Annual Academic Assessment Report

Bachelor of Science in Mechanical Engineering (BSME)

Student Learning Outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. an ability to communicate effectively.
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Assessment and Evaluation: AY 2024-2025

The faculty of the Department of Mechanical Engineering will evaluate the 24-25 Student Learning Outcome assessment data at its annual faculty meeting, to be held August 2025. The below analysis was performed based on the 23-24 data:

- **Outcome 1**:
    - Problem solving skills exhibited within mechanical engineering courses indicate students are achieving the Outcome at the desired target level.
- **Outcome 2**:
    - Engineering design skills exhibited in the capstone design experience, as well as some other mechanical engineering courses indicate students are achieving the Outcome at the desired target level.
    - However, assessment data taken in our Thermal Systems Analysis and Design course indicate that students are NOT achieving the desired target

level for engineering design skills with regards to heat exchangers in advanced thermal-fluid systems.

- **Outcome 3:**
    - Communication skills exhibited in the capstone design experience and in a laboratory course indicate students are achieving the Outcome at the desired target level.
- **Outcome 4:**
    - Recognizing ethical and professional responsibilities to make informed judgments exhibited in the Professional Engineering Practices course indicate the students are achieving the Outcome at the desired target level.
- **Outcome 5:**
    - Teamwork and leadership exhibited in the capstone design experience indicate students are achieving the Outcome at the desired target level.
- **Outcome 6:**
    - Conducting experiments, analyzing data, and drawing conclusions exhibited in a laboratory course indicate the students are achieving the Outcome at the desired target level.
- **Outcome 7:**
    - Obtaining and applying new knowledge exhibited in the Professional Engineering Practices course indicates students are achieving the Outcome at the desired target level.

Changes to the Degree Program – Planned or Considered

There are no changes to the BSME degree program planned or considered based on the assessment and evaluation process.

Changes to the Assessment Process – Planned or Completed

In response to the Outcome 2 (Thermal Systems Analysis and Design) assessment data, the faculty voted in favor of modifying the assessment by breaking the problem into smaller steps to better identify the specific issue causing the low scores. This modified assessment was given to students in Fall 2024 and Spring 2025. The ABET and Thermal-Sciences sub-committees will then analyze the results in Summer 2025 and develop a targeted action plan to address the low assessment scores.