

**COURSE NUMBER:** EG1110

**COURSE TITLE:** Engineering Graphics

**COURSE DESCRIPTION:**

This course focuses on basic engineering graphics principles and standards to effectively communicate technical graphical design and also provides the foundation for more advanced engineering graphics concepts.

Engineering graphics is the predominant means by which accurate information is communicated within industries pertinent to all engineering technology disciplines. From the simplest in-the-field sketch, to the most advanced 3-D model, each may constitute a legal document.

**PREREQUISITES:** None

**CO-REQUISITES:** None

**CREDIT VALUE:** Three (3)

**COURSE HOURS PER WEEK:** Two (2)

**LAB HOURS PER WEEK:** Two (2)

**SUGGESTED TEXT:**

Giesecke, F.E., Dygdon, J.T., Novak, J.E., Lockhart, S.D., Goodman, M.L., and Hill, I.L. (2010). *Modern graphics communication* (4th. Ed.). Prentice Hall.; and Giesecke, F.E., Hill, I.L., Spencer, H.C., Mitchell, A.E., Dygdon, J.T., Novak, J.e., Lockhart, S.E. and Goodman, M.L. (2011). *Engineering drawing problems workbook (series 4) for technical drawing with engineering graphics* (14th. ed.). Prentice Hall ISBN 10: 01256712248 (This is a package prepared by Pearson)

or

McAdam, D. and Winn, R. (2007) *Engineering graphics; A problem-solving approach* (3<sup>rd</sup> ed.). Pearson Education Canada. ISBN-10: 0132210746 or ISBN-13: 9780132210744

or

Graham, B. (2007) *Engineering graphics: Tools for the mind-with DVD*. Mission, KS: Scroff Development Corporation. ISBN-10: 1585034126 or ISBN-13: 978-1-58503-412-3

## **LEARNING RESOURCES:**

Jensen, C., Helsel, J. and Short, D. (2007). *Engineering drawing & design* (7th. Ed.). McGraw-Hill. ISBN 10: 0073521515; ISBN 13: 978-0073521510

## **MAJOR TOPICS:**

- 1.0 Introduction to Technical Drawing
- 2.0 Geometric Constructions
- 3.0 Orthographic Projection
- 4.0 Pictorial Sketching
- 5.0 Dimensioning Conventions
- 6.0 Sectional Views
- 7.0 Primary Auxiliary Views

## **LEARNING OBJECTIVES:**

The expected learning outcome is that the student will be able to:

### **1.0 Introduction to Technical Drawing**

#### **1.1 Standard Conventions**

- 1.1.1 List “A” Series sheet sizes, in order from the smallest to the largest
- 1.1.2 Describe the purpose of title blocks and revision blocks
- 1.1.3 Identify the standard locations for title blocks
- 1.1.4 Create “A” series borders with revision list title block given their specific dimensions
- 1.1.5 Demonstrate the ability to make the correct forms of the Gothic style of lettering
- 1.1.6 Identify the different linetype symbols used in engineering drawing: object lines, hidden lines, center lines, dimension and extension lines, leaders, cutting-plane lines, section lines, break lines, and phantom lines
- 1.1.7 State the purpose of each of the different linytypes
- 1.1.8 State the thickness of each of the different linytypes

#### **1.2 Scale Ratios**

- 1.2.1 State the purpose of scaling as used in technical drawings
- 1.2.2 Explain common scaling terminology

- 1.2.3 Choose appropriate scale ratios given specified sized objects and specific “A” series sheets
- 1.2.4 Measure lines at specific ratios using the Metric scale
- 1.2.5 Measure lines at specific ratios using the Architectural scale
- 1.2.6 Measure lines at specific ratios using the Civil Engineer’s scale
- 1.2.7 Measure lines at specific ratios using the Mechanical Engineer’s scales
- 1.3 Sketching Techniques
  - 1.3.1 Demonstrate the skill of sketching using specific sketching techniques
- 1.4 Working Drawings
  - 1.4.1 Describe the difference between detail and assembly

