FSE100
Introduction to Engineering

About the Course

Course Description: Introduces the engineering design process; working in engineering teams; the profession of engineering; engineering models, written and oral technical communication skills.

This class introduces the practice and joy of engineering through the engineering design process and the entrepreneurial mindset. By engaging with engineering problems, students will practice and develop skills of curiosity about the world around them and their future, making connections between disparate fields and concepts, with a goal of creating extraordinary value for their customers and stakeholders.

Required Textbook: **None** (all required material will be provided online or in class)

Course Web Site: All documents (readings, videos, quizzes, projects, etc.) for this course will be available in the online content in Canvas. All students who are registered in this course will be able to access the course material in Canvas through ASU's portal. If you experience any difficulty accessing these materials, please let the instructor know as soon as possible.

Prerequisites: None

Learning Outcomes:

1. Students will work effectively as part of a design team to develop and demonstrate team norms and critique team effectiveness through peer evaluation.
2. Students will apply the steps of the engineering design process based on the analysis of customer needs to design, build, and test a physical or software prototype.
3. Students will apply customer focused design and the entrepreneurial mindset to create and evaluate design prototypes that will solve problems.
4. Students will use and select appropriate tools and technical skills to collect and analyze data from a variety of sources, to describe and predict the behavior of designs, and to justify design decisions based on appropriate models.
5. Students will write technical project reports and give oral/multimedia presentations about their designs which includes addressing the economic and societal value of those designs.
6. Students will apply project management skills such as scheduling, budgeting, and resource management to an engineering design.
7. Students will be able to identify their motivations, strengths, the entrepreneurial mindset, and contributions within the field of engineering and critique their own skills and understanding through self-reflection.

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ABET Outcomes to be Covered:

(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

(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

Entrepreneurial Mindset:

This course 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 elements, students are expected to consider the following EM@FSE indicators in the course:

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) Defines a market and market opportunities
k) Engages in actions with the understanding that they have the potential to lead to both gains and losses.
l) Articulates the idea to diverse audiences
m) Persuades why a discovery adds value from multiple perspectives (technological, societal, financial, environmental, etc.)
n) Understands how elements of an ecosystem are connected
o) Identifies and works with individuals with complementary skill sets, expertise, etc.
p) Integrates/synthesizes different kinds of knowledge

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Topics to Be Covered in Course (Tentative)

1. Teamwork
    a. 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
2. Requirements
3. Research
4. Project Management
    a. 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
5. Brainstorming
6. Modeling and Systems
7. Intro to MATLAB or P5*js programming
8. Critical Thinking Skills
9. Analysis
10. Simulation & Prototyping
11. Implementation & Testing
12. Presentation Skills

Assignments and Assessment (subject to change)

Individual work:

Quizzes	25%	(Weekly – prior to the session)
Peer Evaluations	5%	(Complete two peer evaluations)
In-Class Activities	5%	(Completed during the class sessions)

Team work:

Assembly Line Project Report	10%	(Weighted using the peer evaluation)
Master Project Milestones & Demo	30%	(Weighted using the peer evaluation)
Lab Work	30%	(Completed during the class sessions)

Late Submission Policy: No late submission will be accepted (except for verifiable emergencies).

Attendance

Attendance and participation in class activities is an essential part of the learning process, and students are expected to attend class regularly. Some absences are, however, unavoidable. Excused absences for classes will be given without penalty to the grade in the case of (1) a university-sanctioned event [ACD 304-02]; (2) religious holidays [ACD 304-04; a list can be found here https://eoss.asu.edu/cora/holidays]; (3) work performed in the line-of-duty according [SSM 201-18]; and (4) illness, quarantine or self-isolation related to illness as documented by a health professional.

Anticipated absences for university-sanctioned events, religious holidays, or line-of-duty activity should be communicated to the instructor by email at least 10 days before the expected absence.

Absences for illness, quarantine or self-isolation related to illness should be documented by a health professional and communicated to the instructor as soon as possible by email.

Excused absences do not relieve students from responsibility for any part of the course work required during the period of absence. Faculty will provide accommodations that may include participation in classes remotely, access to recordings of class activities, and make-up work.

