1. *Course number and name*

**ENGR 828: Seismic Isolation and Energy Dissipation**

1. *Credits and contact hours*

3 credit hours; one 1-hr-40-minute lecture /week

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

Instructor: Jenna Wong, Associate Professor of Civil Engineering

Course coordinator: Jenna Wong, Associate Professor of Civil Engineering

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

None required.

*Recommended Resources:*

Design of Seismically Isolated Structures by Kelly and Naeim  
Principles of Passive Supplemental Damping and Seismic Isolation by Christopoulous and Filiatrault

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

Seismic isolation and energy dissipation are being increasingly used worldwide with the movement of design towards performance-based approaches. Seismic isolation relies on the introduction of a highly flexible layer between the structure and the ground increasing the structure’s fundamental period producing rigid body motion. Dampers are also introduced into structures to absorb input seismic energy and reduce the level of inelastic behavior. This course will cover the design, code requirements, analytical approaches and computational simulation of these strategies.

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 apply structural dynamics theory to determine the modal response for an isolated system.
* Student can identify a variety of isolator and energy dissipation systems and the situations best suited for this seismic technology.
* Student can design an elastomeric and pendulum bearing.
* Student can evaluate the results of a system implementing these technologies to evaluate the level of improved performance.
* Student can implement an isolation and damper system into a numerical model and determine specific structural responses.

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*

* Introduction to seismic isolation and energy dissipation.
* Review of structural dynamics theory.
* Linear theory of seismic isolation.
* 2-DOF seismic isolation theory.
* Seismic isolation of N-DOF structures.
* Elastomeric and Friction Pendulum Bearings
* Dampers
* Standards related to isolators and dampers