

BUTTE COLLEGE

COURSE OUTLINE

I. CATALOG DESCRIPTION

ENGR 1 - Introduction to Engineering

2 Unit(s)

Prerequisite(s): NONE

Recommended Prep: Reading Level III

Transfer Status: CSU/UC

34 hours Lecture

The course explores the branches of engineering, the functions of an engineer, and the industries in which engineers work. Explains the engineering education pathways and explores effective strategies for students to reach their full academic potential. Presents an introduction to the methods and tools of engineering problem solving and design including the interface of the engineer with society and engineering ethics. Develops communication skills pertinent to the engineering profession.

II. OBJECTIVES

Upon successful completion of this course, the student will be able to:

- A. Describe the role of engineers in society and classify the different engineering branches, the functions of an engineer, and industries in which they work.
- B. Identify and describe academic pathways to bachelor's degrees.
- C. Develop and apply effective strategies to succeed academically.
- D. Explain engineering ethical principles and standards.
- E. Demonstrate knowledge of effective practices for writing technical engineering documents and making oral presentations.
- F. Analyze engineering problems using the engineering design process.
- G. Demonstrate teamwork skills in working on an engineering design team.

III. COURSE CONTENT

A. Unit Titles/Suggested Time Schedule

Lecture	
<u>Topics</u>	<u>Hours</u>
1. Role of engineers in society and comparison of engineering, science and technology	2.00
2. Professional Licensing and engineering profession – branches, functions, industries, careers, job outlook	3.00
3. Professionalism and ethics	2.00
4. Learning Skills in Engineering education: academic success, curriculum, pathways, preparation for upper division coursework	3.00
5. Written and oral communication skills related to engineering	2.00
6. Branches of Engineering	4.00
7. Engineering Statistics: salaries, work environment, life-work balance	2.00
8. Exposure to modern engineering tools and practices	3.00
9. Basic systems used in most every machine such as sensors, pneumatics, hydraulics, bearings, bushings, gears, belts and pulleys, clutches and brakes, and framing materials. AC and DC motor control, simple electrical circuits, machine controllers, programming, testing and analysis of results	4.00
10. Introduction to design process	4.00
11. Exposure to real world engineer through field trips and or guest speakers	5.00

IV. METHODS OF INSTRUCTION

- A. Lecture
- B. Guest Speakers
- C. Collaborative Group Work
- D. Field Trips
- E. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- F. Problem-Solving Sessions

V. METHODS OF EVALUATION

- A. Exams/Tests
- B. Oral Presentation
- C. Projects
- D. Homework
- E. Final Examination
- F. Class Discussion

VI. EXAMPLES OF ASSIGNMENTS

- A. Reading Assignments
 - 1. Read the chapter on the code of ethics for Engineers and be prepared to discuss specific cases in which Engineers make decisions based on their professional ethical code.
 - 2. Read the chapter on team work and be prepared to discuss the 4-steps method that guides the decision process during an engineering project.
- B. Writing Assignments
 - 1. Write two pages to respond to the following questions. What kind of Engineer would you like to become? Why? Search on websites such as www.glassdoor.com and <http://www.nspe.org> and find out about salary, work-life balance and locations for your chosen engineering career.
 - 2. Based on the 4-steps method, write about the different possibilities to address the problem assigned with your project. Address all of the different options and the steps you took to pick a specific option to complete the project.
- C. Out-of-Class Assignments
 - 1. Use a spreadsheet to design a GANTT project timeline for the assigned project.
 - 2. Complete an education plan that includes every class along with its prerequisites, laid out by semester for a degree in engineering.

VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

- A. Stephan, E. A., Park, W. J. Thinking Like an Engineer: An Active Learning Approach. 3rd Edition. Pearson, 2014.