

CE5325: Design for Dynamic Loads (Structural Dynamics)

Recommended References: **Dynamics of Structures**
Anil K. Chopra; Prentice Hall

Instructor: Cesar Carrasco, Ph.D.
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Office Hours: Open

Prerequisite: Instructor approval

Description of the Course

Vibration theory, behavior of structures and foundation members under dynamic loads. Design of structures and foundations for dynamic loads, wind loads, earthquakes and machine vibration.

At the end of the course the student should be familiar with the dynamic behavior of undamped and damped single and multiple degree of freedom systems under various dynamic loads. Students will be able to use analytical, numerical and experimental methods to determine natural frequencies, mode shapes and damping ratios of multiple-degree of freedom systems. Students will be familiar with soil-structure interaction under dynamic loads.

Course Subjects

The following subjects will be covered:

1. Undamped single degree-of-freedom systems (free vibration).
2. Damped single degree-of-freedom systems (free vibration).
3. Response of one-degree-of-freedom system to harmonic loading.
4. Multiple degree-of-freedom systems
5. Determination of Natural Frequencies and Mode Shapes
6. Numerical integration methods in vibration analysis (finite element method)

Grades

Your grade for this course will be assessed based on your performance in the homework and quizzes (10 %), three exams (60 %) and a final project (30 %). Several quizzes will be given throughout the course. The content of a quiz could be the materials covered in previous sessions or to be covered that day. No make-up quizzes will be given. The worst quiz will not be counted for the quiz grade. There will be no make-up exams except for extremely credible reasons. **Students are expected to review the subject to be covered before every class.**

Attendance and Tardiness

Attendance is strongly recommended. The instructor appreciates all efforts to attend the class. There will be no penalty for being late. **However, exams and quizzes will be given at the beginning of the classes. No additional time will be allowed for late attendees.** Homework problems assigned during the week are due on the first class meeting of the following week, unless otherwise specified.

Policy on Cheating

Students are expected to be above reproach in all scholastic activities. Students who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the university. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts. The Department of Civil Engineering has established the Honor Code because it has an obligation to the State and the public to prevent students from entering the profession who are not honest and trustworthy in their academic efforts. This Honor Code Policy allows the Department to recommend disciplinary action to the University Student Conduct Office and to remove students from the Department who have violated the Honor Code. This Honor Code is consistent with the *Student Conduct and Discipline* Chapter of the *Student Affairs* Section of the *Handbook of Operating Procedures* of the University of Texas at El Paso.

All students should sign the Honor Code Agreement and submitted to the Civil Engineering office for record keeping and be deeply familiar with the Honor Code Policy published in our website: <http://ce.utep.edu/honorcode.htm>