

Syracuse University
College of Engineering and Computer Science
Department of Civil and Environmental Engineering

CEE 475 CIVIL AND ENVIRONMENTAL ENGINEERING DESIGN

SPRING 2027¹

Meetings: M & W 12:45 - 2:05 pm, 369 Link Hall
Meetings: F 12:45 - 3:30 pm, 369 or 160 Link Hall

CATALOG DESCRIPTION

Capstone design experience. Fundamental principles in various areas of civil and environmental engineering applied to open-ended design projects. Economics, safety, reliability, environmental, sustainability, ethical and social considerations. **Senior Standing.**²

INSTRUCTORS

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Open door policy/by appt

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TEACHING ASSISTANT

TBD
Email: TBD
Office hours: TBD

REQUIRED TEXTBOOK

None. All course-specific instructional materials will be provided by instructors. **You will also learn so much from your peers and industry mentors in a group setting through individual and group learning.**³

¹ I utilized what I've learned from 2026 CTLE Course Redesign Institute to revise this syllabus for future semesters to mainly refine on the following three aspects: 1) to be more student-centered; 2) to be more approachable, encouraging, and enthusiastic; and 3) to offer early and midterm feedback on teaching and learning. Noted on 5/14/2026.

² "Senior standing" needs to be added to Course Catalog.

³ I've added this language so that students will know the nature of senior design regarding the need of learning new knowledges to provide sound and technical solutions of a senior design project.

OPTIONAL REFERENCES

1. AASHTO LRFD Bridge Design Specifications (9th Edition, 2020)
<https://store.transportation.org/Item/CollectionDetail?ID=202>
2. AASHTO Policy on Geometric Design of Highways and Streets (7th Edition, 2018)
<https://store.transportation.org/Item/CollectionDetail?ID=180>
3. ACI 318-24: Building Code Requirements for Structural Concrete and Commentary (2024)
<https://www.concrete.org/store/productdetail.aspx?ItemID=318U19>
4. TMS 402/602: Building Code Requirements and Specification for Masonry Structures (2022)
<https://masonrysociety.org/product-category/tms-402-602/>
5. AISC Steel Construction Manual 15th Edition
<https://www.aisc.org/Steel-Construction-Manual-15th-Ed-Print>
6. ASCE 7-22: Minimum Design Loads and Associated Criteria for Buildings and Other Structures (2022)
<https://sp360.asce.org/PersonifyEbusiness/Merchandise/Product-Details/productId/276865145>
7. NDS 2024: National Design Specification for Wood Construction (2024)
8. C.T. Brusaw, W.E. Oliu and G.J. Alred, Handbook of Technical Writing, 10th ed. 2011, St Martins Press. ISBN-13: 9781250004413

COURSE OBJECTIVES⁴

The primary objectives of this course are to:

- A. Develop the ability to formulate and design an engineering project to meet **desired needs within realistic constraints**;
- B. Develop the ability to work on a team to accomplish a design project;
- C. Develop the ability to communicate effectively **with a range of audiences**;
- D. Develop an understanding of professional, economic and ethical issues in engineering;
- E. Develop **the ability to acquire and apply new knowledge**.

COURSE OUTCOMES⁵

At the completion of the class, each student should be able to:

1. Identify, formulate, and solve **complex** engineering problems. [ABET Student Outcome 1] [†]
2. Apply knowledge of engineering, science, and mathematics to **an engineering design project**. [ABET Student Outcome 1] [†]
3. Design a system, component, or process to meet desired needs within realistic constraints. [ABET Student Outcome 2] [†]
4. Communicate effectively **with a range of audiences**. [ABET Student Outcome 3] [†]

⁴ I revised Course Objectives as noted in red to be better streamlined with ABET Student Outcomes.

⁵ I revised Course Outcomes as noted in red to be better streamlined with ABET Student Outcomes. Two previous outcomes were deleted as those outcomes didn't align with ABET SOs anymore.

