ME 439
MECHANICAL ENGINEERING DESIGN - I
FALL 2000

GOALS:
1. Analyze and design members for strength and deflection.
2. Failure analysis of members subjected to multi-axial state of stress.
3. Fatigue life and contact stress analyses.

PREREQUISITES: ME 250 and 251, AE 333, and MATH 555.

TEXTBOOK: Robert L Norton, *Machine Design - An Integrated Approach*, Second Edition, Prentice-Hall, Inc., 2000.

REFERENCE: J. E. Shigley and C. R. Mischke, *Mechanical Engineering Design*, McGraw-Hill, Inc., 1989.

INSTRUCTOR: Dr. C. Charles Yang, P.E.
Office: 101C Engineering Building, Phone: 978-6312
E-mail: yang@me.twsu.edu
Office Hours: 10:20 - 11:30 AM T TH (or by appointment) + Right after the class.
Class Hours: 5:35 - 6:50, PM T TH, Classroom: 102 Eng. Bldg.

TOPICS:
1. Load Determination -- Force Equilibrium, Free-Body Diagrams, Dynamic, Vibration and Impact Loadings, Shear and Moment Diagrams.
2. Stress, Strain, and Deflection -- Plane Stress and Plane Strain, Principal Stresses, Mohr's Circles, Bearing Stresses, Bending Stresses, Spring Rates, Singularity Functions, Superposition and Castigliano's Methods, Stress Concentration, Stresses in Cylinders, Column Buckling.
3. Static Failure Theories -- Factor of Safety, Static Failure Theories, Fracture Analysis.
4. Fatigue Failure Theories -- Endurance Limit, Fatigue Strength, Fluctuating Stresses, Combined Loading Modes.
5. Surface Failure -- Friction, Wear, Surface Fatigue, Spherical and Cylindrical Contacts, Dynamic Contact Stresses, Surface Fatigue Strength.
6. Statistical concepts, tolerancing, and dimensioning in design

GRADING: Homework Assignments (20%), Group Project (15%), Two ~~Mid-term~~ Exams (20% each) and Final Exam (25%).

GRADE: A(>90); B(>80); C(>70); D(>60)

FINAL EXAM: **5:40 - 7:30 PM, December 12 (Tuesday), 2000** (8-9)

Note:
1. There will be a total of approximately seven (7) homework assignments.
2. Dates for the two ~~mid-term~~ exams will be decided in the class.
3. No makeup exam will be given. No late assignment will be accepted.