PTFE 4110 POLYMER AND FIBER ENGINEERING DESIGN I
Credit: 2-3-3

Course Coordinators: **Dr. Sundaresan Jayaraman**

Prerequisites: PTFE 3200 or PTFE 3230 or PTFE 3221

Catalog Description: A design course covering the principles of concurrent product/process design and development. Team-based and individual projects will explore product/process design and development in the areas of polymers, fibers, and textiles.

Course Learning Objectives:
1. Learn concepts of engineering design including integrated product/process development, Quality Function Deployment (QFD) and DFX (Design for manufacturability, quality, affordability, etc.).
2. Demonstrate analysis and synthesis skills by utilizing knowledge and fundamentals learned from other courses in the curriculum to work on open-ended product/process design projects.
3. Gain an appreciation for team-oriented activities through work on design teams exploring the various facets of product/process development in polymers, fibers and textiles.
4. Be well prepared to contribute effectively to multidisciplinary design teams in the real world.

Textbook: K.T. Ulrich and S.D. Eppinger, Product Design and Development, McGraw-Hill, Third Edition, 2003.
Useful resources:
1. G.E. Dieter, Engineering Design: A Materials and Processing Approach, 3rd Edition, McGraw-Hill Book Company, 1999.
2. D.G. Ullman, The Mechanical Design Process, McGraw-Hill, 1992.
3. M.L. Shillito, Advanced QFD – Linking Technology to Market and Company Needs, John Wiley & Sons, Inc., 1994.
4. Journal/Magazine Articles and the Web

Topical Outline of Lectures:
We will cover the following key topics during the course (they are not in chronological order):
1. Design as a Competitive Advantage
2. Design and Product Life-Cycle
3. The Engineering Design Process: Key Steps from Concept to Market
4. Understanding & Translating the Customer's Needs: Principles of Quality Function Deployment (QFD)
5. Fundamentals of Concurrent Engineering
6. DFX: Design for Manufacturability, Modularity, Quality, Affordability, Usability, ...
7. ECD: Environmentally-Conscious Design
8. Industrial Design
9. Information Technology in Engineering Design
10. Design Management including Planning, Budgeting and Reporting
11. Intellectual Property: Strategies and the Protection Process

Course Outcomes: Specifically, at the end of the course the students will be able to:
1. Complete an open-ended team-based design project that will culminate in a project report and a final oral presentation [1-13]*.
2. Complete an individual design project that will lead to a final report [1- 5, 7-13].

* Numbers in Brackets refer to PFE Program Outcomes to which the Course Outcomes relate.

Topical Outline of Course

1. Design as a Competitive Advantage
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