1. *Course number and name*

**ENGR 436: Transportation Engineering**

1. *Credits, contact hours, and categorization of credits in Table 5-1 (math and basic science, engineering topic, and/or other)*

3 credit hours: two 75-min sessions per week

1. *Instructor’s or course coordinator’s name*

Instructor: Yiyi Wang

1. *Text book, title, author, and year*

*Principles of Highway Engineering and Traffic Analysis*, by Fred Mannering and Scott Washburn(5th edition).

1. *Specific course information*
2. *brief description of the content of the course (catalog description)*

This course will introduce students to the principles of transportation engineering and focus on design and operation. The ***Design*** aspect involves the geometric design of cross-section, horizontal, and vertical alignments of roadway facilities. The ***operation*** aspect focuses on road vehicle performance, fundamentals of traffic flow and queuing, capacity and level of service analysis, and traffic control (e.g., marking, signs, and signalization).

1. *prerequisites or co-requisites*

ENGR 235 and ENGR 430 (may be taken concurrently)

1. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*

Required for Civil Engineering

1. *Specific goals for the course*
2. *specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.* 
   * Student will appreciate the society and environmental impacts of travels and transportation projects.
   * Student will apply physics law to determine the geometric design given goals and constraints.
   * Student will be able to use design standards to evaluate the safety criterion of a geometric design.
   * Student will be able to compare and contrast various traffic flow models.
   * Student will apply traffic flow models to estimate delay, queue length and other service properties of road facilities.
   * Student will implement a level of service analysis to determine the quality of service of freeways.
   * Student will appreciate different ways to calculate signal cycle length and design signal timing plan.
3. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

Course addresses ABET Student Outcome(s): 1, 2, 4, 6.

1. *Brief list of topics to be covered*

* Horizontal alignment design
* Vertical alignment design
* Combined design
* Traffic flow fundamentals
* Flow-density relationship
* Poisson model of traffic flow
* Basic queuing theory
* Highway level of service
* Design traffic volume
* Signal timing fundamentals
* Signal analysis