SHARIF UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

FALL 2014

FUNDAMENTAL OF EARTHQUAKE ENGINEERING

INSTRUCTOR: Vahab Toufigh, Ph.D., P.E.
2nd Floor Earthquake Engineering Research Center

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OFFICE HOURS: Sunday 13:00-15:00, or by appointment

PREREQUISTE: CE20209

REFERENCES:

- **مهندسی زلزله، مبانی و کاربرد**
  حسن مقدم
- **اصول مهندسی زلزله**
  خسرو برگی
- **Earthquake Engineering for Structural Design**
  Chen & Lui
- **Geotechnical Earthquake Engineering**
  Kramer
- **Dynamics of Structures**
  Clough & Penzin
- **Structural Dynamics**
  Paz
- **Dynamics of Structures**
  Chopra *(ترجمه : دکتر رحیم زاده)*
- **آیین نامه ۲۸۰۰ ویرایش چهارم**

HOMEWORK: Accepted on A4 sheets. Homework must be presented in a neat, professional manner and it must be turned in at the beginning of the class period. Late homework is not acceptable without a valid cause.

EXAMS: There will be one midterm exams and a comprehensive final exam. Exams date TBA.

GRADING:
Midterm Exam 35%
Final Exam 45%
Homework 15%
Participation 5%

COURSE OUTLINE:

1. Fundamental of Earthquake Engineering

1.1. Fundamental Seismic Geology

1.2. Measurement of Earthquakes

1.3. Seismic Hazard Analysis

2. Dynamics of Structures

2.1. Single-Degree-of-Freedom Systems

- 2.1.1. Free Vibration
- 2.1.2. Response to Harmonic Excitations
- 2.1.3. Response to Arbitrary, Step and Pulse Excitations
- 2.1.4. Earthquake Response to Linear Systems
- 2.1.5. Earthquake Response to Inelastic Systems
- 2.1.6. Response Spectrum

2.2. Multi-Degree-of-Freedom Systems

- 2.2.1. Free Vibration
- 2.2.2. Modal Analysis
- 2.2.3. Earthquake Analysis of Linear Systems

3. Seismic Design Codes

3.1. Seismic Provisions of Standard No. 2800 4th Edition

- 3.1.1. Introduction and General Points
- 3.1.2. Seismic Ground Motion
- 3.1.3. Response Spectrum
- 3.1.4. Load Combination for Seismic Design
- 3.1.5. Provisions and Requirements for Seismic Design of Buildings

3.2. Comparison between Standard No. 2800 4th Edition with ASCE 7-10

3.3. Fundamental of Performance Based Design