Academic Program Assessment
AY 2024-2025 Mechatronics Engineering MSME

Table I Closing the Loop

Report on at least one data-informed change to your curriculum during AY 2024-2025 that was implemented to improve student learning, in response to prior assessments or other data.

A. Describe issues or SLOs addressed in the AY 2024-2025 cycle. Paste SLOs verbatim below.
Analyze and/or design a mechatronic system
B. In which academic year and semester was this SLO last assessed to generate data that informed the change(s)?
Spring 2023 – Note: no report in Spring 2024 – Program Director was on sabbatical.
C. What were the recommendations for change in the previous cycle? (See Column H in the previous cycle's report.)
Since Apporto (remote access to MatLab and RobotStudio) became available, additional labs and exercises will be required since students now can access lab software from anywhere.
D. How were the recommendations for change acted upon?
In EN 563 a new lab/demonstration was developed to use RobotStudio and MatLab programming environments to keep using state-of-the-art advances in Robotics.
E. How did the change(s) impact student learning? If the change was not effective, what are the next steps or new recommendations?
Students gained practical knowledge of state-of-the-art programming tools for robotics.

Enter Table I Closing the Loop Comments Below

A. Describe issues or SLOs addressed in the AY 2024-2025 cycle. Paste SLOs verbatim below.
Apply advanced engineering principles in the design and analysis of a system or process to meet specified needs
B. In which academic year and semester was this SLO last assessed to generate data that informed the change(s)?
Spring 2023 – Note: no report in Spring 2024 – Program Director was on sabbatical.
C. What were the recommendations for change in the previous cycle? (See Column H in the previous cycle's report.)
A new AI lab has been established. When ready, some new practical labs for EN 513 will be developed. Since Apporto (remote access to MatLab) became available, additional labs and exercises will be required since students now can access lab software from anywhere.
D. How were the recommendations for change acted upon?
In EN 513 a new AI lab environment was established enabling students to use Python AI tools within Linux OS.
E. How did the change(s) impact student learning? If the change was not effective, what are the next steps or new recommendations?
Students gained practical knowledge of state-of-the-art AI tools for use in robotics and other projects.

Enter Table I Closing the Loop Comments Below

A. Describe issues or SLOs addressed in the AY 2024-2025 cycle. Paste SLOs verbatim below.
Communicate effectively in writing and orally.
B. In which academic year and semester was this SLO last assessed to generate data that informed the change(s)?
Spring 2023 – Note: no report in Spring 2024 – Program Director was on sabbatical.
C. What were the recommendations for change in the previous cycle? (See Column H in the previous cycle's report.)
In EN 563, a review paper will be required again, and the hands-on robotics labs/projects will be replaced by a simulated robotic lab not requiring a lab report. In EN 593, students will receive continuous encouragement in using proper references in their academic reports including research papers and thesis. Additionally, students will be encouraged to use the Writing Center for editing their work.
D. How were the recommendations for change acted upon?
EN 563 review papers did not work as expected due to chargeGPT influence. Also, continuous encouragement in using references properly in EN 593 was successful.
E. How did the change(s) impact student learning? If the change was not effective, what are the next steps or new recommendations?
EN 563 review papers will be more demanding and require the use of generative programs.

Enter Table I Closing the Loop Comments Below

Program Name	Date Completed
Master of Science in Mechatronics Engineering (MSME)	**6/4/2025**
Report Completed By	Report Contributors
Prof. Nebojsa Jaksic	**Dr. Leonardo Bedoya-Valencia and Dr. Trung Duong**

Table II Annual assessment of Student Learning Outcomes (SLOs) in AY 2024-25

1. Include information to share assessment processes, results, and recommendations for improved student learning. Copy this table for each assessed outcome.