5. Develop an understanding of professionalism and ethical responsibility. [ABET Student Outcome 4] [†]
6. Develop a broad understanding of the impact of engineering solutions in a global, economic, environmental and societal context. [ABET Student Outcome 4] [†]
7. Function on a multidisciplinary team **with leadership and collaboration**. [ABET Student Outcome 5] [†]
8. Analyze and interpret data, **and use engineering judgment to draw conclusions**. [ABET Student Outcome 6] [†]
9. **Acquire and apply new knowledge of** techniques, skills, and **industry standard** engineering tools necessary for engineering practice. [ABET Student Outcome 7] [†]

[†] The Accreditation Board for Engineering and Technology (ABET), which accredits engineering programs in the U.S., has established the following objectives for undergraduate engineering programs:

Engineering programs must demonstrate that their graduates have:

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.

SHARED COMPETENCIES⁶

Critical and Creative Thinking; Scientific Inquiry and Research Skills; Communication Skills

POLICIES AND PROCEDURES⁷

⁶ Shared Competencies are added to reflect institutional effectiveness.

⁷ Some languages in this section have been warmed up as noted in red or deleted to be more inclusive and inviting.

1. Blackboard and Email: A Blackboard course site has been created for this class and can be accessed at <http://blackboard.syr.edu/>. You are **invited** to check the course site regularly for announcements, assignments, and additional resources. Instructors will make announcements via both Blackboard and your SU email account, which you are also **invited** to check regularly.

2. Use of Electronic Devices: The use of laptop computers is essential in this class. Please bring your laptop computers to class every time. Usage of social media is also encouraged. Please feel free to hashtag syracuse.CEE on Instagram about any course activities you and your group have for CEE 475. You are also invited to follow and hashtag instructors' LinkedIn pages for course related activities: [Yilei Shi](#) and [Andria Costello Staniec](#).

3. Project Deliverables: Group and individual project deliverables will be assigned during the semester. Deliverables are due at the beginning of the class on the scheduled due date. Assignment and due date will be posted on Blackboard and announced in class. **Try all your best to submit on time.** If you need an extension on a particular deliverable due date, please contact your specific instructor as soon as you are able to. **However, instructors can't extend the deadlines for your work-related deliverables after graduation!**

4. Exams: There will be no exams. Student performance is evaluated through a series of **progressive and scaffolding** measurements. See Tentative Schedule section.

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

Task	Topic	Due in Week	Group Work	Individual Work	Evaluator	Weight
Assignment 1	Letter of Interest	2	x		TA	2.5%
Assignment 2	Client Meeting Documentations	4	x		TA	2.5%
Assignment 3	Project Proposal	6	x		TA	10%
Assignment 4	Midterm Member Evaluation	8		x	TA	5%
Assignment 5	60% Project Poster	10	x		TA	5%
Assignment 6	60% Project Report	12	x		TA/F	15%
Assignment 7	Abstract and Figures	14	x		F	2.5%
Assignment 8	Final Project Poster	15	x		F/IP	5%
Assignment 9	Final Project Report	16	x		F	15%
Assignment 10	Electronic Database	16	x		F	2.5%
Assignment 11	Final Member Evaluation	16		x	TA	5%
Intermittent Assignments	Presentation 1		x		TA/F	5%
	Presentation 2		x		TA/F	5%
	Final Presentation		x		F/IP	5%
				x	F/IP	5%
	Participation & Professionalism			x	TA/F	10%
Group Work Weight						75%
Individual Work Weight						25%
TOTAL						100%

F: Faculty
IP: Industry Practitioner
TA: Teaching Assistant

Grading Scheme:

A	93-100%	C+	77-79.99%
A-	90-92.99%	C	73-76.99%
B+	87-89.99%	C-	70-72.99%
B	83-86.99%	D	60-69.99%
B-	80-82.99%	F	Below 60%

Grades will not be curved in this course.

6. Academic Integrity: Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. Syracuse University students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level.

