

# CE 4188: Senior Design I

## Department of Civil Engineering

### General Information

Instructors:	Jeffrey Weidner, Ph.D. Office: A-222 Lab: E-214 Office Phone: (915)-747-6913 Cell Phone: (215) 292-4830 Email: <a href="mailto:jweidner@utep.edu">jweidner@utep.edu</a> Office Hours: To Be Determined By appointment – Schedule at <a href="http://www.jeffreyweidner.com/schedule">www.jeffreyweidner.com/schedule</a>
	Adeeba Raheem, Ph.D. Office: A-213 Office Phone: (915)-747-6348 Email: <a href="mailto:aarahmeem@utep.edu">aarahmeem@utep.edu</a> Office Hours: To Be Determined
Meeting Time and Location:	There is no weekly assigned meeting time. We will schedule a couple of online full-class sessions (see below) but most work will be asynchronous or video chat in smaller groups. Meeting #1: Friday August 28, 8:30AM to 9:20AM Meeting #2: Friday September 25 – 8:30 AM to 9:20AM Meeting #3: Friday October 23 – 8:30AM to 9:20AM Meeting #4: Friday November 20 – Presentations - Time TBD
Final Exam:	None
Course Description:	ABET Requirements: Students must be prepared for engineering practice through a curriculum culminating in a <i>major design experience</i> based on the <i>knowledge and skills acquired in earlier course work</i> and incorporating <i>appropriate engineering standards</i> and <i>multiple realistic constraints</i> .
Expectations:	Instructor Expectations: From us, you can expect the following: <ul style="list-style-type: none"><li>• We will treat all teams and individuals respectfully and equitably</li><li>• We will adhere to this syllabus</li><li>• We will assign you the grade that you earn</li><li>• We will provide minor instruction on very specific topics as needed</li><li>• We will provide access to resources to support your project through the Resource Library</li></ul>

- We will not teach material that should have been covered in a prior course, regardless of how well you felt it was taught, or how well you learned it
- We will make ourselves available to attempt to address issues that may arise via office hours appointments
- Dr. Weidner will respond within 12 hours to emails and Teams messages
- We will not be expected to reply to students immediately

Student Expectations: From you, we expect the following:

- You will treat us, the other teams, and your teammates with respect
- You will act in a professional manner at all times
- You will adhere to this syllabus and to your team agreement
- You will apply the knowledge to which you previously should have been exposed.
- You will work to learn new skills as needed in a self-guided manner.
- You will treat our time as valuable, scheduling meetings in advance and coming prepared to ask questions and present proposed solutions
- You will take personal responsibility for the success of your project

Class Approach:

*Projects and Team Formation:* For this cohort, you will form your own team and select your own project. We elected to adopt this model because of the COVID19 pandemic and the associated challenges with interacting with industry mentors on externally sponsored projects. You will select your own team for this project. You should have between four and six members. More than six or less than four members will not be permitted. If you need assistance finding a team, please let the instructors know and we will assist.

The theme for projects this year will be centered on improving the UTEP Campus. The project that you propose has to fit that theme, and it must be of a large enough scope to meet the requirements of Senior Design at UTEP and our accreditation board, ABET, listed above in the course description. Your project is your decision. You should be able to craft a project that focuses on your area of interest, if you prefer to focus in more depth on one area (e.g., stormwater or transportation design). Conversely, if you want a traditional senior design experience, focus on a building project, which will cover most aspects of civil engineering. Here are a few examples that you may consider:

- A pedestrian bridge over the arroyo between COBA and the courtyard between CCSB and Engineering
- Net-zero energy innovations across campus to improve building energy efficiency
- A new building of whatever type you feel would benefit the campus
- A campus-wide design to remove all vehicles inside the campus (e.g., Rim Road all Inner Campus parking lots are replaced)

- Distributed green infrastructure (similar to that around Centennial Plaza) that would help with stormwater issues like the flooding that occurs on Rim Road adjacent to the Schuster Garage whenever it rains
- New student housing facilities
- Pedestrian improvements between outer campus lots and main campus
- A retractable roof for the Sun Bowl (Good luck)

*Teamwork:* In order to meet ABET requirements, Senior Design should prepare you for engineering practice. Unless you are practicing as an engineer on your own (which is impossible prior to full licensure), you will be working in teams. Working successfully in a collaborative environment requires trust and patience in the face of pressure and time constraints. To encourage you explore and understand this dynamic, your deliverables will be graded as a team, not on an individual basis. That said, we understand that it is not uncommon for some team members to carry more of the load than others. This is a graded assignment that reflects personally on your individual performances within your team. As such, there will be a peer evaluation to reflect on each individual's performance within your team, including your own.

