Engineering Technology 12
Introduction to Engineering Design (IED)
Course Syllabus

DESCRIPTION:
This course is an introduction to engineering: the people, what they do, what engineering is all about. It is designed to show students the wide variety of fields of engineering, help the student determine which field of engineering is of most interest, and offer the opportunity to become excited about engineering.

GOALS:

1. Learn about the wide variety of fields of engineering and what engineers actually do on the job.
2. Help the student determine what field of engineering is of most interest.
3. Learn about the wide range of non-engineering careers open to those with an engineering education.
4. Learn how engineers communicate.
5. Gain an understanding of ethical professional behavior.

REQUIREMENTS:

Students will be required to keep a portfolio of all exercises, activities and projects as assigned by the instructor. Portfolios will be assessed on a regular basis for completeness. All students will be required to provide pencils for sketching and drawing activities (*the instructor will **NOT** supply pencils or pens*). Everyone will be expected to actively participate in classroom activities. This class is very project oriented.

ADDITIONAL RESOURCES:

- American Indian Science & Engineering Society
- American Institute for Medical & Biological Engineering
- American Institute of Chemical Engineers
- American Institute of Mining, Metallurgical & Petroleum Engineers
- American Nuclear Society
- American Society for Engineering Educators
- American Society of Agricultural Engineers
- American Society of Civil Engineers
- American Society of Mechanical Engineers
- Human Factors & Ergonomics Society
- Institute of Electrical & Electronics Engineers – USA
- National Institute of Ceramic Engineers
- National Society of Professional Engineers
- Society of Fire Protection Engineers
- Society of Hispanic Professional engineers
- Society of Women Engineers
- SPIE – The International Society for Optical Engineering

- College of Engineering at San Diego State University
- Project Lead The Way

DISCIPLINE:
You are responsible for your behavior and are subject to the school rules as stated in the School-wide Discipline Program and the Academic Honesty Policy. Horseplay, food, drinks and gum will not be tolerated in this classroom.

EVALUATION:
Students will be evaluated based on the following:

- Presentations – Oral & Written
- Portfolio
- Sketching Techniques
- Mastery of Software
- Tests & Quizzes
- Conceptual and Physical Modeling

Grades will be determined from the following scale:

- 90% – 100% = A
- 80% – 89% = B
- 70% – 79% = C
- 60% – 69% = D
- < 60% = F

STUDENT LEARNING OUTCOME
Given a simple set of design constraints, the student shall be able utilize AutoCad Inventor software to produce a design package including two-dimensional drawings and three-dimensional models.

This will be evaluated by examination of the student's design project.

ADDITIONAL ASSISTANCE: I am always available to any student requesting additional assistance. I may be contacted by e-mail at:
dvalladares@elcamino.edu

The following are topics to be covered during the course of the year. Please note that these topics are not necessarily addressed in the order listed below.

Unit 1: Introduction to Engineering Design

- History of Design/Evolution of Innovation
- Professional Organizations
- Career Opportunities

Unit 2: What is Design?

- Design Process
- Brainstorming
- Cooperative Designs
- Principles and Elements of Design

Unit 3: Student Portfolio Development

- Types of Portfolios
- IED Portfolio Requirements

Unit 4: Sketching and Visualization

- Sketching Techniques
- Pictorial Sketching
- Annotated Sketches

Unit 5: Geometric Relationship

- Forms & Shapes
- Geometric Constraints
- Coordinate Systems

Unit 6: Modeling

- Conceptual Modeling
- Graphical Modeling
- Physical Modeling
- Mathematical Modeling
- Computer Modeling

Unit 7: Assembly Modeling

- Adding Components
- Assembly Constraints
- Part Library
- Sub-Assemblies
- Driven Constraints
- Adaptive Design

Unit 8: Model Analysis and Verification

- Mass Properties
- Tolerancing

Unit 9: Model Documentation

- Working Drawings
- Dimensioning
- Annotation

Unit 10: Presentation

- Communication Techniques
- Presentation Methodology

Unit 11: Production

- Manufacturing Design Analysis
- Process Planning
- Design for Automated Manufacturing
- Materials, Procurement Handling and Cost Analysis
- Quality Control
- Manpower and Facility Requirements
- Packaging

Unit 12: Marketing

- Product Analysis
- Packaging Requirements