



Mechanical Engineering [MEEG]

Cycles included in this report:

Jun 1, 2024 to May 31, 2025

Program Name: Mechanical Engineering [MEEG]

Reporting Cycle: Jun 1, 2024 to May 31, 2025

1 Is this program offered via Distance Learning?

2 Is this program offered at an off-site location?

No

2.1 If yes to previous, provide addresses for each location where 50% or more of program credits may be earned.

3 Example of Program Improvement

2021-2022:

2022-2023:

- Recruited a new faculty member with Doctorate in Mechanical Engineering.
- Created Advanced Fluid Mechanics MEEN 411 course.
- Purchased new lab equipment - ETL 109 Engineering measurements and Strength of material lab.
- Enhanced the Wind Tunnel equipment and created ASME student project lab in ETL 121.

2023-2024:

- Dr. Ning Zhang taught the new upper level fluid mechanics course MEEN 411 – Advanced Fluid Mechanics for the 1st time in Fall 2023 semester
- Dr. Ning Zhang and Dr. Zhuang Li taught FE review sessions
- Dr. Ning Zhang Updated pump and pipe demonstrations in Fluids Lab
- Qi Guo updated the lab manuals with all detailed instructions for MEEN 415 Heat Flow Lab
- Dr. Ning Zhang and Dr. Zhuang Li upgraded computers in ETL 109 and ETL 122
- Dr. Zhuang Li upgraded oscilloscopes, function generators, and Strength of Material equipment in ETL 109

2024-2025:

- Dr. Qi Guo added a new elective course ENGR/MEEN 466/566 Energy Efficient Manufacturing to the catalog.
- Dr. Zhuang Li obtained 11 licenses of CAESAR II piping stress software and taught it as a part of MEEN423 course in spring 2025.
- Three tensile test machines, purchased with Qi Guo's 2024 LA BoR \$195,000 funding, have been set up in ETL 116 and are ready for use.
- Purchased and installed a cross-flow heat exchanger with a TASC funding (\$21,283) and department funding (\$4,000).
- Mechanical Engineering Program had an audit by the Industrial Advisory Board in Summer 2024.

4 Program Highlights from the Reporting Year

2021-2022:

We obtained external funding of \$88,050 and internal funding of \$60,000 for research and equipment. We also published two journal papers, one book chapter, and five conference papers. Dr. Zhuang Li won the President's Award for Excellence from McNeese State University in August 2021.

2022-2023:

- Two students presented at 2023 LSU Discover Day and one of them got second place in poster competition.
- Three students presented at 2023 University of Louisiana System Academic Summit.
- ASME students participated in LaACES Balloon project.
- One undergraduate Senior Design research project resulted in a publication in 2022 ASME Annual International Conference.
- Two undergraduate senior design projects resulted in two publications in 2023 ASME Annual International Conference.
- Faculty secured external funding of \$32,000 for undergraduate research projects.
- Faculty secured internal funding of \$25,000 for upgrading the computers for ETL 109 and ETL 121 laboratories.
- Faculty secured internal funding of \$10K for undergraduate research projects.

Mechanical Engineering students have revitalized dormant Society of Automotive Engineers Chapter.

- For E-week, mechanical engineering students showcased lab demonstrations to approx 300 local high school students.
- During E-week, industry experts from mechanical engineering background gave presentations to current mechanical engineering students.
- One undergraduate student presented a research paper in 2022 ASME Fluids Engineering Summer Conference.

2023-2024:

- Mechanical Engineering faculty successfully received external grants of \$215,915.
- Mechanical Engineering faculty and students published 10 journal and conference research papers.
- Undergraduate students conducted research projects
 - Flood modeling and assessment research
 - Industrial filter cake simulation
- Dr. Ning Zhang served as Fluids Engineering Track co-organizer for 2023 ASME International Mechanical Engineering Congress and Exposition, New Orleans, LA
- Dr. Ning Zhang served as conference co-organizer for 2024 ASME Fluids Engineering Conference, Anaheim, CA
- Dr. Ning Zhang organized numerous technical symposia for ASME
- Dr. Ning Zhang served as Secretary of ASME Fluids Engineering Division Executive Committee
- Dr. Ning Zhang served as Chair of ASME Fluids Engineering Division 100 year anniversary steering committee
- Dr. Ning Zhang organized ASME Fluids Engineering Division online seminar series, four seminars in this year
- Dr. Zhuang Li served in the International Scientific Committee on the International Congress of Sound and Vibration 2023
- Dr. Zhuang Li served in the International Scientific Committee on the International Congress of Sound and Vibration 2024
- Dr. Zhuang Li served as Treasurer of the International Institute of Acoustics and Vibration
- Dr. Zhuang Li served as Associate Editor of the International Journal of Acoustics and Vibration.
- ASME Student Chapter had monthly members meeting
- ASME Students attended the Turbomachinery and Pump Symposia 2023, Houston, TX
- ASME Students attended the Vibration Institute Triplex Chapter's meeting, Beaumont, TX
- ASME Students attended the ASME IMECE 2023, New Orleans
- ASME Students hosted E-Week Open House and Conference
- ASME Students participated in Fall and Spring Preview Day open house
- ASME Students hosted a meeting with Ms. Janice Parker, the Coordinator of ASME Student Section Engagement
- ASME Students had a joint meeting with the ASME Beaumont Chapter at ReCon Management in Sulphur, LA

2024-2025:

- Mechanical Engineering faculty and students published 10 conference research papers.
- Undergraduate students conducted research projects
 - Vibration Attenuation of Earthmoving Equipment, sponsored by MCMO.
 - Storm Surge Flood Modeling for Contraband Bayou
 - Pollutant Dispersion Modeling for Industrial Facilities
- Dr. Ning Zhang serves as Vice Chair of ASME Fluids Engineering Division (FED), 2024-2025
- Dr. Ning Zhang serves as Chair of ASME FED 100th year anniversary steering committee
- Dr. Ning Zhang serves as Track Chair, 2024 ASME International Mechanical Engineering Congress & Exposition, Portland, OR, 11/17-21, 2024
- Dr. Ning Zhang serves as Conference Chair, 2025 ASME Fluids Engineering Division Summer Conference, Philadelphia, PA, 7/27-7/30, 2025
- Dr. Zhuang Li serves as Treasurer, International Institute of Acoustics and Vibration 2010 ~ present
- Dr. Zhuang Li serves as International organization committee of the International Congress of Sound and Vibration, 2014 ~ present, yearly
- Dr. Zhuang Li serves as Chair of McNeese QEP Team N
- Dr. Zhuang Li served as Associate Editor of the International Journal of Acoustics and Vibration.
- ASME students attended Turbomachinery and Pump Symposia 2024, Houston, August 2024
- ASME students attended Vibration Institute Meeting, Beaumont, TX, September 2024
- ASME students attended ASME Student Leadership Conference at Dallas, November 2024
- ASME students had plant tour in Lyondell-Basell
- ASME students participated various events including Preview Days, E-Week Open House, MathCounts volunteers, tailgates, fall food truck, crawfish boil, etc.

5 Program Mission

The Department of Engineering and Computer Science provides a professionally focused education in the fields of computer science and engineering. Students are prepared to practice in their chosen field and to focus on the industrial and business needs of the region. Students have opportunities for close interaction with faculty, business, and the industrial community in a practice-oriented, student-friendly environment. The department maintains Accreditation Board for Engineering and Technology (ABET)-accredited curricula that foster interdisciplinary teamwork as well as scholarly development through special projects, internships, discussions of professional ethics, and training with regional business or industries. Students are prepared to study for advanced degrees and/or work in regional business or industries upon graduation.

6 Institutional Mission Reference

The program mission supports the University mission by fostering student success, academic excellence, and University-community alliances. In the program mission, student success and academic excellence are promoted by a professionally focused and practice-oriented student friendly environment, and by maintaining an up-to-date curriculum. The University mission is also accomplished by the close cooperation with regional industry.

7 Assessment and Benchmark MEEN 321 Coursework

Assessment: Students' work (tests, homework, quizzes, or projects) taken from MEEN 321. ABET 3.1 rubric is used to evaluate SLOs.

Benchmark: Data will be evaluated on a 5-tier scale with 1.00 being low achievement and 5.00 being high. An average score of 3.30/5.00 is the desired achievement level.

7.1 Data

Academic Year	Average score on PC1
2021-2022	3.88/5.00
2022-2023	3.35/5.00
2023-2024	3.07/5.00
2024-2025	3.34/5.00

7.1.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-22 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-23 academic year.

