

Spring 2021

CE 495-004: Civil Engineering Design II

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



CE 495-Civil Engineering Design II (Structural) Section: 004

Spring 2021

Text: Handout materials only

Instructor: Joseph Baladi, P.E, P.P, CME, CPWM Email: joseph.baladi@njit.edu

7:30 am – 10:20 am Monday, Cullimore Hall LECT 2 (Converged) Jan 18, 2021 - May 13, 2021

Prerequisites: CE 332- Structural Analysis; CE 333 – Reinforced Concrete Design; 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.

***Outlines:**

Class 1: Introduction and overview to Projects

Class 2: Project and group selection, handout related to projects

Class 3: Project support materials review

Class 4: Project process, stakeholders, public meeting, and funding sources

Class 5: Site Visit

Class 6: Design criteria

Class 6: Project management and coordination with entities involved in project (private, local, state and federal)

Class 7: Work with individual group, technical guidance

Class 8: Evaluate design alternatives, bridge type, fixed vs movable bridge, layout, cross section, profiles

Class 9: Additional Specific Design Criteria related to groups. Cross sections, bridge vertical profile and clearance.

Class 9: Group sessions and guidance regarding preferred alternative design

Class 10: Meeting with actual stakeholders and project managers (date may vary)

Class 11: Group session to integrate preferred design with existing infrastructures such as adjacent existing abutments, geometric constraints and existing roadway profiles and layout.

Class 12: CAD and progress and initial submittal. Review and comment on progress set

Class 13: Final submittal and Presentations

Class 14: Closing remarks and comments. Appendix / supporting materials submittals deadline.

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
Student Learning Outcome 1: Analyze, evaluate and design a civil or environmental engineering project (building foundation, treatment facility, etc.)			
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

***Note:**

This class will provide seniors with the type of design experience they would receive if engaged in civil and structural engineering design practice. The main design topic is structural design but there will be interaction and consistency with other design criteria and disciplines of such as foundations, transportation, planning, and environmental engineering.

Students will gather project data of real life ongoing project in New Jersey, visit the site, attend one public session for stake holders or general information session, review relevant project reports, get familiar with all steps needed in the process to prepare alternatives, choose preferred alternative, preliminary engineering and final design.

The sequence of the outlines may vary based on each individual group approach and class progress. Site visit date and timing is subject to weather. Individuals in group may receive different grades based on attendance, class participation and presentation