

# Syllabus

## Course Information

Course Number: CSCE 482, Spring 2022  
Course Title: Senior Capstone Design  
Section: 931  
Time: Monday and Wednesday  
11:35 AM to 11:55 AM Lecture  
12:00 to 2:30 PM Lab  
Location: EABA 118  
Credit Hours: 3

## Instructor Details

Instructor: Rabi Mahapatra  
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Phone: 979-845-5787  
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Website: <https://codes.engr.tamu.edu/rabi/>  
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TA: Krishna C Kushal  
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Office hours: By appointment

## Course Description

Engineering design; working as a design-team member, conceptual design methodology, design evaluations, total project planning and management techniques, design optimization, systems manufacturing costs considerations; emphasis placed upon student's activities as design professionals.

CSCE 482(the capstone design program) consists of the design and implementation of a system (capstone design project) based on the knowledge and skills acquired in earlier course work with significant computer software.

CSCE 482 is a project-oriented course aimed at developing system integration skills. Students work in groups of 4-5 people to complete a significant engineering design project. Every project requires complete implementation, documentation and demonstration of a software system, which may also involve minor hardware too. The focus is not only on the final product but also on design methodology, management process and teamwork.

Each team is required to manage its own efforts to complete its project in a timely manner. Group members are required to keep individual lab notebooks recording their efforts and their personal impressions of the project. Students are graded based on both the quality of the group product and their individual contributions.

Every team is required to schedule a weekly meeting with the course instructor and the TAs, preferably

during the official class or lab hours. These meetings must be attended by every group member. Since the projects will be student managed, the exact nature and style of these meetings is at the group's discretion. **However, every member of the group is expected to participate.**

At the end of the semester, each group will make a public presentation describing and demonstrating their work. These presentations are open to the university community.

## Course Prerequisites

Senior classification; CSCE 315, CSCE 411, and two additional CSCE tracked courses.

## Special Course Designation

Fulfills a writing/communication requirement for graduation. As a result, the aggregate score of the written reports must be a passing grade in order to get a grade in the course.

## Course Learning Outcomes

It is expected that successful participation in the course will allow the student to demonstrate:

- an ability to apply knowledge of mathematics, science, and engineering (3.a)
- an ability to design and conduct experiments, as well as to analyze and interpret data (3.b)
- an ability to design a system, component, or process to meet desired needs (3.c)
- an ability to function on multi-disciplinary teams (3.d)
- an ability to identify, formulate, and solve engineering problems (3.e)
- an understanding of professional and ethical responsibility (3.f)
- an ability to communicate effectively (3.g)
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (3.k)

Moreover, course-specific outcomes are

1. understand and utilize the engineering design method to generate potential solutions to a specific design challenge;
2. understand the basic of project management including: statements of work, work break-down structures, critical path identification, distribution of tasks, project tracking and status reporting; be able to generate status reports;
3. understand professional communication methods and techniques including formal reports and presentations;
4. clearly communicate ideas, status and test results through written reports;
5. clearly communicate through oral presentations.
6. to rigorously define design requirements for potential solutions.
7. Understand and incorporate engineering standards and multiple realistic constraints that include most of the following considerations: economic, environmental, sustainability, manufacturability, ethical, health and safety, social and political.

## Textbook and/or Resource Materials

Required:

Patric M. Lencioni, 2002, "The Five Dysfunctions of a Team: a Leadership Fable" Jossey-Bass.  
(Electronic copy available to all via the library.)

Recommended:

Ralph Ford and Chris Coulston, 2007, "Design for Electrical and Computer Engineers," McGraw-Hill Education.

Barry Hyman, 2003, "Fundamentals of Engineering Design," second edition, Prentice Hall.

Roger Pressman, 2009, "Software Engineering: A Practitioner's Approach," seventh edition, McGraw-Hill.

James Shore, 2007, "The Art of Agile Development," O'Reilly (Electronic copy available to all via the library.)

Supplemental:

Technical material from the literature, manufacturer's data sheets and user manuals.

## Grading Policy

The final grade you will receive in the class will be based on points accumulated during the semester. Thus, both continued progress (the process) and the quality of your product (and other deliverables) will determine your grade. Although the bulk of your grade is based on the performance of your team, individual performance will also be gauged.

