IEE 485 Systems Design Capstone I
Course Syllabus

Instructor: Dr. Joe Juarez, 480-965-2835, joseph.juarez@asu.edu
Office Hours: Zoom Office Hours: W 6:00 PM – 7:00 PM beginning Aug. 25, 2021

Textbook: *A Guide to the Project Management Book of Knowledge (PMBOK Guide)* – Fifth Edition, available at ASU Library Online
Various articles and short papers.

Prerequisites: Must be a senior Engineering BS/BSE student and have completed ENG 101 and completed IEE 369 with a C or better. EM students must also have completed IEE 458 with a C or better. IE students must be enrolled or have completed IEE 475 and EM students must be enrolled or have completed IEE 477 with a C or better.

Course Description: This class, IEE 485, is the first of a two semester senior capstone project course; the second class is IEE 486. In IEE 485, students will select their capstone project, thoroughly plan the project, and prepare for the execution of the project which will be accomplished in IEE 486.

Learning Objectives: This engineering design experience is based on knowledge and skills acquired in earlier course work and incorporates appropriate engineering standards and multiple realistic constraints. Upon completing IEE 485, students will understand the requirements for defining a project, planning a project, creating a project schedule in Microsoft Project, establishing a budget, and writing project communications and controls to be applied during the execution phase of the project.

Topics: The following topics will be covered in class or by the sponsor:

- Academic honesty, plagiarism (throughout the semester)
- Innovation
- Project scope statement including project definition, goals, stakeholders, available resources, **applicable standards, and constraints**
- Project planning
- Microsoft Project
- Budget/cost control
- Project Risk Management
- Project execution
- Project control
- Technical communications
- Oral/written presentations
- Ethics

Industry Sponsors for On-Line Students

On-Line students are expected to find their own projects, mostly because they are employed and ask to have employers sponsor them; this also makes team meeting with internal team members more convenient. Some On-Line students will have a harder time finding their own projects for various reasons and have worked with you to find On-Line sponsors or if you are in the Phoenix Metropolitan area, you have been welcomed to work with Tempe student teams. By now, you should have a project well underway.

Most of our projects are sponsored by local industry partners. It is certainly a huge opportunity for students to work real world engineering projects with real engineering teams! Students will need to manage transportation to and from the sponsors. Several sponsors are within two or three miles of the Tempe campus; others are close to public transportation.

There is no obligation for the sponsor to pay students or ASU for the students' work on the project. Sponsors are providing the projects and support to enable our students to apply their new knowledge and skills to real engineering projects. Therefore, the work from the students for the sponsors is "free of charge".

Readings, Special Materials, Required Activities, Assignments, and Quizzes

Classes will consist of lecturing, active learning exercises, discussions, and presentations.

Assignments and class schedule will be posted on Canvas. Completed assignments will be posted to Canvas. Students are expected to put in at least 6 hours of work each week.

Students will continue on the same teams from IEE 485. Each student will have a defined role and set of responsibilities for the team, and will therefore be graded on these responsibilities.

Each team will give an interim executive overview presentations and a final project presentation. Each team member must write and present his/her own materials for these team presentation.

Each individual student will gather the semester team project assignments and accomplishments, interpret the learned outcomes, evaluate the results, lessons learned, and prepare an individual final essay. Each student will also write an interim and final peer review that also explains their own role and performance on the team.

Grading Policy

Final grades of each student will depend heavily on the results of their team members' peer reviews. A weight between 0 and 100% will be applied to the team assignments and final team presentation grade for each student based on their peer reviews. The approximate points for the work in this class are:

Team written assignments	250 points
Initial individual research report	200 points
Oral presentation	120 points
Individual written assignments	30 points
Sponsor Scorecards	400 points
Total	1000 points

Final grades will be based on the final point percentage:

90 to 100%	A
80 to <90%	B
70 to <80%	C
60 to <70%	D
<60	E

+/- grades are not given.

D, E, or W Grade in This Class

Students who receive a D or E grade in this class will be required to retake this class from the beginning, and find their own projects from their employer, non-profit organization, or another source. This project must meet the requirements for an engineering capstone project. These students will not be added to a team of students in their second attempt at this class. Students who withdraw from this class and receive a W grade because of poor team performance, poor individual performance, or poor performance as identified by the project sponsor will also be required to find their own project the next time they are enrolled. Students who withdraw and receive a W grade for documented medical issues, military obligations, first responder obligations, or reasons beyond their control, and had performed adequately prior to withdrawing, might be added to another student team the next time they enroll in this class.

