Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NCEC533	Traffic Engineering Laboratory	0	0	3	1.5

Course Objective
The course aims to enhance understanding of traffic stream characteristics, speed studies, delay analysis, gap acceptance, parking studies, road safety audits, and the application of emerging technologies such as Arduino-based systems in transportation
Learning Outcome
• Understand and analyze traffic flow characteristics, intersection operations, and road user behavior through hands-on experiments.

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1	Measurement of Traffic Stream Speed, Time and Space Mean Speeds	3	Understanding the concepts of spot speed, time mean speed, and space mean speed
2	To analyze the distribution of time headways between consecutive vehicles in a traffic stream and determine the type of statistical distribution that best fits the observed headway data.	3	Understanding how to analyze time headways in a traffic stream and determine the best-fit statistical distribution
3	Measurement of Travel times and Delay of Congested Corridor	3	Understanding the methods for measuring travel time and delay
4	Journey speed of traffic stream moving car observer method	3	Understanding the moving car observer method to determine journey speed
5	Determine the acceleration and deceleration characteristics of vehicles using a VBOX GPS-based data logger.	3	Understanding the acceleration and deceleration behavior of vehicles using a GPS-based VBOX data logger
6	Traffic Volume, PCU Values, and Conflict Point Analysis at an Unsignalized Intersection	3	Understanding the traffic flow characteristics at an unsignalized intersection, estimating PCU values, and identifying conflict points to improve intersection safety.
7	Determine the critical gap for different vehicle types at an uncontrolled intersection.	3	Determining the critical gap required for safe crossing at an uncontrolled intersection.
8	Analyze pedestrian behavior at an urban intersection	3	Understanding pedestrian movement characteristics, gap acceptance, and crossing behavior
9	Determine the parking demand, turnover rate, occupancy, and efficiency of a selected parking facility to analyze its	3	Understanding the parking demand, turnover rate,

	usage characteristics and identify potential improvements.		occupancy, and efficiency
10	Evaluate the safety performance of an urban road segment through a systematic Road Safety Audit (RSA) and identify potential safety issues and countermeasures.	3	Understanding the systematic process of a Road Safety Audit (RSA)
11	Understand the basics of Arduino and its applications in transportation projects	3	Understanding the basics of Arduino, its hardware and software components
12	Develop a vehicle speed detection system using Arduino Uno, ultrasonic sensors, and timers to measure the speed of moving vehicles.	3	Understanding the principles of vehicle speed measurement
13	Project	6	To utilize the knowledge gained from the conducted experiments to undertake a project in traffic engineering.
	Total Contact Hours	**42**	

Text Books:

1. Roess, R. P., Prassas, E. S., & McShane, W. R. (2011). *Traffic Engineering* (4th ed.). Prentice Hall.

Refference Books:

1. Respective Indian Standard/ International Standard Codes of Practices.