

ITT Technical Institute
CD210
Engineering Graphics I
Onsite Course

SYLLABUS

Credit hours: 4

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

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

Prerequisites: CD111 Introduction to Design and Drafting, CD121 Drafting/CAD

Methods

Course Description:

An introduction to the creation of pictorial, auxiliaries, sections and orthographic working drawings incorporating developments, geometric dimensioning and tolerances as they relate to mechanical topics. The fundamentals of weldments, threads, fasteners, springs, mechanisms and symbol libraries are introduced in this course. Manual drafting and CAD techniques are used in the production of working drawings.

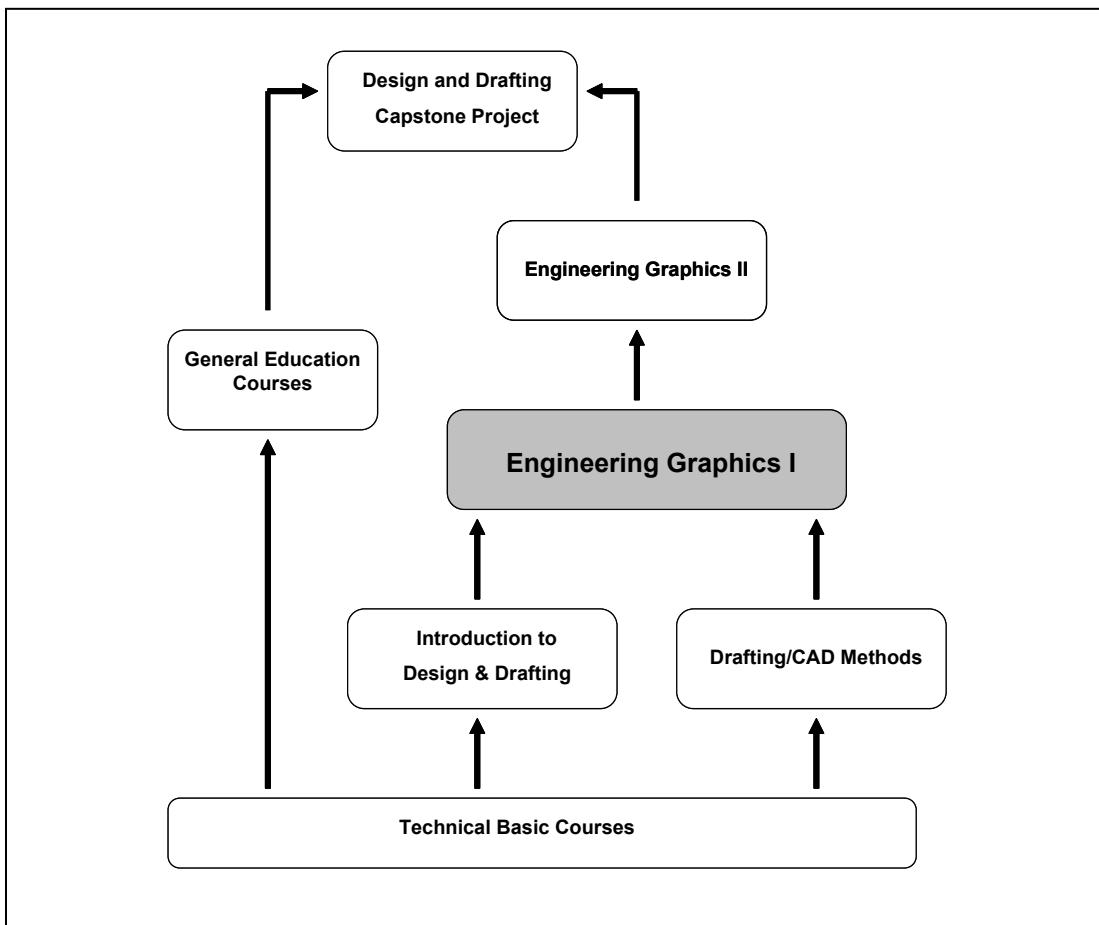
Where Does This Course Belong?

How does this course relate to the program? Take a look!

Engineering Graphics I is a course required to earn an associate degree in the Computer Drafting and Design program.

Many industries use drafters who can translate the ideas, sketches, and specifications from an engineer, architect, or designer into complete and accurate working plans needed to make products, engineer projects, or create structures. Graduates may begin their careers in a variety of entry-level positions in various fields involving drafting and design, some of which include mechanical drafting, piping drafting, architectural and construction drafting, civil drafting, interior design, illustration, and design detailing.

