

<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 661 Dynamics of Soil and Foundations

College: Engineering

Department: Civil

First: Course Definition

1- Course Code: CE 661

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 the concepts, theories of soil properties, behavior and response to types of dynamic loading.
- 2- To develop understanding of the basic principles and concepts of advanced analysis and design of dynamic foundations.

Third: Course Specifications

1- Topics to be covered		
Subject	No of Weeks	Units
Dynamic Loads and Dynamic Soil Properties	1	3
Theory of Vibration and Tolerable Structure Vibration	2	6
Foundation Dynamics (1-Degree-Of-Freedom System)	1	3
Foundation Dynamics (Multi-Degree-Of-Freedom System)	2	6
Guidelines For Design and Analysis Foundation under Dynamic Loads	2	6
Soil-Structure Interaction (SSI)	2	6

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Shear Strength During Cyclic Loading (Soil Liquefaction)	1	3
Earthquake-Induced Deformations / Displacements	1	3
Seismic Stability of Side Slopes	1	3
Seismic Design of Earth Retaining Structures	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:

- Theory of vibration and its attenuation through soil.
- Dynamic loadings and dynamic properties of soil and
- Principles of machine foundation analysis and design.
- Shear Strength During Repeated Loading (Liquefaction)
- Earthquake-Induced Deformations / Displacements
- Seismic stability of side slopes
- Seismic design of earth retaining structures

ii) Teaching strategies to be used to develop that knowledge

- Class lectures.
- Term projects.
- Students' presentations.
- Group discussion.
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iii) Methods of assessment of knowledge acquired

- Exams.
- Quizzes.
- Homework assignments.
- Term projects.
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b- Cognitive (Intellectual) Skills

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i) Cognitive skills to be developed

- Advanced concepts of foundation analysis and design.
- Advanced foundation problem modeling.
- Investigation of advanced foundation design alternatives.
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ii) Teaching strategies to be used to develop these cognitive skills

- Class lectures.
- Case studies analysis.
- Term projects.
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iii) Methods of assessment of students' cognitive skills

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

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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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ii) Teaching strategies to be used to develop these skills

- Class lectures.
- Case studies analysis.
- Computer lab sessions.
- Term projects.

iii) Methods of assessment of students numerical and communication skills

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

e. Psychomotor (if applicable) & Other Non-cognitive Skills

i) Description of the psychomotor or other skills to be developed and the level of performance required

- NA

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

- NA

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 %

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5- Student Support

- Providing electronic library of textbooks and scientific periodicals.
- Providing the necessary computer applications for the course.

6- Learning Resources

i) Essential Books (References)

- Das, B. M. and G.V. Ramana, G. V. "Principles of Soil Dynamics, CL-Engineering," 2nd edition, 2011. ISBN-10: 0495411345 , ISBN-13: 978-0495411345.
- Das, B.M. "Fundamentals of Soil Dynamics" Elsevier, 1993, ISBN-10: 0444007059, ISBN-13: 978-0444007056.
- Prakash, S. and Puri, V. "Foundations for Machines: Analysis and Design", J. Wiley & Sons, 1988, ISBN-10: 0471846864, ISBN-13: 978-0471846864.

ii) Course Notes

- NA

iii) Recommended Books

- Bachman, H., "Vibration Problems in Structures," Birkhauser, 1995
- Beer, F.P., and Johnston, E.R.Jr., "Mechanics for Engineers – Statics", McGraw-Hill
- Bowles, J.E. "Foundation Analysis and Design" McGraw-Hill Book Company
- Gazetas, G. (1991) "Foundation Vibrations" Foundation Engineering Handbook, 2nd Edition, Van Nostrand
- Kramer, S.L., "Geotechnical Earthquake Engineering", Prentice-Hall, Inc.
- Prakash, S., "Soil Dynamics" McGraw-Hill, Inc.
- Richart, F.E., Hall, J.R., and Woods, R.D., "Vibrations of Soils and Foundations", Prentice-Hall, Inc.

iv) Electronic Books & Web Sites:

- Scientific journals and forums.
- Instructor's instruction.

v) Periodicals

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- ASCE scientific journals.
- British Geotechnique journal.
- Canadian journal of geotechnical engineering.

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.
 - Instructor (Course) Report

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

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