

ENGR 101: INTRODUCTION TO ENGINEERING

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2024
Credits:	3
Total Contact Hours:	90
Lecture Hours :	36
Lab Hours:	54
Hours Arranged:	0
Outside of Class Hours:	72
Total Student Learning Hours:	162
Strongly Recommended:	MATH 175.
Transferable to CSU:	Yes
Transferable to UC:	Yes - Approved
Grading Method:	Standard Letter

Catalog Course Description

Introduction to the field of engineering with emphasis on engineering activities characterized in different engineering disciplines and functions. Topics include education and training requirements, ethical and environmental concerns, tools and problem solving techniques used in engineering, historical and engineering design activities and effective communication skills specific to the field of engineering. 36 lecture hours, 54 lab hours.

Course Objectives

- Identify the principal engineering disciplines that are currently practiced and the types of engineering activities with which each discipline is involved.
- Develop and apply effective strategies to succeed academically.
- Demonstrate teamwork skills in working on the engineering design process.
- Describe the variations in engineering employment over the past 50 years and discuss the correlation with national policies and programs.
- Present brief written and oral reports in formats encountered in engineering organizations.
- Gain exposure to modern engineering tools and learn to utilize them to solve problems.
- Utilize computers in the lab and software available for computational and engineering drawing purposes.
- Use the equipment in engineering lab to conduct hands-on experiments, make measurements, gather data, analyze data, and reverse engineer parts and devices.
- Describe the core subjects that are essential to each engineering discipline and the amount of study that is required in an undergraduate engineering program.
- Describe the stages included in the Engineering Design Process and discuss the interactions that occur between stages.
- Describe the main types of engineering job functions and discuss the principal activities of each.

- Discuss the steps necessary to obtain registration as a Professional Engineer with emphasis on California rules.
- Describe the nature of environmental impact studies in shaping engineering projects.
- Describe major engineering accomplishments in the past century and discuss the obstacles encountered and training required to successfully complete those feats.
- Discuss ethical issues that must be considered in engineering projects.
- Discuss the role of the engineer in the 21st century and describe the types of training that will be required.

Major Course Content

Part 1: The Engineering Design Process

- Course introduction
- What is engineering
 - Engineering societies
 - Engineering careers
 - Engineering degree pathways
 - Science and technology
 - Impacts of technology
 - Ethics and design
- What motivates us
 - TED Talks
- The process of design
 - Design process
 - Creativity and innovation in the design process
 - Design limitations
- Development of team
 - Utilization of teams in industry today
 - Team leadership and team control
 - Information sharing as it related to teams
- Generating and developing ideas
 - Creative thinking
 - Generating design ideas
 - Development work
 - Choosing the best solution
- Reverse Engineering
 - Understanding about the products
 - Functional, structural, materials, manufacturing analysis
- Testing and Evaluating
 - Developing appropriate tests
 - Testing an engineering solution
 - Presenting results

Part 2: Resources for Engineering Design

- Engineering disciplines
 - Manufacturing
 - Structural
 - Mechanical
 - Electrical
- Math and science applications
 - Measurement
 - Unit analysis

- c. Vectors
- d. Data analysis
- e. Tools and software

Lab Content

1. The Process of Design
 - a. Paper Tower
 - b. Egg Drop
 - c. Technical Drawing Activity
2. Reverse Engineering
 - a. Buckling
3. Structural Systems
 - a. Bridge Builder
4. Electrical Systems
 - a. Circuits
5. Pneumatics Systems
 - a. Digital Electronics
6. Dimensional Analysis
7. Engineering Success
 - a. SolidWorks Design
 - b. Spaghetti Bridge Building
 - c. Construction
 - d. Bridge Destruction

Suggested Reading Other Than Required Textbook

Selected journal articles and handouts provided by instructors.

Examples of Required Writing Assignments

Write a technical report documenting the design and construction process of egg drop design.

Examples of Outside Assignments

Brainstorm ideas about an assigned project individually to share in group discussions.

Instruction Type(s)

Lab, Lecture, Online Education Lab, Online Education Lecture