2023-2024:

The benchmark was not met for the 2023-24 academic year. The instructor noticed that students in recent years lack basic skills in arithmetic, algebra, and trigonometry. Therefore, the instructor scheduled one-hour study sessions on all Wednesdays. In addition, he spent two classes to go through these basic skills. Unfortunately, about half of the class either dropped or had D or F with the following four actions: (1) one bonus quiz, (2) one bonus homework assignment, (3) 50% of the final exam is exactly the same as the midterm, (4) the instructor curved the whole class's scores.

Plan for continuous improvement: (1) The instructor will conduct a screening test at the beginning of the semester in order to identify each student's weaknesses. (2) The instructor will work on basic math questions at the beginning of each class for students to warm up. (3) The instructor will host regular study sessions. (4) The instructor will include basic math questions in quizzes. (5) The instructor will closely monitor student performance throughout the semester. (6) Weak students are required to study at the Tutoring Center frequently.

2024-2025:

The benchmark was met for the 2024-2025 academic year. As the instructor noticed the decline of student quality in recent years, the instructor made a few changes this year following the plan for continuous improvement mentioned in the last year. This year saw improvements in student learning outcomes. Even though three students withdrew, two failed, and two had incomplete, out of 34 students, most of them made significant improvements. Before the semester started, the instructor made a set of questions including basic knowledge in arithmetic, algebra, and trigonometry. He gave these questions to students in the very first class for them to perform a self evaluation. Although these questions do not count towards the final grade, he graded them and provided feedback to every students to point out their strengths and weaknesses. Therefore, students could target weaknesses and improve themselves.

Plan for continuous improvement: It seems the plan of the last year had a positive impact. The instructor plans to continue doing what he is doing. In addition, he will work with the math department to improve the connection between math and engineering departments.

7.2 Data

Academic Year	Average score on PC2
2021-2022	3.60/5.00
2022-2023	2.77/5.00
2023-2024	2.39/5.00
2024-2025	3.79/5.00

7.2.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-22 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was not met for the 2022-23 academic year. Students in recent years lack basic skills in arithmetic, algebra, and trigonometry. Although the instructor spent a whole class to go through these basic skills, some of the students could not solve simple equations. It is why Quiz #4's score is quite low. In the final exam, a similar question was given, but 1/3 of the class had 0. Students need better elementary and secondary education.

2023-2024:

The benchmark was not met for the 2023-24 academic year. The only task students needed to do is to plug values in formulas. Unfortunately, 1/3 of the class did not get any step correctly. Plan for continuous improvement: (1) The instructor will conduct a screening test at the beginning of the semester in order to identify each student's weaknesses. (2) The instructor will work on basic math questions at the beginning of each class for students to warm up. (3) The instructor will host regular study sessions. (4) The instructor will include basic math questions in quizzes. (5) The instructor will closely monitor student performance throughout the semester. (6) Weak students are required to study at the Tutoring Center frequently.

2024-2025:

The benchmark was met for the 2024-2025 academic year. Most students made significant improvements. The instructor hosts regular study sessions on Wednesdays to help students on scientific principles and problem solving skills. Before midterm and final exams, he spent more time and worked more sample questions.

Plan for continuous improvement: It seems the plan of the last year had a positive impact. The instructor plans to continue doing what he is doing. In addition, he will voluntarily work at the Tutoring Center to help more students who may need help.

7.3 Data

Academic Year	Average score on PC3
2021-2022	3.88/5.00
2022-2023	3.87/5.00
2023-2024	2.10/5.00
2024-2025	3.45/5.00

7.3.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-22 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-23 academic year. The score sustained from the 2021-2022 academic year.

2023-2024:

The benchmark was not met for the 2023-24 academic year. PC 3 was a gear transmission question from the minute hand to hour hand. There is a clock right above the white board in front of the class. Students could totally watch how these hands rotate. The minute hand rotates one cycle per hour, so the gear ratio should be 12:1. However, only 7 students got this right. More than 2/3 of the class answered 60:1, 720:1 or even 1440:1.

