

Year 2

Non-Accredited Programs Only

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

<p>SLO(s)</p> <p><i>Note: Measures might be used for more than 1 SLO</i></p>	<p>ULG *</p>	<p>Measures/Instruments</p> <p><i>Please include a clear description of the instrument including when and where it is administered</i></p>	<p>How is the information Used?</p> <p><i>(include target score(s), results, and report if target(s) were met/not met/partially met for each instrument)</i></p>
<p>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.</p>	<p>C, Q, W</p>	<p>Grades in EEN 1100, EEN 3150, EEN 4501, and EEN 4701</p>	<p>Data for application for ABET accreditation.</p>
<p>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.</p>	<p>C, R, W</p>	<p>Grades in EEN 4301, and EEN 4701</p>	<p>Data for application for ABET accreditation.</p>
<p>3. Demonstrate an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</p>	<p>C, Q, W</p>	<p>Evaluation of projects in EEN 4701, Fundamentals of Engineering Exam</p>	<p>Data for application for ABET accreditation.</p>
<p>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.</p>	<p>Q, W, S</p>	<p>Evaluation of project reports in EEN 4701</p>	<p>Data for application for ABET accreditation.</p>
<p>5. Communicate effectively with a range of audiences.</p>	<p>W, S</p>	<p>Grades in EEN 1001 and EEN 4701</p>	<p>Data for application for ABET accreditation.</p>

SLO(s) <i>Note: Measures might be used for more than 1 SLO</i>	ULG *	Measures/Instruments <i>Please include a clear description of the instrument including when and where it is administered</i>	How is the information Used? <i>(include target score(s), results, and report if target(s) were met/not met/partially met for each instrument)</i>
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	Data for application for ABET accreditation.
7. Work effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	S, R	Evaluation of projects in EEN 4701	Data for application for ABET accreditation.
8. Display awareness of regional and national career opportunities and pathways for Electrical Engineers along with their professional and ethical responsibilities.	NA	Exit Interview	Data for application for ABET accreditation.
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	NA	Grades in EEN 1001	Data for application for ABET accreditation.
10. Obtain the broad education necessary to understand the impact of engineering solutions in a global, economic,	C, Q, R	Exit Interview	Data for application for ABET accreditation.

SLO(s) <i>Note: Measures might be used for more than 1 SLO</i>	ULG *	Measures/Instruments <i>Please include a clear description of the instrument including when and where it is administered</i>	How is the information Used? <i>(include target score(s), results, and report if target(s) were met/not met/partially met for each instrument)</i>
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.	NA	Exit Interview	Data for application for ABET accreditation.

**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*

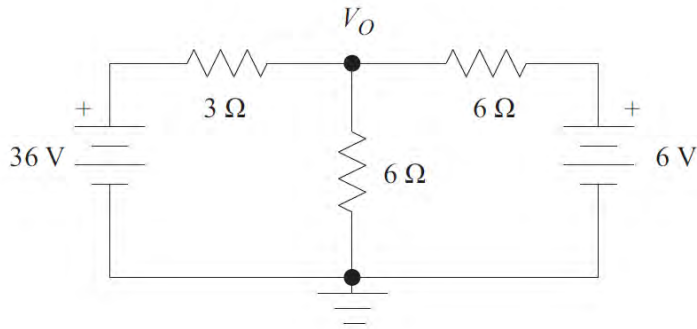
We will be using the Fundamentals of Engineering (FE) ELECTRICAL AND COMPUTER CBT Exam as an assessment tool. This will be given during the student's final semester. It is an important step in the licensure of the students so they should take the exam. We may decide to give past exams to help prepare students for their official exam or we may decide to use the data from the official exam results in our assessment procedure. A few sample questions from the exam is found here:

1. The only point of inflection on the curve representing the equation $y = x^3 + x^2 - 3$ is at:
 - A. $x = -\frac{2}{3}$
 - B. $x = -\frac{1}{3}$
 - C. $x = 0$
 - D. $x = \frac{1}{3}$

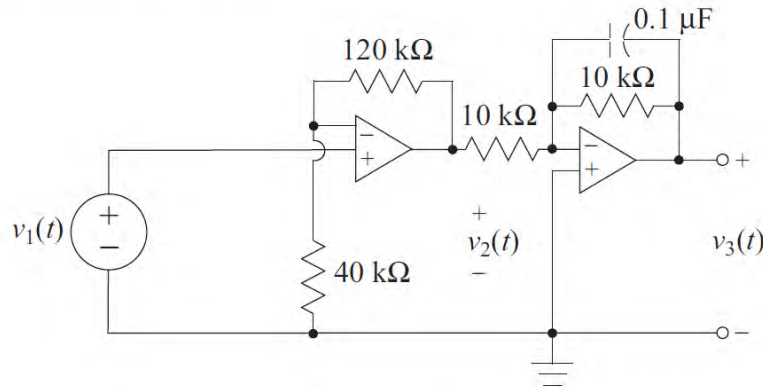
2. As a professional engineer originally licensed 30 years ago, you are asked to evaluate a newly developed computerized control system for a public transportation system. You may accept this project if:
 - A. you are competent in the area of modern control systems
 - B. you do not live in the jurisdiction where the transportation system is being installed
 - C. your original area of specialization was in transportation systems
 - D. you have regularly attended meetings of a professional engineering society

3. If \$500 is invested at an annual interest rate of 8% per year, its future worth at the end of 30 years will be most nearly:
 - A. \$1,200
 - B. \$1,700
 - C. \$5,031
 - D. \$15,000

4. In the circuit shown, voltage V_o (V) is most nearly:



- A. 19.5
 B. 18.5
 C. 16.5
 D. 3.0
5. The following electronic system is designed to process measurements from an accelerometer that produces the input voltage signal $v_1(t)$.