1. **Project Proposal (10%):** These points will be based on the originality, quality and feasibility of the proposed work, the analysis of alternative solutions, the consideration of economic and societal aspects, and the project management approach, as reflected on your written proposal (75%) and oral presentation (25%). A template for the proposal report and a presentation rubric are available on the course webpage.
2. **Weekly Progress (10%):** This grade will be based on your team's ability to maintain the project on schedule. Each team submits a weekly report, which should be incremental and should specifically address the following:
  1. Agenda for the weekly meeting with the instructor and the TA
  2. Team's accomplishments during this period. Accomplishments need to be measurable, e.g. "did more research on such and such" is not an accomplishment, it is an activity (and a loosely defined one).
  3. Team's goals for the following week (individual tasks are entered on basecamp)
  4. Minutes from the previous meeting

Weekly progress reports are due at 8AM on the day of the weekly meeting. Reports are limited to one page and should be submitted according to the template provided in the course website. The team leader will be responsible for submitting these reports and leading the discussion during the weekly meeting. One of the team members, acting as a scribe, will be responsible for generating the meeting minutes throughout the semester.

3. **Critical Design Review (10%):** The CDR is a mid-semester evaluation of your project. The CDR grade will be based on the quality of your design (75%) –as reflected on your oral/poster presentation and written report, and on the degree to which you have a complete design (25%). A template for the CDR report and a presentation rubric are available on the course webpage.
4. **Final Communication (10%):** This grade will be based on the quality of the final presentation (25%), as well as the contents and professional finish of the documentation (75%). Final reports should have a discussion of constraints that the team had to satisfy (e.g., cost, time, technology limitations) and

of relevant industry standards used (e.g., coding, interfaces, safety). A template for the final report and a presentation rubric are available on the course webpage.

**5. Project Grade (20%):** A final grade will be assigned to your project based on the completion of all the objectives stated in the proposal, as well as on a live demonstration in front of the class. The complexity of your project and the size of your team will be factored in.

Due date: Project demonstrations will take place the last day of class of the week prior to final presentations. This earlier deadline ensures that teams have time to (i) thoroughly test and validate their systems after the demo, and (ii) prepare the final presentation.

**6. Team work (10%):** It is very important to understand that accomplishing the technical objectives of the project is not sufficient. These accomplishments should not come at the expense of destroying relationships among team members. Thus, a grade will be assigned based on the ability of the group to function as a team. Is there evidence that the group engaged in team building activities? Were contributions to the project evenly distributed? Were members equally engaged in discussions during meetings? Was there an effective division of responsibilities?

Note: the work should be done primarily in the lab and as a group, regardless of whether you can perform your task assignments individually elsewhere. Being physically present in the same room encourages collaboration and equal distribution of workload. A regular work schedule should be included in the proposal, showing the times when the team will meet in the lab to work on the project (in addition to meeting times).

**7. Individual Performance (30%):** Points in this category are awarded based on assessments of your personal contribution to the team efforts:

a. **Notebook (10%):** You are required to maintain an individual design notebook to collect any information relevant for the project, including ideas, references, designs, and discussions. Your notebook will be graded based on:

1. the evidence of engineering design (e.g., sketches, block diagrams, schematics, pseudo-code, experimental results, formal derivations),
2. the regularity of your entries during the semester, and
3. the organization of your notebook

b. **Participation (10%):** The instructor and TAs will evaluate your attendance to meetings, participation in the discussions, and contributions to the team. Each student is also required to pass a teamwork quiz with a score of 75 or higher (see tentative schedule); failure to do so will result in a 5% penalty on the final grade.

c. **Peer Review (10%):** Your performance will be evaluated by each of your team members throughout the semester. Peer reviews should be submitted to the TA no later than 8AM of the due date. Late submissions will NOT be accepted.

NOTE: Grades will not be assigned until all project deliverables have been turned in (see below), all borrowed items (e.g., keys, books, equipment) have been returned to their proper location or their owner, and the workstations in the lab have been thoroughly cleaned up. All team members are required to be present at the time of the final delivery.

#### **Final deliverables**

- USB Drive including the following (please organize into folders, e.g., Docs, Source, Hardware, Media, References, Freeware, etc.)
  - It should include a plain text readme file that documents the list of contents.
  - Designs: code, schematics, data, data sheets, freeware software tools, etc.

- Reports: proposal, CDR, weekly reports, final report, and ALL presentations
- Audiovisual media: close-up pictures of your system and a high-quality movie demo of the system working, for posterity (see gallery in the course webpage for movie samples)
- Individual notebooks (in digital form)
- Final prototype, as well as any spare parts and supplies
- Software install, to be demonstrated on several machines
- Peer reviews
- Evidence of individual design contributions

Final reports should have a discussion of constraints that the team had to satisfy (e.g., cost, time, technology limitations) and of relevant industry standards used (e.g., coding, interfaces, safety).

## Document preparation

All major documents (proposal, CDR, and final documentation) should contain a title page, an outline, as well as clear section and subsection headings, etc. Please use the templates available in the course website. Please run a spell check before submitting.

