**Course Format:**

15-week, 2-credit, with weekly 50-min lecture and 3-hour lab.

**Course Description:**

The Introduction to Engineering course introduces the engineering design process, basic engineering skills, and provides opportunities to learn about and use various engineering tools and software. The course will also teach basic written and oral communication skills important for communicating technical information effectively. You will learn to work in a team environment, using design methods to address multi-disciplinary real world engineering design problems.

**Course Goals:**

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 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, and contributions within the field of engineering and critique their own skills and understanding through self-reflection.

**Schedule:** A tentative outline of lecture and lab topics is listed below.

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| **Unit** | **Lecture/Lab** | **Lecture/Lab Topic** |
| 1 | Lecture | Course Overview**First Assessment of Engineering Design Process** (beginning of class)  |
| Lab | Team Activities |
| 2 | Lecture | Engineering Design Process Overview & Opportunity Identification & Problem Definition & Design Requirements & Design Criteria  |
| Lab | Two-Week ‘A’ Mountain Design Challenge Part 1 |
| 3 | Lecture | Imagining Possible Solutions & Brainstorming Techniques & Making Informed Design Decisions |
| Lab | Two-Week ‘A’ Mountain Design Challenge Part 2 |
| 4 | Lecture | **Second Assessment of Engineering Design Process**  |
| Lab | What is a Model & Descriptive Modeling & Fusion 360 Tutorial |
| 5 | Lecture  | Project Management & Aircraft Design Basics |
| Lab | Ten-Week Project Problem Definition & Research & Planning |
| 6 | Lecture | Technical Communication & Designing for a Purpose |
| Lab | Ten-Week Project Subsystem Design - Interior Layout  |
| 7 | Lecture | Introduction to MATLAB |
| Lab | MATLAB Tutorial |
| 8 | Lecture | Predictive Modeling & Aircraft Wing Design |
| Lab | Ten-Week Project Subsystem Design – Wing Shape |
| 9 | Lecture | Structural Analysis |
| Lab | Ten-Week Project Subsystem Design – Wing Support |
| 10 | Lecture | Electrical Fundamentals & Basics of Arduino |
| Lab | Arduino Tutorial |
| 11 | Lecture | Financial Analysis  |
| Lab | Ten-Week Project Subsystem Design – Automation System |
| 12 | Lecture | Design Evaluation & Project Testing |
| Lab | Ten-Week Project Subsystem Design – Putting it all Together |
| 13 | Lecture | Cool Design Presentations  |
| Lab | Ten-Week Project Work Day  |
| 14 | Lecture | Cool Design Presentations |
| Lab | Ten-Week Project Work Day |
| 15 | Lecture |  **Third Assessment of Engineering Design Process** |
| Lab | Ten-Week Project Showcase |