Plan for continuous improvement: (1) The instructor will conduct a screening test at the beginning of the semester in order to identify each student's weaknesses. (2) The instructor will work on basic math questions at the beginning of each class for students to warm up. (3) The instructor will host regular study sessions. (4) The instructor will include basic math questions in quizzes. (5) The instructor will closely monitor student performance throughout the semester. (6) Weak students are required to study at the Tutoring Center frequently.

2024-2025:

The benchmark was met for the 2024-2025 academic year. The instructor monitors attendance more carefully and reaches out if anyone missed multiple classes in a row. He helps students who need additional assistance and provides make-up quizzes and tests.

Plan for continuous improvement: It seems the plan of the last year had a positive impact. The instructor plans to continue doing what he is doing. In addition, the instructor will analyze student errors more carefully and provide feedback to students for them to improve.

8 Assessment and Benchmark MEEN 409 Coursework

Assessment: Students work (tests, homework, quizzes, or projects) taken from MEEN 409. ABET 3.1 rubric is used to evaluate SLOs.

Benchmark for PC1: Data will be evaluated on a 5-tier scale with 1.00 being low achievement and 5.00 being high. An average score of 3.50/5.00 is the desired achievement level.

Benchmark for PC2: Data will be evaluated on a 5-tier scale with 1.00 being low achievement and 5.00 being high. An average score of 3.30/5.00 is the desired achievement level.

8.1 Data

Academic Year	Average score on PC4
2021-2022	2.70/5.00
2022-2023	3.68/5.00
2023-2024	3.10/5.00
2024-2025	3.50/5.00

8.1.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

Too many confounding variables, such as the first semester back after COVID, online delivery, hurricane recovery, and a new instructor for course.

2022-2023:

The benchmark was met for the 2022-23 academic year. The average score significantly improved from the 2021-2022 academic year.

2023-2024:

The benchmark was not met for the 2023-2024 academic year. Half of the students in the class took the prerequisite course, Thermodynamics, during the COVID and hurricane recovery period. These students experienced Thermodynamics through online delivery, which affected their learning outcomes. Consequently, this impacted their performance in this advanced Thermodynamics course.

Plan for continuous improvement: As stated in the previous explanation: "Half of the students in the class took the prerequisite course, Thermodynamics, during the COVID and hurricane recovery period. These students experienced Thermodynamics through online delivery, which affected their learning outcomes." Right now, the teaching has back to regular in-class teaching; additionally, both ENGR 207 Thermodynamics and MEEN 409 Advanced Thermodynamics are taught by the same instructor, which guaranteed the learning continuity. As the result, the student learning outcome will be improved and the benchmark is expected to meet next year, as the continuous improvement.

2024-2025:

The benchmark was met for the 2024-2025 academic year. Students performed well on the refrigeration problem during their exams. Both ENGR 207 (Elementary Thermodynamics) and MEEN 409 (Advanced Thermodynamics) are taught by the same instructor, ensuring continuity in learning - from fundamental thermodynamic theory to its application in solving refrigeration problems.

Plan for continuous improvement: The instructor will host regular study sessions to support students who struggle with determining pressure and temperature in refrigeration-related questions.

8.2 Data

Academic Year	Average score on PC5
2021-2022	2.50/5.00
2022-2023	4.45/5.00
2023-2024	4.7/5.00
2024-2025	4.5/5.00

8.2.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was not met for the 2021-22 academic year. More data needs to be collected before making a change to the benchmark.

2022-2023:

The benchmark was met for the 2022-23 academic year. The average score significantly improved from the 2021-2022 academic year.

2023-2024:

The benchmark was met for the 2023-2024 academic year. The score improved from the 2022-2023 academic year.

Plan for continuous improvement: Most students were able to use the tables, charts, data, or models with correct formulas in determining the solution without errors while solving the engineering problem. There are still some students who have minor errors while solving this problem, the potential continuous improvement will be helping those students who have minor errors to solve the problem completely correct by explaining the tables, charts, data more times.

2024-2025:

The benchmark was met for the 2024-2025 academic year. Students performed well in using tables and data to solve heat pump engineering problems during the final exams. Both ENGR 207 (Thermodynamics) and MEEN 409 (Advanced Thermodynamics) are taught by the same instructor, ensuring continuity in learning from thermodynamic theory to its application in solving heat pump problems.

Plan for continuous improvement: The instructor will monitor class attendance more closely and reach out to students who miss multiple classes in a row. Additional support will be provided to help these students catch up, so they can perform better on questions related to heat pump.

