

**UNIVERSITY OF UTAH**  
**MECHANICAL ENGINEERING DEPARTMENT**  
**ME 3200 Mechatronics I**  
**Fall 1999**

<b>DATE</b>	<b>TOPIC</b>	<b>TEXT</b>	<b>HOMEWORK</b>	<b>LAB</b>
Aug 25	Introduction, Mechanisms	Chapt 1		No Lab
27	4-bar linkages - analysis	4.1-4.6	1.33,1.35,1.44,1.52,,1.53,,1.54,CS1.2	
30	Range of Motion			Introduction
Sept 1	Velocity analysis	Chapt 5	4.59,4.63,4.68	to Lab
3	Mech Adv, trans angle			
6	Holiday – Labor Day			
8	Acceleration/dynamics	Chapt 6		No Lab
10	Lab Discussion - Computers			
13	Linkage synthesis	Chapt 7		Computer
15	Linkage synthesis			Data collection
17	Linkage synthesis			
20	Linkage synthesis			Computer
22	Linkage synthesis			Control
24	Lab Discussion - op amps			
27	Cams	Chapt 10		
29	Follower motions			Micro-Controller
Oct 1	Graphical design			
4	Graphical design			
6	Analytical design			No Lab
8	Holiday			
11	Gears	Chapt 11		
13	Involute	11.4		Linkages
15	Standards, contact ratio	11.5-11.7		
18	Gear selection	11.8		
20	Helical, bevel, worm gears	11.10-11.12		Op Amps
22	Lab - Photo sensors			
25	Gear Trains	11.13-11.14		
27	Planetary gears	11.15		Photo Sensors
29	Lab Discussion Position sensors, encoders			
Nov 1	Planetary gears			Position,
3	Belts, chains	Chapt 12		Velocity Sensors
5	Screws	Chapt 13		
8	Motors			
10	DC motors			Encoder Design
12	Lab Discussion - LVDTs			
15	Stepper motors			
17	Stepper motors			LVDTs
19	AC motors			
22	Lab Discussion - Force/torque sensors			
23	Holiday			No Lab
25	Holiday – Thanksgiving			
29	AC motors			Force/torque
Dec 1	Motor control			Sensors
3	Motor control			
6	Project presentations			
8	Project presentations			No Lab
10	Review			

Schedule subject to change

<b>Grades:</b>	Homework	30%	Due every Wednesday at the beginning of class
	Midterm	20%	
	Final	30%	10:15-12:15, Tuesday, 16 December
	Lab	20%	
	Total	100%	

**Text:** Machines and Mechanisms, David H. Myszka, Prentice-Hall, ISBN: 0-13-597915-3

**Reference Text:** Electric Motors and Control techniques, Irving M. Gottlieb, McGraw-Hill, ISBN: 0-07-024011-6, ISBN: 0-07-02412-4 (pbk.)

**Instructor:** Sanford G. Meek  
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### Prerequisites:

CS1000 – C programming

EE1050 (EE108 & EE109) or equivalent – The student is expected to be able to use basic electrical laboratory equipment such as multimeters and oscilloscopes. The student is expected to be able to design simple RLC and op-amp circuits.

Math 2210 – The student is expected to be able to write and solve ordinary differential equations. The student is expected to understand and use Laplace transforms.

Strength of Materials (ME1300)

Dynamics (ME2400)

### Class Objectives:

This is the first of a two part sequence of mechatronics. In this part, the principles of mechanisms – gears, linkages, etc., motors, sensors, and computer systems will be taught. Theoretical and mathematical techniques will be presented in the lectures and measurements and design of real systems will be explored in the laboratory.

### Homework Policy

Students may work together and are encouraged to help each other in understanding the material discussed in the class. However, copied homework is not acceptable. It is the responsibility of each student to understand and solve the problems. Groups of students

who work together have the right to ask a fellow student to leave their study groups if that student does not contribute to their group.

All of one week's homework (assigned Monday through Friday) is due on the following Wednesday at the beginning of class.

Due to the size of the class, no late homework will be accepted without a really good excuse.

### **Laboratory Policy**

Laboratory teams will be formed for the labs. These teams will work together all semester and, hopefully, all year. Lab reports are to be written as a group and the team will be given a single grade. You must deal with personality problems within the team on your own. Serious problems may be brought to the TAs or to me.

### **Office Hours**

This will be posted on my door when the schedule is finalized.