

**1100**  
180 Clock Hours  
080110 (State Code/1hour Credit)  
**ENGINEERING DESIGN**  
**Course Syllabus**

**INSTRUCTOR: Beth B. Fontenot**

email: bbf3314@slp.k12.la.us

---

**CLASSROOM:** Annex, Room 21  
**PLANNING PERIOD:** MONDAY-FRIDAY: PLEASE SCHEDULE AN APPOINTMENT  
**OFFICE PHONE:** BCHS 662-5815. Please leave a message and telephone number where you can be reached.

---

## **A. DESCRIPTION**

The purpose of the Engineering Design course is to introduce students to STEM careers and prepare individuals with the necessary advanced skills to develop, design, produce drawings, using the appropriate design process, in one or more of the various disciplines of the drafting profession. This course provides students with instruction in advanced board and CAD skills. Students will have the opportunity to master Autodesk's Inventor, Civil, Mechanical, 3DMax, Sketchbook software. The course content is organized into competency based units of instruction that specify occupational competencies which the student must successfully complete to receive appropriate credit. The course allows the student extensive time in learning to apply drafting techniques to advanced level drawing exercises as well as instruction in a minimum of one of the basic drafting disciplines including all areas of engineering, architecture, automotive, civil/map, electronic/electrical, machine, marine, piping, and structural drafting & design. Students will explore careers and select a specific field of study for the year. Students may certify in Autodesk's AutoCAD 2D software.

This course covers basic and intermediate concepts, drafting procedures and techniques used in two-dimensional CAD drafting. It introduces the student to the application, operation and use of basic and intermediate two-dimensional CAD commands, terminology, command utilization and components of a CAD workstation. Also covered in this course are isometrics, orthographic and multi-view drawings as well as dimensioning procedures and techniques.

This course covers advanced concepts and techniques used in two-dimensional CAD drafting by the application of advanced commands and terminology. Also covered with advanced 2D CAD commands are primary auxiliary views, the development of intersections of geometric surfaces, flat patterns of geometric shapes and various types of fasteners and threads.

Students may participate in South Louisiana Community College Dual Enrollment Program, completing Computer-Aided Design I and Computer-Aided Design II courses (requirements apply).

Students will have the opportunity to participate in the HUNCH Project, if concentrating in an area of engineering. Students will have the opportunity to participate in the CAD Academy Dream Home Competition, if concentrating in architecture.

Prerequisite: Basic Technical Drafting, Advanced Technical Drafting, CMADD I

## **B. ORGANIZATION**

This is a lecture-lab course in which topics are presented by the instructor, practice drawings are explained, and assigned drawings are completed by students both during lab periods and outside of class. Objective and drawing-type quizzes are given, and there is a comprehensive final exam.

## C. COURSE OBJECTIVES

1. Discuss, understand and apply various techniques and commands used to setup CAD drawings including units, layers and plotting applications and variables.
2. Draw isometrics, orthographic and multi-view drawings using basic and intermediate two-dimensional CAD commands.
3. Create, modify, and apply dimensional variables, procedures, techniques and standard dimensioning practices to two-dimensional orthographic and multi-view CAD drawings.  
SLCC
4. Draw orthographic and multi-view drawings using advanced two-dimensional CAD commands
5. Identify, apply and draw primary auxiliary views used in technical drawings
6. Develop intersections of geometric surfaces and develop flat patterns of geometric shapes.
7. Identify and draw different types of threads, fasteners, springs and welding symbols used in technical drawings.
8. Explore and implement proper techniques for orthographic projection, dimensioning, pictorials, sectionals, working drawings and CADD.
9. Recognize how functional drafting techniques can be used to prepare effective technical drawings.
10. Visualize the surface development of three-dimensional objects: parallel line development, radial line development, and triangulation.
11. Describe and complete auxiliary drawings.
12. Read, interpret and construct graphic charts and diagrams. Prepare drawings of threads using detailed representation.
13. Graphically define the fundamentals of solving descriptive geometry problems.
14. Describe the uses of technical illustrations and prepare one form of technical illustration.
15. Complete drawings in the optional areas.

## D. COURSE TOPICS

The course will cover the following topics as students implement into selected specific fields of study:

### Computer-Aided Design I

- I. Drawing Setup
  - A. Program initialization
  - B. Locating and usage of drawing templates
  - C. Setting units and angles (measuring systems)
  - D. Menu usage
  - E. Layer setup
  - F. Plotting
- II. Basic Two-Dimensional CAD Commands
  - A. Model space vs paper space
  - B. Discuss, demonstrate basic 2D commands
  - C. Review isometrics, orthographic and multi-view drawings
  - D. Apply basic 2D commands to isometrics, orthographic and multi-view drawings
- III. Intermediate Two-Dimensional CAD Commands
  - A. Discuss, demonstrate intermediate 2D commands
  - B. Apply intermediate 2D commands to isometrics, orthographic and multi-view drawings
  - C. Discuss, create and use blocks
- IV. Dimensions
  - A. Discuss, demonstrate dimension styles and variables
  - B. Scales and scales factors
  - C. Setup dimension styles
  - D. Discuss and apply dimensioning techniques

### Computer-Aided Design II

- I. Advanced Two-Dimensional CAD Commands
  - A. Discuss, demonstrate advanced 2D commands
  - B. Apply advanced 2D commands to orthographic and multi-view drawings
- II. Auxiliary Views
  - A. Identify terms and views
  - B. Discuss, demonstrate auxiliary views
  - C. Apply advanced 2D drawings to auxiliary, orthographic and multi-view drawings
- III. Intersections and Developments
  - A. Identify terms, discuss and demonstrate intersections of geometric surfaces
  - B. Develop intersections of geometric surfaces
  - C. Identify terms, discuss and demonstrate flat patterns of geometric shapes
  - D. Develop flat patterns of geometric shapes
- IV. Threads, Fasteners, Springs and Welding Symbols
  - A. Identify types of threads, fastening devices and their designations
  - B. Draw various types of threads and fastening devices
  - C. Identify types of springs
  - D. Draw various types of springs
  - E. Identify types of welding symbols
  - F. Draw types of welding symbols

## **E. TEXT AND REQUIRED SUPPLIES**

1. Exploring Drafting, by J.R. Walker
2. Technical Drawing, by Goetsch, Nelson, Chalk
3. Basic Technical Drawing, by Spencer & Dygdon
4. Architecture: Residential Drawing and Design, by Clois E Kicklighter
5. Supplies: Lab Fee: \$20.00, Black 2" Avery Durable Reference View Binder, 200 clear sheet protectors, Flash Drive (optional)