ARCH 573: Seismic Design  
Units: 2 Units  
2021/22  
Day: Tuesdays  
Time: 9:00am – 10:50am  
Location: HAR 101  
Website: Blackboard

Instructor: Dr Bhavna Sharma  
Office: Zoom  
Office Hours: TBC, or by appointment  
Contact Info: bhavnas@usc.edu

Course Description  
Theory, design methodology and practice of how seismicity affects architecture and structural system selection required for robust earthquake performance and seismic sustainability.

Learning Objectives and Outcomes  
1. Understand the characteristics of earthquakes and the systems that resist them.  
2. Develop informed intuition for structural lateral systems strategies and layout required for seismic design.  
3. Integrate seismic design into the overall architectural design of buildings including the detailing requirements for structural and nonstructural components.

The USC School of Architecture’s five-year Bachelor of Architecture Program and Master of Architecture Program are accredited by the National Architecture Accreditation Board (NAAB). Conditions for accreditation can be found at: https://www.naab.org/wp-content/uploads/2020-NAAB-Conditions-for-Accreditation.pdf. Course Responsibilities: As a required course for an accredited professional degree program, this course is accountable for achieving learning outcomes associated with the following NAAB Criteria.

NAAB student performance criteria for this course includes:  
• SC.1 Health, Safety, and Welfare in the Built Environment—How the program ensures that students understand the impact of the built environment on human health, safety, and welfare at multiple scales, from buildings to cities.

• SC.4 Technical Knowledge—How the program ensures that students understand the established and emerging systems, technologies, and assemblies of building construction, and the methods and criteria architects use to assess those technologies against the design, economics, and performance objectives of projects.

Recommended Preparation:  
Basic knowledge of physics and/or exposure to architectural design. Two semesters of building structures (ARCH 213a and ARCH 213b, or equivalent).

Communication  
To communicate with the instructor, email the instructor from your USC email account. In the subject line, indicate the course number. Simple questions will be answered by email, but for more complex discussions will occur in class or during office hours. Emails will be answered within 48 hours. The instructor does not respond to emails sent from non-USC accounts.
**Course Notes**
For each unit of in-class contact time, the university expects two hours of out of class student work per week over a semester.

**Required Reading**

*Further Reading (available online through library)*


**Description and Assessment of Coursework**
The course includes homework assignments, quizzes, and a final exam.

**Assignments**
The assignments will include weekly problems and activities as detailed on Blackboard. Assignments are to be submitted by Mondays at 11:59pm.

**Quizzes and Exams**
Quizzes will be given throughout the semester. The final exam is scheduled for Tuesday, May 10, 2022, from 8-10 a.m.
Grading Breakdown

<table>
<thead>
<tr>
<th>Coursework</th>
<th>% of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>40</td>
</tr>
<tr>
<td>Midterm</td>
<td>25</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
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</tbody>
</table>

Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>94-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-93</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
</tr>
<tr>
<td>B</td>
<td>83-86</td>
</tr>
<tr>
<td>B-</td>
<td>80-82</td>
</tr>
<tr>
<td>C+</td>
<td>77-79</td>
</tr>
<tr>
<td>C</td>
<td>73-76</td>
</tr>
<tr>
<td>C-</td>
<td>70-72</td>
</tr>
<tr>
<td>D+</td>
<td>67-69</td>
</tr>
<tr>
<td>D</td>
<td>63-66</td>
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<tr>
<td>D-</td>
<td>60-62</td>
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<tr>
<td>F</td>
<td>0-59</td>
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</tbody>
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Course-Specific Policies

**Assignment Submission**
All coursework will be completed and submitted on Blackboard.

**Grading Timeline**
Graded assignments will be returned within one week of submission.

**Late Work**
A 24-hour grace period will be given for submission of homework assignments. Assignments submitted after Tuesdays at 11:59pm will be considered late work and will be penalized by a 25% deduction in the final assignment grade for every 24 hours late unless due to an emergency excused by the instructor. Email the instructor as soon as possible to discuss alternate arrangements due to an emergency.

**Technology in the Classroom**
The course will utilize Zoom and Blackboard for all lectures and coursework.

**Attendance**
Attendance is necessary to understand the course content. If synchronous participation is not possible, students can review the lecture recordings asynchronously to complete homework assignments. Asynchronous attendance will be logged through access to the recordings on Blackboard.

