

**COURSE DESCRIPTION****A. GENERAL**

1. Course: Architecture 213b, 3 units
2. Title: Building Structures and Seismic Design
3. Class meetings: Two 1.5 hour lectures and one 1 hour lab per week
4. Lectures TuTh 12:30-1:50pm HAR101, Lab 3:30-4:20pm Thursdays, location varies
5. Examinations: Quizzes, Midterm and Final Exam
6. Student hours: 9 hours per week, including class and lab time
7. Prerequisite: 213a

**B. OBJECTIVES**

Develop an understanding of building structures and selection criteria for appropriate systems. Learn through case studies and coursework the integration of structures with architectural objectives. Understand conceptual design of structures for gravity and lateral wind and seismic loads.

**C. SUBJECT MATTER**

Structural systems to resist gravity and lateral loads. Integration of architectural and structural objectives for synergy of form and structure. Selection of systems for diverse objectives. Potential of structures to define space, serve as ordering system, provide texture and tectonics. Structural materials will be taught in an order to enhance the learning objectives of 211 and 202b taken concurrently by most students in the course. The first half of the semester will focus on horizontal spanning structures and the second half will focus on vertical and lateral structural systems.

*The USC School of Architecture's five year BARCH degree and the two year M.ARCH degree are accredited professional architectural degree programs. All students can access and review the NAAB Conditions of Accreditation (including the Student Performance Criteria) on the NAAB Website: [http://www.naab.org/accreditation/2009\\_Conditions](http://www.naab.org/accreditation/2009_Conditions)*

**D. ASSIGNMENTS**

Readings, homework, quizzes, term projects Mid Term and Final Exam.

**E. BASIS FOR COURSE GRADE**

Subject	Percentage of grade	Grading scale:
Term projects	~25%	A = 90 -100%
Homework, exercise, etc.	~25%	B = 80 - 89%
Mid Term	~25%	C = 70 - 79%
Final Exam	~25%	D = 60 - 69%
Total	100%	

**To pass the course students must pass the Final and miss not more than two classes.**

**F. REQUIRED TEXT** Schierle (2008) *Structure and Design*, Cognella, <http://www.cognella.com/titles/schierle/>

**Resource books**

Ambrose / Vergun (1987) *Design for Lateral Forces*, Wiley  
 Arnold / Reitherman (1982) *Building Configuration and Seismic Design*, Wiley  
 Natterer et al (2005) *Timber Design and Construction Handbook*, McGraw Hill  
 Schierle (1968) *Lightweight Tension Structures*, UCB  
 Schierle (1970) *Prestressed Trusses* (USC ARCH library)  
 Schueller (1983) *Horizontal Span Structures*, Wiley  
 AISC *Manual of Steel Construction*, American Institute of Steel Construction, <https://www.aisc.org/>  
 IBC *International Building Code*, <http://www.iccsafe.org/Pages/default.aspx>

## G. UNIVERSITY STANDARDS

### Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 am - 5:00 pm, Monday through Friday. The phone number for DSP is (213) 740-0776.

### 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 Section 11, *Behavior Violating University*

*Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu/> or to the *Department of Public Safety* <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage [sarc@usc.edu](mailto:sarc@usc.edu) describes reporting options and other resources.

#### Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* [http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html) provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

#### Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. *Scampus*, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appx A:

<http://www.usc.edu/dept/publications/SCAMPUS/gov/>

Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at:

<http://www.usc.edu/studentaffairs/SJACS/>

**H. COURSE OUTLINE**

Tue Jan 13	Synergy of form and structure <b>Term Project issued</b>
Thu Jan 15	Selection of structural systems
Tue Jan 20	Horizontal span structure introduction
Thu Jan 22	Design of tensile structures
Tue Jan 27	Design of suspended structures
Thu Jan 29	Masonry, arch and vault structures
Tue Feb 3	Membrane/fabric structure design
Thu Feb 5	Joist, beam and girder design
Tue Feb 10	Long span horizontals: trusses and vierendeel structures
Thu Feb 12	Cable truss and stayed structure design
Tue Feb 17	Shell structure design
Thu Feb 19	Folded plates and cylindrical shell design
Tue Feb 24	Concrete structures
Thu Feb 26	Steel structures
Tue Mar 3	Wood structures
Thu Mar 5	Midterm review
Tue Mar 10	Foundation design
<b>Thu Mar 12</b>	<b>Midterm exam</b>
Mar 16-21	Spring Break
Tue Mar 24	<b>Term project review, 12:30 - 4:20 pm</b>
Thu Mar 26	Introduction to vertical/lateral structures
Tue Mar 31	Short vertical structures: wood frame, light gage metal, masonry
Thu Apr 3	Portal method of frame design
Tue Apr 7	Moment frame design
Thu Apr 9	Braced frame design
Tue Apr 14	Shear wall design
Thu Apr 16	Steel highrise design
Tue Apr 21	Concrete highrise design
Thu Apr 23	Lateral force design
Tue Apr 28	Final review
Thu Apr 30	No Class – Studio Finals
May 2 - 5	Study days
<b>Wed May 13</b>	<b>Final Exam, 2 to 4 pm, Harris 101</b>