

**Transportation Engineering**  
**Traffic Flow Theory**  
**01TR1203**  
**(PEC)**

**Objective of the Course:**

- To study microscopic and macroscopic model.
- To learn fundamentals of Traffic flow theory.
- To understand linear and nonlinear models of Traffic.

**Credit Earned: 3**
**Students learning outcomes:**

After successful completion of the course it is expected that student will be able to,

1. analyze the traffic stream parameter.
2. apply macroscopic model, especially fluid flow analogy.
3. apply the queuing theory.
4. evaluate delay at intersection.

**Teaching and Examination Scheme**

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (M)	CSE (I)	Viva (V)	Term Work (TW)	
03	0	0	03	50	30	20	25	25	150

**Detailed Syllabus**

Sr No.	Title of the unit	Number of hours
<b>1</b>	<b>Traffic stream characteristics</b>	<b>05</b>
	Fundamental relation between flow, speed and concentration, Headways, Gap, Speed, Gap acceptance, Discrete and Continuous probability distribution	
<b>2</b>	<b>Traffic Stream Models</b>	<b>10</b>
	Fundamental equation of traffic flow, speed-flow-concentration Relationships, Fluid flow analogy approach, shock wave theory, Car-following theory, linear and non-linear car-following models Acceleration noise	
<b>3</b>	<b>Queuing Analysis</b>	<b>08</b>
	Fundamentals of queuing theory, Demand service characteristics, deterministic queuing models, Models of delay at intersections and pedestrian	
<b>4</b>	<b>ITS application in Traffic</b>	<b>09</b>
	Geographical Information System, Global Positioning System, Intelligent Transportation Systems, Area Traffic Control, Automatic Toll Collection Smart Cards, Collision Detection System	
<b>5</b>	<b>Traffic Simulation</b>	<b>10</b>
	System simulation, simulation languages, Generation of random numbers, generation of inputs, vehicle arrivals, vehicle characteristics, road geometrics, Design of computer simulation experiments	
		<b>42</b>

**Transportation Engineering****Suggested Theory Distribution**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
5%	5%	20%	25%	25%	20%

**Instructional Method and Pedagogy:**

1. Use of Learning Management system like canvas
2. Demonstration through presentations on power point and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

**Reference Book:**

1. Drew, D.R., Traffic Flow Theory and Control, McGraw Hill., 1978.
2. TRB, Traffic Flow Theory - A Monograph, SR165, 1975.
3. Burrough P.A. and Rachel A. McDonell, Principles of Geographical Information Systems, Oxford Publication, 2004.
4. Sussman, J. M., Perspective on ITS, Artech House Publishers, 2005.
5. Wohl M. and Martin, B V., *Traffic System Analysis for Engineers and Planners*, McGraw-Hill, New York.
6. McShane W R & Roess R P, *Traffic Engineering*, Prentice-Hall, NJ
7. Neylor, T.H. et al., *Computer Simulation Techniques*, John Wiley.