*Team Agreement:* To provide context for these peer evaluations, you will be required to create and sign a team agreement. This agreement will specifically address the following items:

- Scheduled meeting times
- Communication plans
- Resource plan
- Documentation plan
- Grievance plan

This agreement and the products from it should be available to us if we feel they are required to address any issues that arise.

*Deliverables:* There are three primary deliverables for this class which will be graded. They are the report, site plan, and presentation. These are the foundation for the final deliverables you will submit in Senior Design II. You should make progress on each primary deliverable throughout the term. ***You are responsible, as a team, for providing updates to the instructors on your progress on your deliverables.*** We will provide feedback in as timely a fashion as possible. In the middle of the term, you will turn in a midterm progress report which we will evaluate and will include in your grade.

Professionalism and appearance are important to deliverables but will only be evaluated as part of the end-of-term submission. When assumptions are required, they must be clearly stated and justified in your final deliverables.

Lecture Format – Working Sessions: Since this course does not have a prescribed lecture period, we are utilizing a couple of defined windows of instructor

availability as an opportunity for us to interact via video conference on Microsoft Teams and address issues that are arising within your team and your project. These working sessions are effectively Office Hours and you should take advantage of the time. ***In addition, we are requiring each group to schedule a biweekly meeting with at least one instructor.***

We will augment these Working Sessions and biweekly meetings with videos to present material that we believe will be beneficial for your project, or we will bring in guest speakers also via video.

As indicated by the ABET description, your design should be based on your knowledge and skills acquired in prior courses. We understand and hereby recognize that you have not learned everything in prior courses that you need to complete this design. ***You are expected to bridge that gap yourself by seeking out resources and guidance.*** See the resource library section for additional information.

Resource Library: To help bridge the gap between your existing coursework and the specific design challenges you are facing with this project, we have created a resource library on Blackboard. Here you will find information about design codes and specifications, software resources, textbooks, and local engineers who may be willing to serve as a mentor or advisor. There is guidance for citing references and resources of which you may use.

Continuing  
Education Units:

This term, as we are working remotely and are in the midst of a pandemic, we are requiring you to complete continuing education units or CEUs. When you are a professional engineer, you will be required to obtain CEUs to keep your license. In practice, you obtain these CEUs by attending conferences, workshops, webinars, lunch and learns, and various other activities through which you are exposed to new research, technologies, and techniques. There are many national and regional conferences that are now online, some of which are free or very affordable for students. A list of potential activities and their associated CEUs is available on Blackboard. If you have another event you would like to suggest, please send it to Dr. Weidner.

Innovation Option:

Dr. Weidner and Dr. Raheem are part of a program called I-Corps from the National Science Foundation. I-Corps provides students an opportunity to learn through experience about product development, customer discovery, and entrepreneurship. We want you to consider if there is some aspect of your project that could be solved through an innovative and potentially commercial solution. Past projects from this course included piezoelectric sidewalk panels that harvest energy as pedestrians walk on them, a bridge wait time app for border crossing, and concrete reinforced with recycled plastic. Pursuing I-Corps will take time beyond this class, but provide opportunities for conferences, participation in the national I-Corps program, and potentially for

startup funding from NSF for your product. You may leave UTEP as the CEO of a startup company.

Course Objectives: By the end of this two-course sequence you should:

1. Describe the design process for a realistic civil engineering project.
2. Produce professional-quality engineering drawings
3. Produce a professional-quality engineering report
4. Produce representative professional quality design calculations
5. Demonstrate professional quality presentation skills
6. Use engineering software tools to aid in civil engineering design
7. Interact with local practitioners to get mentoring and support
8. Describe the role of sustainability in civil engineering design

## Class Policies

Honor Code: Civil Engineering students are expected to adhere to the Honor Code of the Department of Civil Engineering, which can be found here (<http://ce.utep.edu/honorcode.htm>). This statement is consistent with the [UTEP Handbook of Operating Procedures](#). Academic dishonesty includes but is not limited to plagiarism, cheating, and collusion. Under no circumstances should any design work be completed by anyone outside of your team. Additionally, under no circumstances should a practicing mentor be compensated for their time or assistance. All suspected violations must be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action.