**Classroom Norms**
The course will replicate a design office environment and comments and conversations are expected to be respectful, constructive, and inclusive.
Zoom Etiquette
Student microphones will be automatically muted and should remain muted when not speaking. Students are not required to show webcam video. If a student selects to show webcam video, please consider the background and views visible to the class.

Participation in class should be professional and refrain from additional activities to allow focus on the course content. The polling and chat box feature will be used in the class sessions. If students have a question, they can use the hand raise function to identify themselves. Any conflict in class will be addressed in the moment and followed up with an additional meeting outside of class to discuss and resolve any issues.

If there are any concerns about the participation in online course, students are encouraged to contact the instructor with questions or concerns about complying with a policy and possible accommodations where needed.

Synchronous Session Recording Notice
All synchronous sessions will be recorded and provided to all students asynchronously through Blackboard.

Sharing of Course Materials Outside of the Learning Environment
USC policy prohibits sharing of any synchronous and asynchronous course content outside of the learning environment.

SCampus Section 11.12(B): Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

Course Evaluation
University-wide course evaluations will occur at the end of the semester. Students will be notified when the evaluations are available to provide comments and feedback on their individual experience of the course. In addition, informal evaluations will be used throughout the semester.
Course Schedule: A Weekly Breakdown
Class schedule with weekly assignments. The course schedule is subject to change. Any updates will be posted on Blackboard and highlighted in class.

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Topic</th>
<th>Assign. Due</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan 11</td>
<td>Introduction to Earthquakes</td>
<td>FEMA Ch 1 &amp; 2</td>
</tr>
<tr>
<td>2</td>
<td>Jan 18</td>
<td>Earthquakes and Infrastructure</td>
<td>FEMA Ch 3</td>
</tr>
<tr>
<td>3</td>
<td>Jan 25</td>
<td>Structural Systems</td>
<td>FEMA Ch 4</td>
</tr>
<tr>
<td>4</td>
<td>Feb 1</td>
<td>Seismic Design and Materials</td>
<td>FEMA Ch 1 &amp; 2</td>
</tr>
<tr>
<td>5</td>
<td>Feb 8</td>
<td>Sustainability</td>
<td>Gasparini et al. (2014)</td>
</tr>
<tr>
<td>6</td>
<td>Feb 15</td>
<td>Performance Based Design</td>
<td>FEMA Ch 6</td>
</tr>
<tr>
<td>7</td>
<td>Feb 22</td>
<td>Nonstructural Seismic Response</td>
<td>FEMA Ch 9</td>
</tr>
<tr>
<td>8</td>
<td>Mar 1</td>
<td>Midterm</td>
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</tr>
<tr>
<td>9</td>
<td>Mar 8</td>
<td>Wood Systems</td>
<td>FEMA Ch 8 &amp; ASCE 7</td>
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<tr>
<td></td>
<td>Mar 13-20</td>
<td>Spring Break – No Class</td>
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</tr>
<tr>
<td>10</td>
<td>Mar 22</td>
<td>Concrete Structures</td>
<td>FEMA Ch 8 &amp; ASCE 7</td>
</tr>
<tr>
<td>11</td>
<td>Mar 29</td>
<td>Steel Systems</td>
<td>FEMA Ch 8 &amp; ASCE 7</td>
</tr>
<tr>
<td>12</td>
<td>Apr 5</td>
<td>Masonry Systems</td>
<td>FEMA Ch 8 &amp; ASCE 7</td>
</tr>
<tr>
<td>13</td>
<td>Apr 12</td>
<td>Reinforced Concrete Systems</td>
<td>FEMA Ch 8 &amp; ASCE 7</td>
</tr>
<tr>
<td>14</td>
<td>Apr 19</td>
<td>Retrofit strategies</td>
<td>FEMA Ch 8</td>
</tr>
<tr>
<td>15</td>
<td>Apr 26</td>
<td>Semester Review</td>
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</tr>
<tr>
<td>Final</td>
<td>May 10</td>
<td>Final Exam, 8-10 a.m</td>
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Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Student Health Counseling Services - (213) 740-7711 – 24/7 on call engemannshc.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call engemannshc.usc.edu/rsvp
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) | Title IX - (213) 740-5086 equity.usc.edu, titleix.usc.edu
Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421 studentaffairs.usc.edu/bias-assessment-response-support
Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776 dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710
studentaffairs.usc.edu/ssa
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.