A. GENERAL
1. Course: Architecture 613, 4 units
2. Title: Structure Research
3. Class meetings: One 4 hour seminar per week
4. Student hours: 12 hours per week, including class time

B. OBJECTIVES
Develop informed intuition for structures, their response to natural forces, and integration with architectural objectives.

Lectures topics and handouts are posted at [http://usearch.com/structures/](http://usearch.com/structures/) bring handouts to class. Ability to demonstrate the basic principles of structural systems and their ability to withstand gravitational and lateral wind and seismic forces, as well as the selection and application of the appropriate structural system.

C. SUBJECT MATTER
The study of vertical structures in response to gravity, wind, seismic, and thermal load; integration with architectural objectives, fit and synergy of form and structure. Computer aided design and analysis.

D. ASSIGNMENTS
Assigned reading, homework, term project, and presentations

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 Section 11, Behavior Violating University Standards. 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/](http://policy.usc.edu/scientific-misconduct/). Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report incident to the Office of Equity and Diversity [http://equity.usc.edu/](http://equity.usc.edu/) or to the Department of Public Safety [http://capsnet.usc.edu/department/department-public-safety/](http://capsnet.usc.edu/department/department-public-safety/). 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/](http://www.usc.edu/student-affairs/cwm/) provides 24/7 confidential support, and the sexual assault resource center webpage [https://sarc.usc.edu/](https://sarc.usc.edu/) describes reporting options and other resources. Diversity and Inclusion is covered at: [https://diversity.usc.edu/](https://diversity.usc.edu/)

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](http://dornsife.usc.edu/ali), which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs (306 Watt Way, 213-740-0776) provides certification for students with disabilities and helps to arrange relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information [http://emergency.usc.edu/](http://emergency.usc.edu/) will provide safety updates, including means how to provide information by means of blackboard, teleconferencing, or any other technology.

E. TEACHING METHODS
Weekly lectures, student presentations, assigned reading, seminar discussions, computer workshops, field trip.


Resource books
Schierle (1968) *Lightweight Tension Structures, UCB*

Schierle (1970) *Prestressed Trusses*


Schueller (2016) *Vertical Building Structures*
G. COURSE GRADE
Assignments 25%
Exercises 25%
Research project 50%
Total 100%

H. COURSE OUTLINE
1/08 Introduction of seminar and structure systems
   Read chapters 1 & 10
   **Term project phase 1: case study issued**
1/15 Design for lateral forces; wind and seismic
   Read chapter 9
1/22 Vertical structures introduced
   Read chapter 15
   **LDG: Lateral Design Graph introduced**
1/29 Foundation design
   Read pages 534-536
   Term project phase 1: case study reviewed
   Term project phase 2: alternate design issued
   Read chapter 10
2/05 * Portal Method for moment frame design
   Read pages 201-202
   Beam review
   Review chapter 6 & 11
   **Multiframe program introduced**
2/12 * Moment frame design & beam review
   Read chapter 6 & 17, pages 203-204
   **SDG: Structure Design Graph introduced**
   (Design of moment frames, braced frames, shear walls)
2/19 * Braced frame design
   Read chapter 18 & pages 205-206
2/26 * Framed tube design
   Read pages 391-395
   **PDG: Post Design Graph introduced**
   (Design of posts of wood, steel, concrete, masonry)
3/05 * Shear wall and diaphragm design
   Read chapter 16
3/11-16 Spring Recess
3/19 * Suspended high-rise
   Read chapter 19
3/26 * Wood structures
   Read chapter 20
4/02 * Steel & fabric structures
   Read chapters 21 & 24
4/09 * Concrete and Masonry structures
   Read chapters 22 & 23
5/07 **Term Project Final Review**
   * Alternate topic presentations by students