ENG EK 156 Design and Manufacture

2008-2009 Catalog Data:

ENG EK 156 Design and Manufacture Introduction to design and processing steps required in manufacturing. Specialized project involving the design, scheduling, budgeting, and building of a project selected by the student with the consent of the instructor. Includes lab. 2 cr, either sem.

Class/Lab Schedule: 2 lecture hours per week

Status in the Curriculum: Required

Textbook(s) and/or Other Required Material: M. P. Groover, *Fundamentals of Modern Manufacturing*, 2nd ed., Prentice Hall, 2001.

Reference: A reference shelf is maintained for this course.

Coordinator: Theo A. de Winter, Associate Professor, Mechanical Engineering

Prerequisites by topic: None

Goals: This course is a general introduction to materials science and the design and manufacturing aspects of manufacturing engineering. It is designed to be interesting to both majors and non-majors at sophomore and junior levels.

Computer Usage: SolidWorks in Lab demonstrations and in a practice assignment

Laboratory demonstrations:

1. Welding, CNC machining, CAD, metallography, tensile test
2. Machining, casting, robotics, heat treatment

Project Assignment: A major part of the course consists of a project, which starts with a proposal detailing the design, cost and schedule for the building and presentation of a useful product. The proposal must be approved by one of the fulltime laboratory supervisors as being feasible to be built in the available facilities and within the proposed schedule. A progress report and a final report are required to be submitted, showing any changes in schedule, design or cost compared with the original proposal. The finished project is judged by a team of judges.

Course Learning Outcomes:

As an outcome of completing this course, students will:

i. Obtain an introduction to materials science and manufacturing processes
ii. Gain experience with the procedure of submitting a proposal and carrying out the manufacture of a product of their design, on schedule and within budget
iii. Do homework problems which illustrate the lecture material and the laboratory demonstrations

iv. Get hands on experience on production processes while building their project
v. Get their first experience in the concept that nothing in engineering comes close to a job done on time, to specification and within budget

Course 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-v	iv	iv		iii	v	iv	ii,v	i-v		iv	iv	iv	ii,v
Emphasis:	4	3	2	1	3	3	3	3	5	1	4	4	4	4

Topics:
1. Global Manufacturing
2. Mechanical Properties of Materials (1 class)
3. Properties of Metals (1 class)
4. Heat treatment (1 class)
5. Welding (1 class)
6. Forging (1 class)
7. Sheet Metal Forming (1 class)
8. Machining (1 class)
9. Plastics (1 class)
10. Casting (1 class)
11. Cost Analysis(1 class)

Contribution of Course to Meeting the Professional Component:
Engineering topics: 100%

Status of Continuous Improvement Review of this Course:
Date Last Reviewed: Spring 2009 **Reviewed by**: MFG Undergrad Comm./ME Design Comm.
Prepared by: Prof. Theo A. de Winter **Date:** June 2, 2009