Fall 2023

CE 495-101:Civil Engineering Design II

Simon Shim

CEE CE495 – 101: Civil Engineering Design II (Structural)

(3 credits)

Lectures Day(s) Thursday 6:00 PM – 8:50 PM
FMH 203/ Civil Engineering Computer Lab (2nd floor)

Instructor Simon Shim, P.E.
744 Broad Street, Suite 1905
shim@njit.edu
917-287-0232

Office Hours: Thurs 5:30~6:00 PM
by appointment

Prerequisite CE 332 Structural Analysis / CE 333 Reinforced Concrete Design
CE 432 Structural Steel Design
CE494 Civil Engineering Design I

Required Textbook

Tall Building Design: Steel, Concrete, and Composite Systems, by Bungale S. Taranath (**ISBN**: 978-1466556201)

Other Recommended Texts & Reading

Course Description *(from NJIT's course catalog)*

Provides students with the type of design experience they would receive if engaged in civil and environmental engineering design practice including incorporating engineering standards and multiple constraints. Students can select from these design areas: structural engineering.

http://catalog.njit.edu/undergraduate/newark-college-engineering/civil-environmental/civil-engineering-bs/

Course Objectives (General)

By the end of this course, the student will be able to:

Course Topic 1: Understand the workflow of structural engineering design practice to be engaged in a structural design firm during design phase for 40 story commercial building project.

Course Topic 2: Learn to interpret applicable building code and associated structural design provisions including design loads such as dead load, live loads, wind load, and seismic load, and structural design criteria for strength and serviceability requirements.

Course Topic 3: Understand structural planning and system aligning with client's objectives and architectural vision and design and learn finite element software ETABS and SAFE for floor framing, lateral load resisting system, and foundation analysis and design while understanding gravity load and lateral load path.

POLICIES & PROCEDURES

Academic Integrity: It is expected that NJIT's University Code on Academic Integrity will be followed in all matters related to this course. Refer to NJIT's Dean of Students website to become familiar with the Code on Academic Integrity and how to avoid Code violations.

https://www.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf

Communication: Email, Canvas, and Zoom/Webex.

Lectures/Class: Attendance at lectures and project participation are mostly important in class. All students should fully participate in a project story including planning, analysis, and design and presentation. During a semester and a final presentation, the class will have a group photo and video recording. The final presentation poster will be exhibited in Virtual Space (Spatial).

Handouts: All handouts will be made available on Canvas.

Homework: Homework will be assigned and conducted individually or in groups.

Homework Format: homework will be uploaded to the Cavas. Hand-written or word-typed will be accepted.

Late Homework: Late homework will not be accepted.

Homework Solutions: Homework solutions will be distributed and discussed during the class.

Exams: No exams.

Calculation of Course Grade: A weighted average grade will be calculated as follows:

Describe how homework, project participation, presentation, and report, etc. are weighted.

Homework	30%
Mid-term Presentation	30%
Final Presentation & Report	40%

The minimum requirements for final letter grades are as follows:

A = 90.0%, B+ = 85.0%, B = 80.0%, C+ = 75.0%, C = 70.0%, D = 60.0%, F < 50.0%

Grading will be judged based on weights of various assignments, in-class participation, and attendance and final-term project presentation and report. Completeness = Homework 30% + Mid-term Presentation 30 % + final presentation and report. Grade = Project Participation (0.0 ~ 1.0) x Completeness.

Instructor Commitment: You can expect the instructor to be courteous, punctual, organized, and prepared for lecture and other class activities; to answer questions clearly; to be available during office hours or to notify you beforehand if office hours are moved; to provide a suitable guest lecturer or pre-recorded lecture when they are traveling or unavailable; and to grade uniformly and consistently.

Students with Documented Disabilities: NJIT is committed to providing students with documented disabilities equal access to programs and activities. If you have, or believe that you may have, a physical, medical, psychological, or learning disability that may require accommodations, please contact the Coordinator of Student Disability Services located in the Center for Counseling and Psychological Services, in Campbell Hall, Room 205, (973) 596-3414.

Further information on disability services related to the self-identification, documentation and accommodation processes can be found on the webpage at: (http://www.njit.edu/counseling/services/disabilities.php)

Course Schedule:

WEEK	LECTURE TOPIC	HANDOUT OR HOMEWORK
1	Introduction of course work and final project and ETABS 101 Basic	Handout
2	Project team organization and design process. Overview of structural engineering workflow for existing building and New Building. **Concept Design Workshop**	Homework 1
3	Structural design criteria and associated building code Including design loads; Dead Load, Live Load, Wind Load, and Seismic Load, etc and serviceability	Handout
4	Floor framing System I Structural element planning and layout practice (Column, Wall, Beam, Slab) and Column Load Takedown with Tributary Area Method **Schematic Design Workshop I**	Handout
5	Floor framing System and Design II Introduction of Finite Element Software (ETABS) and modelling practice Composite Floor framing Case study using ETABS	Homework 2
6	Floor framing System and Design workshop	Handout
7	Lateral load resisting system I Finite element Modelling and Analysis Practice I **Schematic Design Workshop II**	Homework 3
8	Lateral load resisting system II Finite element Modelling and Analysis Practice II	Handout
9	Lateral load resisting system III Finite element Modelling and Analysis Practice II	Handout
10	**Mid-term Presentation**	Handout
11	Foundation system I Finite element Modelling, Analysis, Design Practice	Handout
12	Foundation system II Finite element Modelling, Analysis, Design Practice	Handout
13	Workshop : Team Project Walk-through	
14	**Final Presentations** Submit Team presentation and Report, closing remarks and comments	

Course Objectives Matrix – CE495 – 002 /HM02

Strategies and Actions	Course Student Learning Outcomes	ABET Student Outcomes (a-k)	Program Educational Objectives	Assessment Methods/Metrics
Course Objective 1: Understand the workflow of structural engineering design practice, where engaged in a structural design firm during design phase for 40 story commercial building project.				
Present a structural engineering design problem-solving and practice	1, 2,7	1, 2	1, 2	Periodic progress homework
Course Objective 2: **L**earn to interpret applicable building code and associated structural design provisions including design loads such as dead load, live loads, wind load, and seismic load, structural design criteria for strength and serviceability requirements.				
Discuss specific code, Design Criteria, performance goals, cost implication and safety objectives.	2, 4	1, 2	1, 2	Periodic progress homework
Course Objective 3: **Understand** structural planning and system aligning with client's objectives and architectural vision and design and **L**earn finite element software ETABS and SAFE for floor framing, lateral load resisting system, and foundation analysis and design while understanding gravity load and lateral load path.				
Work Individually and in group and present final group project	3, 5	1,2	1, 2	Final Group Project Presentation, and Report

CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarship among our faculty and students
- to promote service to the engineering profession and society

Our Program Educational Objectives are reflected in the achievements of our recent alumni:

1. Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward safe, practical, sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.
2. Professional Growth: Alumni will advance their technical and interpersonal skills through professional growth and development activities such a graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as business and law through further education.
3. Service: Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Our Student Outcomes are what students are expected to know and be able to do by the time of their graduation:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies