

ME 263
Introduction to Mechanical Engineering Design, Innovation, and Entrepreneurship

Course Outcomes [Related ME Program Outcomes in brackets]

1. Instill the philosophy that real engineering design problems are open-ended and multifaceted. [1,2]
2. Teach a systemic design methodology. [2]
3. Provide guidance in applying engineering principles to open-ended problems. [1,2]
4. Develop the ability to mathematically model and analyze engineering systems. [1,6]
5. Sharpen skills in leadership, teamwork, communication, project planning, innovation, design and entrepreneurship. [3,5,7]
6. Instill a philosophy of professional and ethical behavior. [4]
7. Provide a foundation for the rest of the mechanical engineering curriculum and future careers. [7]
8. Provide practice on building an actual prototype. [2,3,7]
9. To assist in the personal and professional development of students. [5,7]

Phase I: Problem Definition (4.5 wks)

1. Problem Statement
2. Customer Survey
3. Competitive Product Study (Benchmarking)
4. Market Analysis
5. Patent Search
6. Quality Function Deployment (HOQ)
7. Problem Definition
8. Design Review

Phase II: Concept Generation and Evaluation (4.5 wks)

1. Functional Decomposition
2. Preliminary Concept, Evaluations: Feasibility Judgment, Technology Readiness Assessment, Decision Matrix
3. Concept Selection
4. Bill of Materials
5. Economic Analysis
6. Phase 2 prototype
7. Design Review

Phase III: Product Design (6 wks)

1. Selection Design
2. Parts CAD Modeling
3. Manufacturing Processes and Design for Additive Manufacturing
4. Performance Analyses
5. Design for Assembly
6. Engineering Modeling and Experiments
7. Phase 3 prototype
8. Final Design Presentation

Example Projects

1. Personal Transportation Systems
2. Assistive Devices in Multi- Level Apartments
3. Personal Exercise Machines
4. Personal Power Generation
5. Roof Rack Loading Devices
6. Hitch/Receiver Mounting Accessories
7. Baby Care Systems and Devices
8. Improved Devices for Companion Pets

COURSE NUMBER: ME 263	COURSE TITLE: Introduction to Mechanical Engineering Design, Innovation and Entrepreneurship
REQUIRED COURSE OR ELECTIVE COURSE: Required	TERMS OFFERED: Fall, Spring and Summer
TEXTBOOK/REQUIRED MATERIAL: Optional textbook The Mechanical Design Process, D. G. Ullman, Fourth Edition, McGraw-Hill, 2010.	COURSE OUTCOMES [Related ME Program Outcomes in brackets] <ol style="list-style-type: none"> 1. Instill the philosophy that real engineering design problems are open-ended and multifaceted. [1,2] 2. Teach a systematic design methodology. [2] 3. Provide guidance in applying engineering principles to open-ended problems. [1, 2] 4. Develop the ability to mathematically model and analyze engineering systems. [1,6] 5. Foster key skills in leadership, teamwork, communication, project planning, innovation, design and entrepreneurship. [3,5,7] 6. Instill a philosophy of professional and ethical behavior. [4] 7. Provide a foundation for the rest of the mechanical engineering curriculum and future careers. [7] 8. Provide practice on building an actual prototype. [2,3] 9. To assist in personal and professional development of students. [7]
COORDINATING FACULTY: Tahira Reid	
COURSE DESCRIPTION: The product design process. Development of product design specifications using customer inputs, benchmarking, product/ market research and patent review. Concept generation and evaluation using brainstorming, functional decomposition, modeling and decision matrices. Detailed product design including assembly, economic analysis, CAD, and bill of materials. Oral and written design reviews. Key skills developed include leadership, teamwork, communication, project planning, innovation, design, and entrepreneurship.	
PREREQUISITES – COM 11400 or EDPS 31500 or SCLA 10200; ENGL 10600 or ENGL 10800 or SCLA 10100 or PHIL 26000, or AMST 10100. CONCURRENT PREREQUISITES – MA 26100, ME 29000, ME 27000 or CE27100; CGT 16300	
COURSE STRUCTURE/SCHEDULE: 3 credits a. Lecture - 2 days per week at 50 minutes for 15 weeks b. Lab – 2 days per week at 110 and 50 minutes for 15 weeks	RELATED ME PROGRAM OUTCOMES: [Related ABET Outcomes Listed in Brackets] <ol style="list-style-type: none"> 1. Engineering Fundamentals; 2. Engineering Design; 3. Communication Skills; 4. Ethical/Prof. Responsibilities 5. Teamwork Skills 6. Experimental Skills 7. Life-Long Learning
PREPARED BY: Reid, Tahira	REVISION DATE: January 16, 2019