

**Western Michigan University**  
**College of Engineering and Applied Sciences**  
**Department of Industrial and Manufacturing Engineering**

**IME 1440: Descriptive Geometry**  
**Spring Semester 2009**

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- Catalog Description: Application of analytical graphics in solution of engineering and technical design problems. Study of spatial concepts involving points, lines, planes, and solids. Lecture/Lab (2 & 3 hrs.); Credits: 3 hrs.
- Prerequisites by Courses:  
IME 1420: Engineering Drafting
- Prerequisites by Topic:
  1. The fundamental ability to perform geometric construction techniques.
  2. The ability to measure and produce scale drawings (both metric and customary.)
  3. An understanding of dimensioning and standards.
  4. A background in three-dimensional relational visualization.
  5. A fundamental understanding of third-angle orthographic projection procedures.
  6. A preliminary ability in the production of primary and secondary auxiliary views.
- Textbooks: (required)  
Pare, E. G., Loving, R. O., Hill, I. L., and Pare, R. C., Descriptive Geometry, 9th edition, Prentice Hall, Inc., Upper Saddle River, NJ. 1997.  
  
Pare, E. G. et al, Descriptive Geometry Worksheets Series A, 9th edition, Prentice Hall, Inc., Upper Saddle River, NJ, 1997.  
  
[Drafting instruments]
- References:  
Holliday-Darr, K., Applied Descriptive Geometry, 2<sup>nd</sup> Edition, Delmar Publishers, Albany, NY, 1998.
- Course Instructor:  
Jorge Rodriguez, PhD, MBA., Parkview Campus E-224, (269) 276-3374, jorge.rodriguez @wmich.edu.
- Objectives<sup>1</sup>:

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<sup>1</sup> Letter in parenthesis refers to the ABET-TAC criteria

In accordance with the above stated course description, at the conclusion of the semester the student should be able to:

1. Visualize, analyze, and solve three-dimensional engineering and technical problems using graphical procedures. (a, b, c, f, & g)
2. Adequately utilize a descriptive vocabulary (both verbal and graphical) to describe entity relationship standards. (a, f, & g)
3. Apply descriptive geometry in the engineering analysis design process. (a, b, f, & g)

- Topics (tentative schedule):

Wk 1 (1/7)	Introduction to course, Orthographic Projection (Ch 1)
Wk 2 (1/14)	Primary Auxiliary Views (Ch 2). T-F-S-Normal
Wk 3 (1/21)	Lines (Ch 3). TL-Principal-BSG
Wk 4 (1/28)	Planes (Ch 4). Lines in Planes, Pictorials
Wk 5 (2/4)	Successive Auxiliary Views (Ch 5). PV, EV, NV
Wk 6 (2/11)	Piercing Points (Ch 6). Auxiliary View and Two-view Methods. PARTIAL EXAM 1
Wk 7 (2/18)	Intersection of Planes (Ch 7). AV, TV, Cutting Plane Methods
Wk 8 (2/25)	Angle Between Planes (Ch 8). Dihedral Angle, Oblique-Principal. SPRING BREAK
Wk 9 (3/11)	Parallelism (Ch 9). Lines/Planes, Pictorials.
Wk 10 (3/18)	Perpendicularity (Ch 10). Lines/Planes, Common Perpendicular.
Wk 11 (3/25)	Angle Between Line and Oblique Plane (Ch 11) PARTIAL EXAM 2
Wk 12 (4/1)	Vectors (Ch 14) Definitions, Resultants, Relative Motion.
Wk 13 (4/8)	Shape and Shadow (Ch 19).
Wk 14 (4/15)	Perspectives Projections (Ch 20).
Wk 15 (4/2X)	FINAL EXAM

- Evaluation:

1. Laboratory assignments	40%
2. During-semester Examinations	20%
3. Quiz, Homework, In class	25%
4. Final Examination	15%

- Performance Criteria<sup>2</sup>:

The student should be able to:

Objective 1

- 1.1 Determine the solution to a variety of technical and engineering problems through direct projection procedures. [1, 2, 3, 4, & 5]
- 1.2 Ascertain the solution to a variety of problems through revolution and cutting plane methods. [1, 2, 3, 4, & 5]

Objective 2

- 2.1 Identify the standard characteristics of line and plane relationships in cartesian coordinate space. [1, 2, 3, 4, & 5]

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<sup>2</sup> Number in parenthesis refers to the evaluation method

- 2.2 Properly use terminology to describe lines and plane relations. [1, 2, 3, & 5]
- Objective 3
  - 3.1 Accurately interpret the results of problem solutions in design determination. [1, 2, 3, 4, & 5]
  - 3.2 Resolve vector and static structure force elements through graphical methods. [1, 2, & 5]

- Computer Usage:  
Some use of computer hardware and software is required in this course.
- Laboratory Project:  
No lab project is assigned in this course.
- Oral and Written Communications:  
Written work might be assigned as progress checks during the semester.
- Calculus Usage:  
No use of calculus is expected in this course.
- Library Usage:  
Use of the Library is expected to obtain proper references for assignments.
- Comments:
  - Bring your drafting instruments to lecture and lab sessions.
  - Lecture sessions mainly consist of introduction to concept and in-class exercises. Lab sessions include in-lab work, due at the end of the lab, and homework assignment due at the start of the following lab session
  - Quizzes/exams are written ones. Lecture/lab quizzes could be previously announced or not.
  - All homework is due at the beginning of the following lecture of the same type (i.e., lecture or lab), unless indicated otherwise.
  - All work should be done individually. Student is responsible for being aware of the “Academic Honesty” section of the Student Rights and Responsibilities (WMU Undergraduate Catalog).
  - Presentation is important. Hand-written reports are not acceptable.
  - Strict control of the due dates will be kept. Penalty applies to any late submission of work. The penalties are: 25% for submission during the same session, 50% for submission the same day, additional 25% per calendar day for subsequent days.
  - No work will be accepted after the assignment has been graded.
  - Make up exams and quizzes will be given only for verified excused absences informed before the exam/quiz takes place (unless is an extreme situation).
  - An evaluation will be distributed around mid-semester. It covers what you have learned in the lecture and the lab, what you would like to see changed and kept, and any recommendations or suggestions you might have to improve the course and the learning.
  - E-mail will be used during the semester.

Grades: Based on average and standard deviation for the group. A very good estimate of your grade at any time during the semester is to multiply by the factor (80/Average) and follow a standard scale: 100-93/92-89/88-83/82-79/78-73/72-69/68-63/62-0.

Note: These are basic guidelines. If you have any questions or doubts about something, please ask about it. I will be more than willing to explain or clarify your doubts. Do not assume or expect anything.

**Let's get started!!!**

Prepared by: Jorge Rodriguez

Date: January 2009

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