ENG ME 414 Machine Design II

2008-2009 Catalogue Data:
ENG ME 414 Machine Design II
Prereq: ENG ME 413. Continuation of ENG ME 413 focusing on the capstone senior design project, in which students conceive, plan, and carry out a major mechanical engineering design of a multicomponent system, working in teams. Machine elements not covered in ME 413, such as clutches, brakes, springs and belt drives; engineering design process, including preliminary and detail design, prototype fabrication, and testing; finite element analysis; common manufacturing techniques; project scheduling; project cost estimation; professional liability and engineering ethics. Written reports and oral presentations required. 4cr., 2nd sem

Course Schedule: 4 lecture hour per week

Textbook(s): Dieter, G.E. and L.C Schmidt, Engineering Design, 4th ed., McGraw-Hill, 2009
Juvinall, R.C. and K.M. Marshek, Fundamentals of Machine Component Design, 4th ed., Wiley, 2006
Composition Notebook RR77255

Coordinator: Morton S. Isaacson, Associate Professor, Mechanical Engineering

Prerequisites by Topic:
1. Mechanical design experience embodied in ME 413
2. Machine element analysis embodied in ME 413

Goals:
This course in designed to guide students through the continuation of their transition from being students of engineering to being practitioners of engineering begun in ME 413. Specific goals are:
1. To guide them in the application of basic structural mechanics to the analysis and design of machine components not covered in ME 413
2. To help them combine the engineering science they have already learned with the creative, organizational, and professional skills needed for successful innovative engineering design
3. To give them experience in applying these skills to the completion of a major design experience incorporating appropriate engineering standards and multiple realistic constraints

Course Learning Outcomes:
As an outcome of completing this course, students will:

i. Master the application of basic structural mechanics learned in previous courses to the analysis and design of machine components not covered in ME 413, including clutches, brakes and springs. (A, E, L)

ii. Gain an appreciation for and become proficient in applying the final steps of the engineering design process to the major, systems-level mechanical engineering

design project begun in ME 413, including preliminary and detail design, fabrication, and testing. This includes an introduction to common manufacturing techniques, design for manufacture, design for assembly and machine shop practice. (B, C, K, M, N)

iii. Gain an appreciation for and familiarity with some project management practices such as project cost estimation. (H)

iv. Gain an appreciation for and familiarity with engineering as a profession, including professional registration, liability issues and professional ethics. (F, H, I, J)

v. Become proficient in proper professional written documentation, including design journals, formal engineering reports and engineering drawings. (G)

vi. Become proficient in the oral communication of technical concepts. (G)

vii. Become proficient in functioning in a multi-functional team environment. (D)

Course Learning Outcomes mapped to Program Outcomes:
(For Program Outcomes, please see attached page or Department Web Site)

Program:	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Course:	i	ii	ii	vii	i	iv	v vi	iii,iv	iv	iv	ii	i	ii	ii
Emphasis:	4	4	5	4	5	4	4	3	2	2	3	4	2	5

Topics:
1. Mechanical design process and manufacturing techniques (1 weeks)
2. Machine element analysis and design (5.5 weeks)
3. Professionalism: Ethics and liability (1 week)
4. Project management practices (0.5 weeks)
5. Project time: In-class team meetings, presentations, feedback sessions and work time (6 weeks)

Contribution of Course to Meeting the Professional Requirement:
Engineering Topics: 100%

Status of Continuous Improvement Review of this Course:
Date reviewed: July 15, 2008 **Reviewed by:** Design Committee
Prepared by: Morton S. Isaacson **Date prepared:** January 12, 2009