Attendance Policy: We do not take attendance during working sessions for the purposes of a grade.

Neatness Policy: By this stage in your educational career, you should be submitting work that is neat and professional. We reserve the right to return work unreviewed if we deem it unprofessional. Resubmitted work will be considered late.

Accommodations: The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#).

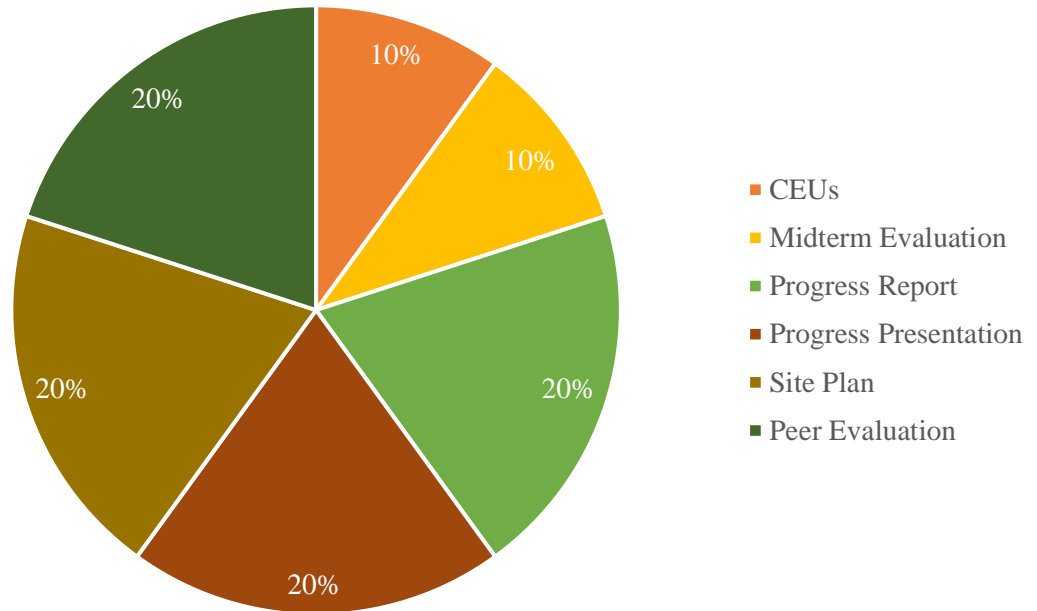
Technology Requirements: The course material will be delivered through and stored on Blackboard. Discussions will occur on Blackboard, and assignments will be assigned, submitted, and graded within Blackboard. [Microsoft Teams](#) will be used for communication. This software is provided for free by UTEP. Please download and install Teams. I will invite you to join the course using your UTEP email. Be sure to check that notifications are set up properly in Blackboard and Teams so that you do not miss any important communications. We will not use a personal email address in this course.

You will need access to a computer for this course. To interact in Office Hours, you will need access to video chat capabilities (webcam, microphone). To submit handwritten homework, you will need a scanner, or a scanning app on your phone. To make use of many UTEP software off campus, you will need [VPN access](#) set up on your computer. The [ETC Helpdesk](#) can support you in terms of technology requirements and [VPN access](#).

UTEP can provide support or technology assistance as required. Please see [Technology Services](#) for access to computer, internet connectivity, and other technology-related support issues to facilitate remote learning during the Pandemic.

## Coursework and Grading Expectations

Grading: Grade Breakdown:



Final Grade  $A \geq 89.5$   
Thresholds:  $89.5 > B \geq 79.5$   
 $79.5 > C \geq 69.5$   
 $69.5 > D \geq 59.5$   
 $59.5 > F$

Exams: There are no exams in this course.

Homework: There is no homework in this course.