# Student Learning Outcomes (SLOs) Report for <u>Non-Accredited Programs</u>

(**updated 9/19/23**)

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| Program Type: | **Non-Accredited Program** |
| Program Name: | B.S. in Electrical Engineering |
| Submitted By: | Steven Daniels |
| Email: | swdaniels@eiu.edu |
| Submission Date: | October 13, 2023 |
| Review Cycle: | **Odd Year** |

Review Round:

- o **Round B** (Associate Dean + VPAA review)

All SLO reports are archived here: https://www.eiu.edu/assess/majorassessment.php

DUE: **October 15th** to your Associate Dean or designee

**Year 4**

**Student Learning Outcomes (SLOs) for Academic Programs**

Please list all of the student learning outcomes for your program as articulated in the assessment plan.

1. Demonstrate an ability to design and conduct experiments, as well as to analyze and interpret data and to use the techniques, skills, and modern engineering tools necessary for engineering practice in aspects of design and implementation of engineering concepts and processes.
2. Demonstrate an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
3. Demonstrate an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
4. Organize and communicate ideas in both oral and written formats using words, mathematical equations, tables, graphs, pictures, animations, diagrams, and other visualization tools appropriate to the field.
5. Communicate effectively with a range of audiences.
6. Recognize and promote ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
7. Work effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
8. Display awareness of regional and national career opportunities and pathways for Electrical Engineers along with their professional and ethical responsibilities.
9. Demonstrate critical professional and life skills, including completing work on time, optimism, realism, time management, responsibility, respect, commitment, perseverance, independence, resourcefulness, integrity, ethical behavior, and cultural and social competence
10. Obtain the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context with a recognition of the need for, and an ability to engage in life-long learning by keeping abreast of contemporary issues
11. Obtain and apply new knowledge as needed, using appropriate learning strategies.

**Overview of Measures/Instruments**

There is only 2 years of data from the classes. This means that only 3 classes have more than one cohort as all of our upper level courses are taught in alternate years. None have more than 2 cohorts. The number of students in each class is also generally small so statistics are typically meaningless.

| SLO(s) *Note: Measures might be used for more than 1 SLO* | ULG* | Measures/Instruments *Please include a clear description of the instrument including when and where it is administered* | How is the information Used? *(include target score(s), results, and report if target(s) were met/not met/partially met for each instrument)* |
|---|---|---|---|
| 1. Demonstrate an ability to design and conduct experiments, as well as to analyze and interpret data and to use the techniques, skills, and modern engineering tools necessary for engineering practice in aspects of design and implementation of engineering concepts and processes. | C, Q, W | Grades in EEN 1100, EEN 3150, EEN 4501, and EEN 4701 | EEN 1100 Average GPA 3.28 EEN 3150 Average GPA 3.00 EEN 4501 Average GPA 3.40 EEN 4701 Average GPA 3.00 All GPAs are 3 and above so the items in the SLO are well understood. |
| 2. Demonstrate an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. | C, R, W | Grades in EEN 4301, and EEN 4701 | EEN 4301 Average GPA 2.9 EEN 4701 Average GPA 3.00 These are two lab courses that teach the students design of systems and the students have been successful. |
| 3. Demonstrate an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics | C, Q, W | Evaluation of projects in EEN 4701 | EEN 4701 Average GPA 3.00 The project presentations demonstrated an ability to solve complex problems by applying principles learned in earlier classes. |
| 4. Organize and communicate ideas in both oral and written formats using words, mathematical equations, tables, graphs, pictures, animations, diagrams, and other visualization tools appropriate to the field. | Q, W, S | Evaluation of project reports in EEN 4701 | EEN 4701 Average GPA 3.00 Student presentations were clear and complete to show their ability to communicate in professional setting. |

| SLO(s)<br><br>*Note: Measures might be used for more than 1 SLO* | ULG* | Measures/Instruments<br>*Please include a clear description of the instrument including when and where it is administered* | How is the information Used?<br>*(include target score(s), results, and report if target(s) were met/not met/partially met for each instrument)* |
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| 5. Communicate effectively with a range of audiences. | W, S | Grades in EEN 1001 and EEN 4701 | EEN 4701 Average GPA 3.00 Students communicated well in 4701 and passed 1001 (it was pass/ fail) and could participate in class discussions on various topics. |
| 6. Recognize and promote ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. | R | Exit Interview | Low number of responses for survey but good response rate.  2 of 3 returned.<br><br>Average on these questions 3.38 on a 5 point scale.  We will focus more on these issues in EEN 1001. |
| 7. Work effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. | | Evaluation of projects in EEN 4701 | EEN 4701 Average GPA 3.00 Projects were well organized and presented as team efforts. |
| 8. Display awareness of regional and national career opportunities and pathways for Electrical Engineers along with their professional and ethical responsibilities. | NA | Exit Interview | Low number of responses for survey but good response rate.  2 of 3 returned.<br><br>Internship prospects could be communicated better. |
| 9. Demonstrate critical professional and life skills, including completing work on time, optimism, realism, time management, responsibility, respect, commitment, perseverance, independence, resourcefulness, integrity, | | | Students that complete the program must produce homework and other assignments on time with commitment, independence, and integrity. |