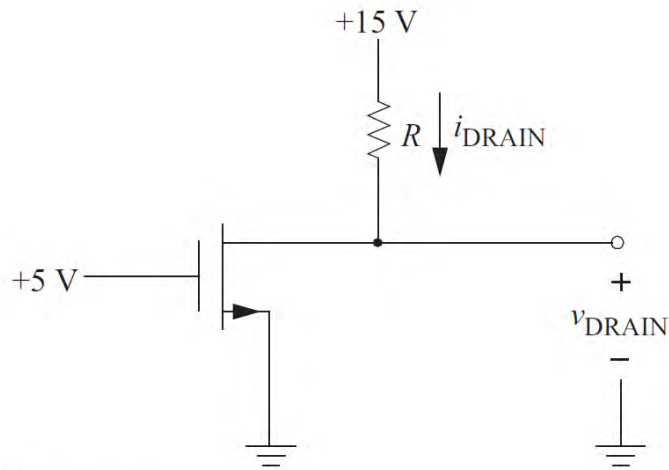
For a practical measurement situation, the signal v_2 is periodic and can be characterized by the Fourier series:

$$v_2(t) = 1.6 \sin(1,000t) + 0.8 \sin(2,000t) + 0.4 \sin(3,000t) + \dots$$

The amplitude (volts) of the fundamental component in $v_3(t)$ is most nearly:

- A. 1.6
 B. 1.13
 C. 0.56
 D. 0.3

6. The figure below shows a circuit with an n -channel enhancement mode MOSFET transistor.



In the FET triode region:

$$i_{\text{DRAIN}} = K[2(v_{\text{GS}} - V_t)v_{\text{DS}} - v_{\text{DS}}^2]$$

In the FET saturation region:

$$i_{\text{DRAIN}} = K(v_{\text{GS}} - V_t)^2$$

The FET operates in saturation for $v_{\text{DS}} \geq v_{\text{GS}} - V_t$.

Assume that $K = 0.5 \text{ mA/V}^2$ and $V_t = 1 \text{ V}$.

If $v_{\text{DRAIN}} = 2 \text{ V}$, the value of R ($\text{k}\Omega$) is most nearly:

- A. 1.63
 - B. 2.17
 - C. 2.50
 - D. 3.42
7. An industrial plant load is rated at 2.8 MVA at 0.7 pf lagging. If a capacitor bank rated at 3 MVA is added to the load, the new overall power factor of the system is most nearly:
- A. 0.9 leading
 - B. 0.9 lagging
 - C. 0.6 leading
 - D. 0.6 lagging

8. The following Routh array has been constructed for a simple control system with a gain of K in the feedback path.

s^4	1	12	$42K$
s^3	7	$10 + 14K$	
s^2	$74 - 14K$	$42K$	
s^1	$196K^2 - 602K - 740$		
s^0	$42K$		

The denominator of the **closed-loop** system transfer function is:

- A. $s^3 + 7s^2 + 12s + 10$
- B. $s^4 + 7s^3 + 12s^2 + 10s$
- C. $s^4 + 7s^3 + 12s^2 + (10 + 14K)s + 42K$
- D. not defined from the Routh array
9. Which of the following is true of the electric field intensity about an isolated point charge?
- A. It varies directly as the distance to the charge.
- B. It varies inversely as the distance to the charge.
- C. It varies directly as the square of the distance to the charge.
- D. It varies inversely as the square of the distance to the charge.
10. The binary number 1011 corresponds to the decimal number:
- A. 3
- B. 10
- C. 11
- D. 15

We will also be using an Exit Survey (interview) as an assessment tool. Here is that tool:

EIU Electrical Engineering Exit Survey

Year entered program _____ Year graduating _____

Name(*Optional*) _____

Upon graduation/transfer I am:

___ Taking a job related to my major (specify _____)

___ Taking a job unrelated to my major (specify _____)

___ Continuing my studies at: _____ (area of study) _____

___ Other: _____

Please provide answers using the following numerical scheme:

