

# **MEE380**

## **FALL 2001**

Instructor: Michael “Mick” Peterson, Ph.D.    E-mail: [mpeterson@umeme.maine.edu](mailto:mpeterson@umeme.maine.edu)  
Office Hours:    Text: Norton, *Design of Machinery*  
Tentative: T, Th 10:30-11:30 p.m.    Class Room: Barrows 125  
or by *e-mail* appt.    Class Meeting: T,Th 8:00 to 9:15 a.m.  
Office Location: 208 Boardman

### **I. PHILOSOPHY**

This course is intended to reinforce previous courses in mechanics and to provide an introduction to the design process. The development of analytical skills results from practice doing problems and from understanding the derivations of the important equations. This class will provide an opportunity to practice skills as well as demonstrate proficiency. In addition, an engineer needs to know when to perform analysis. Occasional problems will be included as homework that address this objective, and this will be a primary objective of the design portion of the class.

### **II. COURSE OBJECTIVES**

- To demonstrate proficiency in analysis of kinematics problems.
- To reinforce basic problem analysis skills.
- To begin the process of learning and practicing design skills needed for engineering practice.

### **III. EXPECTATIONS**

- Attend class, attendance will not be taken, but it is the responsibility of students to obtain any information from their peers if they miss class.
- Homework is a significant factor in this course. The homework must be completed neatly and turned in using the approved format. Any homework that is late or deviates from the specified format will not be graded at the discretion of the instructor and grader. Solutions will be posted.
- It is expected that all academic honesty issues will conform to University regulations and that everyone will maintain a level of professionalism such that no issues will arise in this area. The policy on academic integrity is available and should be reviewed.

## IV. CLASS SCHEDULE

This schedule is tentative and will be used for planning. The later in the semester, the more tentative the schedule!!

<b>Class Session</b>	<b>Date</b>	<b>Topic</b>	<b>Homework</b>
1	Sept. 4	Introduction to Design	
2	Sept. 6	Kinematics of Machines – 2-0 to 2-15	
3	Sept. 11	Kinematics of Machines – 2-0 to 2-15	Working Model and 2-1 a,d,i, j, k
4	Sept. 13	Linkage Synthesis - sections 3.0 to 3.5	3-1 b,e 3.3
5-7	Sept. 18-25	Position Analysis – 4.0 to 4.3, 4.5, 4.6, 4.9, 4.10	4-3, 4-6
8	Sept. 27	Position Synthesis – 5.0 to 5.3	5-2, 5-5
9-10	Oct. 2-11	Velocity Analysis - 6.0 to 6.3, 6.4, 6.7, 6.9	6-3, 6-5
	Oct. 9	Fall Break	
11	Oct. 16	Acceleration Analysis–7.0, 7.1, 7.3, 7.5 – 7.7	7-4, <b>Design Concept Due</b>
12	Oct. 18	Exam I – up to section 6	
13-16	Oct. 23- Nov. 1	Force Analysis – 11.0 – 11.3, 11.4, 11.5, 11.8, 11.11, 11.12	11-5 (use MathCAD), 11-11
17-20	Nov. 6-15	Kinematics of Cams – 8.0 – 8.5, 8.7-8.9	
23-25		Kinematics of Gear Trains 9.0 – 9.8	
22	Dec. 6	Homework due 5:00 p.m. and work session	8-22, 8-23, 9-1, 9-11, 9-25
	Dec. 13	Optional In-Class Exercise, comprehensive	
27-28	Dec. 10-14	Presentations/Demonstration of Concept	<b>Presentation Due</b>
	8:00a.m. Dec. 20	<b>Final report Due</b>	

## V. GRADING

Aspect	Points	Total
Homework		10
Quizzes (3)	3@15%	45
Design Notebook		5
Conceptual Design Document		10
Design Project Final Grade		30
	<b>Total</b>	100

EXTRA CREDIT!!! 5 points – maximum – on your final grade for:  
Participation in the cardboard canoe race – Family and friends weekend

Homework will be graded and returned. Homework will become part of your class notes. Class notes MAY be graded depending on the need for clarification. The notes will then become part of your homework grade. Homework will be graded individually but can represent collaboration with your colleagues.

The quizzes represent a significant portion of your grade. It is expected that a large variation between class members will be in this area. Quizzes will be closed book and closed note with a single information card (4 inch by 6 inch or smaller) to be used to jog your memory. At least one of the quizzes may include a take home problem to be done with Working Model or other software tool. If you miss any quiz you will need to have a reasonable excuse. If the excuse is reasonable, your class grade will depend on the grades you have received on the quizzes that you have taken. Make up exams will not be given. Chronic absence from quizzes and class or unacceptable excuses will result in assignment of a zero for the exam grade. If you have any questions about this rule ask! All questions regarding quizzes or assignments must be submitted within 24 hours of return of the assignment. The question must be in writing and must be accompanied by the original unmarked copy of the assignment. You will receive a written reply to all grading questions as well. No exceptions will be made to the policy of no verbal discussion of grading details or clarification. Quizzes represent individual effort and absolute personal integrity is expected.

The design documents and design project represents a significant portion of the grade. These are a group project and depend on meeting a number of specified criteria. The first step is the design notebook. This must be a bound volume (not spiral or loose leaf) which will be used to document your efforts and your design notes. We will discuss the contents of the design notebook in class, but suffice it to say this is where you should do your thinking on paper.

The conceptual design document is the explanation of the basis for selection of the design that will be used for the analysis stage of the project. The conceptual design document will be formatted according to the handout. This is an important step in the design process.

The design project final grade will be based on the presentation and final document for the review panel. The review panel will be made up of experts in the field as well as industrial experts in kinematics. A standard review form will be provided to the design review panel that will also be given to you to help you to prepare your written and oral documents.