CEE 414 – 001: Engineered Construction

(3 credits)

Lectures	Fridays, 2:30 pm – 5:20 pm Tiernan Hall (TIER) 114	
Instructor	**Patrick Borges Rodrigues** Fenster Hall (FENS) 446 patrick.borgesrodrigues@njit.edu	Office Hours: Thursdays, 11 am – 12 pm or by appointment
Prerequisite	CE 210, CE 332, CE 341	

Required Textbook

Ratay, R. (2012). Temporary structures in construction (3rd ed.). McGraw-Hill.
(The e-book is available for free through the NJIT libraries website: https://primo.njit.edu/permalink/01NJIT_INST/97f46a/cdi_askewsholts_vlebooks_9780071753081)

Souder, C. (2015). Temporary structure design (1st ed.). John Wiley & Sons, Inc.
(The e-book is available for free through the NJIT libraries website: https://primo.njit.edu/permalink/01NJIT_INST/dcbe8h/alma995304393005196)

Other Recommended Texts & Reading

Recommended texts & readings will be posted on Canvas throughout the semester.

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

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 support 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: The instructor will use Canvas and NJIT email to communicate with the class. Students are required to use these same channels for all course-related communications. It is the students' responsibility to regularly check Canvas and their NJIT email to stay updated on announcements, course readings, and assignments.

Lectures/Class: Students are expected to attend all lectures in person. Attendance will be recorded at each class session throughout the semester.

Handouts: Class handouts will be made available on Canvas. When necessary, the instructor may also distribute printed materials during class.

Homework: There will be five assignments for this course. While assignments are individual submissions, students are encouraged to collaborate and discuss concepts with their classmates if they wish. However, each student is expected to complete and submit their own work independently. Copying another student's answers or submitting work that is not your own is strictly prohibited and will be reported in accordance with NJIT's academic integrity guidelines. For each assignment, students must clearly report any collaboration and specify with whom they worked when submitting their work.

Homework Format: Assignments will be posted on Canvas, and students must submit their solutions through Canvas. Students may use word processing software or scan handwritten answers for their submissions. All work, including calculations and intermediate steps, must be clearly shown for each question. Final answers and any critical intermediate results should be highlighted or clearly indicated to facilitate grading. If scripts or spreadsheet software are used for computations, students must also submit the corresponding scripts, spreadsheets, and any supporting files via Canvas.

If the instructor allows the use of large language models (LLMs) or other artificial intelligence (AI) tools for a specific assignment, students must submit a copy of all prompts used to support their solutions. Any such permission will be clearly stated in the assignment description. However, students are strictly prohibited from using LLMs to directly generate solutions. These tools may only be used for clarifications and conceptual understanding (see the AI Statement below for additional details).

Late Homework: Students are allotted a total of three (3) "late days" to use across all five assignments during the semester. These late days may be applied at the student's discretion, and

no justification is required for using them. However, students only have three days in total, not three days per assignment. For example:

- If a student submits Assignment #1 three days late, they will have no remaining late days for the rest of the semester.
- If a student submits Assignment #1 one day late, they will still have two remaining late days to use on future assignments.

A late submission is defined as any work submitted after the posted due date and time. Even if an assignment is submitted just a few minutes late, it will count as one full late day.

Once all three late days have been used, any additional late submissions will be graded according to the following policy:

Submission Timeframe	Grade Awarded
Submitted on time	100% of the original grade
Submitted up to 24 hours late	60% of the original grade
Submitted 24 to 48 hours late	30% of the original grade
Submitted more than 48 hours late	0% (no credit)

After using the three late days, subsequent late submissions may be excused only if they are accompanied by supporting documentation from the Dean of Students Office.

Finally, please note that late days cannot be applied to the semester project materials (presentation and report) or exams. All project deliverables must be submitted by the deadlines posted on Canvas.

Homework Solutions: Homework solutions (rubrics) will be posted on Canvas within three days after the assignment due date. This delay is intended to accommodate any potential late submissions within the allowed timeframe.

Semester Project: The course includes a semester project related to the topics discussed in class. This is a group project consisting of two main components: an in-class presentation and a written report. Detailed project guidelines, deliverable requirements, and evaluation criteria will be provided later in the semester and posted on Canvas.

