
M1.01	Sketch standard cross sections of Expressways, Freeways, NH/SH, MDR/ODR	2	Applying
M1.02	Flakiness and Elongation Index test on aggregates	2	Applying
M1.03	Angularity Number test on aggregates	2	Applying
M1.04	Aggregate impact test	2	Applying
M1.05	Los Angeles Abrasion test on aggregate	2	Applying
M1.06	Aggregate crushing test	2	Applying
CO2	**To perform different tests on bituminous material for its suitability as road construction.**		
M2.01	Softening point test on bitumen	2	Applying
M2.02	Penetration test on bitumen	2	Applying
M2.03	Flash and Fire Point test on bitumen	3	Applying
M2.04	Ductility test on Bitumen	3	Applying
	Lab Test I	2	
CO3	**To prepare reports of defects and remedial measures of existing roads.**		
M3.01	Visit the constructed road (flexible or rigid) for visual inspection to identify defects and the drainage condition to suggest remedial measures	3	Applying

M3.02	Prepare the photographic report on construction activity of road	3	Applying
M3.03	Prepare the photographic report suggesting possible repairs and maintenance of roads and drainage.	3	Applying
CO4	**To prepare reports of defects and remedial measures of existing railway track.**		
M4.01	Model study /Site visit of railway track, fixtures, fasteners, points and crossings and yards.	4	Applying
M4.02	Prepare the photographic report containing details for visual inspection of fixtures, points and crossing fasteners and yards.	3	Applying
M4.03	Prepare the photographic report suggesting possible repairs of defects like cracks, creep, abrasion of ballast, derailment, loosening of fixtures etc and maintenance of railway tracks	3	Applying
	Lab Test II	2	

Text / Reference:

T/R	Book Title/Author
T1	L.R. Kadiyali, Transportation Engineering, Khanna Book Publishing Co., New Delhi (ISBN: 978-93-82609-858) Edition 2018.
R1	Khanna S.K., Justo, C E G and Veeraragavan, A., Highway Engineering, Nem Chand and Brothers, Roorkee
R2	Arora, N. L., Transportation Engineering, Khanna Publishers, Delhi
R3	Saxena S C and Arora S P, A Textbook of Railway Engineering, Dhanpat Rai Publication
R4	Birdi, Ahuja, Road, Railways, Bridge and Tunnel Engg , Standard Book House, Delhi
R5	Duggal, Ajay K. and Puri, V. P., Laboratory Manual in Highway Engineering, New Age International (P) Limited, Publishers, New Delhi
R6	Subramanian, K.P., Highway, Railway, Airport and Harbour Engineering, Scitech Publications, Hyderabad

Online Resources:

Sl.No	Website Link
1	https://www.uvpce.ac.in/content/transportation-engineering-laboratory
2	http://www.iitk.ac.in/ce/test/IS-codes/is.2386.1.1963.pdf
3	http://www.iitk.ac.in/ce/test/IS-codes/is.1201-1220.1978.pdf
4	https://www.civilenggnotes.in/ductility-test-of-bitumen/