Overview

• What is the concept of the course
  – Similarity with EGR 286
    • Team-oriented
    • Cross-teamwork required
    • Project-oriented
  – Differences with EGR 286
    • NO LEGOS
    • More product focused
    • More detail required
    • More ME-discipline content

Main ME 386 Scenario

• We are a company’s Mechanical Engineering resource
  – Product Development and Design
  – Test Instrumentation Design
  – Matrix out our (i.e., your) services
• Our company produces Electromechanical products
  – Interact primarily with Electrical Engineers and Marketing
Project

• Create a new product: The electric hand drill/driver
  – Develop functional descriptions
  – Benchmark competitors’ products
    • Physical Decomposition
    • Develop Test Instrumentation
    • Measure performance
    • Compare against requirements (from Marketing)

Course Deliverables

• Team Assignments
  – Teams of 3-4 people from ME
    • Teamed with 4-6 students from EE
      • ME/EE separate after the Preliminary Design Report

• Individual Assignments
  – CAD
  – Design for Manufacturing and Assembly (DFM/A)
  – Design for Cost
  – CAD/CAM issues (if time permits)
  – Design for Reliability (if time permits)

• Final Exam
Team Assignments

1. Functional Analysis:
   a. ME/EE – Functional Analysis of a hairdryer (1/22/01) ➔ (1/29/01)
   b. ME/EE – Functional Analysis of a drill (2/2/01) ➔ (2/9/01)
   c. ME/CSE – Functional Analysis of Lunar systems (2/9/01) ➔ (2/16/01)
2. Test instrumentation:
   a. ME/EE – Test instrumentation design/plan (2/5/01) ➔ (2/23/01)
   b. ME/EE – Test instrumentation build and test (2/5/01) ➔ (3/19/01)
3. ME/EE – Preliminary product design report (2/19/01) ➔ (3/19/01)
4. ME – Critical product design report (3/26/01) ➔ (4/16/01)
5. Weighted as last item in team assignments:
   a. ME – Critical product design reviews (3/26/01) ➔ (4/25/01 & 4/27/01)
   b. ME* – CAM team effort: Cut a single component from the team's product design. Must have at least one surface issue. (3/26/01) ➔ (4/27/01)

Individual Assignments

(not in order)

2. CAD II: Assembly I: Each team member draws a part from the drill explosion that they are interested in. All parts must connect as part of a larger assembly. State strategy of coordinate axis and layers organization.
3. CAD II: Assembly II: Team organizes the part files into an assembly. Not a team grade, because each member turns in their own assembly file, with their individual part as the base part in assembly. Turn in exploded layout with BOM.
4. CAD IV: Intro to surfaces: Assignment - lofted surfaces, intersections and trims.
5. QFD homework
6. COTS homework
7. Design for Cost homework
8. DFM/A homework
9. CAM I: G-code. Initials (As time permits)
10. CAM II: Setups and fixturing concepts. Each individual must turn in a set of verified Gcodes. Cut something simple with two setups. (As time permits)
11. Reliability homework (As time permits)
12. Team reports and critiques
EGR 286 vs. ME 386

• 3 major team documents to turn in
• 1 minor team document
• 1 major demo
• 1 minor demo
• 9 individual homeworks.
• 1 presentation

• 3 major team documents
• 3 minor documents
• 1 major build/demos
• 1 minor build/demo*
• 8-12 individual assignments
• 1 presentation

One Test: The Final Exam

• Open-book (what book?) and open-notes
• Covers Individual Assignment topics

Review: The 286 Design Process

- Needs
- Specification
- Design
- Implement
- Test
- Customer Interaction
- Design Reviews
- Formal Presentation
- Product Demos
ME 386: Engineering Design –
The Methods

• “The Methods”
  – Tools/Techniques used by mechanical engineers in the design process
    • Conceptual – Functional Analysis, Physical Decomposition, Quality Function Deployment (QFD)
    • Analytical – CAD (not just graphics!), Design for Manufacturing/Assembly (DFM/A), Design for Cost, Design for Reliability
  – No way to cover everything...

ME 386: Engineering Design –
The Methods

• We like to learn by having you do things in the physical world
  – “Experimentation” is a loose term, though not wholly applicable here.
• Nevertheless, much of the work in this class will be in terms of critical analysis and documentation

Friday

• Meet jointly with EE 386 in room 329.
• Bring something to take notes with.