



Annual Assessment Report for Academic Programs

The University Assessment Team advocates for the enhancement of student learning through purposeful, meaningful, and feasible student-outcomes assessment practices. The Assessment Team seeks to collaborate with programs, departments, and units to ensure that effective assessment of student learning occurs across the University. To assist in meeting this goal, the Team requests that you complete this Annual Assessment Report form to document student learning in your program. A PDF version of this completed form will be posted to the Academic Affairs Assessment website. Please note that this Annual Assessment Report form should only be completed after you have an Assessment Plan for Academic Programs forms on file with the University Assessment Team. The plan is completed once and only updated when revisions have been made to components of the plan.

1. **Degree Level and Program Name:** MS in Civil Engineering
2. **College/School:** College of Engineering & Science
3. **Assessment Overview** - Briefly share how student learning outcomes assessment is conducted within your program/department (e.g. number of outcomes, examples of assignments used, and frequency of assessment).

The graduate program of Civil Engineering has three learning outcomes: Technical Competence, Research Skills, and Effective Communication.

Assessment is continuous throughout the program.

Student performance is evaluated through a combination of homework assignments, projects, and multiple examinations in most lecture-based courses. Some courses also include oral presentations and paper essays to assess communication skills.

Students may additionally choose to complete a master's thesis as an optional component. Students who select the thesis option are required to produce a written thesis and present their research in a public forum, followed by a question-and-answer session.

4. **Student Learning Outcomes & Benchmarks** -Which student learning outcome(s) from the assessment plan filed with the University Assessment Team is/are being reported on in this report? Include the corresponding benchmark(s) for each outcome.

The program has three Student Learning Outcomes (SLOs).

SLO 1: Technical Competence: Analyze and design a complex engineering system or component. This outcome is assessed through graduate-level coursework, including assignments, projects, exams, and written essays.

SLO 2: Research Skills: Independently investigate an engineering topic and make conclusions about its effect on designs .

This outcome is assessed through graduate-level coursework and, when applicable, master's thesis work, based on students' ability to design experiments that address research questions, analyze data and interpret results, test hypotheses, and apply concepts to investigate case studies.



SLO 3: Effective Communication: Present engineering solutions.

This outcome is assessed through project or poster presentations and written reports.

The benchmark for every course in the program is a minimum grade of B (3.0). Students must maintain a cumulative GPA of at least 3.0. If this standard is not met at the end of a semester, a warning is issued indicating that a grade of A is required in the following semester to restore the GPA to the required minimum level of B. If the final GPA is below 3.0 (B), the student cannot graduate.

5. Institutional Outcomes - For which institutional outcome(s) do the reported student learning outcome(s) align?

SLO Outcome Alignment	Institutional Outcome
Yes	I. Jesuit & Mercy Values
Yes	II. Diversity & Cultural Awareness
Yes	III. Critical Thinking & Problem Solving
Yes	IV. Communication
Yes	V. Professionalism
Yes	VI. Lifelong Learning

6. Assessment Period: Select the academic year for which you are reporting results (i.e. when data were collected):
2024-2025

7. Program Assessment Results -Briefly summarize the assessment results and how they relate to benchmark(s).

A core course that all graduate students in the program have to take is ENGR 5020: DESIGN OF EXPERIMENTS. The goal of this course is to improve research, development, and engineering efficiency in product design and manufacturing. It emphasizes applied techniques that maximize useful information, address random effects, plan testing sequences, evaluate errors, and organize experimental data effectively.

The course outcomes are as follow:

- Understand and apply the terminology of Design of Experiments.
- Analyze single-factor and multi-factor experiments using provided data.
- Verify model assumptions, such as normality and independence, in Design of Experiments models.
- Demonstrate understanding of core DOE principles, including randomization, replication, blocking, confounding, and aliasing.
- Use appropriate software tools to solve problems related to Design of Experiments.
- Design, conduct, analyze, and communicate the results of an experiment using proper DOE procedures.

ENGR 5020 course outcomes align with the Master of Civil Engineering program outcomes:

Course Outcomes 1–5 primarily align with SLO 1 (Technical Competence) as they develop students' ability to analyze data-driven engineering problems and apply systematic and fundamental engineering methods using appropriate tools.



Course Outcomes 2, 3, 4, and 6 also support SLO 2 (Research Skills) as they require and emphasize independent investigation, model evaluation, and data-based conclusions that inform engineering design. The emphasis on designing, conducting, and analyzing experiments fosters independent inquiry and evidence-based decision-making.

Course Outcome 6 directly addresses SLO 3 (Effective Communication) by requiring clear and professional communication of experimental methods, analyses, and results.

When assessing the course outcomes, a satisfaction scale was used to measure the extent to which each outcome was achieved:

If the class average falls in the Very High Level of Achievement range = (5), the outcome rating is "Satisfied"

If the class average falls in the High Level of Achievement range = (4), the outcome rating is "Mostly Satisfied"

If the class average falls in the Acceptable High Level of Achievement range = (3), the outcome rating is "Partly/Somewhat Satisfied"

If the class average falls in the Low Level of Achievement range = (2), the outcome rating is "Needs Improvement"

If the class average falls in the Not Achieved range = (1), the outcome rating is "NOT Satisfied"

The assessment results are presented below.

1)- For SLO #1: Course Outcomes (CO) 1-5:

-- CO 1 Understand and apply the terminology: Degree of Satisfaction 4.9

-- CO 2 Analyze single-factor and multi-factor experiments: Degree of Satisfaction 5.0

-- CO 3 Verify model assumptions: Degree of Satisfaction 4.9

-- CO 4 Demonstrate understanding of core DOE principles: Degree of Satisfaction 4.8

-- CO 5 Use appropriate software tools: Degree of Satisfaction 5.0

2)- For SLO #2: Course Outcomes (CO) 2, 3, 4, and 6

-- CO 2 Analyze single-factor and multi-factor experiments using provided data: Degree of Satisfaction 5.0

-- CO 3 Verify model assumptions, such as normality and independence, in Design of Experiments models. Degree of Satisfaction 4.9

-- CO 4 Use appropriate software tools to solve problems related to Design of Experiments. Degree of Satisfaction 5.0

-- CO 6 Design, conduct, analyze, and communicate the results of an experiment using proper DOE procedures. Degree of Satisfaction 4.9

3)- For SLO #3: Course Outcome (CO) 6

-- CO 6 Design, conduct, analyze, and communicate the results of an experiment using proper DOE procedures. Degree of Satisfaction 4.9

As shown, the levels of satisfaction for all course outcomes, and consequently for the program's Student Learning Outcomes, ranged between 4 and 5, corresponding to a rating of "Satisfied to Mostly Satisfied."



8. **Planned Actions and/or Actions Taken in Response to Assessment Results** - Briefly summarize how you are using the assessment results to enhance student learning and improve program quality.

Based on the assessment results, overall performance was good. Nevertheless, the department is exploring opportunities to incorporate more creative extra-credit activities, expand effective online teaching practices, and introduce new software tools to further enhance student learning.

On another note, the total number of credits required for graduation is 30, of which 15 credits (five courses) must be completed at the graduate-only 5000 level. It is often challenging to offer five graduate-only courses with sufficient enrollment. Additionally, international students are limited to taking no more than one online course per semester, which further restricts course availability and presents a significant challenge. To address these constraints, the department is exploring the option of requiring a thesis track for international graduate students.