Design of Wind & Seismic Loads

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Catalog Description
New course, not in catalog yet.

Prerequisites
CE 331: Introduction to Structural Engineering.

Corequisites
None

Course Objectives
Students will learn to calculate wind and seismic loads on buildings, to analyze the response of the building to these loads, and to perform preliminary design of steel frames resisting the loads. Specifically, students will learn to:

- Analyze the free vibration response of a damped and undamped single degree of freedom (SDOF) oscillator.
- Analyze the response to harmonic loading of a damped SDOF oscillator.
- Calculate the frequencies and mode shapes of a multi-degree of freedom oscillator.
- Generate and use response spectra to analyze the response of a structure to ground shaking.
- Calculate the seismic loads on simple buildings following two procedures in ASCE 7-05: the Equivalent Lateral Force Procedure and the Modal Response Spectrum Analysis procedure.
- Calculate the wind loads on simple buildings following two procedures in ASCE 7-05: Method 1—Simplified Procedure and Method 2—Analytical Procedure.
- Design a multi-story multi-bay steel frame structure to resist gravity, wind and seismic loads.
- Use electronic spreadsheets and a commercial structural analysis program as analysis and design tools.

Course Website
richardson.eng.ua.edu/Wind_and_Seismic

Required Texts and References

Suggested Texts and References
none
## Grading
<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams</td>
<td>60%</td>
</tr>
<tr>
<td>Projects</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>5%</td>
</tr>
<tr>
<td>Homework &amp; Portfolios</td>
<td>25%</td>
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## Attendance Policy
Students are expected to attend all lectures. In an absence is unavoidable, the student should contact the instructor before the class meets. Excessive unexcused absences may result in grade reductions.

## Homework Policy
HW assignments are due at the beginning of class. Late assignments will be accepted only with prior approval from the instructor.

## Exam/Quiz Policy
Make-up exams will be given with prior approval of the instructor only.

## Policy on Missed or Late Coursework
Project reports will be accepted late only with prior approval of the lab instructor.

## Course Portfolio
The CE program requires every student in every class to develop a course outcome portfolio. Through the course portfolio, each student is to demonstrate their achievement of the specific program outcomes addressed in each course (see the “Contribution to Program Student Outcomes” section of this syllabus). Graded work from the course (e.g., graded homework, projects, reports, quizzes, exams, etc.) may be used to illustrate achievement of the outcomes. Several assignments, projects, and/or quiz/exam questions in each course will address specific outcomes. If a student does well in these assignments, they would be suitable examples for inclusion in the degree portfolio. The portfolios will be collected prior to or during the final exam.

The intent of this requirement is to assist students with the development of a well-organized program outcome achievement portfolio required for graduation.

The portfolio must be organized with tabs indicating each outcome separately (e.g., T3, T5, T6, and P2). Behind each tab, student work demonstrating command of the respective outcome should be neatly presented. All materials must be three-hole punched, but do not use a three-ring binder. Rather, the portfolio materials must be secured with appropriately sized binder clips. A cover page is required and must include the student’s name, the course number and title, and the term the course was taken.

## Portfolio Grading
Portfolios will be graded at the end of the semester.

## Academic Misconduct
Any act of dishonesty in any work constitutes academic misconduct. The Academic Misconduct Disciplinary Policy will be followed in the event of academic misconduct and will be handled by the Dean’s office.
**Accommodations**
Reasonable accommodations are made on an individualized basis. It is the responsibility of persons with disabilities, however, to seek available assistance and make their needs known. The University has designated the Office of Disability Services as the campus coordinating office for the provision and delivery of services and reasonable accommodations that ensure the University's programs, services, and activities are accessible to students with disabilities. The Office of Disability Services is available to assist any student who has a qualified and documented disability. Please contact the Office of Disability Services at 348-4285 for additional information.

**Schedule/Topic Outline**
See Course Objectives

**Important Dates:**
See the course calendar on the class website for important dates including exam dates, HW due dates, and project due dates.

**Contribution to Program Student Outcomes**
As required for the accreditation of our BSCE program, the Civil Engineering program at The University of Alabama, in full consultation with its various constituencies, including alumni and employers, has established the following overarching student outcomes. These outcomes describe what students are expected to know or be able to do at the time of graduation from our program. To progress towards these outcomes, each course contributes both directly and indirectly to the development of various skills, specific to the course subject matter, that support these outcomes. At a minimum, the outcomes that have been checked below will be fully or partially addressed specifically and in a significant manner in this course. Other outcomes may be addressed to a lesser extent.

- **Outcome T1:** Solve problems in mathematics through differential equations, probability and statistics, calculus-based physics, and general chemistry.
- **Outcome T3:** Apply relevant knowledge, techniques, skills, and modern engineering tools to identify, formulate, and solve engineering problems, including problems in at least four technical areas appropriate to civil engineering.
- **Outcome P3:** Demonstrate the ability to learn through independent study, without the aid of formal instruction.