

COLLEGE OF SAN MATEO  
TECHNOLOGY DIVISION

COURSE OUTLINE

DEPT. & NUMBER: **DRAF 130**

COURSE TITLE: **MECHANICAL DESIGN WITH CAD**

UNITS: 3.0

LECTURE HOURS/WEEK: 2

LAB HOURS/WEEK: 4

LENGTH OF COURSE: Semester Long

GRADING: Letter

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1. **PREREQUISITE** (Attached is Prerequisite Course Validation Form A):  
DRAF 120 and DRAF 121 or the equivalent with a grade of "C" or higher.
2. **COREQUISITE:** None
3. **RECOMMENDED PREPARATION:** None
4. **CATALOG DESCRIPTION:**  
**130 Mechanical Design With CAD (3)**  
Two lecture and four lab hours per week. Prerequisite DRAF 120 and DRAF 121 or the equivalent. Preparation of working drawings including: detail, assembly drawings and engineering change procedures; threads and fasteners; dimensioning and tolerancing, pictorial projections; intersections and developments. (CSU)
5. **CLASS SCHEDULE DESCRIPTION:**  
**Mechanical Design With CAD**  
Preparation of detail, assembly drawings and engineering changes; threads and fasteners, dimensioning and tolerancing, pictorial projections; intersections and developments. Prerequisite DRAF 120 and 121 or the equivalent. (CSU).
6. **COURSE OBJECTIVES**  
Upon completion the 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. draw oblique, isometric and perspective projections of simple and complex parts,
  - e. make accurate sheet metal flat pattern layouts.

7. COURSE CONTENT AND SCOPE

See attached.

8. INSTRUCTIONAL METHODOLOGIES

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.

9. MULTIPLE METHODS OF EVALUATION

- a. 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.
- b. CAD drawings: Each drawing completed by students is evaluated and graded.
- c. 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 MATERIALS

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.

11. REQUIRED OUT-OF-CLASS ASSIGNMENTS

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.

12. WRITING ASSIGNMENTS/PROFICIENCY DEMONSTRATION:

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.

Prepared by:

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Date:

11/96

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COURSE CONTENT AND SCOPE

**MECHANICAL DESIGN WITH CAD**

- I. 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
  
- II. Threads and Fasteners
  - a. Standard thread symbols for drawings
  - b. Standard thread callouts
  - c. Standard hardware commonly used on mechanical assemblies
  
- III. 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
  
- IV. Tolerance
  - a. Nomenclature: tolerance, allowance and types of fits, types of tolerance expressions
  - b. Tolerancing tables
  - c. Tolerance calculations for interchangeable parts
  
- V. Pictorial Drawing
  - a. Axonometric
    - 1. Isometric
    - 2. Dimetric
    - 3. Trimetric
  - b. Oblique
    - 1. Cabinet
    - 2. Cavalier
  - c. Perspective
  
- VI. Intersection and Developments
  - a. Developing simple shapes
  - b. Calculating bend allowances
  - c. Intersection of simple shapes
  - d. Flat pattern layouts with proper notations