A. Program SLO assessed in this cycle. Copy the SLOs verbatim from the assessment plan.
Analyze and/or design a mechatronic system
B. Semester and year this SLO was reported on prior to this cycle.
Spring 2023
C. Describe the assessment method for this SLO.
Methods: EN 563 Final Course Exam and/or Project Reports
D. Described student group(s) assessed. Provide the number of students or number of artifacts assessed.
Twelve MSME second year graduate students who were enrolled in Spring 2023
E. Expected proficiency level and proportion of students who should reach this level.
At least 80% of the students should meet or exceed expectations (have a total class score 80% or higher)
F. Assessment results and number of students who met proficiency level.
Ten out of twelve students met or exceeded expectations.
G. Describe what results indicate about student performance.
The student assessments are well designed. Most of the students performed well.
H. Describe program level changes/improvements planned for AY 2025-2026 informed by this assessment.
No other changes are planned for AY 2025-2026.

Enter Table II AY 2025 Assessment Comments Below

A. Program SLO assessed in this cycle. Copy the SLOs verbatim from the assessment plan.
Apply advanced engineering principles in the design and analysis of a system or process to meet specified needs
B. Semester and year this SLO was reported on prior to this cycle.
Spring 2023
C. Describe the assessment method for this SLO.
Methods: EN 561 Final project and/or Homework, EN 513 Homework/ Mini-Projects, and Final Project
D. Described student group(s) assessed. Provide the number of students or number of artifacts assessed.
In EN 561 there were four students enrolled in Fall 2023. EN 513 had ten MSME student in Spring 2023.
E. Expected proficiency level and proportion of students who should reach this level.
At least 80% of the students should meet or exceed expectations
F. Assessment results and number of students who met proficiency level.
As in the previous year, all students in EN 561 were able to apply correct state-space design strategy under given constraints. They were able to demonstrate their knowledge when solving complicated problems. Also, all students in EN513 could apply appropriate modern AI/ML methods, tools and technologies to solve engineering problems, analyze data, and interpret results.
G. Describe what results indicate about student performance.
All the students performed well.
H. Describe program level changes/improvements planned for AY 2025-2026 informed by this assessment.
The establishment of a new AI lab with computers running Linux will require additional instruction on Linux, Python, possibly R, as well as other AI/ML and generative AI tools.

Enter Table II AY 2025 Assessment Comments Below

A. Program SLO assessed in this cycle. Copy the SLOs verbatim from the assessment plan.
Communicate effectively in writing and orally.
B. Semester and year this SLO was reported on prior to this cycle.
Spring 2023
C. Describe the assessment method for this SLO.
Methods: EN 593: Written reports and oral presentations EN 507: Project report evaluation EN 563: Review paper evaluation
D. Described student group(s) assessed. Provide the number of students or number of artifacts assessed.
Two MSME first-year graduate students who were enrolled in EN 593 (Fall 2024), Nine MSME first-year graduate students who were enrolled in EN 593 (Fall 2022), Eleven MSME graduate students who were enrolled in EN 507 (Fall 2022), Twelve MSME graduate students who were enrolled in EN 563 (Spring 2023)
E. Expected proficiency level and proportion of students who should reach this level.
At least 80% of the students should meet or exceed expectations
F. Assessment results and number of students who met proficiency level.
The students in EN 507 wrote a project report. They all (100%) exceeded the expectation for this SLO. The students in EN 563 wrote a review paper on a robotics topic. They all (100%) met the expectation for this SLO. The students in EN 593 wrote literature reviews, academic critiques on thesis and dissertations, and did presentations each on a potential topic for their master thesis. 100% of the students exceeded the expectation for this SLO.
G. Describe what results indicate about student performance.
All MSME students met or exceeded expectations for this SLO. In EN 593, instead of course specific student surveys, feedback through the grading method was given to the students.
H. Describe program level changes/improvements planned for AY 2025-2026 informed by this assessment.
Based on generative AI tools evolution, educational strategies and methods must change to reflect changes in academic environments. While not discussed yet, prompt engineering may become a part of necessary person-computer communication skills.

MSME Assessment Rubrics

Analyze and/or design a mechatronic system

	Exceeds expectations 5%	Meets expectations 75%	Does not meet expectations 20%
Design Strategy	Develops a design strategy, including a plan; decomposes work into subtasks, and develops a timetable.	Uses a design strategy with guidance.	No design strategy is attempted.
Solutions	Develops several potential designs and based on the analysis of those designs finds an optimal design solution using the system view approach.	Can develop and compare multiple solutions to a mechatronic design problem, but does not usually arrive at the best result; conducts optimization but neglects one or two key aspects. Does not use the system view approach.	Cannot design a mechatronic system or individual component without a significant amount of help. Only focuses on one solution to a problem; no optimization attempted.
Tools	Uses computer tools and engineering resources effectively.	There is evidence of mostly correct use of computer tools and engineering resources.	There is no evidence of use of computer tools and engineering resources.

