



Birla Institute of Technology & Science, Pilani
Hyderabad Campus

ACADEMIC – GRADUATE STUDIES AND RESEARCH DIVISION
BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI-HYDERABAD
CAMPUS

FIRST SEMESTER 2021-2022

Course Handout Part II

Date: 12/08/2021

In addition to Part-I (General Handout for all courses appended to the timetable), this portion gives further specific details regarding the course.

Course No. : CE G568
Course Title : Traffic Systems Analysis
Instructor-in-charge : Bandhan Bandhu Majumdar
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1. Scope & Objective of the course:

Characteristics of traffic stream: Traffic flow, speed and density, Traffic data collection. Modeling uninterrupted traffic flow: Microscopic and macroscopic modeling, Car-Following theory. Capacity and level-of-service analysis: Concepts of capacity and level-of-service (LOS) of highways, expressway, highway, multi-lane highway and multi-modal LOS as per latest Highway Capacity Manual (HCM). Traffic flow at Toll-Plazas: Queuing theory, delay and queue length analysis of traffic at Toll-Plazas. Traffic flow at un-signalized intersections: Gap acceptance theory and capacity estimation of traffic at un-signalized intersections. Traffic flow at signalized intersections: Delay and queue length analysis of traffic at signalized intersections, design of signals and concept of Co-ordinated signals. Adaptive signal concepts., Advanced Intelligent Transport Systems (ITS). Introduction to latest Traffic simulation packages, Exposure to relevant codes of practice.

Course Outcomes

CO1 Estimate basic characteristics of traffic stream

CO2 Conduct traffic studies and analyze traffic data

CO3 Design traffic signal systems

CO4 Determine the capacity and LOS of highways

2. Text Book:

T1 Garber, N. J. And Hoel, L. A. *Traffic and Highway Engineering*, Brooks/Cole: 3rd Edition, CA, USA, 2009

Reference Books:

R1 May, A. D. *Traffic Flow Fundamentals*, PHI: USA, 1990

R2 Chakroborty, P. and Das, A. *Principles of Transportation Engineering*, PHI Pvt. Ltd., 2018.

R3 Roess R., Prassas.E.S and McSHANE W. *Traffic Engineering*, 5th Edition, Pearson., 2019



3. Course Plan:

| Lecture No. | Learning Objectives | Topics to be covered | Reference |
|-------------|---|--|----------------|
| 1 | To understand the basic traffic flow characteristics | Components of a traffic system; Definition of a traffic stream; Introduction to Macroscopic and microscopic traffic parameters | T1-Ch3 |
| 2-6 | To understand the variables which describe a traffic stream mathematically. | Traffic flow characteristics to characterize a traffic stream | T1-Ch4 |
| 7-10 | To learn the estimation procedures of traffic flow, density and speed. | Estimation of traffic stream variables to estimate traffic flow, density and speed | T1-Ch6 |
| 11-17 | To understand and analyze uninterrupted traffic flow. | Uninterrupted traffic flow to estimate the impact of any engineering interventions on traffic flow | T1-Ch6 |
| 18-22 | To understand and estimate the arrival and departure processes as well as the delay to vehicles at a signalized intersection. | Traffic flow at signalized intersections and the Level-of- Service of different approaches at a signalized intersection | T1-Ch4, R2-Ch5 |
| 23-26 | To learn the design process of channelization, auxiliary lanes and rotaries. | Design of un-signalized intersections with rotary shape and size | R2-Ch5 |
| 27-31 | To learn the warrants for signalization and the process of signal timing design. | Design of signalized intersections, the cycle length and green times of different approaches at an intersection | R3-Ch18 |
| 32-38 | To learn the estimation procedure of parking demand and types of parking. To learn the design of placement of signs as well as letter size for signs. | Parking facilities and road signs, the warning of the impending curve, sign board location | T1-Ch4, R2-Ch5 |
| 39-42 | To learn the factors which cause accidents, ways of collecting accident data and analysing statistically the collected data. | Road accidents and its analysis, the probability of occurrence of 'n' number of accidents per year at a site, significant improvement in accident related events at a site | R3-Ch10 |



4. Evaluation Scheme

| S. No. | Evaluation Component | Duration (min) | Weightage (%) | Date & Time | Remarks |
|--------|----------------------|----------------|---------------|-----------------------|---------|
| 1 | Mid-semester | 90 | 30 | Will be announced | OB |
| 2 | Quiz | 30 | 10 | Will be announced | OB |
| 3 | Research Seminar | - | 5 | Continuous evaluation | OB |
| 4 | Term Paper | - | 5 | Continuous evaluation | OB |
| 5 | Assignments (L+P) | - | 10 | Continuous evaluation | OB |
| 6 | Compre. Exam | 120 | 40 | Will be announced | OB |

5. **Chamber Consultation Hour:** Students are suggested to email for setting up an appointment.
6. **Notices:** Notices concerning this course will be displayed on CMS and Department Notice Board. If Google Classroom is followed, it shall be informed in advance accordingly.
7. **Make-up Policy:** Prior permission for all make ups are a must. For medical emergencies, requests have to be forwarded by the Chief Warden to the satisfaction of IC.
8. **Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**Instructor-In-Charge
CE G568**