1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree NA=not applicable

- | | | |
|---|-----|-----|
| 1. I can recommend EIU to another student. | 1. | ___ |
| 2. In general, the quality of instruction at EIU is high. | 2. | ___ |
| 3. In concept, the EIU general education curriculum is a good idea. | 3. | ___ |
| 4. EIU as a whole provides a stimulating atmosphere for undergraduate study. | 4. | ___ |
| 5. I can recommend the Electrical Engineering degree program to another student. | 5. | ___ |
| 6. In general, I am pleased with the curriculum in my EE degree program. | 6. | ___ |
| 7. The quality of instruction in the program is high. | 7. | ___ |
| 8. Class sizes in the EE classes are appropriate. | 8. | ___ |
| 9. I had a rewarding undergraduate research experience. | 9. | ___ |
| 10. Faculty members in the EE program provide a stimulating atmosphere. | 10. | ___ |
| 11. Faculty members in the EE program are accessible and helpful. | 11. | ___ |
| 12. My academic advisor for EE was accessible and helpful. | 12. | ___ |
| 13. The EE lab facilities and equipment were appropriate for undergraduate instruction. | 13. | ___ |
| The Electrical Engineering Program has: | | |
| 14. prepared me for the next step in my professional career. | 14. | ___ |
| 15. given me an appropriate background in digital systems. | 15. | ___ |
| 16. given me an appropriate background in electricity and magnetism. | 16. | ___ |
| 17. given me an appropriate background in feedback and control. | 17. | ___ |
| 18. given me an appropriate background in semiconductor device physics. | 18. | ___ |

- | | | |
|--|-----|-----|
| 19. developed in me the ability to use mathematics in the solution of real EE problems. | 19. | ___ |
| 20. given me an appropriate understanding of the ethical standards of EE professionals. | 20. | ___ |
| 21. given me the ability to communicate effectively, both verbally and in writing. | 21. | ___ |
| 22. given me a desire to engage in life-long learning by keeping abreast of contemporary issues | 22. | ___ |
| 23. helped me to understand the impact of engineering solutions in a global and economic context | 23. | ___ |
| 24. helped me to understand the impact of engineering solutions
in an environmental and societal context. | 24. | ___ |
| 25. helped me to recognize and promote ethical and professional responsibilities of engineers | 25. | ___ |
| 26. helped me to make informed judgments by considering the
global impact of engineering solutions | 26. | ___ |
| 27. helped me to make informed judgments by considering the
economic impact of engineering solutions | 27. | ___ |
| 28. helped me to make informed judgments by weighing the
environmental impact of engineering solutions | 28. | ___ |
| 29. helped me to make informed judgments by considering the
societal impact of engineering solutions | 29. | ___ |
| 30. prepared me well to function as an Electrical Engineer | 30. | ___ |

How was your internship experience?

Were you made aware of potential internships in a timely manner?

Was the internship related to your field of study?

Was the work environment satisfactory for your professional growth?

Were there any specific strengths or weaknesses in textbooks, equipment, etc in the:

(a) introductory physics sequence

(b) introductory EE sequence

Were there any specific strengths or weaknesses in textbooks, equipment, etc in the:

(a) math sequence of courses

(b) chemistry classes

(c) advanced EE courses

(d) EE electives or mentored research (if you participated in that)

(e) Senior design project process

If you wish, describe an area or areas in which the instructional program was good.

If you wish, describe an area or areas in which the instructional program was lacking. How can it be improved?

Are there any general thoughts on the department that you would like to share?

Please return this form to the Physics Department's office (or your instructor):

Dr. Steven Daniels / 2133 Physical Science / Eastern Illinois University / Charleston, IL 61920

The assessment program may include a final interview five years after graduation/transfer. Please separately email your name, address, and preferred email address to djcombs@eiu.edu.

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 two 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 is a new program so there is no Assessment basis for revisions.

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

This is a new program so there is no Assessment basis for improvements or interventions.

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).

This is a new program so there is no Assessment basis for comparison.

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...)

Dean Review & Feedback

Dean or designee

Date

CLAS Deans' comments on B.S. in Electrical Engineering report

Reviewer: Mike Cornebise

1. SLOs are clear and seem well-suited to departmental curricular and program-specific goals. They include a good mix of high- and mid-level Bloom's Taxonomy verbs. Evaluation is appropriately embedded throughout the curriculum, though it's unclear how closely the measures correspond to ABET accreditation needs. In other words, in the column "how is the information used," the instrument indicates "data for application for ABET accreditation." However, how will the department (and ABET) actually utilize the data to evaluate (and hopefully improve) the program over time? If the plan already follows the ABET assessment model, please indicate this in the instrument.
2. Many of the measurements do not specify how student attainment of SLOs will be determined. How will projects be evaluated to determine if a student has met a particular learning outcome? For several SLOs, specific course grades are listed as the method, but these also lack explanation. For example, how will grades in EEN 1001 and 4701 illustrate if students can "communicate effectively with a range of audiences" in SLO #5? If the students need to attain a particular course grade to demonstrate their proficiency, please indicate in the assessment plan.
3. The use of the Fundamentals of EE exam and the exit survey are both well-developed instruments and the data collected can be used to improve the program over time.

While the EE exam and exit survey appear ready for implementation, please provide greater explanation pertaining to how project evaluation and course grades will indicate levels of student proficiency. Since the goal for the program is eventual ABET accreditation, if the instrument is already designed around ABET assessment norms, please indicate in the table (as noted above). Let us know if we can assist with program assessment as you begin the process. We look forward to seeing data analysis in fall of 2023.