

COURSE OUTLINE Engineering Graphics II

Course Description

EN 102. Engineering Graphics II. 3 hours credit. Prerequisite: EN 101 with a C or better. This course will enable the student to expand his/her skill in drafting and design, and its integration into computer-aided design (CAD). The student will use CAD to complete multiple design projects and complete a team project.

Course Relevance

Because CAD is utilized in engineering design, skills learned in this class will provide the student with the fundamentals to either continue on with his/her education in more advanced CAD courses, or to work in the industry. This course will allow students to develop skills aligned with the American Society of Mechanical Engineers (ASME), the American National Standards Institute (ANSI), and the International Organization of Standards (ISO).

Required Materials

Jensen. (2008). *Engineering drawing and design*. (7th ed.). McGraw Hill.

Supplementary Materials

The student will provide one 256 MB jump/flash drive, three-ring binder, pencil, and notebook.

Learning Outcomes

The intention is for the student to be able to:

1. Demonstrate problem solving and analytical skills in design and drafting
2. Accurately apply CAD/drafting skills in more advanced design projects

Primary Learning PACT Skills that will be DEVELOPED and/or documented in this course

Through the student's involvement in this course, he/she will develop his/her ability in the following primary PACT skill areas:

1. Problem Solving
 - Through working on an assigned team project, the student will resolve problems that occur during the project.
2. Critical Thinking
 - Through working on the team project, the student will research and analyze needed information to complete the project.

Secondary skills (developed but not documented):

Time Management

Ethical Conduct
Listening
Computer Literacy
Nonverbal Communication
Teamwork

Major Summative Assessment Task(s)

These learning outcomes and the primary Learning PACT skills will be demonstrated by:

1. Developing a high quality drawing portfolio of assigned drawings completed according to deadlines and specifications, including reflections on work
2. Completing a final team project demonstrating the utilization and implementation of learned CAD/drafting skills and critical thinking and problem solving skills

Course Content

- I. Themes - Key recurring concepts that run throughout this course:
 - A. Design
 - B. Drafting
 - C. Team work
 - D. Project management
 - E. CAD
- II. Issues – Key areas of conflict that must be understood in order to achieve the intended outcome:
 - A. Drawing legibility
 - B. Drawing accuracy
 - C. ASME, ANSI, and ISO standards
 - D. Team work
 - E. Quality of work
 - F. Industry expectations
- III. Concepts – Key concepts that must be understood to address the issues:
 - A. Rules of dimensioning
 - B. Team collaboration
- IV. Skills/Competencies - Actions that are essential to achieve the course outcomes:
 - A. Drawing setup
 - B. Demonstrate proper use of cutting plane lines
 - C. Demonstrate correct practice of dimensioning rules
 - D. Demonstrate correct use of orthographic projection
 - E. Demonstrate how to correctly setup multiple views
 - F. Demonstrate how to accurately print drawings to assigned printer
 - G. Demonstrate correct use of auxiliary views
 - H. Demonstrate how to draw a revolved section
 - I. Demonstrate how to draw a removed section
 - J. Demonstrate use of rotated views
 - K. Demonstrate use of aligned views
 - L. Develop a bill of materials (BOM)

- M. Demonstrate the ability to communicate well with peers in a team environment
- N. Demonstrate the ability to cooperate with peers in a team environment
- O. Demonstrate the use of non-verbal communication

Learning Units

- I. Sketching and text
 - A. Technical sketching
 - B. Sketching techniques
 - C. Perspective projection
 - D. Technical lettering
- II. Section and auxiliary views
 - A. Sectioning basics
 - B. Cutting plane lines
 - C. Section lines
 - D. Section view types
 - E. Auxiliary views
- III. Dimensioning and tolerancing practices
 - A. Dimensioning
 - B. Size and locations of dimensions
 - C. Detail dimensioning
 - D. Tolerancing
- IV. Reading and constructing working drawings
 - A. Basic concepts
 - B. Working drawings
- V. Team project
 - A. Team development
 - B. Collaboration
 - C. Design research
 - D. Develop a set of working drawings
 - E. Design/build processes

Learning Activities

Independent and collaborative learning activities will be assigned to assist the student to achieve the intended learning outcomes. Class discussions, lecture, and reading assignments will also contribute to the learning process.

Grade Determination

The student will be graded on learning activities and assessment tasks. Grade determinants may include the following: Daily work, tests, both essay and objective (including quizzes, chapter or unit tests and comprehensive examinations), writing assignments, research papers, student projects, student presentations, class

participation and other methods of evaluation employed at the discretion of the individual instructor. These methods may be used individually or in combination by all instructors.