

Western Michigan University
College of Engineering and Applied Sciences
Engineering Design, Manufacturing, and Management Systems

EDMM 1440: Descriptive Geometry

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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:

EDMM 1420: Engineering Graphics

Prerequisites by Topic:

The fundamental ability to perform geometric construction techniques.

The ability to measure and produce scale drawings (both metric and customary)

An understanding of dimensioning and standards.

A background in three-dimensional relational visualization.

A fundamental understanding of third-angle orthographic projection procedures.

A preliminary ability in the production of primary and secondary auxiliary views.

Textbooks & Course Materials:

- 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. ISBN-10; 002391341x, ISBN-13; 9780023913419
- Pare, E. G. et al, Descriptive Geometry Worksheets with Computer Graphics Series B, 9th edition, Prentice Hall, Inc., Upper Saddle River, NJ, 1997. ISBN-10 0023913444, ISBN-13 9780023913440

Drafting instruments:

- Mechanical pencils. (These can be inexpensive. You do NOT need an official drafting pencil. Pentel and Bic make great low cost pencils that can last for decades). Your choice on size .3mm, .5mm or .7mm. My favorite is the Pentel Quicker Clicker, almost every store that sells pencils sells a good basic mechanical pencil.
<http://www.pentel.com/store/quicker-clicker-mechanical-pencil-pd345>
- Erasers.
- 6 or 12-inch ruler - clear plastic is best. My favorite is C-Line clear plastic.
- Set of 6 inch triangles – Kit is available at the Bernhard Center (Same one used for EDMM 1420).
- Protractor – Need one that will measure 360 degrees.
- Degree protractor (Clear plastic work best).
- Divider with two needle points, est. 6" - There will be many comparisons and transfers of lengths. These will make your life easier. Much easier!
- Compass, with center wheel, est. 6" - Optional but a good idea
- Eraser shield - Optional cheap helpful tool

Objectives:

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

- Visualize, analyze, and solve three-dimensional engineering and technical problems using graphical procedures.
- Adequately utilize a descriptive vocabulary (both verbal and graphical) to describe entity relationship standards.
- Apply descriptive geometry in the engineering analysis design process.
- Be better able to understand historical engineering documents from the era BC, (Before Computers).
- Learn to see.

What this means for you...

The need for paper has continued from its invention to this day. This may change during your lifetime. Today you will need to be able to sketch at any moment; in the field, on the factory floor; on a napkin. Tablet computers and phones are almost “smart” enough.

There is a world full of old drawings on paper. You need to know how to read them without the help of a Rosetta Stone.

The feedback from the people who hire our students has been consistent for years. People who know Descriptive Geometry “know their way around the part” better than most. Visual, spatial training.

1st. Rule of Descriptive Geometry – Don't Fall Behind!

Each lecture will include a demo of how to do the problems. Each demo will have a note about which problems are to be done.

Topics:

Wk 1	Introduction to course, & Orthographic Projection (Ch 1) WB 1a-1,2,3,4; 1b-1,2,3,4 Video - "Between The Folds" All chapters except 5 & 9
Wk 2	Primary Auxiliary Views (Ch 2). WB 2a-1,2,3,4 MC Escher Do Not ASSUME. Lost in the Lines. Right Brain Left Brain update. Iain McGilchrist: The divided brain, from RSA Animate http://www.ted.com/talks/iain_mcgilchrist_the_divided_brain.html
Wk 3	Lines (Ch 3). Bigger Work Week! WB 3a-1, 2, 3, 4, 5 3b-1, 2, 3 3c-1, 2, 3, 4 Anything I did not get to last Wednesday
Wk 4	Planes (Ch 4). WB-4a1.2.3.4 4b-1.2.3.4 Work from weeks 1, 2 & 3 will all be due by the end of this week.
Wk 5	Successive Auxiliary Views (Ch 5). WB 5a-1.2.3.4 5b-1,2
Wk 6	Review Add reference to KISS principle in relation to cutting plane and transferring shapes from one plane to another – problems 4 and 5 on exam http://en.wikipedia.org/wiki/KISS_principle You may bring one page of hand written notes to use on the exam. EXAM 1 chapters 1, 2, 3 & 4 in Lab Chap 5 due next week.
Wk 7	Piercing Points (Ch 6). WB 6a-1,3 6b-2,3,6 6c-1,3,5 6d-1,3,5 (This is the biggest workload from a single chapter this semester.) Last week to turn in re-do's from chapters 1, 2, 3 & 4
Wk 8	Intersection of Planes (Ch 7) WB 7a-1,2,4 7b-1,3,5 7c-1,3,5
Wk 9	Angle Between Planes (Ch 8). WB 8a-1,2 Find all four angles.
Wk 10	Parallelism (Ch 9). WB 9a-1,2,3,4,5 9b-1,2,4
Wk 11	Perpendicularity (Ch 10). WB 10a-1,2 (extra credit-3,4) 10b-1 (extra-2,3,4) Last week to turn in re-do's from chapters 5, 6, 7 & 8
Wk 12	Review You may bring one page of hand written notes to use in the exam. EXAM 2 chapters 5, 6, 7 and 8 Chap 9 due next week
Wk 13	Angle Between Line and Oblique Plane (Ch 11). WB 11a-1,2a,2b

