1. Course Title:

Machine Design I
MET 418 – 5 Credits

Four hours lecture and two hours laboratory per week
MET Core Program Requirement
Prerequisite: MET 426, MET 327, IET 265
This is a Technical content course under ABET Criterion 5

2. Faculty Member Information:

Instructor: Charles Pringle
Office: Hogue 308pringlec
Phone: 509- 963-2437
E-mail: pringlec@cwu.edu

3. Course Description:

Study of shafts, springs, couplings, clutches, bearings, cams, linkages and crank mechanisms.

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,i,k 9d,g	Proceed from a design concept to a complete design including analysis, part drawings, and material specification	lab work, projects and examinations.
3b,f 9b,c,f	Analyze applications of standard machine components such as shafts, gears, bearings, clutches, etc	Homework, lab work and examinations.
3a,b,g,j	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 Class: Introduction, course overview
Lab: Design Project 1 – ASME Student Design Concept
Week 2 Class: Properties of Metals Review, Materials
Class: Composite Materials & Design
Lab: Design Project 2 – ASME Team Design
Week 3 Class: Stress Analysis Review, Mohr's Circle Review, Pure Bending of Curved Beams
Class:, Failure Theories, Types of Loading, Design Procedures for Failure Modes
Lab: Design Project 3 – ASME Single Part Loading
Week 4 Class: Design Problem Examples
Class: Design Factors, Example Problems
Lab: Design Project 3 – ASME Single Part Loading (Cont)
Week 5 Class: Design Factors, Example Problems
TEST #1 (Chapters 1 – 5)
Week 6 Class: Column Design Review, Column Design computer Program
Class: Belt Drives, Chain Drives
Lab: Design Project 4 – Lever Design
Week 7 Class: Kinematics of Gears, Spur Gears, Spur Gear Interferences
Helical and Bevel Gear Geometry, Worm Gearing
Lab: Gear Design Project
Week 8 Class: Complex Gear Trains
Lab: Gear Design Project 2
Week 9 Chapter 6-8 Review
Test #2(Chapters 6-8)
Week 10 Spur Gear Forces, Spur Gear Materials & Loading
Spur Gear Design
Lab: Project 5 – Belt or Chain Design
Final Exam

7. Grading:

Homework and Quizzes	35%
2 Exams and Final	30%
Lab Projects	25%
Participation/Involvement	10%
Total	**100%**

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)

8. ADA Statement:

Students who have special needs or disabilities that may affect their ability to access information and or material presented in this course are encouraged to contact me or Robert Harden, ADA Compliance Officer, Director, ADA Affairs and Students Assistance on campus at 963-2171 for additional disability related educational accommodations.

Prepared by Roger Beardsley June 24, 2009