

1. Department, number, and title of course

Department of Civil Engineering, CENG 5361, Traffic Flow Theory

2. Graduate Course

3. Course (catalog) description

In-depth traffic flow theory at micro-, meso-, and macro-scopic levels. Fundamentals of traffic flow, traffic flow characteristics, statistical distributions of traffic flow parameter, traffic stream models, car following models, continuum flow models, shock wave analysis, queuing analysis, traffic flow models for intersections, network flow models and control, traffic simulation.

4. Prerequisite(s)

Graduate standing, CENG 4351 Traffic Engineering: Operations and Control.

5. Textbook(s) and/or other required material

Fundamentals of Transportation and Traffic Operations, 1st Edition, by C. Daganzo, Published by Pergamon, ISBN 0-08-042785-5, 1997.

6. Course Objectives

- Outline the present state of knowledge in traffic flow theory.
- Identify fundamental microscopic, mesoscopic, and macroscopic traffic flow characteristics.
- Formulate and apply theories for describing and explaining the motion of a single vehicle and groups of vehicles.
- Compare and contrast several different traffic analysis techniques.
- Apply traffic flow theory to solving a variety of traffic problems.

7. Topics Covered

- Micro-, meso-, and macro-scopic concepts.
- Traffic flow characteristics.
- Statistical distributions of traffic flow parameters and traffic stream models.
- Car following models.
- Continuum flow models.
- Shock wave analysis.
- Queuing analysis.
- Traffic flow models for intersections.
- Network flow models and control.
- Traffic simulation.

8. Class/laboratory schedule, i.e., number of sessions each week and duration of each session

LESSONS: 45 @ 50 min (3.0 Att/wk)

LABS: None

9. Contribution of course to meeting the professional component

3.0 Credit Hours (ES=3.0, ED=0.0)

This transportation engineering course focuses on state-of-the-art traffic flow theory and modeling techniques used in transportation systems. The course incorporates government and industry

standard manuals and software for engineering planning and analysis. It provides the principles of traffic flow theory needed in transportation industry planning, design, and analysis.

10. Relationship of course to program outcomes

The course director's assessment of how this course contributes to the civil engineering program outcomes is listed below. The following scale is used:

1=No Contribution; 2=Small Contribution; 3=Average Contribution; 4=Large Contribution; 5=Very Large Contribution

CIVIL ENGINEERING PROGRAM OUTCOMES	Course Director Assessment
Program Outcomes	
Students who qualify for graduation with a civil engineering masters will demonstrate:	
Have specialized knowledge in an area of civil engineering beyond that normally expected at the undergraduate level.	4
Are adequately prepared for advanced professional practice.	2
Completing a thesis or design project address a civil engineering problem using sound engineering principles and techniques.	3
Solve an engineering problem of importance to the State, the Nation, or the Global community.	1
Demonstrate the ability for independent life-long learning.	3
Have effective oral, written, and graphical communication skills.	1

11. Person(s) who prepared this description and date of preparation

Dr. Wei (David) Fan, E.I.T., Assistant Professor, 6 June 2008.