

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

**IME 1440: Descriptive Geometry
Spring Semester 2010**

Instructor - Mr. David Middleton, IDSA
Parkview Campus G-241,
IME Dept. phone +1-269-276-3350, leave message or use e-mail
david.middleton@wmich.edu
office hours before or after lecture or lab and by appointment

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, 2nd Edition, Delmar Publishers, Albany, NY, 1998.

Course Coordinator:

Jorge Rodriguez, PhD, MBA., Parkview Campus E-224, (269) 276-3374,
jorge.rodriguez @wmich.edu.

Objectives¹:

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	11 Jan	Introduction to course, Orthographic Projection (Ch 1)
Wk 2	18 Jan	NO CLASS MONDAY, MLK DAY, Primary Auxiliary Views (Ch 2). T-F-S-Normal
Wk 3	25 Jan	Lines (Ch 3). TL-Principal-BSG
Wk 4	1 Feb	Planes (Ch 4). Lines in Planes, Pictorials
Wk 5	8 Feb	Successive Auxiliary Views (Ch 5). PV, EV, NV
Wk 6	15 Feb	Piercing Points (Ch 6). Auxiliary View and Two-view Methods. PARTIAL EXAM 1
Wk 7	22 Feb	Intersection of Planes (Ch 7). AV, TV, Cutting Plane Methods
	1 Mar	!!! SPRING BREAK
Wk 8	8 Mar	Angle Between Planes (Ch 8). Dihedral Angle, Oblique-Principal.
Wk 9	15 Mar	Parallelism (Ch 9). Lines/Planes, Pictorials.
Wk 10	22 Mar	Perpendicularity (Ch 10). Lines/Planes, Common Perpendicular.
Wk 11	29 Mar	Angle Between Line and Oblique Plane (Ch 11) PARTIAL EXAM 2
Wk 12	5 Apr	Vectors (Ch 14) Definitions, Resultants, Relative Motion.
Wk 13	12 Apr	Shape and Shadow (Ch 19).
Wk 14	19 Apr	Perspectives Projections (Ch 20).
Wk 15	26 Apr 5-7pm	FINAL EXAM, in lecture room (Please Note – as of 11 January 2010, the instructor, David Middleton, will NOT be present for the final exam. He will be out of town for an accreditation visit to another university. An experienced substitute will be here to give the test. HOWEVER, it is best if questions are asked before the final rather than when you walk in.

Evaluation:

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

¹ Letter in parentheses refers to the ABET-TEC criteria

Performance Criteria²:

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]
- 1.2 Ascertain the solution to a variety of problems through revolution and cutting plane methods. [1, 2, 3, & 4]

Objective 2

- 2.1 Identify the standard characteristics of line and plane relationships in Cartesian coordinate space. [1, 2, 3, & 4]
- 2.2 Properly use terminology to describe lines and plane relations. [1, 2, 3, & 4]

Objective 3

- 3.1 Accurately interpret the results of problem solutions in design determination. [1, 2, 3, & 4]
- 3.2 Resolve vector and static structure force elements through graphical methods. [1,2, & 4]

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.

² Number in parenthesis refers to the evaluation method

- 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.
- University approved excused absences will allow you to avoid penalties but the work is still due.
- 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). Contact the instructor by e-mail.
- 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. The instructor expects each student to check his/her WMU e-mail at least once a day. Class cancellations or other news and information will be sent via e-mail to your WMU registered e-mail address only.

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 $(80/\text{Average})$ and follow a standard scale:

A-100-93; BA-92-89; B-88-83; CB-82-79; C-78-73; DC-72-69; D-68-63; F-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.

Prepared by: Jorge Rodriguez, January 2009
JRV010509

Edited by David Middleton, January 2010