

ITT Technical Institute

AM350 Technical Graphics

Onsite Course

SYLLABUS

Credit hours: 4

Contact/Instructional hours: 50 (30 Theory Hours, 20 Lab Hours)

Prerequisite(s) and/or Corequisite(s):

None

Course Description:

Areas of study include interpretations of symbols, abbreviations, and conventions found in industrial prints. The course offers the opportunity to examine the use of graphics standards and various scales used in technical drawings and to visualize and interpret plan views, sections, and details in prints generated manually and with CAD systems.

Outside Work:

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a "time-based option" for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education, ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the "Course Outline" section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

STUDENT SYLLABUS

Instructor: _____

Office hours: _____

Class hours: _____

Major Instructional Areas

Unit 1

Chapter 1: Engineering and Technology

- Introduction
- Engineering Graphics
- Descriptive Geometry
- Technology

Chapter 2: The Design Process

- Introduction
- The Design Process
- Graphics and Design

Chapter 10: Drawing Instruments

- Introduction
- Drawing Media and Equipment
- Lines
- Measurements
- Scales
- Units- English, Metric

Unit 2

Chapter 3: Problem Identification

- Introduction
- The Identification Process
- Design Worksheets
- Organization of Effort

Chapter 4: Preliminary Ideas

- Introduction
- Individual and Team Efforts
- Plan of Action
- Brainstorming
- Sketching and Notes
- Opinion Surveys

Chapter 11: Lettering

- Introduction
- Lettering Tools
- Guidelines
- First AutoCAD Session- Title Block and Border (pp. 648- 655)
- Lettering in AutoCAD

Unit 3

Chapter 5: Refinement

- Introduction
- Physical Properties
- Application of Descriptive Geometry

Chapter 6: Design Analysis

- Introduction
- Graphics and Analysis
- Types of Analysis

Chapter 12: Geometric Construction

- Introduction
- Drawing in AutoCAD
- Object Snaps in AutoCAD
- Polygons, Circle, Lines, and Arcs
- Tangents

Unit 4

Chapter 7: Decision

- Introduction
- The Decision Making Process
- Types of Decisions
- Presentations
- Written Reports

Chapter 8: Implementation

- Introduction
- Working Drawings
- Specifications
- Assembly Drawings

Chapter 13: Freehand Sketching

- Introduction
- Shape Description
- Sketching Techniques
- Three-view Drawings

Unit 5

Chapter 14: Orthographic Projections

- Introduction
- Orthographic Projection
- Alphabet of Lines
- Multi- View Drawings
- Projecting With a Miter Line
- Partial Views
- Conventional Practices
- Fillets and Rounds
- 3rd Angle Projection
- 1st Angle Projection
- Drawing Orthographic Views in AutoCAD

Chapter 37: 2D Computer Graphics in AutoCAD

- Introduction
- Drawing Aids

- Drawing Layers
- Toolbars
- Drawing Scale
- Saving and Exiting
- Plotting
- Blocks

Unit 6

Chapter 15: Primary Auxiliary Views

- Introduction
- Folding Line Principle
- Auxiliaries from the Top View
- The Rules of Auxiliary Construction
- Secondary Auxiliary Views

Chapter 16: Sections

- Introduction
- Sectioning Basics
- Sectioning Symbols
- Full Sections
- Half Sections
- Broken-Out Sections
- Hatching in AutoCAD

Unit 7

Chapter 17: Screws, Fasteners, and Springs

- Introduction
- Thread Terminology

- English Thread Specification
- Metric Thread Specification
- Thread Representation

Chapter 20: Dimensioning

- Introduction
- Terminology
- Units
- English/Metric Conversions
- Dimensioning Rules
- Notes
- Dimensioning in AutoCAD

Unit 8

Chapter 21: Tolerances

- Introduction
- Tolerance Dimensions
- Mating Parts
- Tolerancing Terms
- Fits
- Geometric Tolerances
- Tolerance Notes
- Rules for Tolerancing
- Dimensioning and Tolerancing in AutoCAD

Chapter 22: Welding

- Introduction
- Welding Terminology
- Welding Processes
- Welding Symbols
- Surface Contouring