2nd. Rule of Descriptive Geometry – Don't Fall Behind!

Each chapter's work is due one week after it is assigned by Friday of the week due.

(Week 1 is due week 2. Week 2 is due week 3 etc.)

After the week it is due the score will be dropped by 50% for the rest of the semester. You can always get some points for late work, but it is better to remember rules one and two.

There are FOUR ways to turn in work:

- Hand it to me in lecture, lab or study session.
- Go to the EDMMS Dept. Office F-232, and have it put in my mailbox; M-F 8am to 5pm
- Put it under my office door, G-241. No access to hall after 7pm each day.
- Scan and e-mail the worksheet to david.middleton@wmich.edu.

DO NOT...

...leave the work randomly in any room expecting me to find it as if it were Waldo.

...put it under the F-104 door. Many people use that room and it will get lost.

When turning in the workbook pages you NEED to turn them all in together, i.e. 1a with 1b, 3a, b and c all at the same time. STAPLE them together.

This goes for the teacher too. I have to get the grading done so you can have the paper back in no more than one week. You need time for corrections and to study for the test.

3rd. Rule of Descriptive Geometry – Be ready to REDO for half credit.

REDO - Each problem assigned will be worth 10 points. If you score 7 to 10 points you have earned all you can for that problem. If you score 0 to 6 points you may make corrections, (REDO) for half the missed points. I am NOT going to write REDO. You decide if you get 6 or less on a problem to redo it.

Labs are a time to do work and ask questions. Sometimes I need to finish a lecture in lab.

Do you HAVE TO come to lab in any given week? NO! If your work is done, and if you have no questions, you do not have to come to lab. I keep an attendance sheet for a reference if your work is not turned in or if it is consistently poor. Your work determines your grade, not your attendance.

This is a test of your maturity as a future professional. You have a job to do in this class as in all classes. Will you do your job? Your "paycheck" is your grade. You are given this flexibility to get the work done without required attendance.

I will stay in labs until the last student leaves, whichever comes first. If you know you are going to be late you can e-mail me and let me know.

Evaluation:

Laboratory assignments 50%

Examinations 1 and 2 15% each x 2 = 30%

Final Examination 20%

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: A-100-93; BA-92-89; B-88-83; CB-82-79; C-78-73; DC-72-69; D-68-63; E-62-0.

Comments:

- Bring your drafting Textbook, materials, & instruments to lecture and lab sessions. It is wise to copy the demo as it is being done in class.
- The instructor's demos will be posted as a PDF on e-mail (and/or e-learning if it will work).
- Lecture sessions mainly consist of introductions to concepts and in-class exercises. Lab sessions are a time to do the work and clarification. If you come to the lecture and lab each week you should be able to complete all the work in that time.
- You may come to either Lab in any given week. There are enough chairs in the room to accommodate people who need to switch sections for one week or the entire semester.
- All work should be done individually. Students are responsible for being aware of the "Academic Honesty" section of the Student Rights and Responsibilities (WMU Undergraduate Catalog).
- Presentation is important. Sloppy work will lose points.
- University approved excused absences will allow you to avoid penalties but the work is still due.
- Make up exams will be given only for verified excused absences informed before the exam/quiz takes place (unless it is an extreme situation). Contact the instructor by e-mail.
- I consider severe weather an excused absence for those students who have to commute. I do not need students risking life and property.
- 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.
- You may bring one page of hand written notes to use on each exam.

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. Do not assume or expect anything.