

EM634 Advanced Structural Dynamics

Policy & Syllabus

Fall 2017

Catalog Description: (3 units) this graduate-level course is designed to give student an in-depth understanding of the advanced concepts in structural dynamics. Topics include modal analysis theory and implementation, data acquisition and analysis, digital signal processing, random vibration concepts, system identification, structural health monitoring and damage detection, advanced sensor technologies, and smart structure technologies. A big portion of the course will be devoted to the fundamentals of numerical simulations and experimental methods in structural dynamics, exposing students to state-of-the-art simulation software and dynamic testing equipment and providing practical laboratory experience. For many problems, such simulation and testing is essential to validate new structural concepts, as well as to understand structural responses and failures that are not readily explained by intuition, analytical models, or previous experience.

Prerequisite(s): EM 633 – Structural Dynamics and Earthquake Engineering
or **Knowledge of Structural Dynamics (Approval of Instructor)**

Learning outcomes:

Students should be able to:

1. Demonstrate an understanding of the principles of structural dynamics.
2. Demonstrate structural dynamics problem-solving skills.
3. Demonstrate numerical simulation skills of structural dynamics problems
4. Demonstrate familiarity with experimental methods in structural dynamics

Instructor: Hongki Jo
Lecture class: TuTh 2:00-3:15 @ Social Science, Room 136
Office hours: W 11:00-1:00 PM or by appointment
Office: CE 220D
E-mail: hjo@email.arizona.edu

Textbook: 1) Fundamentals of Structural Dynamics, Roy R. Craig Jr. and Andrew J. Kurdila, 2nd ed., Wiley. **2)** Vibration: Fundamentals and Practice, Clarence W. de Silva, 2nd ed., Taylor & Francis

Evaluation

Midterm Exam	30%
Final Exam	40%
Homework	30%

Examination schedule

Midterm	Oct. 12 th , 2016 (Thr), during regular class time
Final	Dec. 12 th , 2016 (Tue), 3:30 ~ 5:30 PM

Examinations

You must take all examinations during the semester and a final examination. All midterm examinations will be held during the regular class session in the lecture room assigned to this course. Midterm and final exams are closed book, but you will be provided with a formula sheet. Allowable calculators include Casio (fx-115 models), HP (33s, 35s), TI (TI-30X, TI-36X).

There will be no make up for missed examinations. The final examination score (%) will be adjusted for, at most, one acceptable excused missed examination. An unexcused missed examination or a second missed examination is scored as zero.

Examinations are regarded as engineering reports. Procedures and presentation of solutions should be precise and legible. Deductions are assessed for:

- (I) Algebra and arithmetic errors;
- (II) Answers presented without proper units, sign or direction;
- (III) Messy or illegible presentation.
- (IV) Lack of narrative describing the solutions steps.

No credit will be given for correct answers obtained by incorrect reasoning or compensation errors. Partial credit may be given for work that pertains to the correct solution.

Homework policy

Homework is due at the beginning of class on the due date. Late Homeworks will not be accepted. Homeworks will be posted on the D2L class website. Students are responsible for checking D2L and university email on a regular basis.

Homework must be submitted in paper form. On occasion, students may be asked to turn in special assignments through D2L, but only if instructed to do so. Homework that does not satisfy these requirements will not be accepted and a grade of zero will be assigned.

A summary of your HW grades will be posted regularly on D2L. It is the student's responsibility to check that your grades are correct. The student must notify the instructor of any omission or error before the date of the final examination. No changes will be accepted after the final examination.

Homework guidelines

1. Homework should be done neatly on Engineering paper using only one side of the sheet.
2. It should be neatly lettered, logically arranged and capable of being readily reviewed by the instructor. Different problems should be started from different page; do not crowd problems together on a page.
3. Each page should include student's name, subject name, and page number identification on the page top right.
4. Each problem should include:
 - a. Student's name, subject name, and page number (top of page).

- b. Problem identification (Chapter; problem number).
- c. Problem statement: normally includes a sketch, and must be sufficient to define the problem so that the solution can be evaluated without reference to the textbook.
- d. The solution must include diagrams (e.g., free-body diagram, etc.) as are necessary to understand the work and the meanings of the symbols employed.
- e. Answers must be complete with all necessary information such as magnitude, units of measurement, and vector direction. Underline intermediate answers. **Box** final answers.
- f. Use proper units.

Attendance & class participation policies

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences. If a late arrival or an early departure is anticipated, check with the instructor to be sure that it is done without disturbing the class. The instructor, at his discretion, may decide to consider late arrivals or early departures as full absences. A three-time absence may result in administrative withdrawal. If a student misses a class, he/she is responsible for all announcements and subjects covered in that class. If in doubt, contact the instructor.

- All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion,
- Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.

ADA compliance

The University of Arizona strives to comply with the provisions of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. Students with disabilities must notify the instructor at the beginning of the semester and must contact the Disability Resource Center.

Code of Academic Integrity

Principle Integrity and ethical behavior are expected of every student in all academic work. This Academic Integrity principle stands for honesty in all class work, and ethical conduct in all labs and clinical assignments.

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at <http://www.library.arizona.edu/help/tutorials/plagiarism/index.html>

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of

Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

Failure to follow this code of academic integrity will result in failing the course and be reported to the Dean of Students' office.

Prohibited Conduct

Conduct prohibited by this Code consists of all forms of academic dishonesty, including, but not limited to:

1. Cheating, fabrication, facilitating academic dishonesty, and plagiarism as set out and defined in the Student Code of Conduct, ABOR Policy 5-308-E.6, E.10, and F.1
2. Submitting an item of academic work that has previously been submitted without fair citation of the original work or authorization by the faculty member supervising the work.
3. Violating required professional ethics rules contained or referenced in the student handbooks (hardcopy or online) of undergraduate or graduate programs, or professional colleges.
4. Violating health, safety or ethical requirements to gain any unfair advantage in lab(s) or clinical assignments.
5. Failing to observe rules of academic integrity established by a faculty member for a particular course.
6. Attempting to commit an act prohibited by this Code. Any attempt to commit an act prohibited by these rules shall be subject to sanctions to the same extent as completed acts.

Student Responsibility

Students engaging in academic dishonesty diminish their education and bring discredit to the academic community. Students shall not violate the Code of Academic Integrity and shall avoid situations likely to compromise academic integrity. Students shall observe the generally applicable provisions of this Code whether or not faculty members establish special rules of academic integrity for particular classes. Students are not excused from complying with this Code because of faculty members' failure to prevent cheating.

Classroom behavior policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Threatening behavior policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>