CE221 Aug 3:0

Earthquake Geotechnical Engineering

Instructor

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Department: Civil Engineering

Course Time: Mon Wed Fri 11 AM - 12 Noon

Lecture venue: Geotechnical Lecture Hall

Detailed Course Page:

Announcements

Brief description of the course

This course is designed for post graduate and research students. The contents of the course provide basic knowledge of the engineering seismology with a brief background on plate tectonics, processes that lead to earthquakes and engineering aspects of it in the 4-5 initial lectures and quickly movies towards understanding ground motion and ground response, quantifying earthquake hazards in the next 10 lectures. Latter parts of the course are specific to determination of dynamic properties of soils that are important to earthquakes, understanding ground liquefaction and quantifying it and finally seismic response analysis of slopes, foundations and retaining walls and ends with earthquake resistant design and mitigation of earthquake hazards using several engineering techniques. The course is relevant to students of civil engineering, earth sciences, earthquake engineering and infrastructure engineering.

Prerequisites

None

Syllabus

Introduction to engineering seismology. Plate tectonics. Earthquake magnitude. Ground motion. Effect of

local soil conditions on ground motion. Dynamic behaviour of soils. Analysis of seismic site response. Liquefaction phenomena and analysis of pore pressure development. Laboratory and in-situ testing for seismic loading. Analysis and design of slopes, embankments, foundations and earth retaining structures for seismic loading. Case histories. Mitigation techniques and computer-aided analysis

Course outcomes

After the completion of course, students will learn about all the engineering aspects of earthquakes and ground response and they would be able to analyse and quantify earthquake hazard in terms of ground amplifications, deformations and liquefaction and would be able to design earthquake resistant structures.

Grading policy

10% for assignments, 30% for mid-term examinations (two), 10% for term project and 50% for final examination

Assignments

1. Finding epicenter of an earthquake
2. Using Seismo-signal program to extract ground motion parameters from time-acceleration history of an earthquake
3. Ground response analysis for a layered soil deposit
4. Probabilistic seismic hazard analysis for a site
5. Determination of liquefaction potential of a site from field testing data
6. Design of a retaining wall to given earthquake

Resources

Text books:

Geotechnical Earthquake Engineering By Steven L. Kramer, Pearson Education, 2003.

Geotechnical Earthquake Engineering Handbook, Robert W. Day, McGraw-Hill, 2002.