7. Students with Disabilities: Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. My goal as your instructor is to create learning environments that are useable, equitable, inclusive and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, I invite you to meet with me to discuss additional strategies beyond accommodations that may be helpful to your success. If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS) located at 804 University Avenue, third floor or go to the ODS website at disabilityservices.syr.edu and click current students tab to register on-line. You may also call 315.443.4498 to speak to someone regarding specific access needs. ODS is responsible for coordinating disability-related accommodations and will issue 'Accommodation Letters' to students as appropriate. Since accommodations may require early planning and are not provided retroactively, please contact ODS as soon as possible.

8. Faith Tradition Observances: Syracuse University's religious observances policy, found at http://supolicies.syr.edu/emp_ben/religious_observance.htm, recognizes the diversity of faiths represented in the campus community and protects the rights of students, faculty, and

staff to observe religious holy days according to their tradition. Under the policy, students should have an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors no later than the end of the second week of classes for regular session classes and by the submission deadline for flexibility formatted classes. Student deadlines are posted in MySlice under Student Services/Enrollment/My Religious Observances/Add a Notification.

9. Participation and Professionalism: The success of this course heavily relies on equal and adequate contribution of all team members to the group project. It is essential that you attend and participate all course activities. Only university/college approved absences will be accommodated for missing work. Each one of the unexcused non-participations of individual members for group work will lead to 2% less on final weighted score. **Five unexcused non-participations of individual members for group work will lead to 0% for the grade of Participation & Professionalism.**

10. Team Awards: CEE department will award at least three team awards after the final presentation. **The minimum eligibility requirement is that all team members are in good academic standing and team spirit.**

11. Artificial Intelligence Use: Applications of all generative-AI tools are prohibited for all the processes of project report and deliverables to clients in this course because their use inhibits achievement of the course objectives. However, the following activities are permissible to be aided by AI tools: researching, brainstorming, outlining, organizing, and polishing of project proposal and correspondences with Client. Do not use Generative-AI tools to create any other content. If no instructions are provided for a specific assignment, then no use of any artificial intelligence tool is permitted. Any AI use beyond that which is detailed in course assignments is explicitly prohibited except when documented permission is granted.

12. Special Notes: Instructors reserve the right to make changes to this syllabus as needed along the semester. Although any updated syllabus will be posted on Blackboard and notified by email, you are **invited** to check any announcements in addition to syllabus updates made in class regarding changes.

TENTATIVE SCHEDULES⁸

Unit 1: Week 1 - Week 4

Week	Day	Instructor in Charge	Assignment Due	Topics
1	1/11 M	Shi/Costello		Syllabus; Project Introductions
	1/13 W	Shi		Students rank preferred projects individually; What is a leader? Instructors and TA formalize teams
	1/15 F	Shi/Costello		Letter of Interest; Meet with your group; Correspondences to clients to set up a kick-off meeting time (1/23 - 1/28) (Meeting in Link 369)
2	1/18 M	MLK Holiday		
	1/20 W	Shi		Team Composition Agreement; Meeting 101
	1/22 F	Shi/Costello	Assignment 1: Letter of Interest	Client Meeting Documentations Client Meetings
3	1/25 M	Shi/Costello		Client Meetings
	1/27 W	Shi/Costello		Client Meetings
	1/29 F	Shi		Project Proposal (Meeting in Link 369)
4	2/1 M	Guest Speaker 1		TBD
	2/3 W	Costello		Teamwork in Class; Meet with Dr. Costello (Groups 1 - 5)
	2/5 F	Costello/Guest Lecture	Assignment 2: Client Meeting Documentations	Project Management (Meeting in Link 160)

⁸ All course contents need to be coordinated with Chair to be in accordance with CEE 400 in fall 2026.

