



MASTER COURSE OUTLINE

Prepared By: Jim Hamm

Date: Sep 2017

COURSE TITLE

Engineering Graphics I

GENERAL COURSE INFORMATION

Dept.: ENGR&

Course Num: 111

(Formerly: EGR 160)

CIP Code: 14.1901

Intent Code: 11

Program Code:

Credits: 3

Total Contact Hrs Per Qtr.: 77

Lecture Hrs: 33

Lab Hrs: 44

Other Hrs: 0

Distribution Designation: Specified Elective SE

COURSE DESCRIPTION (as it will appear in the catalog)

This course studies the principles of mechanical drawings: geometric construction, orthographic projection, sectional views, auxiliary views, isometric and oblique drawings, dimensions, threads, fasteners, and lettering using AutoCad software. This software is used by engineers to communicate proposed designs and new ideas.

PREREQUISITES

None

TEXTBOOK GUIDELINES

A college-level textbook such as *Principles and Practice, An Integrated Approach to Engineering Graphics and AutoCAD 2014*, Randy H. Shih, Schroff Development Corporation (SDC), 2013, ISBN 978-1-58503-813-8. ISBN 978-1-58503-848-0 and the *Ultimate GD&T Pocket Guide*, Krulikowski, ISBN 9780924520235. An online platform such as *SolidProfessor* is also acceptable.

COURSE LEARNING OUTCOMES

Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:

1. List the different types of engineering drawings (3a&b)
2. Explain how CAD works with CAE/CAM in design and manufacturing processes. (3a, b, h)
3. Create a 2-D orthographic projection from a 3-D object. (3a, b, g)
4. Properly Dimension and add text to a 2-D orthographic projection. (3a, b, g)
5. Understand the principle of "dimensioning for manufacture". (3a, b, d, f, g, k)
6. Demonstrate basic Tolerance principles and procedures. (3a)
7. Demonstrate correct use of auxiliary views to properly describe an object. (3a & g)
8. Demonstrate correct use of section views to describe hidden features of an object. (3a & g)
9. Describe the contents of a set of working drawings and explain the purpose of an assembly view. (3a & g)
10. Create a pictorial drawing. (3a)
11. Demonstrate writing skills through a written as assigned in class. (3a, b, g, h, k)
12. The student will be able to produce specific geometric shapes using specific drawing commands (3a, d, g)
13. The student will be able to set up a drawing with correct scales. (3a, g)

INSTITUTIONAL OUTCOMES

IO2 Quantitative Reasoning: Students will be able to reason mathematically.

COURSE CONTENT OUTLINE

- I. Introduction and AutoCAD Fundamentals
 - A. Drawing in CAD Systems
 - B. Development of Computer Geometric Modeling (CAE/CAM)
 - C. Getting started with AutoCAD 2014
 - D. Create a New CAD Drawing
- I. Geometric Constructions
 - A. Classical Methods
 - B. CAD Methods
 - C. GRID and SNAP Interval Setup
 - D. QuickCalc Calculator to Measure Distance and Angle
- II. Object Properties and Organization in AutoCAD
 - A. Floor Plan Design
 - B. Using the Setup Wizard
 - C. AutoCAD MULTILINE command
 - D. Controlling Layer Visibility
- III. Orthographic Projections and Multiview Constructions
 - A. Orthographic Projection
 - B. First and Third Angle Projections
 - C. Dynamic Rotation – 3D Orbit
 - D. AutoSnap and AutoTrack
- IV. Pictorials and Sketching
 - A. Engineering Drawings, Pictorials, and Sketching
 - B. Isometric Sketching
 - C. Oblique Sketching
 - D. Perspective Sketching
- V. Dimensioning and Notes
 - A. Orthographic Projection
 - B. First and Third Angle Projection
 - C. Dynamic Rotation – 3D Orbit
 - D. AutoSnap and AutoTrack
- VI. Tolerances and Fits
 - A. Precision and Tolerance
 - B. Nomenclature
 - C. American National Standards Limits and Fits - Inches
 - D. Tolerancing –Metric System
- VII. Symmetrical Features in Designs
 - A. The GenevaCam Design
 - B. Drawing
 - C. Dynamic Rotation – 3D Orbit
 - D. AutoSnap and AutoTrack
- VIII. Auxiliary Views
 - A. Construction Method I – Folding Line Method
 - B. Construction Method II – Reference Plane Method
 - C. Partial Views

- D. Creating the V-cut in the Auxiliary View
- IX. Section Views
 - A. Section Drawing Types
 - B. The Bearing Design
 - C. Setting up the Side View
- X. Threads and Fasteners
 - A. Screw Thread Terminology
 - B. Thread Representations
 - C. Bolt and Screw Clearances
- XI. Working Drawings
 - A. General Engineering Design Process
 - B. Working Drawings
 - C. Detail Drawings
 - D. Assembly Drawings

NOTES: Layers, Linetypes, and blocks should also be included in this course. (These topics may be enveloped in Sections I through III.)

DEPARTMENTAL GUIDELINES *(optional)*

Exams and Quizzes 30-40%; Homework and Projects 30-40%; In-Class Work 20%; Attendance 10-20%

PO5 should be assessed: Students will be able to solve problems by gathering, interpreting, combining and/or applying information from multiple sources.

DIVISION CHAIR APPROVAL

DATE