

COURSE SYLLABUS

I. GENERAL

1. Course: ARCH 313
2. Title: Design of Building Structures
3. Semester: Fall, 2020
4. Class Meetings: Two lectures per week (T/Th 11:00 - 12:20 pm online Los Angeles Time)
5. Exams: Quizzes from time to time, midterm and final exams
6. Assignments: Weekly homework
7. Prerequisite: ARCH 213a (Not really; we'll review essential fundamental concepts.)
8. Textbook: None required; supplemental reading materials and handouts will be provided in class as necessary; optional reference: "Architectural Structures" by Prof. Schierle that you already have.
9. Instructor: T. Jeff Guh, Ph.D., P.E., S.E., Adjunct Associate Professor
10. Contact: Cell: 310-699-3112; e-mail: tguh@usc.edu
11. Office Hours: T/Th 12:30-1:30pm online or other time and venues by appointment

II. OBJECTIVES

ARCH313 aims to integrate the basic theories and knowledge of structural analysis and material properties you learned in ARCH 213 into practical design solutions for contemporary building structures. The goal is to help you develop your ability to understand, classify, compare, summarize, explain and interpret architectural project information related to:

1. The fundamental physics and structural behaviors of buildings in resisting gravity, lateral (especially seismic and wind), and other environmental forces;
2. The underlying theories, assumptions, and modeling as applied to the analysis and design of contemporary structural systems and elements;
3. Structural characteristics of common building materials, including wood, steel, reinforced concrete, masonry, and light gauge metal;
4. Integration of structural elements into complete structural systems in modern building design and construction;
5. Good professional practice in assembling structural design documents, including calculations, drawings, and specifications;
6. The financial aspects of a building project including financial planning, funding, basic construction cost estimating and operational/life cycle cost.

Understanding of the materials discussed in this class will also adequately prepare you to pass the Structural Systems (SS) portion of the NCARB Architect Registration Examination (ARE).

III. TOPICS & AGENDA

Date	Topic
Week 1	<ol style="list-style-type: none">I. Basic Structural Concepts<ul style="list-style-type: none">• Force & Equilibrium – The Basis of Structural Analysis• Stress & Strain – The Basis of Structural Design• Structural Modeling: Systems & Elements

Week 2	<ul style="list-style-type: none"> • Structural Stability • Mechanical Properties of Structural Materials • Design Loading – DL, LL, Seismic, Wind, Soil, Fluid, Thermal, Blast, etc.
Week 3	<ul style="list-style-type: none"> • Structural Element: Beam – Behavior, Analysis, and Design
Week 4	<ul style="list-style-type: none"> • Structural Element: Truss • Structural Element: Column • Structural Element: Slab & Wall
Week 5	<ul style="list-style-type: none"> • Structural Element: Soil & Foundation • Modern Building Structural Systems
Week 6	<p>II. Wood Structures</p> <ul style="list-style-type: none"> • Basic Characteristics of Wood Materials
Week 7	<ul style="list-style-type: none"> • Wood Structural Elements & Connections
Week 8	Midterm Exam
Week 8	<ul style="list-style-type: none"> • Wood Structural Systems
Week 9	<ul style="list-style-type: none"> • Wood Structure Case Study: Design Criteria; Gravity & Lateral Design; Foundation, Detailing & Design Documents
Week 10	<p>III. Steel Structures</p> <ul style="list-style-type: none"> • Basic Material Characteristics of Structural Steel & Light Gauge Steel
Week 11	<ul style="list-style-type: none"> • Steel Structural Elements & Connections • Steel Structural Systems • Steel Structure Case Stud
Week 12	<p>IV. Concrete Structures</p> <ul style="list-style-type: none"> • Basic Characteristics of Concrete, Masonry & Reinforcing Steel Materials • RC Structural Elements & Connections • RC Structural Systems
Week 13	<p>V. Miscellaneous Topics</p> <ul style="list-style-type: none"> • Innovative Structural Systems –Cable (Suspension and Stayed), Arch, Pate and Shell Structures • Project Finance & Value Engineering – Project Finance, Construction Cost Estimating, Value Engineering, and Building Operational & Life Cycle Cost.
11/17/2030	Final Exam (11am – 1pm)

IV. BASIS FOR FINAL GRADE

Assignment	Percentage
Homework	25%
Quizzes	10%
Midterm Exam	30%
Final Exam	35%
Total	100%