The following course sequence provides an overview of how Engineering Graphics I fits into the program:



Note: Refer to the catalog for the state-specific course information.

First Things First

Welcome! This courseware is designed to provide strategies and resources that will aid you in teaching this course.

The courseware components check list below provides a snapshot of this course. You may want to review the components of the courseware. A good way to track your review is by **checking** in the box next to each component as you review it. Reviewing the components will give you the bigger picture and better prepare you for what is coming up in the next few weeks. All the best!

Courseware Components Check List

Courseware Components	Reviewed
Syllabus	
Course Description	<input type="checkbox"/>
Major Instructional Areas	<input type="checkbox"/>
Course Objectives	<input type="checkbox"/>
SCANS Objectives	<input type="checkbox"/>
Course Outline	<input type="checkbox"/>
Instructional Methods	<input type="checkbox"/>
Instructional Materials and References	<input type="checkbox"/>
Course Evaluation and Grading	<input type="checkbox"/>
Instructor Guide	
Important Notes before You Start	<input type="checkbox"/>
Course Overview	<input type="checkbox"/>
Instructor Resources	<input type="checkbox"/>
Classroom and Lab Setup	<input type="checkbox"/>
Your Feedback	<input type="checkbox"/>
Unit 1	
Objectives	<input type="checkbox"/>
Content Covered	<input type="checkbox"/>
Key Concepts That Must Be Covered in Class	<input type="checkbox"/>
Teaching Tips for This Unit	<input type="checkbox"/>
Homework	<input type="checkbox"/>
Labs	<input type="checkbox"/>
Summary and Reminders	<input type="checkbox"/>
Unit 2	
Objectives	<input type="checkbox"/>
Readings	<input type="checkbox"/>
Key Concepts That Must Be Covered in Class	<input type="checkbox"/>
Teaching Tips for This Unit	<input type="checkbox"/>
Homework	<input type="checkbox"/>
Labs	<input type="checkbox"/>
Summary and Reminders	<input type="checkbox"/>
Unit 3	
Objectives	<input type="checkbox"/>
Readings	<input type="checkbox"/>
Key Concepts That Must Be Covered in Class	<input type="checkbox"/>
Teaching Tips for This Unit	<input type="checkbox"/>
In-Class Assessment	<input type="checkbox"/>
Homework	<input type="checkbox"/>
Labs	<input type="checkbox"/>

Courseware Components	Reviewed
Summary and Reminders	<input type="checkbox"/>
Unit 4	
Objectives	<input type="checkbox"/>
Readings	<input type="checkbox"/>
Key Concepts That Must Be Covered in Class	<input type="checkbox"/>
Teaching Tips for This Unit	<input type="checkbox"/>
Homework	<input type="checkbox"/>
Labs	<input type="checkbox"/>
Summary and Reminders	<input type="checkbox"/>
Unit 5	
Objectives	<input type="checkbox"/>
Readings	<input type="checkbox"/>
Key Concepts That Must Be Covered in Class	<input type="checkbox"/>
Teaching Tips for This Unit	<input type="checkbox"/>
Homework	<input type="checkbox"/>
Labs	<input type="checkbox"/>
Summary and Reminders	<input type="checkbox"/>
Unit 6	
Objectives	<input type="checkbox"/>
Readings	<input type="checkbox"/>
Key Concepts That Must Be Covered in Class	<input type="checkbox"/>
Teaching Tips for This Unit	<input type="checkbox"/>
In-Class Assessment	<input type="checkbox"/>
Labs	<input type="checkbox"/>
Summary and Reminders	<input type="checkbox"/>
Unit 7	
Objectives	<input type="checkbox"/>
Readings	<input type="checkbox"/>
Key Concepts That Must Be Covered in Class	<input type="checkbox"/>
Teaching Tips for This Unit	<input type="checkbox"/>
Homework	<input type="checkbox"/>
Labs	<input type="checkbox"/>
Summary and Reminders	<input type="checkbox"/>
Unit 8	
Objectives	<input type="checkbox"/>
Readings	<input type="checkbox"/>
Key Concepts That Must Be Covered in Class	<input type="checkbox"/>
Teaching Tips for This Unit	<input type="checkbox"/>
Homework	<input type="checkbox"/>
Labs	<input type="checkbox"/>
Summary and Reminders	<input type="checkbox"/>
Unit 9	
Objectives	<input type="checkbox"/>
Readings	<input type="checkbox"/>

