PENN STATE UNIVERSITY
Department of Mechanical & Nuclear Engineering
Department of Industrial & Manufacturing Engineering

ME546   **DESIGNING PRODUCT FAMILIES**   **IE546**
Spring 2009

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
Professor of Mechanical and Industrial Engineering
314D Leonhard Bldg
tws8@psu.edu

Text: Simpson, T. W., Siddique, Z., and Jiao, J., Eds., 2005, Product Platform and Product Family Design: Methods and Applications, Springer, New York + selected readings (distributed via Angel)

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

First name Middle initial Last name	Major/year	Email address
Computer experience: Sun? SGI? IBM? Macintosh?		
CAD/CAE experience: PRO/E? Autocad? Patran? ABAQUS? Optimization?		
Machining skills: lathe? mill? drilling? welding? CNC? rapid prototyping?		
Publishing experience: word processing? spreadsheets? presentations (powerpoint)?		
Web/multimedia experience: HTML? JAVA? digital images? scanner? video?		
Other professional experience: anything else that you feel you can offer to your group (**please summarize internships/co-op experience on the back**)		

On the back of the card, please include information about internships/work experience (include: company name, responsibilities, etc.).

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.
   -
   -
   -
   -
   -

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.
   -
   -
   -
   -
   -

4. What do you really want to achieve in this course?

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