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

Department of Civil Engineering, CENG 5355, Transportation Systems Management and Operations

2. **Graduate Course**

3. **Course (catalog) description**

Foundations of 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 such as HCS+, Corsim, Synchro, Transyt-7F and Passer-V. Co-listed with CENG 4355. The graduate student will complete an additional project.

4. **Prerequisite(s)**

CENG 4351 Traffic Engineering: Operations and Control

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


6. **Course Objectives**

   - Analyze and develop the signal timing and system partition technique to improve signal coordination and traffic progression.
   - Identify and select the most appropriate signal timing and traffic simulation model and software in various applications for the arterial street systems and freeway systems.
   - Conduct and evaluate traffic impact study.
   - Analyze and evaluate the transit signal priority system.
   - Evaluate and compare freeway interchanges alternatives (such as diamond interchange) and analyze corresponding traffic operational characteristics.
   - Use commercially available software (such as SYNCHRO) to conduct traffic operational analysis, identify problems, and propose traffic solutions.

7. **Topics Covered**

   - Computer simulation, features and functions of several commercial available software packages
   - Signal timing terminologies, actuated signal operation, signal coordination, offset and delay, bandwidth optimization
   - Traffic impact analysis
   - Transit signal priority
   - Diamond Interchanges
   - Ramp Metering
   - Special event traffic operations
   - 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=1.0, ED=2.0)

This is a graduate level transportation engineering course that focuses on state-of-the 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

<table>
<thead>
<tr>
<th>CIVIL ENGINEERING PROGRAM OUTCOMES</th>
<th>Course Director Assessment</th>
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<tbody>
<tr>
<td>Students who qualify for graduation with a civil engineering masters will demonstrate:</td>
<td></td>
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<tr>
<td>Have specialized knowledge in an area of civil engineering beyond that normally expected at the undergraduate level.</td>
<td>5</td>
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<tr>
<td>Are adequately prepared for advanced professional practice.</td>
<td>4</td>
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<tr>
<td>Completing a thesis or design project address a civil engineering problem using sound engineering principles and techniques.</td>
<td>1</td>
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<tr>
<td>Solve an engineering problem of importance to the State, the Nation, or the Global community.</td>
<td>1</td>
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<tr>
<td>Demonstrate the ability for independent life-long learning.</td>
<td>1</td>
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<tr>
<td>Have effective oral, written, and graphical communication skills.</td>
<td>4</td>
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11. **Person(s) who prepared this description and date of preparation**

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