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SYLLABUS

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COURSE DESCRIPTION.

The design of artifacts is addressed from a multidisciplinary perspective that includes engineering, art, psychology, marketing, and economics. Using a decision-making framework, emphasis is placed on understanding basic quantitative methods employed by the different disciplines for making design decisions, and on the interdisciplinary interactions throughout the design development process, Students work in teams to apply the methods on a design project from concept generation to prototyping and design verification. The course is open to all seniors and graduate students (3 or 4 credits).

ME seniors must register for ME455 either to satisfy the ME450 capstone requirement (4 credits) or as an elective (3 credits). All graduates (ME, DESCI, other) must register for DESCI 501 as an elective (3 credits).

PREREQUISITES

Familiarity with undergraduate math requirements typical in engineering programs is expected. ME seniors must satify all ME450 prerequisites and other constraints. Non-ME students must have senior or graduate standing and should consult the instructor to confirm they have a suitable background for the course.

COURSEWORK

Students work in teams on a design project proposed by the team or by a sponsor. Project work includes:

- Definition of design intent. Concept generation. Early prototyping for concept exploration.
- Development of mathematical models for design decisions from engineering, economic, and marketing (user) perspectives. These will include use of engineering analysis tools and software, Excel-based economic analysis, and conjoint analysis.
- Conduct of scientific surveys to support user preference modeling
- Prototype construction to test design concept prior to finalizing the design

Some homework and short quizzes will be assigned to augment the lectures. Grades will be based approximately 20% on homework and quizzes, and 80% on project work. More details are discussed in class.

The amount of work is similar to that required in ME 450. Prototyping work is done earlier in the semester to allow time for redesign.

The class meets TuTh 1:30-3:30 pm in 165 Chrysler for regular lectures. Additional work in shops/labs is expected. All students must be certified to use the ME shops.

DETAILED TOPICS

The topics attached are addressed through regular lectures, study of references, guest lectures and project work. Most of the topic listed correspond to “modules” on the Canvas course site.

Analytical Product Design

A Design Science Approach