

**1. Department, number, and title of course**

Department of Civil Engineering, CENG 4355, Transportation Systems Management and Operations

**2. Graduate Course**

**3. Course (catalog) description**

Foundations of the transportation system management and operations, including arterial street systems and freeway systems. Principles of simulation of urban streets operations and traffic signal control and optimization, and freeway operations analysis and simulation using commercially available packages. Co-listed with CENG 5355.

**4. Prerequisite(s)**

CENG 4351 Traffic Engineering: Operations and Control

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

No prescribed textbooks.

**6. Course Objectives**

- Develop an organized approach to solving transportation systems management and operations problems.
- Identify and select the most appropriate simulation model and software in various applications for the arterial street systems and freeway systems.
- Develop and apply optimal traffic signal control plans for urban streets.
- Conduct, compare, and contrast simulation techniques with other traffic operational analyses techniques.
- Use the HCS+/Corsim /Synchro/Transyt-7F/Passer-V software as a tool to perform traffic simulations, design, analyze, and evaluate traffic solutions.

**7. Topics Covered**

- Computer simulation
- Features and functions of HCS+/Corsim /Synchro/Transyt-7F/Passer-V
- Signal Timing Terminologies
- Actuated Signal Operation
- Signal Coordination
- Offset and Delay
- Diamond Interchanges
- Bandwidth Optimization
- Ramp Metering
- Dynamic 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)

This is a graduate level transportation engineering course that focuses on the state-of-art traffic operations and control, and advanced system management techniques used in transportation system including arterial street systems and freeway systems. The course incorporates government and industry standard manuals and software for engineering operations and design. It provides the principles of traffic simulation, and systems management and analysis techniques needed in transportation industry 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

<b>CIVIL ENGINEERING PROGRAM OUTCOMES</b>	<b>Course Director Assessment</b>
<b>Program Outcomes</b>	
Students who qualify for graduation with a civil engineering major will demonstrate:	
Can apply knowledge of traditional mathematics to solve problems	4
Can apply knowledge of traditional science (calculus-based physics, Chemistry, additional science) to solve problems	3
Can apply knowledge of traditional engineering skills to solve problems	4
Can use modern engineering tools to solve problems	5
Can design and conduct experiments, as well as analyze and interpret data in more than one civil engineering discipline	4
Can design systems, components, and processes considering standards and engineering constraints	4
Can recognize the strengths and areas for possible improvement of their creative designs	3
Can work independently as well as part of a multidisciplinary design team	2
Can identify, formulate, and solve engineering design problems using engineering models in the discipline of structural engineering	1
Can identify, formulate, and solve engineering design problems using engineering models in the discipline of transportation engineering	5
Can identify, formulate, and solve engineering design problems using engineering models in the discipline of construction management	1
Can identify, formulate, and solve engineering design problems using engineering models in the discipline of hydrology and hydraulic design	1
Can analyze a situation and make appropriate professional decisions	3
Can analyze a situation and make appropriate ethical decisions	2
Have effective oral, written, and graphical communication skills	5
Demonstrate a commitment to learning and continued professional development outside the classroom	3
Incorporate contemporary issues during problem solving	4
Determine the impact of engineering solutions in a global and societal context	4
Can explain professional practice issues	4
Can explain leadership principles and attitudes	3
Can explain management concepts and processes	3
Can explain concepts of business practices	4
Can explain public policy and public administration	4

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

Dr. Wei Fan, E.I.T., Assistant Professor, 20 October 2007.