**TO:** The Faculty of the College of Engineering

FROM: The Faculty of the School of Mechanical Engineering

**RE:** ME 36400 Systematic Engineering Design – Permanent course number

The faculty of the School of Mechanical Engineering has approved a permanent course number (ME 36400) for the course "Systematic Engineering Design." The action is now submitted to the Engineering Faculty with a recommendation for approval.

ME 36400: Systematic Engineering Design Credits: 3 credits [2 (lectures) +1(lab)] Offered: Spring, Summer, and Fall Prerequisite: ME 26400 (Introduction to Manufacturing for Mechanical Design)

**Description:** The engineering design process including planning and clarification, conceptual design, embodiment design, and detail design. Identification of customer requirements and development of engineering specifications. Concept generation and selection. Rules and guidelines for embodiment design. Design considerations including quality, modularity, manufacturing, assembly, and economics. Detail design to support manufacturing.

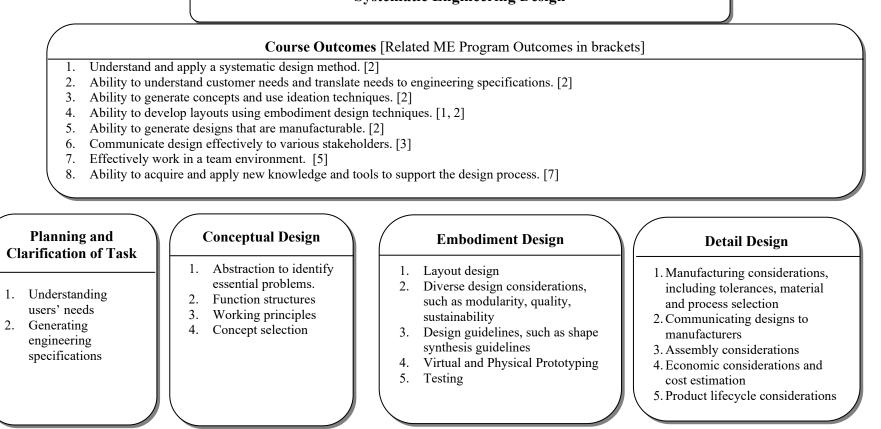
## **Learning Outcomes:**

- 1. Understand and apply a systematic design method.
- 2. Ability to understand customer needs and translate needs to engineering specifications.
- 3. Ability to generate concepts and use ideation techniques.
- 4. Ability to develop layouts using embodiment design techniques.
- 5. Ability to generate designs that are manufacturable.
- 6. Communicate design effectively to various stakeholders.
- 7. Effectively work in a team environment.
- 8. Ability to acquire and apply new knowledge and tools to support the design process.

**Background:** The faculty of Mechanical Engineering has determined that basic knowledge of manufacturing and hands-on manufacturing skills are important for all students graduating with BS in Mechanical Engineering, and these skills should be introduced early in the BSME curriculum. To achieve this goal, the current ME 263: *Introduction to Mechanical Engineering Design, Innovation, and Entrepreneurship* will be replaced with the new course ME 264: *Introduction to Manufacturing for Mechanical Design*, which has been approved by the ECC (ref. EFD 58-25). The design-related content in the current ME 263 will be moved to the proposed junior-level design course ME 364: Systematic Engineering Design. Moving the sophomore design course to the junior level would allow students to utilize scientific knowledge learned in other courses to their design projects. This course will be required for all BSME students. The course outline is attached below. This EFD is for the approval of the permanent course number. A separate EFD will be submitted with the new BSME plan of study.

Jitesh Panchal Associate Head for Undergraduate Studies Professor of Mechanical Engineering

## **ME 36400** Systematic Engineering Design



## **Guided Design Projects and Design Case Studies Typical Examples:** 1. Robotic vehicle design Wearables and bio-mechanics design 3. Water filtration system

- 4. Design of a high-performance racing bicycle
- 5. HVAC design

2.

TEXTBOOK/REQUIRED MATERIAL:       P.         TBD       M         COORDINATING FACULTY: Jitesh Panchal       P.	
ASSESSMENT TOOLS: 1. Homework 2. Design reviews 3. Peer evaluations	<ul> <li><b>TERMS OFFERED:</b> Fall, Spring, and Summer</li> <li><b>PRE-REQUISITIES:</b> ME 26400</li> <li><b>COURSE OUTCOMES</b> [Related ME Program Outcomes in brackets]: <ol> <li>Understand and apply with a systematic design method. [2]</li> <li>Ability to understand customer needs and translate needs to engineering specifications. [2]</li> <li>Ability to generate concepts and use ideation techniques. [2]</li> <li>Ability to develop layouts using embodiment design techniques. [1, 2]</li> <li>Ability to generate designs that are manufacturable. [2]</li> <li>Communicate design effectively to various stakeholders. [3]</li> <li>Effectively work in a team environment. [5]</li> <li>Ability to acquire and apply new knowledge and tools to support the design process. [7]</li> </ol> </li> </ul>
COURSE STRUCTURE/SCHEDULE:1.Lecture - 2 days per week at 50 minutes2.Lab - 2 days per week at 110 and 50 minutes3.4.5.6.6.	RELATED ME PROGRAM OUTCOMES:         1. Engineering fundamentals         2. Engineering design         3. Communication skills         4. Ethical/Professional responsibilities         5. Teamwork skills         6. Experimental skills         7. Knowledge acquisition         REVISION DATE: October 30, 2024