In case you cannot attend class in person as a result of illness or possible exposure to infectious disease, you may participate in this class remotely via ASU Sync. To participate remotely, notify your instructor to receive a zoom link. Note that all students should bring a mobile device to class regularly to allow participation with colleagues via ASU Sync as necessary.

Recordings may be used to accommodate student absences.

If there is a disagreement as to whether an absence should be accommodated, the instructor and student should contact the academic unit chair immediately for resolution.

Grade Breakdown:

Percentage	Final Grade
>= 98%	A+
>= 89.6% and < 98%	A
>= 84.6% and < 89.6%	B+
>= 79.6% and < 84.6%	B
>= 74.6% and < 79.6%	C+
>= 69.6% and < 74.6%	C
>= 60% and < 69.6%	D
< 60%	E

Grading Appeals: Any discrepancy or disagreement in grading must be presented to the instructor by email **within one week** of your receipt of your graded materials; otherwise no grade change will be made.

Submission: All assignments will be submitted online using Canvas. No submissions by email will be accepted for any credit.

Late Submissions Policies: No late submissions are allowed for any activity on the course.

Policies

University Policies: All university and college policies concerning withdrawal deadlines, incomplete, audits, and other procedures are in effect for this course. All students are advised to be aware of and to carefully follow these guidelines.

Academic Integrity:
ASU expects and requires all students to act with honesty and integrity, and respect the rights of others in carrying out all academic assignments. Each student in this class is expected to abide by the ASU *Academic Integrity Policy* and *Student Code of Conduct*. Discussions are encouraged for assignments. However, individual assignments must be your own work. **Copying is not allowed**. Teamwork must be the original work of the team and each team member is expected to participate in the teamwork.

Team assignments are expected to be completed by ALL members of the team, although the details of how each member participates will be left up to the individuals in the team. **Zero credit** will be given to individuals who fail to contribute on team assignments.

You are encouraged to work with others on assignments. However, assignments denoted as **individual assignments** MUST be your own, original work. If you work with others on these assignments, you must acknowledge their help. Direct copying of others' assignments will result in an ***E or XE*** for this course. Cheating on exams will also result in an ***E or XE*** for this course. Any cheating will be reported to the ASU academic integrity office.

Students in this class must adhere to ASU's academic integrity policy, which can be found at https://provost.asu.edu/academic-integrity/policy). Students are responsible for reviewing this policy and understanding each of the areas in which academic dishonesty can occur. In addition, all engineering students are expected to adhere to both the ASU Academic Integrity Honor Code and the Fulton Schools of Engineering Honor Code. All academic integrity violations will be reported to the Fulton Schools of Engineering Academic Integrity Office (AIO). The AIO maintains record of all violations and has access to academic integrity violations committed in all other ASU college/schools.

Copyright
All course content and materials, including lectures (Zoom recorded lectures included), are copyrighted materials and students may not share outside the class, upload to online websites not approved by the instructor, sell, or distribute course content or notes taken during the conduct of the course (see ACD 304–06, "Commercial Note Taking Services" and ABOR Policy 5-308 F.14 for more information).

You must refrain from uploading to any course shell, discussion board, or website used by the course instructor or other course forum, material that is not the student's original work, unless the students first comply with all applicable copyright laws; faculty members reserve the right to delete materials on the grounds of suspected copyright infringement.

In general, the instructor believes learning is a collaborative activity - that students learn best when they work together - and that students should be encouraged to learn from and teach each other.

In completing the course projects, student team collaboration is encouraged and will be permitted as long as **each member of the team contributes equally to the work**. **Failure to abide by these rules will result in a score of zero being assigned to one or more members of the team** (i.e., if I have a reasonable hunch that one student did all of the work on a team Project and the other students simply put their name on it, then the student who did all of the work will receive the assignment score and the other students will be given a score of zero). **Collaboration on Individual assignments and quizzes are not permitted**; each Individual assignment and quiz must be completed by the individual student.

Participation

During **in-person** or **synchronous** online activities it is asked that you please put away all other distractions and focus on the discussion. Synchronous activities are designed to give you the opportunity to work live with the instructor and other students, so failure to stay focused will diminish your experience. There will be group activities that require your full attention, so for you and your teammates, please stay actively involved.

