



COURSE OUTLINE

ENT116
Course Number

Engineering Graphics
Course Title

2
Credits

1/2
Lecture/Laboratory Hours

COURSE DESCRIPTION

Broad-based course in basic graphic concepts of engineering drawing, including such topics as orthographic projection, sectioning, isometric drawing, and dimensioning.

Required Text:

Fundamentals of Graphics Communication

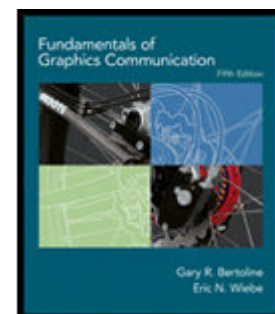
Author(s): Bertoline, Gary Robert / Wiebe, Eric N.

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Publisher: McGraw-Hill Publishing Company

Book Type: Paperback



Prerequisites:

Co-requisites: ENG 033 and MAT 033 or equivalent proficiency

Coordinator: John Santosuosso

Latest Review: 2007

I. GENERAL COURSE OBJECTIVES

The well-trained engineer, scientist, or technician must be able to make correct graphical representations of engineering structures, designs, and data relationships. This implies that the student have a deep understanding of the fundamental principles of the graphic language, and be able to execute the work with reasonable skill. Throughout the course, the correct methods of graphic representation and instrument use will be demonstrated and explained. The student is expected to learn these methods and techniques so that correct habits may be formed and maintained. The instructor will insist upon absolutely correct form and solutions at all times.

The following are general course objectives:

- A. To produce accurate and correct drawings. The student must acquire the habit of consistently accurate and correct work.
- B. To produce neat and legible work. The student must produce clear, legible work for successful completion of the course.
- C. The student must develop a demonstrated understanding of the standard principles of engineering graphics. These principles include the theories of orthographic projection, isometric drawing, standard dimensioning techniques, and sectioning operations of single parts.

UNIT I:

TOOLS, LETTERING AND GEOMETRIC CONSTRUCTION

A. Time Required: 2 Weeks

B. Unit Description:

This unit will familiarize the student with the tools and equipment used in the course, fundamental lettering procedures, and basic geometric construction.

C. Specific Objectives:

- 1. Students must be able to identify, care for, and manipulate properly all tools and equipment required in the course. Proficiency is expected to develop and improve throughout the course.
- 2. Students must be able to produce engineering lettering using single stroke gothic form, developed in proper guidelines. The student should be improving lettering speed and accuracy over the course of the semester.
- 3. Students must be able to produce with standard drafting equipment, but without templates, geometric constructions including hexagon, octagon, and other polygons. Special attention will be given to arc tangencies and arcs tangent to points.

D. Method of Instruction:

An introduction is offered defining the type of drawings, caliber of work expected and the class decorum required to produce a good grade for this course. The purchase of drafting equipment and a list of tools that will meet the minimum requirements for the graphics courses are discussed.

Care of the equipment and the use of fine line pencils will be dealt with in depth. Lines and line work on drawings will be demonstrated by using ready-made blue prints and originals, examples displayed on the overhead projector, and through demonstrations on the chalkboard. The art and rules to be used in lettering drawings will be demonstrated.

Geometric construction using the basic tools of drafting will be illustrated showing methods that may be used and accuracy that must be developed to produce acceptable drawings. The proper use of compass, triangle, etc. will be included.

UNIT II:

ORTHOGRAPHIC PROJECTION AND DIMENSIONING

A. Time Required: 4 Weeks

B. Unit Description:

In this unit, the student will develop a working knowledge of the theory and practice of orthographic projection, the ability to apply dimensions to orthographic drawings in proper form and technique, and develop an emerging understanding of precision tolerancing.

C. Specific Objectives:

1. The student must be able to produce 85% accurate multi-view drawings of moderately complex shapes using standard orthographic third angle projection, and should be capable of 75% accurate drawings of more complex shapes.
2. The student must be capable of producing these drawings in most standard scales (i.e. 1/4, 1/2, 3/4) size with accuracy of $\pm 1/16$ " actual, and should be capable of this accuracy in any of the standard scales.
3. The student must be able to apply dimensions to a two or more view orthographic drawing either from given information or from scaling the drawing itself, according to A.N.S.I. Standards, using both aligned and unidirectional systems.
4. The student must be able to state properly in limit and bilateral form, specific tolerances of size according to a prescribed class of fit.

D. Method of Instruction:

Standard rules and methods of dimensioning and drawing are introduced. Extension, dimension lines, arrows and dimension lettering are discussed relative to actual drawings during formal lectures.

E. Lecture and Laboratory Emphasis:

Orthographic drawings are introduced with an illustrated lecture. After several demonstrations and supervised board work, the student is given problems to complete. This work will show the level of competence which will then allow the instructor to point out deficiencies, review areas of instruction or go on to more sophisticated drawings. The concept of drawing scales will be discussed and demonstrated.