Unit 2 Schedules: Week 5 - Week 8

Week	Day	Instructor in Charge	Assignment Due	Topics
5	2/8 M	Shi		Feasibility Study Process
	2/10 W	Costello		Teamwork in Class; Meet with Dr. Costello (Groups 6 - 10)
	2/12 F	Shi		Project Flowchart (Meeting in Link 160)
6	2/15 M	Costello/Bedros Keushkerian	Assignment 3: Project Proposal	Engineering Ethics
	2/17 W	Costello		Teamwork in Class; Meet with Dr. Costello (Groups 1 - 5)
	2/19 F	Shi		Written Reports: Expanding Project Proposal to Project Report (Meeting in Link 369)
7	2/22 M	Guest Speaker 2		TBD
	2/24 W	Costello		Teamwork in Class; Meet with Dr. Costello (Groups 6 - 10)
	2/26 F	Shi/Costello		Oral Presentations of Project Proposal (Meeting in Link 160)
8	3/1 M	Shi	Assignment 4: Midterm Member Evaluations	Project Poster
	3/3 W	Shi		Career Services Talk
	3/5 F	Shi/Costello		Oral Presentations of Project Proposal (Meeting in Link 160)

Unit 3 Schedules: Week 9 - Week 12

Week	Day	Instructor in Charge	Assignment Due	Topics
9	3/8 M	Spring Break		
	3/10 W			
	3/12 F			
10	3/15 M	Shi		Written Reports: Executive Summary, Abstract and Figures
	3/17 W	Costello	Assignment 5: 60% Project Poster	Teamwork in Class; Meet with Dr. Costello (Groups 1 - 5)
	3/19 F	Shi/Costello		Midterm Client Meetings
11	3/22 M	Shi/Costello		Midterm Client Meetings
	3/24 W	Shi/Costello		Midterm Client Meetings
	3/26 F	Shi/Costello		Oral Presentations of Project Design: (Groups 1 - 5) Meeting in Link 160
12	3/29 M	Shi	Assignment 6: 60% Project Report	Feedback on 60% Project Poster; Selected groups notified to present at ECS Open House on Saturday, 4/11/26
	3/31 W	Costello		Teamwork in Class; Meet with Dr. Costello (Groups 6 - 10)
	4/2 F	Shi/Costello		Oral Presentations of Project Design: (Groups 6 - 10) Meeting in Link 160

Unit 4 Schedules: Week 13 - Week 16

Week	Day	Instructor in Charge	Assignment Due	Topics
13	4/5 M	Guest Speaker 3		TBD
	4/7 W	Costello		Teamwork in Class; Meet with Dr. Costello (Groups 1 - 5)
	4/9 F			Student Wellness Day (No Class-wise Meetings)
	4/10 S			Selected Groups to Present Project Poster at ECS Open House *
14	4/12 M	Shi	Assignment 7: Abstract and Figures	Feedback on 60% Project Report
	4/14 W	Costello		Teamwork in Class; Meet with Dr. Costello (Groups 6 - 10)
	4/16 F	Shi/Costello		Dress Rehearsal (Groups 1 - 5) Meeting in Link 160
15	4/19 M	Guest Speaker 4	Assignment 8: Final Project Poster	TBD
	4/21 W	Shi		Teamwork in Class
	4/23 F	Shi/Costello		Dress Rehearsal (Groups 6 - 10) Meeting in Link 160
16	4/26 M	Shi		Teamwork in Class
	4/27 T	Costello/Shi		Final Presentation Day 160 Link Hall (9:00 am - 4:00 pm)
	4/30 F	Costello/Shi	Assignments 9 - 11: Final Project Report, Electronic Database, and Final Member Evaluations	Final Project Report and Final Member Evaluations Submitted on Blackboard; Electronic Database archived in a provided flash drive submitted to CEE front desk or Drs. Costello/Shi's Offices/Mailboxes by 4 pm.

* The College of Engineering and Computer Science Admissions Office is hosting an Open House for prospective students (high school juniors and seniors) on Saturday, April 10. Selected senior design teams are invited to talk to prospective students about their design projects with posters from 10:45 a.m. to 12:30 p.m. on this date. Lunch will be provided.