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**ACADEMIC - GRADUATE STUDIES AND RESEARCH DIVISION**  
**FIRST SEMESTER 2022-2023**  
**COURSE HANDOUT Part II**

**Date: 29.08.2022**

In addition to part I (General Handout for all courses appended to the Time table) this portion gives further specific details regarding the course.

**Course No** : CE G568  
**Course Title** : Traffic Systems Analysis  
**Instructor-in-Charge** : Prof. V. Vinayaka Ram (Hyderabad Campus) (Coordination)  
Dr. Durgesh Vikram (Pilani Campus) (Theory Sessions)  
**Instructor(s)** : NA  
**Tutorial/Practical Instructors:** Mr. Naveed

**Description** : 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, multilane 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

**1. Course Description:** This course offers analysis procedures, modeling concepts and data collection techniques related to vehicular traffic studies. The course is outlined in basically four segments. First one deals with the parameters that are generally involved in microscopic or macroscopic modeling of traffic flow. The second segment deals mostly with analysis of uninterrupted traffic flow (like, behavior of traffic streams on highways or expressways). The third segment is dedicated to the analysis of interrupted traffic flow (like, behavior of traffic streams on urban stretch of a road). The last segment talks about design features of various traffic facilities (like, signal time design of an intersection, decision on number of toll booths at a toll plaza, and capacity of an unsignalized intersection).

**2. Scope and Objective of the Course:** Over past few decades, a sustained increase in the per capita ownership of vehicles, has given rise to several traffic related issues including parking, accidents, delays, congestion, environmental degradation, etc. Hence, there is a need to find solutions to these problems by understanding the principal components governing them. The present course seeks to develop an understanding of the problems related to traffic management. Not only that, it also aims at gaining knowledge of the analysis which can help in designing traffic facilities that can alleviate such problems.

**3. Text Books:**

T1: Chakroborty, P. and Das, A. **Principles of Transportation Engineering**, PHI Pvt. Ltd., 2017 edition.  
T2: Kadiyali, L. R. **Traffic Engineering and Transport Planning**, Khanna Publishers, 2017 edition.

**4. Reference Books:**



R1: Garber, N. J. And Hoel, L. A. **Traffic and Highway Engineering**, Brooks/Cole: CA, USA, 2008 edition.

R2: May, Adolf D. **Traffic Flow Fundamentals**, PHI: USA, 1990 edition.

## 5. Course Plan:

| Lecture No | Topics to be covered  | Learning Objectives  | Reference  |
|------------|---|--|------------|
| 1-7        | Traffic flow characterization and understanding variables that describe traffic streams mathematically. | Learning the parameters which need to be used for analyzing and characterizing traffic flow.               | T1         |
| 8-14       | Estimation of traffic stream variables.   | Learning estimation of traffic flow, density and speed.  | T1, R1,R2  |
| 15-22      | Analyzing uninterrupted traffic flow.   | Learning estimation of the impact of any engineering interventions on traffic flow.                        | T1         |
| 23-29      | Traffic flow at signalized intersection   | Learning estimation procedure for the delay to vehicles at a signalized intersection.                      | T1, R1, R2 |
| 30-35      | Analysis of traffic flow at unsignalized intersections  | Learning estimation of critical gap at a priority junction.  | T1         |
| 36-40      | Design of signalized intersections  | Learning estimation procedure of cycle length and green times for different approaches at an intersection. | T1 and T2  |

## 6. Evaluation Scheme:

| Component                 | Duration | Weightage (%) | Date & Time              | Nature of component (Close Book/ Open Book) |
|---------------------------|----------|---------------|--------------------------|---|
| Mid-Semester Test         | 90 Min.  | 25            | 05/11 1.30 - 3.00PM      | Closed Book                                 |
| Comprehensive Examination | 3 h      | 35            | 30/12 AN                 | Closed Book                                 |
| Quiz/Assignment           | TBA      | 20            | Spread over the semester | Open/Closed Book                            |
| Term paper                | TBA      | 20            | TBA                      | Open Book                                   |



**7. Chamber Consultation Hour:** To be announced during the lecture.

**8. Notices:** Notices concerning this course will be displayed on Department Notice Board.

**9. 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.

**10. Note (if any):** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**Academic honesty and academic integrity Policy:** Academic honesty and integrity are to be maintained by all students throughout and no academic dishonesty is acceptable

**Instructor-in-charge**  
**Course No. CE G568**