Exams: There will be a midterm exam and a final exam for this course. Each exam will assess material covered in class and in the assigned readings. The instructor will communicate, via Canvas, which resources (if any) are permitted during each exam. This information will be provided at least one week before the scheduled exam date. Students are required to take all exams in person at the times specified in the syllabus or as scheduled by NJIT for the final exam. Make-up exams will not be offered, except in cases approved by the Dean of Students Office.

Safety First Discussions: At the beginning of each lecture, there will be a short discussion and occasional student presentations focused on safety topics related to material covered in previous classes. Students are encouraged to share relevant examples (e.g., videos, case studies, reports, etc.) through Canvas and to participate in discussions on Canvas about materials shared by their peers or the instructor. Students may also choose to present their materials in class. Extra credit

may be awarded for: sharing relevant safety-related materials, providing meaningful insights in Canvas discussions or in class, and presenting materials during class. Students may earn up to 0.5 points per lecture if their contributions are relevant and enhance class discussions, with a maximum of 3.0 points for the entire semester. These extra credit points can be applied toward offsetting lost points from assignments, the semester project, or exams.

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

Breakdown	
Homework	25%
Midterm Exam	25%
Semester Project	25%
Final Exam	25%

The ranges for final letter grades are as follows:
A = 90-100%
B+ = 85-89%
B = 80-84%
C+ = 75-79%
C = 70-74%
D = 60-69%
F < 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.

AI statement: The use of artificial intelligence (AI) is permitted in this course only when explicitly stated in assignments. If students use AI for any course-related work, they must cite it according to the guidelines provided on the **NJIT Library AI Citation page**. If you have any questions about AI use in this course, please contact the course instructor before submitting any assignments. In cases where AI use is not allowed, students are expected to complete work without AI assistance to develop their skills in this subject area.

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) 5963414. 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:

Date	Topic	Assignments / Notes
09/05/2025	Introductions / Syllabus / Integrity Loads on Temporary Structures	Assignment # 0 Posted (optional)
09/12/2025	Forms & Formwork Part I (Walls)	Assignment # 0 Due (optional) Assignment # 1 Posted
09/19/2025	Forms & Formwork Part II (Walls)	Assignment # 1 Due Assignment # 2 Posted
09/26/2025	Forms & Formwork Part III (Slabs)	
10/03/2025	Temporary Roads and Bridges Construction Safety & Best Practices	Assignment # 2 Due Assignment # 3 Posted
10/10/2025	Midterm Review	Assignment # 3 Due Semester Project Posted
10/17/2025	MIDTERM EXAM	
10/24/2025	Scaffolding	Assignment # 4 Posted
10/31/2025	Sheet Piling Slopes, Excavations, Walls	Assignment # 4 Due
11/07/2025	Coffer Dams & Dewatering Underpinning	
11/14/2025	Semester Project Presentations	Semester Project Presentations Due
11/21/2025	Tie Back Walls	Semester Project Reports Due Assignment # 5 Posted
11/28/2025	NO CLASS	
12/05/2025	Final Exam Review	Assignment # 5 Due
12/12/2025	READING DAY	
TBD	FINAL EXAM	Please refer to the official NJIT exam schedule for the final exam date/time (https://www.njit.edu/registrar/exams)

Course Objectives Matrix – CEE 414 – 001

Strategies and Actions	Course Student Learning Outcomes	**Student Outcomes (1-7)**	Program Educational Objectives	Assessment Methods/Metrics
Course Objective 1: Determine loading on temporary construction structures.				
Review loading, live load, dead load, concrete, soil, water	1, 2	1, 2	1	Homework, semester project, and exams
Course Objective 2: Design various types of support and temporary structures.				
Determine the earth pressure and loading for various soil conditions	1, 2	1, 2	1	Homework, semester project, and exams
Design support members for buildings and civil infrastructure	1, 2	1, 2	1	Homework, semester project, and exams
Course Objective 3: Discuss and review construction safety practices for temporary structures.				
Review OSHA 1926	4, 7	4, 7	1	Class discussions, homework, semester project, and exams

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 scholarships among our faculty and students
- to promote service to the engineering profession and society

Program Educational Objectives

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

1. **Engineering Practice:** Alumni will successfully engage in the ethical practice of civil engineering within industry, government, and private practice, working towards safe, practical, resilient and 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 academia, 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.

Student Outcomes

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 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 conclusion
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated 8/2025