1. *Course number and name*

**ENGR 826: Seismic Hazard Analysis**

1. *Credits and contact hours*

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

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

Instructor: Zhihua Li, Doctor of Civil Engineering

Course coordinator: Cheng Chen, Professor of Civil Engineering

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

Steven L. Kramer, Geotechnical Earthquake Engineering, Pearson Education, 1996.

*Recommended Resources:*

Leon Reiter, Earthquake Hazard Analysis, Columbia Univ. Press, New York, 1990.

Robin K. McGuire, Seismic Hazard and Risk Analysis, EERI 2004.

Yousef Bozorgnia and Vitelmo Bertero, Earthquake Engineering: From engineering seismology to performance-based engineering, CRC 2004

Ikuo Towhata, Geotechnical Earthquake Engineering, Springer 2008.

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

Fundamentals of seismic hazard analysis; introduce the seismic strong ground motions and attenuation relations; discuss effect of surface ground conditions on strong ground motions; elaborate probabilistic and deterministic approaches in seismic hazard analysis; review seismic code provisions and design ground motions; describe appropriate selection and development of acceleration time histories for dynamic analysis of structures.

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.*

* Student can understand the basic knowledge in seismic hazard analysis.
* Student can understand strong ground motions, attenuation relations, and effect of surface geology on strong ground motions.
* Student can conduct site-specific seismic hazard analysis using both probabilistic and deterministic approaches.
* Student can follow code provisions for obtaining design ground motions
* Student can select and develop appropriate acceleration time history records

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, 5, 6, 7

1. *Brief list of topics to be covered*

* Strong ground motions
* Attenuation relations
* Effect of surface geology on site response
* Site-specific seismic hazard analysis
* Deterministic seismic hazard analysis
* Probabilistic seismic hazard analysis
* Selection of ground motions for estimating structural response
* Development of acceleration time histories for dynamic analysis