Apply advanced engineering principles in the design and analysis of a system or process to meet specified needs

	Exceeds expectations 5%	Meets expectations 75%	Does not meet expectations 20%
Design Strategy	Develops a design strategy, including a plan; decomposes work into subtasks, and develops a timetable.	Uses a design strategy with guidance.	No design strategy is attempted.
Constraints	Develops a solution that includes all realistic constraints.	Develops a solution that fails to include one or more minor realistic constraints.	There is no consideration of realistic constraints.

Communicate effectively in written form

	Exceeds expectations 5%	Meets expectations 75%	Does not meet expectations 20%
Articulation	Articulates ideas clearly and concisely using visual aids where appropriate.	Articulates ideas, but the idea flow is somewhat disjointed. Does not always use visual aids appropriately (e.g. a table and a graph representing the same information are used; a figure is not addressed in the narrative).	Does not develop/articulate ideas well. Makes points that are hard to understand. Does not use visual aids.
Organization	Organizes the material in a logical sequence (paragraphs, subheading, etc.).	In general, organizes the material well; however, occasionally paragraphs combine multiple thoughts. Does not identify sections and sub-sections clearly.	Imposes little or no structure or organization; does not use subheadings or proper paragraph structure.
Neatness	Presents material neatly and professionally.	Occasionally, does not present material neatly.	Does not present material neatly.
Grammar and Spelling	Uses grammar and spelling correctly.	Makes one or two spelling/grammar errors per page.	Makes spelling/grammar errors throughout more than 1/3 of the paper.
Writing Style	Uses professional writing style.	Sometimes uses jargon, improper voice, improper tense, inappropriate style, etc.	Uses inappropriate writing style for the audience and for the assignment.
Document Formatting	Conforms to the prescribed format.	Conforms to the prescribed format in many portions of the assignment.	Does not follow the prescribed format.

Communicate effectively in oral form

	Exceeds expectations 5%	Meets expectations 75%	Does not meet expectations 20%
Delivery	Plans and delivers an oral presentation effectively; applies the principle of "tell them."	Presents key elements of an oral presentation adequately but does not apply "tell them" clearly.	Organizes the presentation poorly (e.g. no clear introduction or summary is delivered).
Length and Detail	Presents technical content appropriate for the time allowed and the audience level.	Presents excessive or insufficient detail for time allowed and/or the audience level.	Presents for an inappropriately short or long period; omits key results during the presentation.
Mechanics	Makes eye contact; can be easily heard; speaks comfortably with minimal prompts; does not block the screen; doesn't show any distracting habits.	Exhibits minor difficulties (e.g. makes sporadic eye contact; occasionally is difficult to hear or understand; overuses prompts or does not use prompts enough; occasionally stumbles or loses place; occasionally blocks the screen; occasionally exhibits some distracting habits (um, ah, clicking pointer, etc.)).	Exhibits major difficulties with the presentation (e.g. makes no eye contact; is difficult to hear or understand; reads from prepared script; blocks the screen; exhibits distracting habits (um, ah, clicking pointer, etc.)).
Dialect	Uses proper American English.	Occasionally uses an inappropriate style of English-too conversational; uses understandable English.	Uses poor English and/or poor pronunciation.
Visual Aides	Uses visual aides effectively.	Presents visual aides that have minor errors or are not always clearly visible.	Presents multiple slides that are unclear or incomprehensible.
Appearance	Exhibits professional appearance.	Appears too casual for a professional presentation.	Appears inappropriately dressed for the occasion (e.g. wears shorts, sandals, etc.)
Listening and Response to Questions	Listens carefully and responds to questions appropriately; is able to explain and interpret results for various audiences and purposes.	Sometimes misunderstands questions; does not respond appropriately to the audience or has some trouble answering questions.	Does not listen carefully to questions; does not provide appropriate answers or is unable to answer questions about the presentation material.