



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 Product Development
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).

For the Master of Science in Product Development Program we have six learning outcomes and will assess two outcomes per year. This year we are assessing learning outcome #1 (MPD5100) and #2 (MPD5300)

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.

This year, we are evaluating Outcome 1 & 2 (see details below) per the approved assessment plan:

Outcome (1): Apply systems thinking/engineering with a customer-focused, total-enterprise perspective
Using Course number and name: MPD 5100 Systems Optimization

Outcome (2): Understand and apply current and advanced tools and techniques for design, analysis, and management in product development and manufacturing. Using Course number and name: MPD 5300 Systems Optimization

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
	II. Diversity & Cultural Awareness
Yes	III. Critical Thinking & Problem Solving
	IV. Communication
	V. Professionalism
	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).

Outcome (1): Apply systems thinking/engineering with a customer-focused, total-enterprise perspective

Course number and name: MPD 5100 Systems Optimization

Term taught: Winter 2025-2026

Number of students completing the course: 13

Instructor name: Jonathan Weaver

1. For the learning outcome formally assessed in this worksheet, complete the following table. For quantitative assessment methods, a score of 3.5/5 (i.e., 70%) or better is considered as having achieved the program outcome. For rubric-based assessment methods, students achieving a level of 3/4 (i.e., 75%) or better are considered to have performed satisfactorily. Rubrics for determining the level of achievement for this outcome are included in this document.

Assessment method (specific exam problems, homework problems, projects, student surveys, etc.)

% of Students achieving this outcome

Direct

Indirect

Overall

The students do a multi-week project taking a design brief on a trebuchet and performing the following steps: (1) extract key stakeholders and their needs from the design brief, (2) translate stakeholder needs into system level requirements, (3) develop corresponding tests for each requirement, (4) cascade the architecture to component level, (5) cascade the

100%

100%

2. requirements and tests to the component level, (6) develop and manage all system interfaces (internal and external), (7) design all components in the order dictated by a design structure matrix analysis, (8) fabricate, integrate, and test all components/subsystems/the system, (9) compete with the final system.

Comments: For the first time, we are using Spicy-SE as a basic MBSE tool to introduce model based systems engineering in this class. There has been a significant learning curve in doing so. The second project will be written at about 80% done requiring the student to only complete the remaining 20%; this is to minimize workload while maximizing the likelihood of a good result.



Outcome (2): Understand and apply current and advanced tools and techniques for design, analysis and management in product development and manufacturing.

Course number and name: MPD 5300 Systems Optimization

Term taught: Winter 2024-2025

Number of students completing the course: 13

Instructor name: Jonathan Weaver

1. For the learning outcome formally assessed in this worksheet, complete the following table. For quantitative assessment methods, a score of 3.5/5 (i.e., 70%) or better is considered as having achieved the program outcome. For rubric-based assessment methods, students achieving a level of 3/4 (i.e., 75%) or better are considered to have performed satisfactorily. Rubrics for determining the level of achievement for this outcome are included in this document.

Assessment method (specific exam problems, homework problems, projects, student surveys, etc.) % of Students achieving this outcome

Direct Indirect Overall

One analysis tool covered in this course in Monte Carlo simulation. This is widely used in industry to understand the cumulative effect of dimensional variations of components on the overall system metrics/performance characteristics. The students write code in Matlab to perform Monte Carlo simulation as part of a homework assignment and a quiz problem. Details of the assignment and quiz are given below. Assignments may be done in teams of 2 (we had one team of 3). Quizzes must be done independently.
100% 100%

Comments: Most of the course assignments in this course are done using Matlab grader. This is a tool that allows students to submit Matlab code for automatic feedback and scoring. The Matlab Grader assignments are set to unlimited attempts (up until the due date) so students get low-risk, immediate feedback as they work on the assignments.

The class is run in flipped classroom mode with recorded lectures that students watch outside of class time, and class time is used for further examples and Q&A.

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.

Learning Outcome #1: Minor improvements are always being made. The biggest change is the one being piloted now – using Spicy-SE.

Learning Outcome #2: Minor improvements are always being made. An overview of using genetic algorithms to solve optimization problems is being added for next Winter's class.