## Course Schedule

| Week | Date | Classroom Meeting      | Materials Due                  |
|------|------|------------------------|--------------------------------|
| 1    | 1/19 | Kickoff Lecture        | Introduction                   |
|      | 1/24 | Kickoff Lecture        | Resumes                        |
| 2    | 1/26 | Kickoff Lecture        | Teams are formed               |
|      | 2/02 | Kickoff Lecture        |                                |
| 3    | 2/07 | Kickoff Lecture        | Teamwork quiz                  |
|      | 2/09 | Kickoff Lecture        |                                |
| 4    | 2/14 |                        |                                |
|      | 2/16 | Proposal Presentations |                                |
| 5    | 2/21 | Proposal Presentations | Proposal report, peer review 1 |
|      | 2/23 |                        |                                |
| 6    | 2/28 |                        |                                |
|      | 3/02 |                        |                                |
| 7    | 3/07 |                        |                                |
|      | 3/09 |                        |                                |

|    |      |                     |                                    |
|----|------|---------------------|------------------------------------|
| 8  | 3/14 | Spring break        |                                    |
|    | 3/16 |                     |                                    |
| 9  | 3/21 | CDR Presentations   |                                    |
|    | 3/23 | CDR Presentation    | CDR report, Peer Review 2          |
| 10 | 3/28 |                     |                                    |
|    | 3/30 |                     |                                    |
| 11 | 4/04 |                     |                                    |
|    | 4/06 |                     |                                    |
| 12 | 4/11 |                     |                                    |
|    | 4/13 |                     |                                    |
| 13 | 4/18 |                     |                                    |
|    | 4/20 |                     | Peer review 3                      |
| 14 | 4/25 | Project Demos       |                                    |
|    | 4/27 | Project Demos       |                                    |
| 15 | 5/02 | Final Presentations | Final report, and all deliverables |
|    | 5/04 |                     |                                    |

## Optional Course Information Items

*Learning Resources* – The Writing Center is open and available to assist students this semester. They can provide assistance on the written reports that are due throughout the class (proposal, CDR, final report). More information can be found at <https://writingcenter.tamu.edu/>

## University Policies

### Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Not attending weekly meetings harms the other members of your group and makes it much more difficult for the instructor to assess your contributions to the group effort. Therefore, attendance, punctuality and active participation in the weekly meetings are required. Failure to attend a meeting or late arrivals (more than 10 minutes late) will be reflected in your individual grade. Emergencies,

however, do happen. Lateness or absence can be excused if there is a valid reason. Illness, death in the family, inclement weather or accidents for commuters, etc., are valid reasons. Oversleeping, a term paper due, an exam to cram for, etc., are not valid reasons. Ultimately, the instructor reserves the right to determine what constitutes a “valid reason” on a case-by-case basis. If you know you are going to be late or miss a class, please let the instructor and your teammates know, so that they may plan for your absence and make the best use of their time.

## Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student’s grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor” ([Student Rule 7, Section 7.4.1](#)).

“The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence” ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

## Academic Integrity Statement and Policy

“An Aggie does not lie, cheat or steal, or tolerate those who do.”

“Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one’s work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case” ([Section 20.1.2.3, Student Rule 20](#)).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at [aggiehonor.tamu.edu](http://aggiehonor.tamu.edu).

## Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit [disability.tamu.edu](http://disability.tamu.edu). Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

## Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, you will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services](#) (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's [Title IX webpage](#).

## Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at [suicidepreventionlifeline.org](https://suicidepreventionlifeline.org).

## COVID-19 Temporary Amendment to Minimum Syllabus Requirements

The Faculty Senate temporarily added the following statements to the minimum syllabus requirements in Spring 2022 as part of the university's COVID-19 response.

"To help protect Aggieland and stop the spread of COVID-19, Texas A&M University urges students to be vaccinated and to wear masks in classrooms and all other academic facilities on campus, including labs. Doing so exemplifies the Aggie Core Values of respect, leadership, integrity, and selfless service by putting community concerns above individual preferences. COVID-19 vaccines and masking — regardless of vaccination status — have been shown to be safe and effective at reducing spread to others, infection, hospitalization, and death."



PLEASE NOTE that general communications regarding COVID-19 policies, and how these will impact spring semester teaching, will be regularly updated on the following website: [www.tamu.edu/coronavirus/index.html](http://www.tamu.edu/coronavirus/index.html). Any information specific to COVID-19 response and management in classrooms will be shared in additional email communication.

### ***Personal Illness and Quarantine***

Students required to quarantine must participate in courses and course-related activities remotely and **must not attend face-to-face course activities**. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities.

Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence (See [Student Rule 7, Section 7.2.2.](#)) To receive an excused absence, students must comply with the documentation and notification guidelines outlined in Student Rule 7.

### ***Operational Details for Spring 2022 Courses***

For additional information, please review the [FAQ](#) on Spring 2022 courses at Texas A&M University.