

OBJECTIVE

To develop an understanding of the fundamentals of dynamic behavior of structures.

OUTLINE

1. Single-degree-of-freedom linear systems

- . Numerical approach
- . Analytical approach (equation of motion; D'Alembert's approach)
- . Free vibration; forced harmonic vibration; amplification factor
- . Vibration isolation; accelerometer design
- . Forced transient vibration; Fourier series expansion for periodic loading
- . Impulse response; response spectrum

2. Multi-degree-of-freedom (MDOF) linear systems

- . Free vibration: generalized coordinates, modal decomposition
- . Forced vibration
- . Approximate methods to determine mode shapes and periods
- . Lagrange's equation of motion
- . Response of MDOF systems to earthquake ground motions; response spectra

3. Continuous linear systems

- . One-dimensional elastic bodies; wave nature of motion
- . Beam vibration
- . Plate vibration

GRADING

Homeworks: 10% (each question will have equal weight unless otherwise noted); due on announced date at the start of class; no late HWs

Two term exams (in-class, closed book): 25% each

One final exam (in-class, closed book): 40%

Final grades will be based on standard catalog procedure, at the discretion of the instructor.

COLLABORATION POLICY

Homeworks: Please attempt and try to solve homework problems on your own. See the instructor if you need assistance in understanding the concepts. Collaboration is permitted but you have to write down your own solution. Please do not duplicate or worse, photocopy, solutions. It is recommended that you use your chance to test your level of understanding of the course material at homework stage. If you collaborate but not labor in homework assignments, you might be blindsided in the exams.

Exams: No collaboration or sharing of any kind is allowed. No tolerance for transgressions.

COURSE HONOR CODE

Never take unfair advantage of others. Homework solutions from previous years shall not to be consulted.

REFERENCE BOOKS

- Berg – Elements of Structural Dynamics, Prentice Hall, 1989
- Biggs – Introduction to Structural Dynamics. McGraw-Hill, 1964
- Chopra – Dynamics of Structures: A Primer. EERI, 1981
- Chopra – Dynamics of Structures, Theory and Applications to Earthquake Eng., 3rd ed. Prentice Hall.
- Clough and Penzien – Dynamics of Structures. McGraw-Hill
- Craig – Structural Dynamics. John Wiley & Sons

EMERGENCY PREPAREDNESS

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Here are ways to get information about changes in this course.

1. The instructor will email you information through fall2009-ce-57300-001@lists.purdue.edu . This is a one-way, broadcast type mailing-list and only the instructor can forward information through it.
2. If you want to communicate your questions to the instructor directly, the primary/best way to reach him is via email, i.e., at ayhan@purdue.edu. A secondary/less efficient way to reach the instructor is by phone at (765) 496-8270.
3. Last but not least, the course website at <http://cobweb.ecn.purdue.edu/~ce573> will be updated with information.

In the case of a campus emergency closure, virtual classroom meetings, for example via AdobeConnect, could be held. Should such an action become necessary, you will receive an email with information as to how you could participate in virtual meetings for this class. But until then, we will keep our classes as “real” as possible.

If for any pandemic or other emergency reasons one or more of the exams need to be cancelled the following weights will be used in calculating the final grade for performance in this course:

- One term exam cancelled: HW: 15%, one term exam: 35%; final exam: 50%
- Both term exams cancelled: HW: 30%; final exam: 70%
- Final exam cancelled: HW: 20%; term exams: 40% each

Final grades will be based on standard catalog procedure, at the discretion of the instructor.

For more information on Purdue campus emergency planning and preparedness, please visit http://www.purdue.edu/emergency_preparedness/index.htm.

ABSENCE DUE TO HEALTH PROBLEMS/CONCERNS

If you think you may have cold, flu, or any other contagious disease, or simply not feeling well, please: 1) see your doctor or visit PUSH as soon as possible; 2) do not come to class; you may safely consider yourself excused from attending class. You do not need to provide doctor’s report for occasional classroom absence due to health concerns; an email to the instructor would suffice.

In the case of a health problem prohibiting you from attending class for more than three consecutive class meetings, or an exam, or as deemed necessary by the instructor, please be prepared to present a report from your doctor explaining your situation.

Students missing classroom meetings are responsible for catching up with the rest of the class. You may seek reasonable help from the instructor in going over the material you have missed.