1. *Course number and name*

**ENGR 839: Advanced Topics in Civil Engineering**

1. *Credits and contact hours*

3 credit hours; one 2-hr-45-minute lecture/week

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

Instructor: Yiyi Wang, Professor of Civil Engineering

Course coordinator: Yiyi Wang, Professor of Civil Engineering

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

None.

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

A mix of advanced topics in major civil engineering fields, such as structural, geotechnical, and transportation, and environmental engineering. Topics may include performance-based/resilient design methods, experimental techniques, surrogate models, spatial analysis of travel data, transportation safety, and Internet-of-Things technology. Key attributes in soil stability and stiffness, retaining wall design, experimental design and interpretation of various soil tests may also be discussed.

1. *prerequisites or co-requisites*

Restricted to graduate Civil Engineering students or permission of the instructor.

1. *indicate whether a required, elective, or selected elective course in the program*

Elective Course for Civil Engineering.

1. *Specific goals for the course*
2. *Specific outcomes of instruction.*
* Students understand structural testing and can select appropriate method for laboratory experiment planning.
* Students know the nonstructural damage in earthquake and understand its impact.
* Students can implement the sustainable resilience into structural design.
* Students can utilize structural control for vibration.
* Students can apply structural sensing for health monitoring.
* Students can apply spatial analysis to transportation system data to enhance the engineering process.
* Students can design retaining wall, interpret various soil test, and analyze soil stability and stiffness
1. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

ABET Student Outcome(s): 1, 2, 3, 6, 7

1. *Brief list of topics to be covered*
* Structural dynamics
* Structural testing methods
* Nonstructural Damage
* Sustainable Structural Resilience
* Structural control, health monitoring and sensing
* Soil stability and stiffness
* retaining wall design
* interpretation of various soil tests
* spatial analysis of transportation system data.