

Spring 2024

CE 414 - 002: ENGINEERED CONSTRUCTION

Chrissa Roessner

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CEE 414 – 002: Engineered Construction (3 credits)

Lectures Tuesday and Friday, 4:00 pm – 5:20 pm
 Tuesdays - Colton 416 and Fridays – CKB 214

Instructor Chrissa D. Roessner, P.E. Office Hours: Fridays 5:20 pm – 6 pm
 Colton Hall Email professor for a virtual appointment
 cdr44@njit.edu

Prerequisites CE 210, CE 332, CE 341

Required Textbook

Not applicable.

Other Recommended Texts & Reading

As posted in Canvas throughout the semester.

Course Description

Design, erection, and maintenance of temporary structures and procedures used to construct an engineering project. Business practices, codes, design philosophies, construction methods, hardware, inspection, safety, and cost as they pertain to engineered construction projects.

Course Objectives (General)

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

- 1) Determine loading on temporary construction structures.
- 2) Design various types of supports and temporary structures.
- 3) Discuss and review construction safety practices for temporary structures.

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: All communication from the professor to the students will be through Canvas or campus email. The same is expected of the students when communicating with the professor. Weekly course announcements will be posted / emailed utilizing Canvas. Students are strongly encouraged to review these messages carefully. Email responses will generally be within 24-hours.

Lectures/Class: Students are expected to attend every class session in-person, as scheduled. Attendance will be taken. Students are responsible for any missed work, and any absences resulting in missed work must be excused by the Dean of Students. Additional course content will be made available through Canvas, as appropriate. Students are responsible for all course content

regardless of how and when it is presented. Students must check Canvas frequently to check for new modules and content.

Course Schedule:

| Class Meeting Date | Topic | Assignments / Notes |
|--------------------|--|------------------------------------|
| Tue, Jan 16, 2024 | Introductions | |
| Fri, Jan 19, 2024 | Syllabus / Integrity | |
| Tue, Jan 23, 2024 | Loads on Temporary Structures Forms & Formwork Part I (Walls) | |
| Fri, Jan 26, 2024 | Forms & Formwork Part I (Walls) | Homework #1 Assigned |
| Tue, Jan 30, 2024 | Forms & Formwork Part I (Walls) | Homework #1 Due |
| Fri, Feb 02, 2024 | Forms & Formwork Part II (Walls) | Quiz #1 |
| Tue, Feb 06, 2024 | Forms & Formwork Part II (Walls) | Homework #2 Assigned |
| Fri, Feb 09, 2024 | Forms & Formwork Part II (Walls) | Homework #2 Due |
| Tue, Feb 13, 2024 | Forms & Formwork Part III (Slabs) | Quiz #2 |
| Fri, Feb 16, 2024 | Forms & Formwork Part III (Slabs) | Homework #3 Assigned |
| Tue, Feb 20, 2024 | Forms & Formwork Part III (Slabs) | Homework #3 Due |
| Fri, Feb 23, 2024 | Temporary Roads and Bridges | Quiz #3 |
| Tue, Feb 27, 2024 | Time-Lapsed Construction Videos | |
| Fri, Mar 01, 2024 | Construction Safety & Equipment | |
| Tue, Mar 05, 2024 | Midterm Review | |
| Fri, Mar 08, 2024 | Midterm Exam | Midterm |
| Tue, Mar 12, 2024 | Spring Break | No Class |
| Fri, Mar 15, 2024 | Spring Break | No Class |
| Tue, Mar 19, 2024 | Review Midterm Exam Solutions | |
| Fri, Mar 22, 2024 | Sheet Piling | |
| Tue, Mar 26, 2024 | Slopes, Excavations, Walls | Homework #4 Assigned |
| Fri, Mar 29, 2024 | Good Friday | No Class Homework #4 Due |
| Tue, Apr 02, 2024 | Soldier Piles & Lagging | Quiz #4 |
| Fri, Apr 05, 2024 | Soldier Piles & Lagging | Homework #5 Assigned |
| Tue, Apr 09, 2024 | Coffer Dams & Dewatering | Homework #5 Due |
| Fri, Apr 12, 2024 | Scaffolding | Quiz #5 No Class (virtual work) |
| Tue, Apr 16, 2024 | Scaffolding | No Class (virtual work) |
| Fri, Apr 19, 2024 | Guest Speaker – Shotcrete | |
| Tue, Apr 23, 2024 | Construction Business and Legal Aspects | |
| Fri, Apr 26, 2024 | Contracts & Claims | |
| Tue, Apr 30, 2024* | Semester Review / Final Exam Preparation | Follows Friday Schedule - CKB |
| May TBD, 2024 | Final Exam | Final Exam |

Homework Format : Students are responsible for submitting all homework assignments (completely and legibly) before the due date and time **in Canvas**. Preference is for students to use

engineering computation paper, but most importantly, work should be presented neatly and logically. Late assignments will generally not be accepted, and should any homework be submitted after the due date, it will receive no more than 50% credit, regardless of accuracy, unless the absence, and consequently the missed assignment, is substantiated by the Dean of Students Office. Homework can be lengthy, please plan accordingly. Students should consult the professor in advance of the due date if there are any issues or questions regarding the homework, especially since homework content likely appears on a quiz. Solutions will be reviewed in class, and students will receive direct feedback on their assignments. Please plan to use Microsoft Print to PDF, AdobeScan or similar when preparing your assignments for submission through Canvas.

Quizzes and Exams: Students will take all quizzes and exams in-person as scheduled. All quizzes and exams will be available for student review but will be kept / maintained by the professor. Students are permitted to take notes when reviewing quizzes in class. There will be NO makeup quizzes or exams unless substantiated / approved by the Dean of Students Office.

Quiz and Exam Proctoring Requirement: Should any quizzes or exams need to be offered through Canvas, NJIT policy requires that virtual quizzes and exams be proctored to increase and assure academic integrity. In this course we will use either ProctorU Record, or Respondus Monitor with LockDown Browser, or the quiz or exam will be monitored using Webex. The link below provides a brief description of these proctoring options. Please be familiar with the requirements of each since it may be necessary to utilize any of these during the semester. You must have a webcam for this same purpose.

<https://ist.njit.edu/online-course-exam-proctoring>

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

| <u>Breakdown</u> | | <u>Scale</u> | |
|------------------|------------|--------------|----------|
| Homework | 25% | A | 100-90 |
| Quizzes | 25% | B+ | 89-85 |
| Midterm | 25% | B | 84-80 |
| <u>Final</u> | <u>25%</u> | C+ | 79-75 |
| Total | 100% | C | 74-70 |
| | | D | 69-60 |
| | | F | Below 60 |

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 Objectives Matrix – CE 414 – Engineered Construction

| Strategies, Actions and Assignments | ABET Student Outcomes (1-7) | Program Educational Objectives | Assessment Measures |
|--|-----------------------------|--------------------------------|---|
| Student Learning Outcome 1: Determine loading on temporary construction structure | | | |
| Review loading, live load, dead load, concrete, soil, water | 1, 2 | 1 | Homework and exam |
| Student Learning Outcome 2: Design excavation support | | | |
| Determine earth pressure and loading for various soil conditions | 1, 2 | 1 | Homework and exam |
| Design support member sheeting and shoving | 1, 2 | 1 | Homework and exam |
| Student Learning Outcome 3: Discuss and Review construction safety for temporary structure | | | |
| Review OSHA 1926 | 4, 7 | 1 | Class Review and Discussion, Homework, Exam |

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, resilient, 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 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