

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
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CE 612 Earthquake Engineering

College: Engineering

Department: Civil

First: Course Definition

1- Course Code: CE 612

2- Units: 3

3- Semester:

4- Prerequisite:

5- Co-requisite:

6- Location (if not on main Campus):

Second: Course Objectives

- 1- To develop understanding of sources of earthquakes, types of waves etc
- 2- To Develop understanding response spectrum
- 3-To develop understanding of response of a structure to seismic excitation
- 4-To understand the mode of vibrations of the structures
- 5-To develop capability to design the structures for earthquakes of various “g” values

Third: Course Specifications

Source mechanisms, stress waves, and site response of earthquake shaking; effect on the built environment; nature of earthquake actions on structures; fundamental structural response characteristics of stiffness, strength, and ductility; representation of the earthquake input in static and dynamic structural analysis; modeling of steel and concrete structures under earthquake effects; outputs for safety assessment; comprehensive source-to-design actions project.

1- Topics to be covered

Subject	No of Weeks	Units
Structures of the earth and crustal plates	1	3
Theory of plate tectonics	2	6
Sources of earthquakes	2	6

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Shock waves, P-wave, S-wave, Religh wave and love wave	2	6
Site response of earthquake shaking	2	6
Fundamental structural response of the structure to seismic excitation	1	3
Static and dynamic analysis of structure with seismic moments	1	3
Modeling of steel and concrete structures with seismic effects	1	3
Model analysis of the structures	1	3
Source to design action projects	1	3

2- Course components (Total hrs in the Semester): 42

Lecture	Exercise	Other
42	-	0

3- Intended Learning Outcomes of the Course (ILO's)

a. Knowledge

i) Description of the knowledge to be acquired:

- Sources of earthquakes, types of waves
- Response spectrum
- Response of a structure to seismic excitation
- Mode of vibrations of the structures
- Design the structures for earthquakes of various "g" values

ii) Teaching strategies to be used to develop that knowledge

- Class lectures.
- Term projects.
- Students' presentations.
- Group discussion.

iii) Methods of assessment of knowledge acquired

- Exams.
- Quizzes.
- Homework assignments.
- Term projects.

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b- Cognitive (Intellectual) Skills

i) Cognitive skills to be developed

- Structure of earth and sources of earthquakes.
- Response of structure to seismic excitation
- Analysis and design of structure for earthquakes of various magnitudes

ii) Teaching strategies to be used to develop these cognitive skills

- Class lectures.
- Case studies analysis.
- Term projects.

iii) Methods of assessment of students' cognitive skills

- Students' seminars and presentations.
- Term projects.
- Written reports.

c. Interpersonal Skills and Responsibility

i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- Decision making based on engineering analysis.
- Communication skills.
- Team work.

ii) Teaching strategies to be used to develop these skills

- Class lectures.
- Term projects.
- Case studies analysis.

iii) Methods of assessment of students' interpersonal skills and capacity to carry responsibility

- Term project.
- Written reports.
- Students' seminars and presentations.

d. Communication, Information Technology and Numerical Skills

i) Description of the skills to be developed in this domain

- Literature research.
- Problems modeling.
- Utilization of computer applications in analysis and design.

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<p>ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> - Class lectures. - Case studies analysis. - Computer lab sessions. - Term projects. <p>iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> - Term projects. - Written reports. - Students' seminars and presentations.
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e. Psychomotor (if applicable) & Other Non-cognitive Skills

<p>i) Description of the psychomotor or other skills to be developed and the level of performance required</p> <ul style="list-style-type: none"> - NA -

<p>ii) Teaching strategies to be used to develop these skills-</p> <ul style="list-style-type: none"> - NA -

<p>iii) Methods of assessment of student's psychomotor skills</p> <ul style="list-style-type: none"> - NA -
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4- Student Assessment Schedule

Serial	Assessment tool (test, group project, examination etc.)	Week due	Weight
1	Term Project – 1	3 rd	15 %
2	Mid Term Exam -1	7 th	15 %
3	Term Project – 2	10 th	15 %
4	Term Project – 3	13 th	15 %
5	Final Exam	16 th	40 %

5- Student Support

<ul style="list-style-type: none"> - Providing electronic library of textbooks and scientific periodicals. - Providing the necessary computer applications for the course.
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6- Learning Resources

i) Essential Books (References)

- Chen, F. and Lui, E. M. " Earthquake Engineering for Structural Design," CRC Press, 2005.
- N Chen, W. F. and Scawthorn, C. " Erthquake Engineering Handbook," CRC Press, 2002
- Kramer, S. L. "Geotechnical Earthquake Engineering", Prentice Hall, 1996

ii) Course Notes

- NA

iii) Electronic Books & Web Site and journals:

- Engineering structures

iv) Periodicals

- ASCE scientific journals.
- Manual of concrete practice.
- ACI committee reports on concrete

7- Course Evaluation and Improvement Processes

i) Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Students' questioners.
- Students' evaluation of course and instructor.

ii) Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- Public faculty seminars.
- Assessment by external evaluators of students achievements.

iii) Processes for Improvement of Teaching

- Assessment of students' work by external examiners.
- Analysis of students' evaluation of course and instructor.
- Seminars by industry professionals.

iv) Processes for verifying standards of student achievement

- Check marking by an independent faculty member of a sample of student work.

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- Periodic exchange and remarking of a sample of assignments/exams with a external evaluator.

v) Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Assessment and evaluation of the level of achieving the course outcomes through a continuous improvement process (part of a quality assurance system established by the university),
- Consequently, actions are to be taken to improve the course delivery when necessary.
- Review of the course objectives, outcomes and curriculum every 2 years.