

**ME 0022 – Kinematics
Summer, 2004**

Instructor: Prof. Jeffrey Viperman

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Webpage: <http://www.pitt.edu/~jsv/courses/me0022>

Office hours: Th 12-2; by appointment; solicit help by email.

Prerequisites: MATH0240, ENGR0135, ME0024

Objectives:

1. To survey the various components of machines: linkages, sliders, rockers, cams, followers, gears, screws, belts and pulleys in order to synthesize mechanisms
2. To analyze the displacement, velocity, and acceleration of mechanisms using both graphical and analytical methods
3. Perform analysis of mechanisms using Pro/Mechanica
4. Become proficient at using vectors, geometry, and trigonometry in analysis
5. Lay foundation for ME1015 Kinetics (add forces into analysis)

Textbook: Kinematics, Dynamics, and Design of Machinery, by Kenneth J. Waldron and Gary L. Kinzel, 2nd Edition, John Wiley & Sons, 2004.

Homework: Homework is Assigned and collected the following week. Answers and hints will be posted to the webpage: <http://www.pitt.edu/~jsv/courses/me0022>

Exams: 2 total: 1 Midterm and a Final;

Grading: Exam 1 – 30%; Final Exam – 30%, Project 10%, Homework - 30%

Policies:

1. Homework is due at the start of class
2. One homework problem from each set will be graded in depth for a total of 100 points – all other problems will be graded based on participation for 10 points a piece
3. The homework problems so indicated must be solved using Pro/Mechanica. Print out your solution (after changing to a white background).

<u>Date</u>	<u>Week</u>	<u>Topic(s)</u>	<u>Reading</u>
6-May	1	Course Overview, Common Mechanisms, Constraints and degrees of freedom, Mobility	Ch. 1
13-May	2	Graphical Analysis of linkages with pinned and sliding joints	Ch. 2 Pro/M Notes
20-May	3	Instantaneous Centers of Zero Velocity Pro/M	Ch. 2 & 4
27-May	4	Analytical Methods for linkages: position, velocity, Acceleration	Ch. 5
3-Jun	5	Planar Mechanism Design	Ch. 5 & 6
10-Jun	6	Test 1 Review, Pro/Mechanica	Ch. 6
17-Jun		Test 1	
24-Jun	7	Other mechanisms, Cam design	Ch. 7 & 8
1-Jul		Cams and Spur Gears	Ch. 8 & 10
8-Jul	8	Spur Gears	Ch. 10
15-Jul	9	Helical, bevel, and worm gears	Ch. 10 & 11
22-Jul	10	Gear Trains	Ch. 12
29-Jul	11	Static Force analysis	Ch. 13
5-Aug		Final Exam	