

1.	Title of the course	Traffic Flow Modeling and Simulation
2.	Course number	CE510L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CE5022/6
6.	To be offered by	Department of Civil and Environmental Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	<p>Course Objective(s): This course aims to help students better understanding the macroscopic and macroscopic traffic flow variables and their measurement. The course introduces the concepts of scale of analysis of traffic models to the students. This course provides fundamental knowledge on the principles and characteristics of different types of traffic simulation models. This course also aims to train the students in using traffic simulation software to test and evaluate alternative design.</p>	
10.	<p>Course Content: Traffic Flow Characteristics: Macroscopic and microscopic traffic flow variables, time-space and generalized measurement regions, cumulative curves. Traffic Flow Models: General classification. Macroscopic Flow Models: Continuity equation, LWR model, higher order models. Mesoscopic Flow Models: Gas kinetic theory. Microscopic Flow Models: Car following and lane changing. Modeling at Junctions/Intersections: Un-signalized and signalized, roundabouts. Pedestrian Modeling. Traffic Simulation: Probability distributions, random number generation, generation of inputs – vehicle arrivals, vehicle characteristics, road geometrics, different types of traffic simulation models (macroscopic and microscopic), microscopic traffic simulator (VISSIM).</p>	
11.	<p>Textbook(s): 1. Barcelo J, <i>Fundamentals of Traffic Simulation</i>, Springer (2010). 2. May A D, <i>Traffic Flow Fundamentals</i>, Prentice-Hall, New Jersey (1990).</p>	
12.	<p>Reference(s): 1. Leutbach W J, <i>Introduction to the Theory of Traffic Flow</i>, Springer-Verlag, (1989). 2. Treiber M, Kesting A, <i>Traffic Flow Dynamics: Data, Models and Simulation</i>, Springer, (2013). 3. Law A M, David Kelton W, <i>Simulation Modeling and Analysis</i>, McGraw Hill, (2006). 4. Drew D R, <i>Traffic Flow Theory and Control</i>, McGraw-Hill, New York, (1983).</p>	