

## 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 2022-2023**

The faculty of the Department of Mechanical Engineering evaluated Student Learning Outcome assessment data at its annual faculty meeting, held August 16, 2023. The results of the analysis include the following:

- **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 other mechanical engineering courses indicate students are achieving the Outcome at the desired target level.
- **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**

More complete assessment rubrics are being developed across the department for two purposes: (i) to improve inter-rater reliability in direct assessments, and (ii) to provide more granular data in the form of performance indicators that directly tie into the ABET student outcomes. This granular data will better enable us in the future to identify specific areas in student learning that may require continuous improvement action plans.

A continuous improvement action plan initiated in 2021 to better integrate our curriculum is currently being discussed. The plan involves a “trans-curricular” problem that students re-visit throughout their sophomore, junior, and senior years in a series of courses. Direct assessment data collected on student cohorts before and after this plan indicates no statistically significant difference, and indirect assessments (via student surveys) reveals a rather negative impression among the students. The department is currently debating whether to continue this action plan or not.