Courseware Components	Reviewed
Key Concepts That Must Be Covered in Class	☐
Teaching Tips for This Unit	☐
In-Class Assessment	☐
Labs	☐
Summary and Reminders	☐
Unit 10	
Objectives	☐
Readings	☐
Key Concepts That Must Be Covered in Class	☐
Teaching Tips for This Unit	☐
Labs	☐
Summary and Reminders	☐
Unit 11	
Course Review	☐
Final Exam	☐
Appendix A: Test and Answer Key	
Final Exam	☐
Appendix B: Project for This Course	
Course Project	☐
Appendix C: Lab Solutions	☐
Appendix D	N/A
Appendix E	N/A
Appendix F	N/A
Appendix G: Homework Sheet Solutions	☐

Syllabus: Engineering Graphics I

Instructor:	_____
Office hours:	_____
Class hours:	_____

Major Instructional Areas

1. Geometric dimensioning and tolerancing (GD&T)
2. Threads, fasteners, and springs
3. Working drawings, assemblies, and drawing management
4. Gears, bearings, and cams
5. Welding drawings and symbols

Course Objectives

1. Use geometric dimensioning and tolerancing (GD&T) to control an object with respect to the object's function.
2. Describe the concept of tolerances in dimensioning.
3. Identify the different types of removable fasteners.
4. Describe the terminology of weld callouts used in the welding process.
5. Describe the characteristics of different types of gears and cams.
6. Construct a set of working drawings following procedures and American National Standards Institute (ANSI) standards.
7. Manage a set of working drawings following procedures and ANSI standards.
8. Describe the different types of project views in drawings.
9. Use AutoCAD to create the different projection views according to ANSI standards.

SCANS Objectives

SCANS is an acronym for Secretary's Commission on Achieving Necessary Skills. The committee, created by the National Secretary of Labor in the early 1990s, created a list of skills and competencies that the committee feels are necessary for employees to function in a high-tech job market.

1. Prevent, identify, or solve problems in engineering graphics with computers and other technologies.
2. Judge which set of procedures, tools, or machines, including computers and their programs, will produce the desired results.
3. Employ computers to acquire, organize, analyze, and communicate information.
4. Select and analyze information and communicate the results to others using oral, written, graphic, pictorial, or multimedia methods.
5. Identify the need for data, obtain them from existing sources or create them, and evaluate their relevance and accuracy.
6. Competently perform the tasks of communicating and interpreting information to others, including determining information to be communicated.
7. Participate in conversation, discussion, and group presentations about the change-of-position method and the revolution method.
8. Communicate thoughts, ideas, information, and messages.
9. Competently use computers to process information by entering, modifying, retrieving, storing, and verifying data and other information in engineering graphics.

Course Outline

Note: All graded activities, except the Course Project and Final Exam, are listed below in the pattern of <Unit Number>.<Assignment Number>. For example, Lab 2.1 refers to the 1st lab activity in Unit 2.

Unit	Activities
1— Orthographic Projection and GD&T	<ul style="list-style-type: none"> • Content Covered: <ul style="list-style-type: none"> <i>Engineering Graphics Fundamentals:</i> <ul style="list-style-type: none"> ○ Chapter 1, “Orthographic Projection and GD&T” • Labs: 1.1, 1.2 • Assignments: 1.1
2— Sectional Views and GD&T	<ul style="list-style-type: none"> • Read from <i>Engineering Graphics Fundamentals:</i> <ul style="list-style-type: none"> ○ Chapter 2, “Sectional Views and GD&T” • Labs: 2.1, 2.2 • Assignments: 2.1
3— Auxiliary Views and GD&T	<ul style="list-style-type: none"> • Read from <i>Engineering Graphics Fundamentals:</i> <ul style="list-style-type: none"> ○ Chapter 3, “Auxiliary Views and GD&T” • Quizzes: 3.1 • Labs: 3.1, 3.2 • Assignments: 3.1
4— Dimensioning and Tolerancing in AutoCAD and GD&T	<ul style="list-style-type: none"> • Read from <i>Engineering Graphics Fundamentals:</i> <ul style="list-style-type: none"> ○ Chapter 4, “Dimensioning and Tolerancing in AutoCAD and GD&T” • Labs: 4.1, 4.2 • Assignments: 4.1
5— Geometric Tolerancing in AutoCAD and GD&T	<ul style="list-style-type: none"> • Read from <i>Engineering Graphics Fundamentals:</i> <ul style="list-style-type: none"> ○ Chapter 5, “Geometric Tolerancing in AutoCAD and GD&T” • Labs: 5.1 • Assignments: 5.1, 5.2 • Course Project (Start)
6— Threads, Fasteners, Springs, and GD&T	<ul style="list-style-type: none"> • Read from <i>Engineering Graphics Fundamentals:</i> <ul style="list-style-type: none"> ○ Chapter 6, “Threads, Fasteners, Springs, and GD&T” • Quizzes: 6.1 • Labs: 6.1
7— Working Drawings, Assemblies, and Drawing Management	<ul style="list-style-type: none"> • Read from <i>Engineering Graphics Fundamentals:</i> <ul style="list-style-type: none"> ○ Chapter 7, “Working Drawings, Assemblies, and Drawing Management” • Labs: 7.1 • Assignments: 7.1
8— Gears, Bearings, and Cams	<ul style="list-style-type: none"> • Read from <i>Engineering Graphics Fundamentals:</i> <ul style="list-style-type: none"> ○ Chapter 8, “Gears, Bearings, and Cams” • Labs: 8.1, 8.2 • Assignments: 8.1
9— Axonometric and Oblique Projections	<ul style="list-style-type: none"> • Read from <i>Engineering Graphics Fundamentals:</i> <ul style="list-style-type: none"> ○ Chapter 9, “Axonometric and Oblique Projections” • Quizzes: 9.1 • Labs: 9.1, 9.2
10— Welding Drawings	<ul style="list-style-type: none"> • Read from <i>Engineering Graphics Fundamentals:</i> <ul style="list-style-type: none"> ○ Chapter 10, “Welding Representation” • Labs: 10.1 • Course Project (Submit)
11— Course Review and	<ul style="list-style-type: none"> • Course Review • Final Exam

