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

Sem. 1, 2, Class 2, Lab 1, cr. 3.
Prerequisite: CGT 185, COM 114, ENGL 106 or 108, ENGR 126, ME 200, ME 270, Mechanical Engineering majors only.
Concurrent Prerequisite: MA 262, ME 290.

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 teamwork, communication, project planning, innovation, design, and entrepreneurship.
**DEPARTMENT:** Mechanical Engineering  
**SESSION:** Fall 2009

**INSTRUCTIONS:**
- New course with supporting documents
- Add existing course offered at another campus
- 3. Expiration of a course
- Change in course number
- Change in course title
- Change in course credit/grade

**PROPOSED:**
- Subject Abbreviation: ME  
- Course Number: 263
- Long Title: Intro to Mechanical Engineering Design, Innovation, & Entrepreneurship
- Short Title: ME Design/Innov/Entrep

**TERMS OFFERED**
- Check All That Apply: Summer ☐ Fall ☑ Spring ☐  
- CAMPUS(ES) INVOLVED:  
  - Campus: W. Central
  - Cont Ed: Tech Statewide
  - Ft. Wayne: W. Lafayette
  - Indianapolis

**CREDIT TYPE**
- 1. Fixed Credit: Cr. Hrs.
- 2. Variable Credit: Range:
- Minimum Cr. Hrs. (Check One)  
  - To ☑ Or ☐
- Maximum Cr. Hrs.
- Equivalent Credit: Yes ☑ No ☐
- Thesis Credit: Yes ☑ No ☐

**INSTRUCTIONAL TYPE**
- Lecture: Per Mtg. 50  
- Lab: Week 2
- Presentation:  
- Laboratory: 110/50  
- Lab Prep: 2
- Audio: Syn.  
- Dance: Live
- Experiential:  
- Research:  
- Ind. Study:  
- Pract/Observ:  

**COURSE ATTRIBUTES**
- 1. Pass/No Pass Only  
- 2. Satisfactory/Unsatisfactory Only
- 3. Repeatable:  
- 4. Credit by Examination: Yes ☑ No ☐
- 5. Percentage of Credit Allocated:  
- 6. Delivery Method: (Asyn. Or Syn.)  
- 7. Registration Approval Type:  
- 8. Variable Title:  
- 9. Remedial:  
- 10. Honors:  
- 11. Full Time Privilege:  
- 12. Off Campus Experience:  

**COURSE DESCRIPTION (INCLUDE REQUISITES):**
**ME 263 Introduction to Mechanical Engineering Design, Innovation, and Entrepreneurship**  
Sem. 1, 2, Class 2, Lab 1, or 3.  
Prerequisite: CGT 163, COM 114, ENGL 106 or 108, ENGR 126, ME 200, ME 270, Mechanical Engineering majors only.  
Concurrent Prerequisite: MA 262, ME 290.

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 teamwork, communication, project planning, innovation, design, and entrepreneurship.

**SIGNATURES**
- Calumet Department Head:  
- Calumet School Dean:  
- Fort Wayne Chancellor:  
- Fort Wayne Department Head:  
- Fort Wayne School Dean:  
- Grad Curriculum Committee:  
- Indianapolis Department Head:  
- Indianapolis School Dean:  
- Date Approved by Graduate Council:  
- North Central Department Head:  
- North Central Chancellor:  
- Graduate Council Secretary:  
- West Lafayette Department Head:  
- West Lafayette College/School Dean:  
- West Lafayette Registrar:  

**OFFICE OF THE REGISTRAR**
TO: The Faculty of the College of Engineering

FROM: The Faculty of the School of Mechanical Engineering

RE: ME 26300 Prerequisite Changes

The Faculty of the School of Mechanical Engineering has approved the following prerequisite changes. This action is now submitted to the Engineering Faculty with a recommendation for approval.

From:

ME 26300 Introduction to Mechanical Engineering Design, Innovation, and Entrepreneurship
Sem. 1, 2, Class 2, Lab 1, cr. 3
Prerequisite: CGT 16300, ME 20000, ME 27000
Co-requisite: MA 26200, ME 29000

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 teamwork, communication, project planning, innovation, design, and entrepreneurship.