UNIT III:

SECTIONS

A. Time Required: 3 Weeks

B. Unit Description:

This unit allows the student to develop an understanding of section views and a reasonable skill level in the construction of a section within the bounds of orthographic views.

C. Specific Objectives:

1. The student must be able to draw a full, half or offset section view of an object of moderate complexity--see text problems.
2. The student must be able to properly construct a revolved and broken-out section from given orthographic views.

D. Method of Instruction:

Perusal of simple drawings will be used to explain conventions of sections: The student should draw several of these types of sections, including the drawing of at least one assembly section of approximately six parts.

UNIT IV:

ISOMETRIC DRAWING

A. Time Required: 3 Weeks

B. Unit Description:

In this unit, the student will learn to express ideas graphically in a pictorial form, and to transpose an orthographic projection to a pictorial drawing.

C. Specific Objectives:

1. The student will be able to prepare a neat, accurate drawing in isometric form, from orthographic views, including circular shapes (see text for typical degree of difficulty).
2. The student will be able to apply dimensions to at least one form of pictorial drawing in an acceptable form, according to text standards.
3. The student must be able to represent oblique and angular surfaces in an isometric drawing.

D. Method of Instruction:

Lecture and laboratory time will be devoted to explanation and practice of isometric drawing, including simple circular shapes. Discussion and problems on isometric construction of angles, plus dimensioning of isometric drawings, will be the dominant topics.

UNIT V:

SPECIAL PROJECT

A. Time required, 3 weeks

B. Unit Description

The student will prepare a civil engineering technology drawing involving contours, elevations and other site related elements.

C. Specific Objectives

1. The student will be able to explain the terminology of site plan elements.
2. The student will be able to draw cross sections, profiles and plan views of a site plan.

D. Method of Inspection

Lecture and laboratory time will be devoted to the explanation and practice of civil engineering related drawings.

II. **COURSE GRADING**

A. Drawing and Project Grades:

All drawings and projects will be graded on an A+ to F basis and weighted relative to the time required to complete them. Late drawings and projects will be subject to grade reductions at the rate of one letter grade per day. After five days, late drawings and projects will not be accepted. This policy may be modified by the course instructor relative to individual course needs.

B. Quizzes:

Unannounced quizzes may be given at any time. Quizzes missed because of student absence may not be made up.

C. Summative Evaluation:

A final examination or other summative evaluation will be developed and given by the instructor covering objectives learned throughout the semester.

D. Final Grades: Final grades will be calculated as follows:

Drawings & Projects	70%
Quizzes	20%
Semester Evaluation	10%
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	100%

Academic Integrity Statement:

Students are expected to comply with the college-wide requirements for academic integrity. Mercer County Community College is committed to Academic Integrity—the honest, fair, and continuing pursuit of knowledge, free from fraud or deception. This implies that students are expected to be responsible for their own work. Presenting another individual's work as one's own and receiving excessive help from another individual will qualify as a violation of Academic Integrity. The entire policy on Academic Integrity is located in the Student handbook and is found on the college website (http://www.mccc.edu/admissions_policies_integrity.shtml).

**MERCER COUNTY COMMUNITY COLLEGE
EQUIPMENT & SUPPLIES LIST
ENT 116**

<u>Item No.</u>	<u>Description</u>
1	<u>Triangles:</u> 1-45° x 8" and 1 30° x 8" clear acrylic plastic
2	<u>Scale</u> 12" combination. Stadler-Mars #987-1939
3	<u>Bow Compass:</u> 6" with beam extension
4	<u>Drafting pencils:</u> Mechanical Fine Line Type KOH-1-NOOR Rapidomatic or Equal. Size .5mm - 2 required .7mm - 1 required
5	<u>Fine Line Drawing leads:</u> one package of the following size: .5mm - HB Grade (Graphite) .5mm - Non Photo (Blue) .7mm - HB Grade (Graphite)
6	<u>Drafting Leadholder</u> One required
7	<u>Lead for Leadholder</u> - Grade "H" (Graphite)
8	<u>Drafting Lead Pointer</u> - K & E Lancer Style
9	<u>Circle Template:</u> 1/16" to 2 1/4" Diameter Holes
10	<u>Eraser:</u> White Vinyl Pencil Type
11	<u>Erasing Shield</u>
12	<u>French Curve:</u> Any Style, clear acrylic plastic
13	<u>Dry-cleaning Pad:</u> (Fine Powder)
14	<u>Protractor:</u> 6" with 1/2° graduations
15	<u>Drafting Tape:</u> Scotch #238 or <u>Taping Dots</u>
16	<u>Drawing Storage Tube:</u> 3" Diameter x 30" long
17	<u>Drafting Duster Brush</u>
18	<u>Drafting Vellum:</u> 11" x 17" ("B" Size) K & E Albanene Only! Or 17 x 22 ("C" Size) as per instructor.