ME546 DESIGNING PRODUCT FAMILIES

Class Times: TR 8:00 – 9:45 a.m., 103 Leonhard

Web Site: http://www.mne.psu.edu/simpson/courses/me546/ + Angel website

Instructor: Dr. Timothy W. Simpson
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314D Leonhard Bldg
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Grading:
- Individual Homework 20%
- Group Project and Homework Assignments 50%
- Learning Diary and Final Learning Essay 20%
- In-Class Discussion and Participation 10%

Course Overview:
In this class, we explore the implications and difficulties of designing families of products along with state-of-the-art tools and methods that are being developed to facilitate the design and development of mass customized goods. Lecture topics include:
- the transition from craft production, to mass production, to mass customization
- engineering design methods for robust, modular, and scalable products and platforms,
- design for variety and design for mass customization strategies, and
- industry case studies from Black & Decker, Sony, Hewlett Packard, Boeing, and Lutron.

Course Objectives:
Throughout the semester, we will collectively explore the following question as a class:

How can product realization teams provide increased product variety at less cost for a highly competitive, global marketplace?

Within the context of this question, students at the end of this class will be able to:
- define what is meant by a product family and a product platform,
- understand the difficulties of realizing mass customized goods and product families,
- become familiar with and implement several state-of-the-art methods and tools for product family and product platform design, and
- demonstrate the application of this knowledge in the context of a group project.
Syllabus (Tentative):

• **Weeks 1-2: Manufacturing Systems and Customer Demand**
  1. Craft Production and the American System of Manufacturing
  2. Mass Production and Mass Customization

• **Weeks 3-4: Product Families and Product Platforms**
  3. Definitions and Approaches to Product Family Design
  4. Examples of Successful Product Families

• **Weeks 5-11: Architecting Families of Products**
  5. Product Architecture
  6. Modular Design
  7. Commonality
  8. Design for Variety
  9. Robust Design
  10. Scalable Product Platforms
  11. Product Family Optimization

• **Weeks 12-14: Manufacturing Considerations during Product Family Design**
  12. Design for Manufacturing and Assembly
  13. Design for Mass Customization
  14. Internet-based Design and Customization

• **Week 15: Wrap-up and Final Project Presentations**

**Information Cards:**

**Please write what is in italics on your card in addition to your response**

<table>
<thead>
<tr>
<th>First name</th>
<th>Middle initial</th>
<th>Last name</th>
<th>Major/year</th>
<th>Email address</th>
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*Computer experience:* Sun? SGI? IBM? Macintosh?


*Machining skills:* lathe? mill? drilling? welding? CNC? rapid prototyping?

*Publishing experience:* word processing? spreadsheets? presentations (powerpoint)?


*Other professional experience:* anything else that you feel you can offer to your group
  (**please summarize internships/co-op experience on the back**)
PENN STATE UNIVERSITY
Department of Mechanical & Nuclear Engineering
Department of Industrial & Manufacturing Engineering

ME546 DESIGNING PRODUCT FAMILIES IE546
Spring 2009

INDIVIDUAL COURSE GOALS AND OBJECTIVES

Date: __________________ Name (optional): ___________________

1. Why are you here?

2. List five things you would like to achieve in this course.
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3. Analyze and make corrections. Change their order? Refine your thoughts? The first thing you write down may not be the most important -- upon analysis.
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4. What do you really want to achieve in this course?

5. What is your biggest fear about taking this course?