Professional and Ethical Behavior:

All students in this class are expected to treat others fairly, with respect and courtesy, regardless of such factors as race, religion, sexual orientation, gender, disability, age, or national origin. In this class, you are expected to contribute to the overall campus climate such that others feel welcome, are respected, and are able to develop to their full potential. This will allow each person to contribute to the success of the class as a whole. ASU and the College of Engineering are committed to maintaining a productive, enjoyable and diverse campus environment.

Students are expected to effectively communicate ideas. Inappropriate language (written and oral) does not effectively communicate your ideas to an audience. Inappropriate language includes not only profanity, but also words that are demeaning to a person or group (racially, sexually, ethnically, etc.). You are expected to participate in the various classroom activities, including:

- coming to each class on time and staying until dismissed;
- following instructions given by the instructor, including actively working on whatever assignment has been given;
- not consuming any food or drink while in the ASU classrooms, and not bringing any open containers of food or drink into the classrooms; and
- avoiding disruptive side conversations.

You are expected to make appropriate use of ASU facilities and property, including:

- leaving a clean work space – tables, floors and chairs; all trash picked up and disposed of; treating walls, furniture and floors properly –putting feet on tables and chairs, etc., not writing upon or disfiguring furniture; and
- leaving computers as you would furniture – clean and ready to use, without any remaining software, links, screen savers or settings that will offend or impede the efforts of subsequent users.

These are consistent with university-wide behavioral expectations described in the various codes of conduct and policies administered through ASU Office of Student Life - Student Judicial Affairs.

Classroom Behavior:

Until further notified, per ASU policy, faculty, staff, students and visitors, are required to wear face coverings in classrooms, labs, offices and community spaces.

Students, faculty, staff, and other individuals do not have an unqualified right of access to university grounds, property, or services. Interfering with the peaceful conduct of university-related business or activities or remaining on campus grounds after a request to leave may be considered a crime. All incidents and allegations of violent or threatening conduct by an ASU student (whether on- or off-campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students.

The ASU Student Services Manual (SSM 201-10) permits the instructor to withdraw a student from a course for disruptive behavior with a mark of W (withdrawal) or E (failure). Note that "disruptive behavior" is defined by the instructor, not by the University or the student. Violation of conventional and acceptable classroom behavior will result in the offender being asked to exit the classroom and notification of the offense to the Fulton Schools of Engineering's Dean's Office. A warning may or may not be provided. Any violent or threatening conduct by an ASU student in this class will be reported to the ASU Police Department and the Office of the Dean of Students.

Note that in general, you may sit where you wish. However, the instructor has the right to ask you to sit in a specific seat or move to a different seat at any time during the semester. In the past, I have moved students whom I suspected were cheating during an exam, and I will do so in this course if I believe you are looking at another student's paper or sharing answers during an exam.

Harassment and Sexual Discrimination:

Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information.

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 https://sexualviolenceprevention.asu.edu/faqs .

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. ASU online students may access 360 Life Services: https://goto.asuonline.asu.edu/success/online-resources.html .

Disability Accommodations:
The Student Accessibility and Inclusive Learning Services (480-965-1234; Matthews Center; email: Student.Accessibility@asu.edu) is the central location for students requiring accommodation. Any student requiring accommodation must contact and register with the Center before any accommodation requests can be granted by the instructor. If you require accommodation, please contact the Center as soon as possible so the instructor can work with you to ensure your success.

Suitable accommodations will be made for students having disabilities. Students needing accommodations must register with the ASU disabilities resource Center and provide documentation of that registration to the instructor. Students should communicate the need for an accommodation in sufficient time for it to be properly arranged. See ACD 304-08 Classroom and Testing Accommodations for Students with Disabilities.

Waiting for an Absent Instructor: Students are obliged to wait at least 15 minutes for class sessions lasting 90 minutes or less, and 30 minutes for class sessions lasting more than 90 minutes. Students may be directed to wait longer by someone from the academic unit if they know the instructor will arrive shortly.