Unit	Activities
Final Exam	

Instructional Methods

This course will provide information in various ways, such as lectures, collaborative (team) learning options, hands-on laboratory activities, guest speakers, Internet-based communications, and educational software. Your instructor will regularly assess your progress through weekly assignments and graded lab work, three quizzes, and a final exam. In addition, in the second half of the course, you will complete an individual project that brings together the major concepts of the course.

Classroom practices are expected to create a climate of high values with respect to both diversity and inclusiveness. An open communication environment will help to ensure useful interactions between you, the instructor, and the other students. Your instructor may make lesson plans, course materials, notes, or other information resources available to you as needed.

Instructional Materials and References

Student Textbook Package

Bethune, J. (2012). *Engineering Graphic Fundamentals (Custom 3rd ed.)*. Boston, MA: Pearson Custom

Equipment and Tools

- CDD drafting kit
- CDD drafting table

References

ITT Tech Virtual Library

Log on to the ITT Tech Virtual Library at <http://library.itt-tech.edu/> to access online books, journals, and other reference resources selected to support ITT Tech curricula.

Books

You may click "Books" or use the Library Catalog on the home page to find the following books.

- Boothroyd, G., et al. *Product Design for Manufacture and Assembly*. 2nd ed. Boca Raton, FL: CRC Press, 2002.
- Dorf, R. C. *The Engineering Handbook*. 2nd ed. Boca Raton, FL: CRC Press, 2005.
- Dorf, R. C., ed. *The Mechanical Systems Design Handbook: Modeling, Measurement, and Control*. Boca Raton, FL: CRC Press, 2002.
- Eder, W. E., and S. Hosnedl. *Design Engineering: A Manual for Enhanced Creativity*. Boca Raton, FL: CRC Press, 2008.
- Giudice, F., et al. *Product Design for the Environment: A Life Cycle Approach*. Boca Raton, FL: CRC Press, 2006.
- Lo, J., and D. Pressman. *How to Make Patent Drawings: A Patent it Yourself Companion*. 5th ed. Berkeley, CA: Nolo, 2007.
- McGraw-Hill Professional. *Resumes for Scientific and Technical Careers*. 3rd ed. New York: McGraw-Hill Professional, 2008.
- Yang, K., and B. El-Haik. *Design for Six Sigma: A Roadmap for Product Development*. 2nd ed. New York, NY: McGraw-Hill, 2009.

Periodicals

You may click “Periodicals” or use the “Search” function on the home page to find the following periodicals.

ITT Tech Virtual Library> Main Menu> Periodicals> Academic Search Elite>

- Pektas, Sule. “Effects of Cognitive Styles on 2D Drafting and Design Performance in Digital Media.” *International Journal of Technology & Design Education* 20 (2010): 63-76.

