

Engineering and Design

Course Overview and Syllabus

Grade level: 9–12

Prerequisite Courses: None

Credits: 0.5

Course Description

This semester-long course focuses on building real-world problem-solving and critical-thinking skills as students learn how to innovate and design new products and improve existing products. Students are introduced to the engineering design process to build new products and to the reverse engineering process, which enables engineers to adjust any existing product. Students identify how engineering and design have a direct impact on the sustainability of our environment and the greening of our economy. Finally, students incorporate the engineering design process, environmental life cycle, and green engineering principles to create a decision matrix to learn how to solve environmental issues.

Course Objectives

Throughout the course, you will meet the following goals:

- Discuss design and the prevalence of design opportunities in our world
- Examine how engineers use fluid systems to transfer power and force
- Practice drawing, sketching, and modeling to develop solutions to problems within given constraints
- Demonstrate reverse engineering as a critical part of the product redesign process
- Explore how improving sustainability can lessen environmental impact on a human and global level

Student Expectations

This course requires the same level of commitment from you as a traditional classroom course. Throughout the course, you are expected to spend approximately 5–7 hours per week online on:

- Interactive lessons that include a mixture of videos, readings, and tasks
- Assignments in which you apply and extend learning in each lesson
- Assessments, including quizzes, tests, and cumulative exams

Communication

Your teacher will communicate with you regularly through discussions, email, chat, and system announcements. You will also communicate with classmates, either via online tools or face to face, as you collaborate on projects, ask and answer questions in your peer group, and develop your speaking and listening skills.

Grading Policy

You will be graded on the work you do online and the work you submit electronically to your teacher. The weighting for each category of graded activity is listed below.

Grading Category	Weight
Lesson Quizzes	20%
Unit Tests	20%
Cumulative Exams	20%
Assignments	10%
Projects	30%
Additional	0%

Scope and Sequence

When you log into Edgenuity, you can view the entire course map—an interactive scope and sequence of all topics you will study. The units of study are summarized below:

- Unit 1:** Introduction to Engineering and Design and the Design Process
- Unit 2:** Fluid Systems: Energy and Power Technologies in Engineering
- Unit 3:** Modeling and Sketching
- Unit 4:** Reverse Engineering
- Unit 5:** Engineering to Improve Sustainability