To:

ME 26300 Introduction to Mechanical Engineering Design, Innovation, and Entrepreneurship
Sem. 1, 2, Class 2, Lab 1, cr. 3
Prerequisite: CGT 16300, COM 11400, ENGL 10600 or 10800, ENGR 12600, ME 20000, ME 27000, Mechanical Engineering majors only
Concurrent Prerequisite: MA 26200, ME 29000

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 teamwork, communication, project planning, innovation, design, and entrepreneurship.

Reason: The added prerequisites of COM 11400, ENGL 10600 or 10800 and ENGR 12600 are needed because of an increasing number of requests to admit students into ME without one or more of these First-Year Engineering courses.

James D. Jones, Associate Professor and Associate Head
School of Mechanical Engineering

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC Minutes #11
Date 12/14/09
Chairman ECC R. Ciper
ME 26300
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. [A5, A6, A7, B8]
2. Teach a systemic design methodology. [A5, A7, B6]
3. Provide guidance in applying engineering principles to open-ended problems. [A2, A3, A5, A7]
4. Develop the ability to mathematically model and analyze engineering systems. [A3, A7]
5. Sharpen skills in leadership, teamwork, communication, project planning, innovation, design and entrepreneurship. [B1, B2, B3, B4, B5, B6, C1, C2, C4, C5, C6]
6. Instill a philosophy of professional and ethical behavior. [C3]
7. Provide a foundation for the rest of the mechanical engineering curriculum and future careers. [C6]

Phase I: Problem Definition (4.5 wks)
1. Problem Statement
2. Customer Survey
3. Competitive Product Study
   (Benchmarking)
4. Market Survey
5. Patent Periodical Search
6. House of Quality
7. Problem Definition
8. Preliminary Design Review

Phase II: Concept Generation and Evaluation (4.5 wks)
1. Functional Decomposition
2. Brainstorming
3. Preliminary Evaluations
   - Feasibility Judgement
   - Technology Readiness Assessment
   - Decision Matrix
4. Concept Selection
5. Engineering Modeling of Concepts
6. Comparison with Benchmarks
7. Preliminary Design Review

Phase III: Product Design (6 wks)
1. Selection Design
2. Bill of Materials
3. Assembly/Parts Drawings
4. Performance Analysis
5. Assembly Analysis
6. Economic Analysis
7. Critical Design Review

Example Projects
1. Personal Transportation Systems
2. Assistive Devices in Multi-Level Apartments
3. Personal Exercise Machines
4. Portable, Adjustable Basketball Goals
5. Roof Pack Loading Devices
6. Hitch/Receiver Mounting Accessories
COURSE NUMBER: ME 26300

REQUISITED COURSE OR ELECTIVE COURSE: Required


COORDINATING FACULTY: G.B. King

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.

ASSESSMENTS TOOLS:
1. Weekly deliverables.
2. 5-6 unannounced quizzes.
3. Two 1-hour exams.
4. Design notebook.
5. Three technical group presentations (2 progress presentations + 1 comprehensive final presentation).
6. Three 10-page technical group reports + appendices (2 progress reports + 1 final comprehensive report).
7. Self and peer evaluations.
8. Instructor evaluations.

PROFESSIONAL COMPONENT:
1. Engineering Topics: Engineering Design – 3 credits (100%)

NATURE OF DESIGN CONTENT: ME 26300 is a true exposure to the multi-faceted and open-ended nature of design problems. Students experience design by doing, but are also taught the latest design theories and techniques in lectures. The focus of the course is how to design, not just experience trying to design.

COMPUTER USAGE: Students use spreadsheets, 3-D solid modeling software in the analysis and digital representation of their product design.

COURSE STRUCTURE/SCHEDULE:
1. Lecture - 2 days per week at 50 minutes.
2. Laboratory - 2 days per week at 110 and 50 minutes.

RELATED COURSE OUTCOMES:
A2. Engineering fundamentals
A3. Analytical skills
A5. Open-ended design problem solving skills
A6. Multidiscipl. within and beyond engineering
A7. Integ. of analy./prob solv./design skills
B1. Leadership
B2. Teamwork
B3. Communication
B4. Decision-making
B5. Recognize and manage change
B6. Work effect. in diverse/multicult. envir.
B8. Synthesize engnr./sctry/bus. persp.
C1. Innovative
C2. Strong work ethic
C3. Globally/social/ethic./intell./tech. resp.
C4. Adaptable in a changing environment
C5. Entrepreneurial and intrapreneurial
C6. Curious and persistent lifelong learners