

1. Course Title:

Machine Design II **MET 419 – 5 Credits**

Four hours lecture and two hours laboratory per week

MET Core Program Requirement

Prerequisite: MET 418.

This is a Technical content course under ABET Criterion 5

2. Faculty Member Information:

Instructor: Roger Beardsley
Office: Hogue 302
Phone: 509- 963-1596
E-mail: beardslr@cwu.edu

3. Course Description:

Fasteners, welds, machine frames, pressure vessels, hydraulic cylinders, electrical motors and actuators

4. Textbook and other required materials for the course:

Machine Elements in Mechanical Design, 4th ed., by Robert Mott; Prentice Hall Publ., 2004. Software: Net access, word processing, spreadsheet and graphing capability required.

5. Specific Learner and Expressive Outcomes and Assessment Strategies:

ABET Outcome Criteria #	Learner Outcomes The student will be able to	Assessment Students shall be assessed via
3a,d,e,j,k 9b,c,d,g,i	Proceed from a design concept to a complete design including analysis, part drawings, and material specification	lab work, projects and examinations.
3a,c,f 9b,c,f,g	Analyze applications of standard machine components such as shafts, gears, bearings, clutches, etc	Homework, lab work and examinations.
3a,g 9c,d,f	Use engineering methodology in analyzing a complete design in terms of weight and cost estimates, as well as 'buy' decisions	Homework, lab work and examinations.

6. Course Topics and Schedule:

Week 1	Helical Gears, Bevel Gears, Worm Gearsets Lab #1: Group Design: Brainstorming
Week 2	Keys, Splines, Pins, & Tapered Bushings Couplings & Joints, <u>Retaining Rings and Seals</u> Lab #2: Analysis of Ford 3 speed transmission
Week 3	Shaft Design; Component Forces Shaft Design, Stress Concentrations Lab #3: Model T Planetary Gear Transmission
Week 4	TEST #1 - Ch 10 thru 12 Tolerance & Fit, Geometric Tolerancing & Tolerance Issues Manufacturability & Cost effects Lab #4: Shaft Design Lab A; Loading & Stress Analysis
Week 5	Roller Bearings: Types & Material Roller Bearing Design Factors Lab #5: Shaft Design Lab B: Select bearings & Final design
Week 6	Plain Surface (Journal) Bearings, Lubrication Design Lab #6: Group Design Problem Definition
Week 7	Threaded Fastener Types; Torque & Clamping TEST #2 , Chapters 13, 14, 15, 16, & 18 Lab #7: Group Design Progress Report
Week 8	Machine Frames & Welded Joints, Linear Motion Linkages, Cams, & Intermittent Motion Lab #8: Group Design Progress Report
Week 9	Spring Types & Applications, Spring Stress & Deflection Electric Motor Controls; <u>Motion Control; Clutches & Brakes</u> Lab #9: Group Design Project Presentation
Week 10	Fluid Power: Hydraulics, Pneumatics Course Review Lab #10: Fluid Power
Final Exam	

7. Grading:	Homework Sets/ Quizzes	20%	
	Exams & Final	(3)	40%
	Lab Reports	30%	
	Participation/involvement	10%	(weightings are approximate)

A(92-100), A-(90-92), B+(88-90), B(82-88), B-(80-82), C+(78-80), C(72-78), C-(70-72), D+(68-70), D(62-68), D-(60-62), F(<60)

Prepared by Roger Beardsley June 24, 2009