

I. GENERAL

Course:	ARCH 573
Title:	Seismic Design
Units:	2 Units
Semester:	Spring, 2019
Class Meetings:	One lecture per week (T 2:00 – 3:50 pm @VKC155)
Exams:	Final Exams
Assignments:	Homeworks
Prerequisite:	Physics or Calculus, Approval of Instructor
Textbook:	FEMA 454: Designing for Earthquakes: A Manual for Architects https://www.fema.gov/media-library/assets/documents/8669 (free download)
References:	<i>ASCE7-10 Minimum Design Loads for Buildings and Other Structures</i> <i>Seismic Conceptual Design of Buildings- Basic principles for engineers, architects, building owners and authorities</i> : Hugo Bachmann <i>Earthquakes</i> : Bruce Bolt (any edition) W.H. Freeman <i>Structures and Design</i> : G. G. Schierle
Instructor:	Santosh Shahi, Ph.D., P.E., S.E.,
Contact:	Cell: 310-403-9225; e-mail: santoshbshahi@yahoo.com
Office Hours:	Tuesday & Thursday 1:00-2:00 pm, Location: WAH 3 rd Floor MBS Corner, or by Appointment

II. OBJECTIVES

Develop informed intuition for structural lateral systems strategies and layout for seismic design. Understand the characteristics of earthquakes and the systems that resist them. Integrate seismic design into the overall architectural design of building including the detailing requirements for structural and nonstructural components.

III. SUBJECT MATTER

This course is intended for graduate architecture students. It covers:

- Earthquakes and how they influence building design.
- Earth science behind earthquakes.
- Fundamentals of the physics and behavior of structural systems designed to resist earthquakes motions.
- System and material selection for seismic design considering the structure, façade.
- Nonstructural components

IV. COURSE OUTLINE

Introduction

- Week 1 Introduction to course objectives, policies, term project
Earth Science Basics, how the earth moves, the nature of earthquakes
- Week 2 Earthquakes Effects: shaking, liquefaction, damage to building and infrastructure

Lateral Force Resisting System

- Week 3 Loading and behavior, deformations, dynamics, load path, resultant forces.
- Week 4 Overview of Systems and materials and impact on design

Lessons Learnt from Major Earthquakes

- Week 5 Do's and don'ts of design in earthquake prone areas, societal impact and earthquake preparedness
- Week 6 Earthquake prediction, Code changes due to earthquakes, performances based design

Lateral System Integration

- Week 7 Reinforced Concrete and Masonry System: Selection, Layout & Sizes
- Week 8 Concrete Systems: Impact on nonstructural elements, facades and detailing
- Week 9 Steel Systems: Selection, Layout and Sizes
- Week 10 Steel Systems: Impact on nonstructural elements, facades and detailing
- Week 11 Wood Systems: Selection, Layout and Sizes
- Week 12 Wood Systems: Impact on nonstructural elements, facades and detailing
- Week 13 Retrofit Strategies: Maintaining Functionality and preserving design.
- Week 14 Supplemental Systems: Base isolation, Dampers, Friction System
- Week 15 Term Project Due

Study Week

Final Exam: Thursday May 2/2019 2- 4 pm

V. BASIS FOR FINAL GRADE

Homework	30%
Class Attendances	10%
Term Project	30%
Final Exam	30%
Total	100%

To pass the course students must pass the Final and not miss more than two classes without valid written excuses.