ASU Policies Applied to This Course

1. Late or Missed Assignments

Accommodations will be made for religious observances provided that students notify the instructor at the beginning of the semester concerning those dates. Students who expect to miss class due to officially university-sanctioned activities should inform the instructor early in the semester. Alternative arrangements will generally be made for any examinations and other graded in-class work affected by such absences.

Notify the instructor BEFORE an assignment is due if an urgent situation arises and the assignment will not be submitted on time. Published assignment due dates (Arizona Mountain Standard time) are firm. Please follow the appropriate University policies to request an

accommodation for religious practices or to accommodate a missed assignment due to University-sanctioned activities.

Due dates for classwork are on the class schedule. All work is due on the scheduled date. Late work will not be graded, and you will receive a score of "0".

Make-up work is permitted in only four situations:

1. Required class absence due to university sanctioned events/activities (refer to ACD 304-02)
2. Religious observance (refer to ACD 304-04)
3. Death of an immediate family member (spouse, domestic partner, child, parent, sibling, or grandparent)
4. Severe illness or injury that requires hospitalization

You must provide verifiable documentation for all of the above situations. For (1) and (2), it is your responsibility to notify the Instructor at the beginning of the semester. For (3) and (4), the Instructor must be contacted as soon as possible. All make-up work must be completed within two weeks of the missed date. If you miss any classwork for any situation other than the four situations listed above, you will receive a score of "0."

2. Academic Integrity

All students in this class are subject to ASU's Academic Integrity Policy which is available at the following link:

https://provost.asu.edu/academic-integrity/policy

Students should acquaint themselves with its content and requirements, including a strict prohibition against plagiarism. All violations will be reported to the Dean's office, who maintain records of all offenses.

3. Disability Accommodations.

Suitable accommodations will be made for students having disabilities and students should notify the instructor as early as possible if they will require same. Such students must be registered with the Disability Resource Center and provide documentation to that effect.

4. Title IX Federal Law

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the

basis of sex or sexually assaulted, you can find information and resources at http://sexualviolenceprevention.asu.edu/faqs/students.

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, https://eoss.asu.edu/counseling, is available if you wish to discuss any concerns confidentially and privately.

5. Entrepreneurial Mindset

This Initiative is a Fulton Schools of Engineering wide effort being introduced to CIDSE IE/EM in Spring 2020. Assignments will have prefix designators throughout the rubric using the format EM@FSE (letter from a. through q.) These letters map to the expected considerations below.

The senior design program leans heavily on the *entrepreneurial mindset* (https://engineeringunleashed.com/), which goes beyond the concept of traditional entrepreneurship and "start-up" mentality to provide the best possible professional preparation for any job in engineering or a career that can be built on the combination of *engineering skillset* and *entrepreneurial mindset*. The core components of the entrepreneurial mindset are the 3C's: **Curiosity**, **Connections**, and **Creating Value**. In developing an understanding of these core components, students are expected to consider the following in the course of their project-based capstone:

a. Critically observes surroundings to recognize opportunity.
b. Explores multiple solution paths.
c. Gathers data to support and refute ideas,
d. Suspends initial judgement on new ideas.
e. Observes trends about the changing world with a future-focused orientation/ perspective.
f. Collects feedback and data from many customers and customer segments.
g. Applies technical skills/knowledge to the development of a technology/product.
h. Modifies an idea/product based on feedback.
i. Focuses on understanding the value proposition of a discovery.
j. Describes how a discovery could be scaled and/or sustained, using elements such as revenue streams, key partners, costs, and key resources.
k. Defines a market and market opportunities.
l. Engages in actions with the understanding that they have the potential to lead to both gains or losses.
m. Articulates the idea to diverse audiences.
n. Persuades why a discovery adds value from multiple perspectives (technological, societal, financial, environmental, etc.).
o. Understands how elements of an ecosystem are connected.
p. Identifies and works with individuals with complementary skill sets, expertise, etc.
q. Integrates/synthesizes different kinds of knowledge.