CE 697R
Seismic Design of Steel Structures
Fall 2019
MWF 8:30-9:20am
Seng-Liang Wang Hall 2555

Instructor:	Amit Varma	Office Hours:	MWF Walk-ins, TTh by appt. at Bowen
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Course Description:
Design of steel buildings for earthquake resistance. Topics include: (i) behavior of various steel systems subjected to earthquake ground motions, (ii) seismic design of these systems following current design criteria, (iii) analysis for design and for performance evaluation, (iv) repair, rehabilitation, and retrofit of existing or earthquake damaged buildings, and (v) current research on innovative steel systems. Systems emphasized include moment resistant frames, braced frames, and composite frames. Component and connection design are presented in detail.

Pre/Co requisites:
Prerequisite: CE 591. Pre or Co requisite: CE571. Authorized equivalent courses or consent of instructor may be used in satisfying course pre- and co-requisites.

Recommended Books:
Bruneau, M., et al., Ductile Design of Steel Structures, McGraw-Hill, New York, NY, 2011

Some References (will be provided on flash drive or made available for download):
1. 2016 Seismic Provisions for Structural Steel Buildings, ANSI/AISC 341-16, 341-16
2. Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications, ANSI/AISC 358-16
3. NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures, FEMA 450, 2003
4. Recommended Seismic Design Criteria for New Steel Moment-Frame Buildings, FEMA 350, 2000
5. Minimum Design Loads for Buildings and Other Structures, ASCE 7-16
6. Seismic Rehabilitation of Existing Buildings, ASCE/SEI 41-13

Homework, Exams, and Grading:
Homework may be assigned periodically. There will be an individual course project (two project reports needs to be submitted). Your final course grade will be determined as follows: course project 70% (30% for the 1st submission, 30% for the second submission, and 10% for the presentation); homework, participation, quizzes, other 30%.

Ethics:
Academic dishonesty will not be tolerated. Please refer to the section, "Definition of Academic Dishonesty," on the following web page: http://www.purdue.edu/odos/osrr/academic-integrity/index.html Any incidents of academic dishonesty will, *at the very least*, result in zero credit for the associated assignment or exam. Further penalties, such as immediate failure of the course and/or referral to the Dean of Students, are at the discretion of the instructor.

Lecture Plan:

WEEK 1-3: Introduction to Nonlinear Inelastic Behavior, Seismic Design Philosophy, AISC Provisions

WEEK 4-5: Seismic Design of Moment Resisting Frames and Various Pre-qualified Connections

WEEK 5-7: Seismic Design of Concentric, Eccentric, and Buckling Restrained Braced Frames

WEEK 8-10: Seismic Design of Steel and Composite Plate Shear Walls and Coupled Wall Systems

WEEK 11 – 12: Performance-based Design and Evaluation of Seismic Response

WEEK 13-14: Performance Evaluation using Linear and Nonlinear Procedures

WEEK 15-16: Student Project Presentations

Scheduled University Holidays

Week 3	M	9/2/19	**Labor Day-No Class**
Week 8	M	10/7/19	**Fall Break-No Class**
Week 15	W	11/27/19	**Thanksgiving-No Class**
Week 15	F	11/29/19	**Thanksgiving-No Class**