IEEM 5371 Collaborative Product Development Spring 2024

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Textbook: Product Design and Development, K.T. Ulrich and S.D. Eppinger, McGraw Hill, 7th Edition.
References: Class-notes, clips, and related reading notes

Course Description:

A product must make people's life better by solving their pain points and/or problems by tangible or intangible solutions. This course introduces the basic concept, process, methodologies, and management practices in new product development (NPD). Students are expected to learn fundamental knowledge in product design and development, to experience its interdisciplinary nature, and to position themselves in product value chain for future career. In order to achieve this goal, students in group must realize one product concept in a collaborative manner. This project aims to provide a real environment where students can experience and learn new product development in school environment. Each group is responsible for problem finding, marketing analysis, product planning, product specifications, product architecture, concept generation, engineering design, industrial design, prototyping, in addition to project management, scheduling control, cost management, project coordination, as well as liaison.

The project execution and the final grading emphasize on both the process and the result. The execution details and processes during the project and the output produced at each stage must be recorded and well documented. All the discussion notes, decision factors, and related documents among team members should be preserved and will be graded.

Project Description:

Each project team consists of 3~4 students and each student plays one following role: Product Manager (PM), Marketing Specialist, Industrial Designer and Visualization Specialist, and Product Engineer (hardware and software). Notice that the responsibility and tasks of each role is not 100% well defined (the nature in real industry). Many activities must be conducted by team, not individually. Each group needs to conceive a product concept, generate several sketches, and realize one design during the course of the project subject to functional, schedule, and budgetary constraints. In other words, students need to manage the project by properly controlling quality, time, scheduling, and costs. Each team has a budget around 3000 NTD including the manufacturing costs and purchase for all mechanical and electrical parts, but without labor and overhead.

A working prototype must be accomplished for each product idea. We will have a small tradeshow at the semester end. Each group will make a poster and display the prototype in this event. The final prototype must demonstrate the original design functions and comply with the product specifications proposed by each team.

This course is not a typical engineering course conducted only via lectures, exams, and homework. We emphasize less on theories, but more on handons, exposure, and learning of real-world experiences. Interdisciplinary design is the idea we want to promote throughout this class. Collaboration is the key to the success of any product development. Thus, the grading will be determined by the process of the project running, team dynamics, and the final result.

Grading: Homework 20% + Midterm 35% + Final Prototype/Tradeshow 40% + Class/Team Participation 5%

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1	Introduction
2	Product Development Process
3	Customer Requirements
4	Product Planning
5	Customer Needs Analysis
6	Brainstorming & Ideation
7	Product Specifications
8	Quality Function Deployment (QFD)
9	Industrial Design
10	Product Architecture
11	Product Architecture Implications
12	Prototyping & Testing
13	Design Thinking
14	User Experience
15	Arduino Training
16	Final Exam
17	Final Tradeshow