

COURSE OUTLINE

Engineering 103 Descriptive Geometry

Catalog Statement

Engineering 103 presents a study of a valuable engineering tool which facilitates the solution of engineering problems graphically. It has a study of lines and planes in space, the representation of surfaces, solids, interferences, and intersection. It is also excellent training in visualization and interpretation of engineering drawings.

Total Lecture Units: 0.0

Total Laboratory Units: 0.0

Total Course Units: 0.0

Total Lecture Hours: 0.0

Total Laboratory Hours: 0.0

Total Laboratory Hours To Be Arranged: 0.0

Total Faculty Contact Hours: 0.0

Prerequisite: Engr 101 and Arch 101

Recommended preparation: Engr 109

Note: This course may not be taken for credit by students who have completed Architecture 103.

Course Entry Expectations

Prior to enrolling in the course, the student should be able to:

Skill Level Ranges: Reading 5; Writing 5; Listening 1/ Speaking 5; Math 3.

- complete a series of basic drafting assignments utilizing lecture and text information;
- demonstrate their knowledge of basic drafting and dimensioning through a series of drawing assignments;
- gain a basic knowledge of industrial drafting practices through tests and lecture information.

Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:

- develop the ability to create flat pattern developments in relation to mechanical design requirements through a series of problems;
- develop spatial relationships within different types of geometry through the use of computer aided drafting and or working drawings;
- demonstrate knowledge of descriptive geometry through a series of lectures and work book assignments.

Course Content

Total Faculty Contact Hours = 96.0

Orthographic drawing	Lecture 4 hours Lab 12 hours
Review of the theory of third angle projection	
Folding of the image planes and point notations	
Auxiliary elevation views	
Inclined views	
Related views	
Reading orthographic views	
Fundamental auxiliary views	Lecture 4 hours Lab 12 hours
The four fundamental views for solution of problems	
Determination and reading of the bearing of a line	
The true length and the slope of a line	
Planes in space, edge view, true size and shape, and the determination of slope	
Point, line, and plane problems	Lecture 4 hours Lab 16 hours
Theorems	
A point on a line	
A point on a plane	
A line of given length, bearing, and slope	
Plane containing one line and parallel to another line	
Shortest distance between any two lines	
Intersection of any two oblique planes	
Dihedral angles	
A circle on an oblique plane	
Rotation	Lecture 5 hours Lab 13 hours
Principles of rotation	
To find the true length of a line	
To determine the true size and shape of a plane	
Other solutions possible by use of rotation	
Curved lines and surfaces	Lecture 4 hours Lab 12 hours
Introduction and definitions	
A study of cylinders	
A study of cones	
Development of surfaces	
Lines of intersection on curved surfaces	
Presentation of Project	Lecture 2 hours Lab 8 hours
Creation of a portfolio	
Final project	

Methods of Instruction

The following methods of instruction may be used in this course:

- lecture;
- multimedia;
- guest speakers;
- field trips.

Out of Class Assignments

The following out of class assignments may be used in this course:

- weekly forum posts (e.g. short written response to weekly forum question);
- individual and group projects (e.g. completion of projects from lab manual);
- written research (e.g. writing a research paper on an assigned topic).

Methods of Evaluation

The following methods of evaluation may be used in this course:

- Performance tests (e.g. timed drawing tests);
- Midterm examination (e.g. a performance-based drawing project);
- Final examination (e.g. a performance-based drawing project);
- Portfolio review and critique (e.g. a critique of all of the work that the student has accomplished during the course).

Textbooks

Martin, D., *Descriptive Geometry Lab Manual*, Current edition.
Glendale: Glendale Community College Bookstore, 2009. Print
10th Grade Textbook Reading Level.

Pare, E.G. *Descriptive Geometry*. 9th ed.
San Francisco: Peachpit, 1996. Print.
13th Grade Textbook Reading Level. ISBN: 978-0023913419.

Student Learning Outcomes

Upon successful completion of the required coursework, the student will be able to:

- Know the different auxiliary view and their appropriate uses for planes, lines, patterns, spaces, and points.
- Know how to draw and determine the true slope, slope length, dihedral angles, along with lines, curved lines, and curves surfaces.
- Know how to solve both coplanar and non-coplanar vector geometry problems.
- Student will demonstrate knowledge of CAD software and utilize their descriptive geometry in the job force.