## **2.0 Geometric Constructions**

- 2.1 Terminology
  - 2.1.1 Define common geometric solids: prisms, cylinders, pyramids, cones
- 2.2 Constructions
  - 2.2.1 Construct tangents to circles, lines, and arcs
  - 2.2.2 Construct polygons

## **3.0 Orthographic Projection**

- 3.1 Introduction to Orthographic Projection
  - 3.1.1 Explain the advantages of 2D drawings
  - 3.1.2 State the principles of orthographic projection
  - 3.1.3 Project views using projection lines
  - 3.1.4 Select the required views of an object
  - 3.1.5 List the standard line conventions in order of precedence
  - 3.1.6 Identify the three principal planes of projection
  - 3.1.7 Explain the three principal surfaces of an object
  - 3.1.8 Explain the difference between first and third angle
- 3.2 Visualization Exercises
  - 3.2.1 Construct orthographic views from pictorial views
  - 3.2.2 Construct a third view given the required information in two complete orthographic views
  - 3.2.3 Complete the orthographic views by adding the missing lines

## **4.0 Pictorial Sketching**

### **4.1 Major Types of Pictorial Views**

- 4.1.1 Distinguish between the three types of pictorial views: axonometric, oblique, and perspective
- 4.1.2 Distinguish between the three types of axonometric views: isometric, diametric, and trimetric
- 4.1.3 Distinguish between the three types of oblique views: cavalier, cabinet, and general

### **4.2 Practical Exercises**

- 4.2.1 Sketch cavalier oblique views from two dimensional drawings
- 4.2.2 Sketch isometric views from two dimensional drawings

## **5.0 Dimensioning Conventions**

### **5.1 General Dimensioning Practices**

- 5.1.1 Describe the purpose of dimensioning
- 5.1.2 Explain the difference between aligned and unidirectional dimensioning
- 5.1.3 Position dimensions appropriately to describe given objects
- 5.1.4 Dimension both cylindrical and non-cylindrical objects
- 5.1.5 Demonstrate proper dimensioning conventions
- 5.1.6 Demonstrate chain dimensioning

## **6.0 Sectional Views**

### **6.1 Specific Linetypes**

- 6.1.1 Identify the different linetype associated with section views
- 6.1.2 State the purpose(s) of the different linetypes associated with section views

### **6.2 Common Types of Sections**

- 6.2.1 Full Sections
  - 6.2.1.1 Create full-section views of objects from orthographic and pictorial drawings
  - 6.2.1.2 Describe when full section views are appropriate
- 6.2.2 Offset Sections
  - 6.2.2.1 Create offset-section views of objects from orthographic and pictorial drawings

6.2.2.2 Describe when offset-section views are appropriate

6.2.3 Half Sections

6.2.3.1 Create half-section views of objects from orthographic and pictorial drawings

6.2.3.2 Describe when half-section views are appropriate

6.2.4 Aligned Sections

6.2.4.1 Create aligned section views of objects from orthographic and pictorial drawings

6.2.4.2 Describe when aligned section views are appropriate

6.2.5 Revolved and Removed Sections

6.2.5.1 Create revolved and removed section views of objects from orthographic and pictorial drawings

6.2.5.2 Describe when revolved and removed section views are appropriate

6.3 The Application of Sections and Views

6.3.1 Analyze orthographic and pictorial views of objects and define what sectional views are required

**7.0 Primary Auxiliary Views**

7.1 Primary Auxiliary Views of Inclined Surfaces

7.1.1 Define primary auxiliary views

7.1.2 State the purpose of primary auxiliary views

7.2 Demonstrate the ability to draw full and partial primary auxiliary views

7.3 Project the true length of an oblique line

7.4 Demonstrate the correct method of dimensioning a primary auxiliary view

**EVALUATION:**

Assignments: 30%

Quizzes: 70%

**DATE DEVELOPED:** Nov. 22, 2004

**DATE REVIEWED:**

**REVISION NUMBER:** 3

**REVISED DATE:** March 2013

*Note to instructor: Check PIRS to ensure this outline is the most current version.*