Fall 2000 **MIM 1250**

NORTHEASTERN UNIVERSITY

Department of Mechanical, Industrial and Manufacturing Engineering

Engineering Mechanics

Instructor: Professor G. Adams, 203 SN, 373-3826, adams@coe.neu.edu

Conference Hours: Monday 9:15-10:20; Wednesday 2:50-3:55
Thursday 4:05-5:00; 5:30-5:50, or by appointment

Textbook: Bedford, A., and Fowler, W.L., *Engineering Mechanics - Statics and Dynamics,* Second Edition, Addison Wesley Longman, Inc., Menlo Park, California, 1999.

Library Reserve:

- Beer, F.P., and Johnston, Jr., E.R., *Vector Mechanics for Engineers: Statics and Dynamics,* Sixth Edition, McGraw-Hill Book Co., Boston, 1997.
- Boresi, A.P., and Schmidt, R.J., *Engineering Mechanics: Statics and Dynamics,* Brooks/Cole Publishing Company, Boston, 2001.
- Hibbeler, R.C., *Engineering Mechanics: Statics and Dynamics,* Eigth Edition, Prentice-Hall, Inc., New Jersey, 1998.
- McGill, D.J., and King, W.W., *Engineering Mechanics: Statics and Dynamics,* Third Edition, PWS Publishing Company, Boston, 1995.
- Merriam, J.L., and Kraige, L.G., *Engineering Mechanics: Statics and Dynamics,* Fourth Edition, John Wiley & Sons, Inc., New York, 1997.
- Pytel, A., and Kiusalaas, J., *Engineering Mechanics: Statics and Dynamics,* Second Edition, Brooks/Cole Publishing Company, Boston, 1999.
- Riley, W.F., and Sturges, L.D., *Engineering Mechanics: Statics and Dynamics,* Second Edition, John Wiley & Sons, Inc., New York, 1996.

Goals and Objectives:

The students are expected to learn and demonstrate the following abilities:

1. To decompose a vector into its components.
2. Take the moment of a force with respect to a point and/or a line.
3. To draw a free body diagram of a structure subjected to complex loading.
4. To write equations of equilibrium for forces and moments.
5. To find internal forces in a structure.
6. To consider friction forces in static analyses.
7. To find the centroid of an area or volume.
8. To do dynamic analyses for a particle.

Grading Policy: There will be 3 one-hour examinations and a final examination.
2 Highest grades on one-hour exams 20% each; Lowest grade on one-hour exam 10%;
Final Examination 40%; Homework, Attendance, Participation 10%

- **There will be 8 Indicator Questions during the quarter. You must answer 7 out of 8 correctly in order to receive a passing grade in this course.**

- Homework is due in class on Tuesdays at 7:50 p.m. for the previous week's assignments. **No late homework will be accepted.** Underlined homework problems will be counted as 2 problems.

- **There will be no make-up exams.**

- Grades of Incomplete (I) will be given only under extraordinary circumstances at the discretion of the instructor.

Assign. #	Topic (Text Article)	Homework
1	Introduction (Chapter 1)	15,17,21,22,30
	STATICS	
	Vectors	
	Manipulating Vectors, Cartesian Components (2.1-2.3)	8,17,38,47
	Components in Three-Dimensions, Products of Vectors (2.4-2.7)	76,81,88,102, 118,142,148
	Forces	
2	Two-Dimensional Equilibrium of Particles (3.1-3.3)	4,6,18,37,52
	Three-Dimensional Equilibrium of Particles (3.4)	70,72,80,83
	Systems of Forces and Moments	
3	Moment of a Force (4.1-4.2)	14,34,42,62,74
	Moment of a Force About a Line, Couples (4.3-4.4)	92,106,122
	Equivalent Force Systems (4.5-4.6)	136,161,176
	Rigid Body Equilibrium	
4	Two-Dimensional Equilibrium (5.1-5.3)	6,14,40,73
	Three-Dimensional Equilibrium (5.4)	88,110
	Two-Force and Three-Force Members (5.5) and Review (5.1-5.4)	126,130,138
	Structures in Equilibrium	
5	Trusses and the Method of Joints (6.1-6.2)	6,18
	Trusses and the Method of Sections (6.3)	36,51
	Frames and Machines (6.5)	78,97,100,112,122
	Centroids and Centers of Mass	
6	Centroids of Areas, Distributed Loads (7.1-7.3)	17,18,28,34,57
	Centroids of Volumes, Pappus-Guldinus Theorems (7.4-7.5)	80,96
	Center of Mass (7.6-7.8)	100,108
	Friction	
7	Theory of Dry Friction (9.1)	7,16,44,49
	Applications of Friction (9.2)	73,88
	Internal Forces and Moments	
8	Internal Forces and Moments (10.1)	4,10
	Shear and Bending Moment Diagrams (10.2,10.3)	26*,28*,33*
	Pressure (10.7-10.8)	84,97
	DYNAMICS	
	Kinematics of Particles	
9	Position, Velocity, and Acceleration (2.1-2.2)	40,46,50
	Curvilinear Motion (2.3)	78,84,86,96,100
	Normal and Tangential, Polar and Cylindrical Components	106,122,144
	Relative Motion (2.4)	179,183
	Kinetics of Particles	
10	Equations of Motion (3.1-3.4)	5,12,28,39
	Normal and Tangential, Polar and Cylindrical Components	66,80,104

* On 10.26, 10.28, 10.33 sketch the shear and bending moment diagrams only.