| SLO(s) Note: Measures might be used for more than 1 SLO | ULG* | Measures/Instruments Please include a clear description of the instrument including when and where it is administered | How is the information Used? (include target score(s), results, and report if target(s) were met/not met/partially met for each instrument) |
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| ethical behavior, and cultural and social competence | | | |
| 10. Obtain the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context with a recognition of the need for, and an ability to engage in life-long learning by keeping abreast of contemporary issues | | | Low number of responses for survey but good response rate.  2 of 3 returned.<br><br>Average on these questions 3.67 on a 5 point scale.  Gen Ed could do better on these issues. |
| 11. Obtain and apply new knowledge as needed, using appropriate learning strategies. | | | Based on exit survey Senior Design project was a positive and helpful experience. |

*Please reference any University Learning Goal(s) (ULG) that this SLO, if any, may address or assess. C=Critical Thinking, W=Writing & Critical Reading; S=Speaking and Listening; Q=Quantitative reasoning; R=Responsible Citizenship; NA=Not Applicable

## Improvements and Changes Based on Assessment

1. Provide a short summary (1-2 paragraphs or bullets) of any curricular actions (revisions, additions, and so on) that were approved over the past four years as a result of reflecting on the student learning outcomes data.  Are there any additional future changes, revisions, or interventions proposed or still pending?

    This program is only a few years old.  This year we graduate our first cohort.  The upper level courses are taught every other year.  Even the lower level courses have only been EEN since 2021.  So there is very little data to base changes on.  We implemented EEN 1100 in 2021 through introspection.  We decided to include a laboratory component the following year and that improved the overall engagement of the students.  We will adjust the EEN 1001 course to include more emphasis on ethics and social responsibility based on the Exit Survey.

    The FE Exam was to be an assessment tool for the program and for ABET accreditation (see 2021 Assessment).  However, the Dean's Office does not support requiring this for the students because of cost.  So we are not able to consistently use it.

2. Please provide a brief description or bulleted list of any improvements observed/measured in student learning over the past four years. Be sure to mention any intervention made that has not yet resulted in student improvement (if applicable).

> There is no way to measure such improvements since there is no more than one data point for the upper level courses. And the low numbers of students in the classes makes statistics useless.

3. Using the form below, please document annual faculty and committee engagement with the assessment process (such as the review of outcomes data, revisions/updates to assessment plan, and reaffirmation of SLOs).

| History of Annual Review | | |
|---|---|---|
| **Date of Annual Review** | **Individuals/Groups who Reviewed Plan** | **Results of the Review (i.e., reference proposed changes from #1 above, revised SLOs, etc...)** |
| 5/2/22 | EE Advisory Board | Approved of new course implementation |
| 11/12/22 | EE Advisory Board | Reviewed curriculum and approved overall classes |
| 12/15/22 | EE Steering Committee | Proposed ideas related to Senior Design<br>Suggested additional courses for the program<br>　　　Project Management<br>　　　Communications Theory<br>　　　Embedded Systems<br>These courses would have to be electives in the program |
| 3/31/23 | EE Advisory Board | Reviewed curriculum and approved entirety. Also approved the creation of the Computer Engineering Program. |

**CLAS Dean's Comments**

The BS in Electrical Engineering assessment plan has well-defined student learning objectives mapped to instruments in specific courses. The plan also includes an exit survey. My only suggestion is that the program consider means of assessment other than course grades. For example, assessing a student's ability to "communicate effectively with a range of audiences" is difficult to determine on the basis of a final course grade. Perhaps a rubric or more intentional instrument can be developed. The EE program has an advisory board and steering committee that were consulted on four separate occasions since the 2021 report leading to curriculum changes and adjustments to assessment procedures. It's worth noting that the program is preparing to apply for eventual ABET accreditation, which could lead to modifications in program assessment. Overall, the EE assessment program has made some headway, and we look forward to seeing the progress at the 4-year mark (2025).
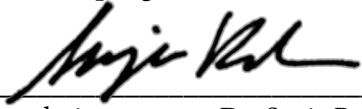
Dean or designee: Michael Cornebise                                Date: 11/17/2023

**Academic Affairs –Review & Feedback**
 **B.S. Electrical Engineering**
The B.S. in Electrical Engineering program is at an early phase of its assessment of student learning. The program faces a number of challenges in conducting assessment of its student learning goals. First, there are very few data points (2) in advanced courses, as the program itself acknowledges. Second, the sources for assessment data need to be more refined and reliable, as they are only course and project grades and an exit survey. Third, while 7 of the 11 student learning outcomes map onto the 7 required student learning outcomes for ABET accreditation, there may be some overlap that needs to be addressed. Since the program is preparing to seek ABET accreditation, the program will want to focus on measuring outcomes in a more focused and utilitarian way, as ABET specifies: "The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The results of these evaluations must be systematically utilized as input for the program's continuous improvement actions."

_____        ____4/2/24_____
VPAA or designee        Dr. Suzie Park, Asst VPAA Interim

                                                                                    Date