

CE740 (3 0 1 8) - Traffic Engineering

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1 Overview

1.1 Course contents

Introduction, Basic for traffic engineering; Planning and design of facilities; Travel forecasting principles and techniques; Design Hourly volumes and speed; Highway capacity and performance characteristics; Parking, simulation in Traffic engineering design.

1.2 Lecture schedule

See detailed lecture list

See the current time table Best time to meet me: after the class.

1.3 Evaluation

Quizzes	10.0	open notes, surprise
Assignments	12.5	including Excel
Mid Sem	20.0	closed notes
Term paper	07.5	report and presentation
Lab class	15.0	report (by TAs)
Lab viva	10.0	
End Sem	25.0	closed notes
Total	100	

The weights may be changed (plus or minus 5 percent).

2 Lecture notes

1. See the lecture notes page

2.1 Laboratory Schedule

To be handled by TA's

3 Assignments

Instructions: Maintain a separate note book for assignments. All questions must be hand written. Start new question on a new page. Descriptive questions should be rich in figures/tables/equations along with appropriate references (books/journals). Student shall do this assignments independently. Submit the assignment on Friday's to the TA who will sign and give you back. Evaluation by the instructor will be done randomly. Copying, if found, will have grade penalty.

1. Select a current transportation issue for modeling and do the following.
(i) Identify the transportation system components, (ii) Activity system that is interest to the transportation issue, (iii) What could be a suitable service function, (iv) What could be a suitable demand function, (v) Visualize how the activity system may change, (vi) Propose some transport improvement options, (vii) Illustrate flow predictions. (D/L Aug 09)
2. Draw a typical time-distance diagram of a non-uniform flow and illustrate the concept of flow and density measurement. (D/L Aug 09)
3. Derive the relationship between the time mean speed and space mean speed. Verify the above relation using some hypothetical speed data expressed in a frequency table. (D/L Aug 09)
4. Show the functional form and illustration of any traffic stream model (other than the ones covered in the class). Give the reference from where it has taken. (D/L Aug 09)
5. If we assume that drivers keep a gap of one car length for each 10 kmph increment of the speed and if the car length is 6 meters, develop the equations of stream flow and draw the fundamental diagrams. [Hint: write expression for gap interns of speed. density is inverse of gap.] (D/L Aug 09)
6. The table given below shows headway data for a number of traffic conditions. It is assumed that the traffic contains only cars and trucks. Compute the PCU values using the headway method for each traffic condition and plot how the PCU values changes with respect to the percentage of trucks.

Average headway for mixed traffic	Headway for traffic consisting of cars only	percentage of trucks
2.7	2.5	0.1
2.8	2.5	0.15
2.94	2.5	0.2
3.1	2.5	0.25
3.25	2.5	0.3
3.35	2.5	0.35
3.7	2.5	0.5
3.8	2.5	0.55
3.95	2.5	0.6
4.2	2.5	0.7

(D/L Aug 09)

7. Write a brief note on the following: (A) One example of intrusive method of data collection, (B) One example of non-intrusive technology, (C) One example of in-vehicle technology. The write up should be organized under these heads: (i) working principle (supported with simple sketches), (ii) Advantages and disadvantages, (iii) any Traffic application, (iv) Commercial product details (any one company), and (v) Reference. Item i-iii should be from good books/reports and (iv) from company website. Devote about 2-4 page per technology. (D/L Aug 14)

4 Assignment in Excel

Instructions. These assignments has to be done on any spread sheet (Excel/Open office etc.). Each student has to create his/her assignment from scratch. Each student has to create a drop-box account and create a public folder with name **rollno name** and share ONLY with the instructor. Each assignment will be uploaded on or before the deadline. You have to follow the strict file name convention. Each file will start with your roll no, followed by the assignment no, followed by an experiment name, followed by version no (starting with 1). Dropbox folder will show the upload date and will be used to check late submission. If you made a mistake in a file and would like to correct, the corrected file should be uploaded with same name but with version 2 and so on. Each excel file should have only one sheet.

1. Write a program to compute the time mean and space mean speed from a frequency table and verify their relationship. File name **rollno_01_meanspeed_v_x.xlsx** where rollno is your roll number, and x is the version no (1,2,3, etc.). (D/L Aug 07)
2. Write a program to calibrate greenshields model given several speed density values. The program should calculate all the parameters and boundary conditions. Also plot the fundamental diagram. File name **rollno_02_greenshields_v_x.xlsx** where rollno is your roll number, and x is the version no (1,2,3, etc.). (D/L Aug 12)
3. Write a program to compute the following speed statistics: mean, median, Nth percentile (N should be any value between 0 and 100), quartiles, SD, and standard error of the mean from a frequency table. The program should also plot the speed histogram, frequency distribution curve, and cumulative frequency distribution curve. File name **rollno_03_speedstat_v_x.xlsx** where rollno is your roll number, and x is the version no (1,2,3, etc.). (D/L Aug 14)

References

- [1] D R Drew. *Traffic flow theory and control*. McGraw-Hill Book Company, New York, 1968. IITB–.
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- [6] Adolf D. May. *Fundamentals of Traffic Flow*. Prentice - Hall, Inc. Englewood Cliff New Jersey 07632, second edition, 1990.
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