9 Assessment and Benchmark MEEN 316 Coursework

Assessment: Students' work taken from MEEN 316. ABET 3.3 (W) rubric is used to evaluate SLOs.

Benchmark: Data will be evaluated on a 5-tier scale with 1.00 being low achievement and 5.00 being high. An average score of 3.50/5.00 is the desired achievement level.

9.1 Data

Academic Year	Average score on PC1
2021-2022	3.52/5.00
2022-2023	4.84/5.00
2023-2024	3.96/5.00
2024-2025	3.94/5.00

9.1.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-2022 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-2023 academic year. The average score significantly improved from the 2021-2022 academic year.

2023-2024:

The benchmark was met for the 2023-2024 academic year. The score dropped slightly from the 2022-2023 academic year.

Plan for continuous improvement: The instructor will take actions to remind the students about the capabilities of Word to correct grammatical errors.

2024-2025:

The benchmark was met for the 2024-2025 academic year. The score dropped slightly from the 2023-2024 academic year.

Plan for continuous improvement: Students showed improvement in their most recent lab reports, with the majority of grammatical errors corrected in Lab Reports 2–7. The slight reduction in performance is attributed to Lab Report 1, which was used to assess baseline writing skills, and where most students did not follow the established guidelines. The instructor will continue to conduct in-class demonstrations on how to enable and use Microsoft Word's grammar and spelling tools—once at the beginning of the term and again at midterm. Additionally, reminders about grammar checks will be included in future assignment instructions.

9.2 Data

Academic Year	Average score on PC2
2021-2022	3.38/5.00
2022-2023	4.16/5.00
2023-2024	4.58/5.00
2024-2025	4.69/5.00

9.2.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was not met for academic year 2021-2022. More data needs to be collected before changing the benchmark.

2022-2023:

The benchmark was met for the 2022-2023 academic year. The average score significantly improved from the 2021-2022 academic year.

2023-2024:

The benchmark was met for the 2023-2024 academic year. The score improved slightly from the 2022-2023 academic year.

Plan for continuous improvement: The instructor will take actions to provide an additional lecture in the beginning of the semester to go over the guidelines on how to properly write a technical lab report.

2024-2025:

The benchmark was met for the 2024-2025 academic year. The score improved slightly from the 2023-2024 academic year.

The additional lecture at the beginning of the term helped the students. Next year, the instructor plans to provide a sample lab report from a previous year as an example for students. Additionally, the instructor will implement an initial evaluation of a lab report outline to support better organization and clarity in student writing.

9.3 Data

Academic Year	Average score on PC3
2021-2022	3.57/5.00
2022-2023	4.97/5.00
2023-2024	4.81/5.00
2024-2025	4.76/5.00

9.3.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-2022 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-2023 academic year. The average score significantly improved from the 2021-2022 academic year.

2023-2024:

The benchmark was met for the 2023-2024 academic year. The score sustained from the 2022-2023 academic year.

Plan for continuous improvement: The instructor will take actions to go over on how to cite references in the lab reports. Examples will be given to the students about the different formatting of the citations, the importance to keep them consistent throughout the report as well as the importance to use the reference whenever students are using/copying information from textbooks and other internet resources.

2024-2025:

The benchmark was met for the 2024-2025 academic year. The score dropped slightly from the 2023-2024 academic year.

Plan for continuous improvement: The students have shown improvement in providing citations at the end of their lab reports. However, with the increased use of AI, there is concern that students may rely too heavily on online resources. To address this, the instructor plans to include a mini-lesson on plagiarism and the ethical use of sources.

10 Assessment and Benchmark MEEN 491 Project and Team Survey

Assessment: Students work (Project and Team Survey) taken from ENGR 491. ABET 3.5 rubric is used to evaluate SLOs.

Benchmark for PC1: Data will be evaluated on a 5-tier scale with 1.00 being low achievement and 5.00 being high. An average score of 3.50/5.00 is the desired achievement level.

Benchmark for PC2: Data will be evaluated on a 5-tier scale with 1.00 being low achievement and 5.00 being high. An average score of 4.00/5.00 is the desired achievement level.

Benchmark for PC3: Data will be evaluated on a 5-tier scale with 1.00 being low achievement and 5.00 being high. An average score of 3.50/5.00 is the desired achievement level.