- Brazing and Soldering

Unit 9

Chapter 23: Working Drawings

- Introduction
- Working Drawings as Legal Documents
- Dimensions and Units
- Laying Out Detail Drawings
- Notes and Other Information
- Checking a Drawing
- Assembly Drawings
- Working Drawings in AutoCAD

Chapter 24: Reproduction of Drawings

- Introduction
- Computer Reproduction
- Types of Reproduction
- Assembly Drawing Sets
- Transmittal of Drawings

Unit 10

Chapter 36: Electric / Electronic Graphics

- Introduction
- Types of Diagrams
- Schematic Diagram Connecting Symbols
- Graphic Symbols
- Terminals
- Separation of Parts
- Numerical Units of Function
- Installation / Circuit Diagrams
- Symbols in AutoCAD

Supplemental I: Piping and Instrumentation Drawings

- Introduction
- Piping Equipment
- Process Control Instruments
- Symbols for Piping
- Drawing P & ID Diagrams in AutoCAD

Unit 11**Review and Final Examination**

- Review session
- Final examination

Course Objectives

Upon successful completion of this course, the student should be able to:

1. Identify the fundamental elements of technical graphics.
2. Identify the instruments used in technical and engineering graphics.
3. Define the field of engineering design graphics and its application to the design process.
4. Describe the methods for solving engineering and design problems with the design process.
5. List the different types of lines and their application.
6. Create lines, circles, and other basic shapes in AutoCAD.
7. Identify the application of lettering in technical drawings.
8. Create and edit text in AutoCAD.
9. Describe the concept of dimensioning in technical drawings and the importance of tolerances in dimensioning.
10. Explain the techniques and principles of orthographic projection.

11. Project lines and planes on auxiliary planes.
12. Create and interpret section views.
13. Read working drawings.
14. Describe the uses of different process control instruments and piping equipment.
15. Identify the features of different types of drawings in piping and instrumentation.
16. Identify the advantages of CAD over manual drawings.
17. Identify the functions of different toolbars in AutoCAD.
18. Dimension and modify simple objects using AutoCAD.
19. Describe the use of screws, fasteners, and springs in relation to industrial automation.
20. Define the basic thread terminology.

Teaching Strategies

Curriculum is designed to promote a variety of teaching strategies that support the outcomes described in the course objectives and that foster higher cognitive skills. Delivery makes use of various media and delivery tools in the classrooms.

Student Textbook and Materials

Text:

Earle, J. H., (2004) *Engineering Design Graphics (11th ed.)*. Upper Saddle River, N.J.: Pearson Prentice Hall.

Course Outline

Unit	Topic (Lecture Period)	Chapters	Lab and Other Coverage
1	The Design Process & Drawing Instruments	1, 2, 10	Labs 1, 2- Lab 3 If Time Permits
2	Ideation & Lettering	3, 4, 11	Labs 1, 2- Lab 3 If Time Permits
3	Design Analysis & Geometric Construction	5, 6, 12	Labs 1, 2- Lab 3 If Time Permits
4	Decision Making and Freehand Sketching	7, 8, 13	Labs 1, 2
5	Orthographic Projections	14, 37	Lab 1
6	Auxiliary Views and Sections	15, 16	Labs 1, 2- Lab 3 If Time Permits
7	Fasteners and Dimensioning	17, 20	Labs 1, 2- Lab 3 If Time Permits
8	Tolerances and Welding Drawings	21, 22	Labs 1, 2
9	Working Drawings and Drawing Reproduction	23, 24	Labs 1, 2- Lab 3 If Time Permits

10	Electronic Graphics and Piping and Instrumentation Drawings	36, S-1	Labs 1, 2
11	Review and Final Examination		

Evaluation Criteria and Grade Weights

Assignments	10%
Exams	20%
Participation	10%
Lab exercises	35%
Final exam	25%

Assignments-	Work assigned by the instructor to be done by the student outside of scheduled class sessions
Exams-	3 Unit Exams
Participation-	Based on participation in classroom activities
Lab exercises-	End of unit labs issued by instructor

Final grades will be calculated from the percentages earned in class as follows:

A	90 - 100%	4.0
B+	85 - 89%	3.5
B	80 - 84%	3.0
C+	75 - 79%	2.5
C	70 - 74%	2.0
D+	65 - 69%	1.5
D	60 - 64%	1.0

F <60% 0.0