

College of San Mateo
Official Course Outline

1. **COURSE ID:** DRAF 130 **TITLE:** Mechanical Design with CAD
Semester Units/Hours: 3.0 units; a minimum of 32.0 lecture hours/semester; a minimum of 64.0 lab hours/semester
Method of Grading: Letter Grade Only
Prerequisite: DRAF 111, DRAF 122

2. **COURSE DESIGNATION:**
Degree Credit
Transfer credit: CSU

3. **COURSE DESCRIPTIONS:**
Catalog Description:
Preparation of working drawings including: detail, assembly drawings and engineering change procedures; threads and fasteners; dimensioning and tolerancing, pictorial projections; intersections and developments.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
Upon successful completion of this course, a student will meet the following outcomes:
 - A. Create accurate detail drawing of a component including necessary dimensions for making the component.
 - B. Create assembly drawing including complete parts lists.
 - C. Do simple plus/minus tolerancing for interchangeable parts.
 - D. Create sectional projections of simple and complex parts.
 - E. Make accurate sheet metal flat pattern layouts.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
Upon successful completion of this course, a student will be able to:
 - A. Create accurate detail drawings of a component including all necessary dimensions for making the component.
 - B. Create assembly drawings including complete parts lists.
 - C. Do simple plus / minus tolerancing for interchangeable parts.
 - D. Create sectional perspective projections of simple and complex parts.
 - E. Make accurate sheet metal flat pattern layouts.

6. **COURSE CONTENT:**
Lecture Content:
 1. Detail Drawing
 - A. Selection and creation of proper views
 - B. Selection and proper placement of necessary dimensions
 - C. Application of fabrication notes
 - D. Document control including engineering change notices and updating drawings
 2. Threads and Fasteners
 - A. Standard thread symbols for drawings
 - B. Standard thread callouts
 - C. Standard hardware commonly used on mechanical assemblies
 3. Assembly Drawing
 - A. Orthographic assemblies - assembled and exploded
 - B. Pictorial assemblies - assembled and exploded
 - C. Part numbers - selection and placement
 - D. Parts lists
 - E. Notes
 4. Tolerance
 - A. Nomenclature: tolerance, allowance and types of fits, types of tolerance expressions
 - B. Tolerancing tables
 - C. Tolerance calculations for interchangeable parts
 5. Pictorial Drawing
 - A. Axonometric

- a. Isometric
 - b. Dimetric
 - c. Trimetric
- B. Oblique
 - a. Cabinet
 - b. Cavalier
- C. Perspective
- 6. Intersection and Developments
 - A. Developing simple shapes
 - B. Calculating bend allowances
 - C. Intersection of simple shapes
 - D. Flat pattern layouts with proper notations

Lab Content:

- 1. Detail Drawings
 - A. Dimensioning project
 - B. Application of fabrication notes
 - C. Document control including engineering change notices and updating drawings
- 2. Threads and Fasteners
 - A. Thread and fastener drawing project
- 3. Assembly Drawing
 - A. Orthographic project using fabrication notes
 - B. Part numbers - selection and placement
 - C. Bill of materials
 - D. Notes
- 4. Tolerancing project
- 5. Pictorial Drawing Projects
 - A. Axonometric
 - B. Oblique
 - C. Perspective
- 6. Intersection and Development projects for sheet metal

7. REPRESENTATIVE METHODS OF INSTRUCTION:

Typical methods of instruction may include:

- A. Lecture
- B. Lab
- C. Critique
- D. Discussion
- E. Guest Speakers
- F. Individualized Instruction
- G. Observation and Demonstration
- H. Other (Specify): The primary method of instruction is lecture, including demonstrations and extensive discussions. Past student experiences and student participation is utilized in all lecture and discussions. Drawing demonstrations on a white board and on a CAD computer are used for showing efficient drawing, design and problem solving strategies. Computer demonstrations contained on CD ROMs are used to show modern techniques. All units of instruction have lab activities where the student designs and draws drawing (using CAD). These activities are designed to incorporate the new knowledge introduced in each of the units of instruction.

8. REPRESENTATIVE ASSIGNMENTS

Representative assignments in this course may include, but are not limited to the following:

Other Outside Assignments:

- A. Homework consists of reading of text and handouts; completion of work sheets, and lab books. Approximately four extensive design projects are used which require problem solving and critical thinking. The major means of communication is formal standardized mechanical drawing, however the students do written production outlines for all parts designed. In addition to production outlines, the students write justifications for their designs.

9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

- A. Class Participation

B. Class Performance

C. Class Work

D. Exams/Tests

E. Home Work

F. Lab Activities

G. Portfolios

H. Quizzes

I. Written examination

J. Quizzes: Typically, a quiz is given following each lecture - the quiz is given at the next class session. The quizzes cover only the lecture material and are short answer essays. CAD drawings: Each drawing completed by students is evaluated and graded: Midterm and Final Examinations: Each examination includes short answer essay, multiple choice, true and false, sketches and CAD drawings. Both the midterm and final examination include problem solving.

10. **REPRESENTATIVE TEXT(S):**

Possible textbooks include:

A. Ge, C.. *Package Structure and Mechanism Design* , ed. SDC Publications, 2012

Other:

A. There will be a comprehensive text used in the course. The text changes as new texts become available. Drafting and design is dynamic and a current text is critical.

Origination Date: October 2010

Curriculum Committee Approval Date: May 2013

Effective Term: Fall 2013

Course Originator: Valeria Vorobey