10.1 Data

Academic Year	Average score on PC1
2021-2022	4.47/5.00
2022-2023	4.48/5.00
2023-2024	4.81/5.00
2024-2025	4.68/5.00

10.1.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-2022 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-2023 academic year. The score sustained from the 2021-2022 academic year.

2023-2024:

The benchmark was met for the 2023-2024 academic year.

Plan for continuous improvement: The score is improved from the 2022-2023 academic year. The new implementations in this year include clearly defining the leadership role in the team and requiring documentation of communications. It seems that the implementations contributed to better collaborations among team members, and could be the possible reason for improving the assessment score. We will continue the implementations in the next year.

2024-2025:

The benchmark was met. During the semester, the team met with the faculty advisor once a week to ensure performance stayed on track. There were very few mentions of any team members not actively participating in the project throughout the semester.

Plan for continue improvement: next year we will implement the required meeting minutes of weekly team meetings (not the weekly meeting with the faculty advisor). In the minutes, the individual tasks and collaborations between team members are required to be documented.

10.2 Data

Academic Year	Average score on PC2
2021-2022	4.64/5.00
2022-2023	4.61/5.00
2023-2024	4.83/5.00
2024-2025	4.78/5.00

10.2.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-22 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-23 academic year. The score sustained from the 2021-2022 academic year.

2023-2024:

The benchmark was met for the 2023-24 academic year.

Plan for continuous improvement: The score is improved from the 2022-2023 academic year. The new implementations in this year include clearly defining the leadership role in the team and requiring documentation of communications. It seems that the implementations contributed to better collaborations among team members, and could be the possible reason for improving the assessment score. We will continue the implementations in the next year.

2024-2025:

The benchmark was met. All seven mechanical engineering capstone projects were successful and achieved the defined project outcomes. Students completed their assigned tasks effectively, contributing to the overall success of each project.

Plan for continuous improvement: we will implement in next year is the required meeting minutes of weekly team meeting (not the weekly meeting with the faculty advisor). In the minutes, the individual tasks and collaborations between team members are required to be documented.

10.3 Data

Academic Year	Average score on PC3
2021-2022	4.65/5.00
2022-2023	4.60/5.00
2023-2024	4.78/5.00
2024-2025	4.71/5.00

10.3.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-22 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-23 academic year. The score sustained from the 2021-2022 academic year.

2023-2024:

The benchmark was met for the 2023-24 academic year.

Plan for continuous improvement: The score is improved from the 2022-2023 academic year. The new implementations in this year include clearly defining the leadership role in the team and requiring documentation of communications. It seems that the implementations contributed to better collaborations among team members, and could be the possible reason for improving the assessment score. We will continue the implementations in the next year.

2024-2025:

The benchmark was met. Based on the peer assessments (Question 3) conducted among team members across all teams in the capstone senior design class, the average score is 4.71 out of 5.00. This score not only exceeds the benchmark but also surpasses the four-year average of 4.685. Therefore, the criterion is considered satisfied for the 2024-2025 academic year.

Plan for continuous improvement: Starting next year, we will implement a new requirement: each team must submit meeting minutes for their weekly team meetings (excluding meetings with the faculty advisor). These minutes must document individual tasks as well as collaboration among team members.

11 Assessment and Benchmark MEEN 415 Coursework

Assessment: Students work (tests, homework, quizzes, or projects) taken from MEEN 415. ABET 3.6 rubric is used to evaluate SLOs.

Benchmark: Data will be evaluated on a 5-tier scale with 1.00 being low achievement and 5.00 being high. An average score of 3.30/5.00 is the desired achievement level.

11.1 Data

Academic Year	Average score on PC1
2021-2022	3.67/5.00
2022-2023	4.29/5.00
2023-2024	3.00/5.00
2024-2025	3.00/5.00

11.1.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-2022 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-2023 academic year. The score is improved from the 2021-2022 academic year.

2023-2024:

The benchmark was not met for the 2023-2024 academic year.

Plan for continuous improvement: The benchmark for 2023-2024 academic year was not selected well to reflect the students learning outcome. The benchmark stated "Demonstrate knowledge of safety considerations and run the experiment in a safe and appropriate manner." The 3-point item states "Experiment was run in a safe manner. Students demonstrated knowledge of all safety considerations", which most of the students should fit in, but the 5-point item states "Developed additional safety procedure that are superior to current procedures", which most likely no one will fit in. In the future, for the continuous improvement reason, a more reasonable benchmark will be selected and applied.

