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Fall 2018

# CE 495-103: Senior Design II (Structural)

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JOHN A. REIF, JR. DEPARTMENT OF  
**CIVIL AND ENVIRONMENTAL  
 ENGINEERING**



**CE 495-Senior Design II (Structural) Section: 103 Fall 2018**

**Text:** Wight, James K. Reinforced Concrete, Mechanics and Design, 7<sup>th</sup> Edition, Prentice Hall, ISBN: 13:978-0-13-348596-7

**Instructor:** Professor Methi Wecharatana, Office 219 Colton Hall, 973-596-2458,

Office Hours: Tuesday: 3-5 PM and Wednesday 10-11 AM or by appointment; E-mail: [methi@njit.edu](mailto:methi@njit.edu)

**Prerequisites:** CE 333, CE 432, CE 443 and CE 494.; A working knowledge of how to analyze a structure for the applied design loads in order to obtain the shear and moment diagrams, as well as deflection of the structure. Some basic knowledge in the design of reinforced concrete members.

| Week | Topic  | Homework to be Assigned in Class |
|------|--|----------------------------------|
| 1.   | Introduction: Review of RC Design and Introduction to Building Design Concept                              |                                  |
| 2.   | Design of Two-story Building: Structural Floor Plans, Design of Slabs, Beams, Columns and Stair            |                                  |
| 3.   | Design of Two-story Building (cont.): Design and Drawings of Floor Plans, Slabs, Beams Columns, and Stair  |                                  |
| 4.   | Design of Two-story Building (cont.): Design and Drawings of Floor Plans, Slabs, Beams, Columns, and Stair |                                  |
| 5.   | Overview of the 24-story building  |                                  |
| 6.   | Design of Structural Floor Plans and Drawings  |                                  |
| 7.   | Design of Structural Floor Plans and Drawings  |                                  |
| 8.   | Design of Slabs and Drawing  |                                  |
| 9.   | Design of Slabs and Drawing  |                                  |
| 10.  | Design of Beams and Drawing  |                                  |
| 11.  | Design of Beams and Drawing  |                                  |
| 12.  | Design of Columns and Drawings   |                                  |
| 13.  | Design of Stairs and Drawings  |                                  |
| 14.  | Final Project Submission: Design Report and Drawings   |                                  |

**Grading:** Grading will be judged from the final term project presentation, report, and design drawings.

### Outcomes Course Matrix – CE 495 Civil Engineering Design II

| Strategies, Actions and Assignments  | ABET Student Outcomes (1-7) | Program Educational Objectives | Assessment Measures   |
|--|-----------------------------|--------------------------------|---|
| <b>Student Learning Outcome 1: Analyze, evaluate and design a civil or environmental engineering project (building foundation, treatment facility, etc.)</b> |                             |                                |   |
| Present an area specific civil and environmental engineering practice design problem.  | 1, 2, 7                     | 1, 2                           | Final project report and periodic progress reports.                 |
| Discuss specific code, performance, cost, time, quality and safety objectives.   | 2, 4                        | 1, 2                           | Final project report and periodic progress reports.                 |
| Work individually and within multi-disciplinary design teams.  | 3, 5                        | 1, 2                           | Final project report, periodic progress reports, oral presentation. |

### 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 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 skills through professional growth and development activities such as 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

Revised: 2/13/18