ITT Tech Virtual Library> Main Menu> Periodicals> ProQuest>

- Anonymous. “The Art of Mechanical Drawing: A Practical Course for Drafting and Design.” *Mechanical Engineering* 131 (2009): 57-57.
- Design News
- Inside AutoCAD

School of Study

You may click “Program Links” or use the “E-Journal Lookup” function on the home page to find the following program links.

ITT Tech Virtual Library> School of Study> School of Drafting and Design> Recommended Links> Dictionaries

- CAD/CAM Glossary

ITT Tech Virtual Library> School of Study> School of Drafting and Design> Recommended Links> Directories

- The Blue Book of Building and Construction

ITT Tech Virtual Library> School of Study> School of Drafting and Design> Recommended Links> General

- CADD Primer: An online CAD tutorial
- The History of CAD

ITT Tech Virtual Library> School of Study> School of Drafting and Design> Recommended Links> Geometric Dimensioning & Tolerancing

- GD&T Glossary

ITT Tech Virtual Library> School of Study> School of Drafting and Design> Professional Organizations

- American Design Drafting Association
- American Institute of Steel Construction
- American Society of Civil Engineers
- American Society of Mechanical Engineers
- Autodesk User Group International (AUGI)
- Industrial Designers Society of America
- Materials Research Society
- Project Management Institute
- SkillsUSA-VICA
- Society of Automotive Engineers
- Society of Manufacturing Engineers
- Women In Technology International

ITT Tech Virtual Library> School of Study> School of Drafting and Design> Recommended Links> Software

- AutoCAD Commands
- Autodesk Support
- FreeCAD.com

Other References

The following resources may be found outside of the ITT Tech Virtual Library, whether online or in hard copy.

Books

- Bertoline, G. *Fundamentals of Graphics Communication*. Glencoe, IL: McGraw-Hill, 2011.
- Boothroyd, G. *Product Design for Manufacture and Assembly*. New York, NY: CRC Press, 2010.
- Dix, M., and P. Riley. *Discovering AutoCAD 2012*. Upper Saddle River, NJ: Prentice Hall, 2011.
- Grabowski, R. *The Illustrated AutoCAD 2012 Quick Reference*. Florence, KY: Delmar Publishing, 2011.
- Koser, G., and D. Zirwas. *Workplace Skills for Success with AutoCAD 2011: Basics*. Upper Saddle River, NJ: Prentice Hall, 2011.
- Lang, K., and A. Kalameja. *AutoCAD 2011: Tutoring for Engineering Graphics*. Florence, KY: Cengage Learning, 2011.
- Omura, G. *Introducing AutoCAD 2010 and AutoCAD LT*. New York, NY: John Wiley & Sons, 2009.
- Tickoo, S. *AutoCAD 2010: A Problem Solving Approach*. Florence, KY: Autodesk Press, 2009.

Periodicals

- CADALYST Online
<http://www.cadalyst.com>
- CAD Digest
<http://www.caddigest.com>
- CADinfo.NET
<http://www.cadinfo.net>
- CAD User Magazine
<http://www.caduser.com>
- Tokuta, A. O. "Computer Graphics." *AccessScience* (2008).
- White, K. P., and L. G. Richards. "Computer-Aided Design and Manufacturing." *AccessScience* (2008).

Websites

- American Design Drafting Association
<http://www.adda.org>
ADDA is a non-profit professional society serving the professional growth and advancement of individuals, students, instructors, and organizations in the professional graphic community.
- Autodesk Education Community
<http://students.autodesk.com/>
This Autodesk site offers free downloads, training, and a design showcase for students.
- Car Body Design
<http://www.carbodydesign.com/>
This site provides links to automotive design and engineering technical publications, design tutorials, and selected daily news from the automotive and design world, including original projects created by emerging designers.
- Industrial Designers Society of America
<http://www.idsa.org/>
This professional organization works to advance the industrial design profession. The site includes a section for students and educators.
- Material Property Data

<http://www.matweb.com/index.asp?ckck=1>

MatWeb is a searchable database of material properties.

- PBS CAD Standards (2010)

http://www.gsa.gov/graphics/pbs/CAD_standards_06-18-10.pdf

All links to Web references outside of the ITT Tech Virtual Library are always subject to change without prior notice.

Course Evaluation and Grading

Evaluation Criteria Table

The final grades will be based on the following categories:

CATEGORY	WEIGHT
Assignments	20%
Labs	25%
Quizzes	15%
Course Project	20%
Final Exam	20%
Total	100%

Note: Students are responsible for abiding by the Plagiarism Policy.

Grade Conversion Table

The final grades will be calculated from the percentages earned in the course, 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

(End of Syllabus)