

# Introduction to Engineering

## Dual Enrollment Spring (Optional<sup>1</sup>)

### Course Description

The Introduction to Engineering course is a course designed to introduce the profession, ethics, and diversity of the field of engineering to students. The course will expose students to the various engineering disciplines: Biological Engineering, Civil Engineering, Chemical Engineering, Computer Science, Construction Management, Electrical Engineering, Environmental Engineering, Industrial Engineering, Mechanical Engineering, and Petroleum Engineering. Specifically, this course will emphasize that the engineer is a team worker who needs strong skills in technical problem solving, engineering design, ethical decision making, and communicating to diverse audiences.

### Course Objectives

- Demonstrate an understanding of academic honesty and ethics pertaining to the profession of engineers.
- Demonstrate effective communication skills, through team working, oral presentations, and good written communication.
- Demonstrate an awareness of the connections between engineering and the wider world.
- Use the engineering design process to create, test, and redesign discipline specific projects to gain a better appreciation of the diverse engineering fields.

### Assessing Performance

Students are assessed by obtaining weekly grades on the following: Work Ethic, Quizzes, Lab Reports, Presentations, and Reflections.

Equipment	Cost/Unit
Consumable material	\$500
Reusable material	\$1,000
Classroom set of computers	\$0 if you already have some, \$500-600 per computer if you need to purchase

### First Semester

<b>Unit 1: Ethics and Professionalism*</b>	Engineering Creed, Ethical dilemma situations and discussions
<b>Unit 2: Communication, Teamwork, and Work Ethic*</b>	Oral, Written, Technological, and Visual communication, Value of Work Ethic
<b>Unit 3: Engineering Design Process*</b>	Understand and explore the engineering design process
<b>Unit 4: Lab Report and Presentations</b>	Understand how to write each part of the lab report and the characteristics of a good presentation
<b>Unit 5: Intro to Arduino</b>	Basic electrical circuits and computer programming
<b>Unit 6: Intro to Drafting</b>	Understand Multiview drawings and isometrics
<b>Unit 7: Math and Graphing</b>	Sail Car Activity with velocity and acceleration, make/create a table, make/create a graph, analyze data, dimensional analysis, percent error
<b>Unit 8: Additional Engineering Design</b>	Pick from the Fluor projects if time permits

### Second Semester

<b>Unit 9-18: Examination of Disciplines*</b>	Guest Speaker, Hands-on project, Presentation of results for each of 10 engineering disciplines
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<sup>1</sup> This course may be offered in full year format with Dual enrollment in Spring or simply as a full year non-dual enrollment course

\*These units are the dual enrollment content



## INTRODUCTION TO ENGINEERING

### 1. Materials

A desktop or laptop computer, access to 1-to-1 daily, and Internet. Chromebooks will not work with the free Arduino software.

Reusable Hardware/Material	Recommended Unit	Cost/Unit
Various reusable material and hardware for projects	1 per classroom	\$1,000
Consumables		
Various consumables for projects	1 per classroom	\$500
Software		
Arduino IDE	1 per student	Free on PC; \$1/month for Chromebook

\*Complete supply list with purchase links can be found [here](#).

### 2. Required software, networking access, and access to LSU servers

- Teachers will need to be able to share documents via Google drive with LSU Instructors.
- Arduino software will need to be installed on computers. It is free to download on computers. There is a cloud based version that is also available but requires drivers to be downloaded and will not work on Chromebooks. There is also a Chrome App that can be purchased for \$1/student per month (only required for one month). However, IT would have to install it on student chromebooks.

### 3. Required teacher collaborations

Teachers will communicate with LSU instructors via email and shared Google Drive folder.

### 4. Required administration of course content, pre/post test, and research instruments

All required materials and instruments will be either posted in a Google drive or their location announced via the Google group for this course.

### 5. Other

As this is a project-based learning class, we strongly suggest that each section of the course be limited to a *maximum* of 20 students. If the course is overloaded with students, they will not receive adequate instruction.