2024-2025:

The benchmark was not met for the 2024-2025 academic year. This year's evaluation was based on whether students wore safety glasses while running the lab and whether they conducted the lab in a safe manner. The instructor did not apply the full 5-point scale to a comprehensive safety assessment. Instead, every student received a 3.

Plan for continuous improvement: A more comprehensive evaluation method will be developed and implemented to cover the full range of scores from 1 to 5. Additionally, proper records will be maintained to demonstrate results to auditors. Safety quiz grades are proposed to be used as the evaluation method next year. The instructor will also emphasize possible hazards and safety rules at the beginning of every lab. The instructor will encourage students to take additional safety precautions such as fire-resistance outfits, steel-toed boots, ear plugs, safety goggles, gloves, on top of the basic safety requirements.

11.2 Data

Academic Year	Average score on PC2
2021-2022	4.33/5.00
2022-2023	3.87/5.00
2023-2024	4.87/5.00
2024-2025	4.8/5.00

11.2.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-2022 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-2023 academic year. The score is declined slightly from the 2021-2022 academic year.

2023-2024:

The benchmark was met for the 2023-2024 academic year. The score improved from the 2022-2023 academic year.

Plan for continuous improvement: The benchmark was met in the past three years. One of the reasons of the fluctuation is the student group of that particular semester. Sometimes, there are more good students in the semester and sometimes the overall student qualification is not that good, lowered the class average. As the continuous improvement plan, the instructor will keep the eyes on those students who are willing to study but did not get a good performance and help those students do better on applying measurement techniques to the experiment.

2024-2025:

The benchmark was met for the 2024-2025 academic year.

Plan for continuous improvement: The instructor will help students do better on interpolating the result and compare the lab results difference from the theory. In addition, the instructor will host regular study sessions.

11.3 Data

Academic Year	Average score on PC3
2021-2022	3.76/5.00
2022-2023	3.84/5.00
2023-2024	4.31/5.00
2024-2025	4.33/5.00

11.3.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-2022 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-2023 academic year. The score is improved from the 2021-2022 academic year.

2023-2024:

The benchmark was met for the 2023-2024 academic year. The score improved from the 2022-2023 academic year.

Plan for continuous improvement: The benchmark was met in the past three years. One of the reasons of the fluctuation is the student group of that particular semester. Sometimes, there are more good students in the semester and sometimes the overall student qualification is not that good, lowered the class average. As the continuous improvement plan, the instructor will keep the eyes on those students who are willing to study but did not get a good performance and help those students do better on analyzing and interpreting data using the experimental and engineering tools.

2024-2025:

The benchmark was met for the 2024-2025 academic year.

Plan for continuous improvement: The instructor will help students do better on interpolating the result and compare the lab results difference from the theory. In addition, the instructor will host regular study sessions.

11.4 Data

Academic Year	Average score on PC4
2021-2022	4.10/5.00
2022-2023	3.87/5.00
2023-2024	4.56/5.00
2024-2025	4.56/5.00

11.4.1 Analysis of Data and Plan for Continuous Improvement

2021-2022:

The benchmark was met for the 2021-2022 academic year. More data needs to be gathered before making a continuous improvement plan.

2022-2023:

The benchmark was met for the 2022-2023 academic year. The score is declined slightly from the 2021-2022 academic year.

2023-2024:

The benchmark was met for the 2023-2024 academic year. The score improved from the 2022-2023 academic year.

Plan for continuous improvement: From the performance, most students did well on this benchmark, indicated that most students were able to use engineering judgment to draw conclusion on how results relate to or are different from theory, appropriate models, or previous results. As the continuous improvement plan, the instructor will keep the eyes on those students who are willing to study but did not get a good performance and help those students do better on interpolating the result and compare the lab results difference from the theory.

2024-2025:

The benchmark was met for the 2024-2025 academic year. Most students were able to use engineering judgment to draw conclusions on how results relate to or are different from theory, appropriate models, or previous results.

Plan for continuous improvement: The instructor will help students do better on interpolating the result and compare the lab results difference from the theory. In addition, the instructor will host regular study sessions.