



El Camino College
COURSE OUTLINE OF RECORD – Official

Course Acronym:	ETEC
Course Number:	10
Descriptive Title:	Principles of Engineering Technology
Division:	Industry and Technology
Department:	Engineering Technology
Course Disciplines:	Electronic Technology, Manufacturing Technology
Catalog Description:	In this course, students will explore technology systems and engineering processes to learn how math, science, and technology impact our society. The topics introduced include the design process, communication and documentation, engineering systems, statics, properties of materials, quality assurance, materials testing and engineering for reliability.
Prerequisite:	
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	2
Hours Laboratory (per week):	4
Outside Study Hours:	4
Total Course Hours:	108
Course Units:	3
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	1/23/2006
Transfer UC:	No
Effective Date:	
General Education: ECC	
Term:	
Other:	
CSU GE:	
Term:	

Other:	
IGETC:	
Term:	
Other:	
Student Learning Outcomes:	<p>SLO #1 Careers</p> <p>Students will research engineering and engineering technology careers and create a report.</p> <p>SLO #2 Marble Sorter</p> <p>Students will build an automated marble sorter.</p> <p>SLO #3 Six Simple Machines</p> <p>Student will build the SMET project demonstrating the six simple machines.</p>
Course Objectives:	<ol style="list-style-type: none"> 1. Compare and contrast essential components contained in a basic mechanical system. 2. Compare and contrast various forms of energy. 3. Document design ideas graphically and in writing. 4. Identify the application of commonly used mechanisms, such as levers, wheels, pulleys, screws and gears. 5. Evaluate the properties, characteristics and application of materials commonly used in manufacturing. 6. Specify destructive and non-destructive means of testing materials commonly used in manufacturing. 7. Explain the effects that stress has on a material and explain how a particular material will react. 8. Analyze a simple truss to determine types and magnitude of forces that act on the truss.
Major Topics:	<p>I. SAFETY (2 hours, Lecture)</p> <ol style="list-style-type: none"> A. Engineering overview B. Career opportunities C. Engineering education

II. CAREERS (4 hours, Lab)

- A. Career research lab
- B. Engineering, Engineering Technology and Science differences research lab

III. COMMUNICATION AND DOCUMENTATION (4 hours, Lecture)

- A. Technical writing
- B. Data representation and presentation
- C. Computer tools

IV. COMMUNICATION AND DOCUMENTATION (7 hours, Lab)

- A. Perspective sketching lab
- B. Orthographic sketching lab

V. THE DESIGN PROCESS (6 hours, Lecture)

- A. Problem identification, design brief
- B. Information gathering
- C. Alternative solutions and optimization
- D. Modeling
- E. Testing, evaluation
- F. Presentation

VI. THE DESIGN PROCESS (9 hours, Lab)

- A. Product life cycle lab
- B. Invention research lab

VII. FORMS OF ENERGY (2 hours, Lecture)

- A. Kinetic
- B. Electrical
- C. Potential
- D. Chemical
- E. Thermal

VIII. FORMS OF ENERGY (8 hours, Lab)

- A. Heat engines lab
- B. Energy forms lab

IX. ENGINEERING SYSTEMS (10 hours, Lecture)

- A. Simple machines (e.g. levers, pulleys, screws, gears, linkages)
- B. Thermodynamics
- C. Fluid systems
- D. Electrical systems

	<p>X. ENGINEERING SYSTEMS (20 hours, Lab)</p> <ul style="list-style-type: none"> A. Fischertechnics exercises B. Marble sorter lab <p>XI. STATICS AND STRENGTH OF MATERIALS (6 hours, Lecture)</p> <ul style="list-style-type: none"> A. Statics terminology B. Strength of materials terminology C. Materials testing D. Properties of materials E. Production processes F. Quality <p>XII. STATICS (12 hours, Lab)</p> <ul style="list-style-type: none"> A. Bridge Builder lab B. Vector components lab <p>XIII. ENGINEERING FOR RELIABILITY (3 hours, Lecture)</p> <ul style="list-style-type: none"> A. Reliability definitions B. Case studies <p>XIV. RELIABILITY (6 hours, Lab)</p> <ul style="list-style-type: none"> A. Reliability case study lab B. Reliability test lab <p>XV. DYNAMICS AND KINEMATICS (3 hours, Lecture)</p> <ul style="list-style-type: none"> A. Linear motion B. Rotary motion <p>XVI. DYNAMICS (6 hours, Lab)</p> <ul style="list-style-type: none"> A. Ping pong ball projectile device lab B. Dynamics calculations lab
Total Lecture Hours:	36
Total Laboratory Hours:	72
Total Hours:	108
Primary Method of Evaluation:	2) Problem solving demonstrations (computational or non-computational)
Typical Assignment Using Primary Method of Evaluation:	A mousetrap is a good example of how energy can be transmitted to perform some kind of work. Design a mousetrap-powered vehicle that will travel 12 feet, no more - no less. Submit a sketch of your design concept for assessment to the instructor.

Critical Thinking Assignment 1:	Perform "Mass-Property-Analysis" on an assigned component using the Autodesk analysis feature. Create a chart of the analysis and submit to the instructor.
Critical Thinking Assignment 2:	Predict mathematically the shearing forces of a .125" thick piece of C-1020 mild steel. Verify the predictions through standard laboratory practices. Record your calculations, prediction, and actual finding on a Materials Testing Laboratory Report Form and submit to the instructor.
Other Evaluation Methods:	<p>Class Performance</p> <p>Completion</p> <p>Laboratory Reports</p> <p>Matching Items</p> <p>Multiple Choice</p> <p>Other Exams</p> <p>Performance Exams</p> <p>Quizzes</p> <p>True/False</p> <p>Written Homework</p>
Instructional Methods:	<p>Demonstration</p> <p>Lecture</p> <p>Multimedia presentations</p>
If other:	Computer simulations
Work Outside of Class:	<p>Study</p> <p>Answer questions</p> <p>Required reading</p> <p>Problem solving activities</p>
If Other:	
Up-To-Date Representative Texts:	Michael Hacker. Engineering & Technology. 1st ed. Cengage Learning, 2010. Discipline Standard
Alternative Texts:	
Required Supplementary Readings:	Project Lead the Way (PLTW) handouts
Other Required Materials:	
Requisite:	
Category:	

Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	
Requisite course:	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Steve Cocca and Eric Carlson
Date:	04/09/2015
Original Board Approval Date:	01/23/2006
Last Reviewed and/or Revised by:	Eric Carlson
Date:	10/03/2023
Last Board Approval Date:	06/17/2024
Effective Term:	FALL 2025