Instructor’s Name: Dr. Shahram Pezeshk; Office EN108C
Phone: 901-678-4727, Email: spezeshk@memphis.edu

Date: August 27, 2007

Hours Credit: 3 Semester Hours

Prerequisites: CIVL 7119/8119

Office Hour: “open door policy”

Course Meetings: 5:30 - 6:55, MW, Room EN114

COURSE DESCRIPTION
Mechanics of earthquakes and strong motion; Seismic design criteria; Building codes and Applied Technology Council’s publications.

GRADING
The final grades for the course will be based on the following percentages:

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Homework</td>
<td>25%</td>
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<tr>
<td>Project(s)</td>
<td>20%</td>
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<tr>
<td>Mid-Term Exam</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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ATTENDANCE
Regular attendance is necessary to maintain pace with the lectures and the progress of the class. If you must be absent, please make sure you know the assignment for the following class meeting and turn in any work due that day.
MAKE-UP WORK
Generally, if a student misses an exam or a homework assignment a score of zero will be awarded. However, the student may be allowed to make-up an exam or turn in their homework late if a valid reason for the absence is presented to the instructor at the next class meeting. If the student must miss an exam because of a conflict in his/her schedule the student must notify the instructor in writing at least two days prior to the absence.

ATTENDANCE
Regular attendance is necessary to maintain pace with the lectures and the progress of the class. If you must be absent, please make sure you know the assignment for the following class meeting and turn in any work due that day.

COURSE OUTLINE
. The nature and physics of earthquakes
  - Introduction to earthquakes
  - Causes of earthquake
  - Seismic waves
  - Factors affecting earthquake motion at a site
  - Prediction of motion at a site
  - Recording and processing of earthquake ground motion

. Response of structures to earthquake ground motion
  - Review of theory of vibration of elastic structures
  - Calculation of dynamic response of elastic structures
  - Inelastic dynamic response of structures
  - Response spectrum analysis of elastic and inelastic structures
  - Transient response analysis for complex structures
  - Normalization procedures for earthquakes

. Design specifications for buildings and other structures
  - General background and philosophy
  - Development of design spectra
  - Uniform Building Code and “Blue Book” approach
  - Selecting the structural configuration for a building
  - Design and behavior of irregular structures
  - Material specifications and detailing requirements

. Design and behavior of special structures.

Final Exam:  Wednesday, Dec 12, 5:30 - 7:30pm
List of References


Dowrick, D.J. Earthquake Resistant Design for Engineers and Architects. Wiley.


1. Research the design and detailing requirements, analysis procedures, experimental determination of behavior under cyclic loads and the expected behavior under earthquake excitation for one of the structural types listed below. A minimum of six to eight technical papers or reports should be studied and cited in your paper. The paper should be about ten to twenty pages in length excluding figures, tables and references. The structure may be chosen from the following list or from another source after consulting with Prof. Pezeshk: steel eccentric or concentric braced frames (SMRSF) of steel or concrete or masonry; intermediate moment resisting space frame (IMSRF) of steel or concrete; dual system with shear wall and concrete SMRSF or IMSRF; dual system with masonry shear wall and SMRSF or IMSRF; steel eccentric braced frame or concentric braced frame with steel SMRSF or IMSRF; liquid storage tank; water tank; earth dam; concrete arch dam; suspension bridge; cable-stayed bridge; others.

2. Review reports of damage to structures from past earthquakes and write a paper on the lessons learned from the event.

3. Read technical papers and reports on one of the following topics and write a paper summarizing these works; torsional response of buildings; diagrams on the translational and torsional response of buildings; seismic design of retaining walls; seismic design of cooling towers; effects of soft soil sediments on the ground motion at a site; others.

4. Write a computer program to calculate the dynamic response of a single-degree-of-freedom system with bilinear or degrading bilinear hysteretic behavior and perform a parameter study.

5. Using computer simulations, investigate the effects of flexible diaphragms on the elastic or/and inelastic response of buildings to earthquake.

6. Using computer simulations, investigate the effects of mass or stiffness discontinuities on the elastic and/or inelastic response of buildings to earthquakes.

7. Using computer simulation, investigate the effects of various types and depths of soil layers on the earthquake motion at a site.

8. Comparison of some aspects of different earthquake codes. (ANSI, NEHRP, SEAOC, ATC, and UBC).