B.S. in **ELECTRICAL ENGINEERING**
Student Outcomes Assessment Program (SOAP)

I. Mission

The mission of the Department of Electrical and Computer Engineering is to provide a comprehensive undergraduate education in Electrical Engineering and Computer Engineering and graduate education leading to an Electrical and Computer Engineering MS degree to a diverse student body across several subdisciplines of the field. The programs are continuously enhanced in order to prepare graduates for industry positions and/or further advanced education both regionally and globally. The undergraduate curriculum emphasizes the theoretical foundations in basic science, mathematics, and engineering science, hands on experience developed by the use of modern tools in the laboratory, the development of professional skills, and an awareness of ethical responsibilities, thereby enabling graduates to become life-long learning successful engineers.

II. Program Objectives

The Electrical and Computer Engineering Department seeks to develop an educational program for students in Electrical Engineering **such that following completion of the degree and once well established in their careers,**

1) Graduates will be employed in the engineering industry, government agencies, or academia and will be engaged in addressing and helping solve complex and technically challenging problems that impact society.

2) Graduates will continuously enhance their careers through life-long learning, active involvement in the development of their skills, and will dedicate themselves to positively contribute to their communities by practicing their profession ethically.

3) Graduates will be skillful communicators, expressing their technical and non-technical ideas through various media to a wide range of audiences, while promoting the power of engineering to collaboratively help solve some of the more vexing challenges faced by civilization with a goal of achieving a more equitable and diverse society.

III. Student Learning Outcomes (SLOs)

Graduates of the Electrical Engineering program are expected to achieve the following student learning outcomes.

SLO 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
SLO 2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
SLO 3: An ability to communicate effectively with a range of audiences
SLO 4: An ability to recognize 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
SLO 5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
SLO 6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
SLO 7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

IV. Relevance of SLOs to Program Educational Objectives

The student leaning outcomes prepare graduates to attain the program educational objectives in the following ways:

Program Educational Objective 1 - graduates will be employed in the engineering industry, government agencies, or academia and will be engaged in addressing and helping solve complex and technically challenging problems that impact society

.Knowledge of mathematics, science, and engineering (SLO 1), conducting analysis, design, analysis, and evaluation using mathematical and engineering tools (SLOs 1, 2, 6), communication skills (SLO 3) are essential attributes to be productive in the workplace. Additionally, the motivation for continuous development of engineering knowledge and skills (SLO 7) is also emphasized.

Program Educational Objective 2- Graduates will continuously enhance their careers through life-long learning, active involvement in the development of their skills, and will dedicate themselves to positively contribute to their communities by practicing their profession ethically.

SLOs 4 and 7 contribute directly to developing students the ability for independent learning and continued professional growth. Additionally, SLO 4 provides the foundation for ethical development as engineers.

Program Educational Objective 3 - Graduates will be skillful communicators, expressing their technical and non-technical ideas through various media to a wide range of audiences, while promoting the power of engineering to collaboratively help

solve some of the more vexing challenges faced by civilization with a goal of achieving a more equitable and diverse society.

This objective is supported by SLOs 3 and 5.

Table 1 summarizes the above statements that describe the link between student learning outcomes and the program educational objectives. The table shows the relational mapping between student learning outcomes and program educational objectives. The 'X' markings on the table identify those student learning outcomes that most directly support a given program educational objective.

Table 1 SLO/PEO Map

SLO	Program Educational Objectives (PEO)		
	1	**2**	**3**
1	X		
2	X		
3	X		X
4		X	
5			X
6	X		
7	X	X	

Table 2 Electrical Engineering Curriculum Map

SLO	*ECE 1*	*ECE 71*	*ECE 72*	*ECE 85*	*ECE 85L*	*ECE 90*	*ECE 90L*	*ECE 102*	*ECE 103*	*ECE 111*	*ECE 118*	*ECE 118L*	*ECE 121*	*ECE 124*	*ECE 124L*	*ECE 125*
1	1	2	2	3		3	1	3		3	2	2	3	3	2	3
2				3	2	3	2	2		2	2	2		3	2	2
3	2				1		2		3		1	2				
4	2			1					3		3	2		1		
5	2				3		3		2			3			3	
6	2				3		3					3			3	
7	1	3	3					3		3			3		2	3

3=Strong, 2=Moderate, 1=Possible

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1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize 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
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

SLO	*ECE 126*	*ECE 128*	*ECE 128L*	*ECE 134*	*ECE 138*	*ECE 138L*	*ECE 155*	*ECE 186*	*ECE Electives*	*ECE lab Electives*	*GE Courses*
1	3	3	2	3	3	2	3	3	3	3	
2	1	3	2	2	3	2	3	3		3	
3			2			2		3		2	3
4				3				3	2	3	3
5			3			3		3			
6			3			3		3	1	3	
7	3				3		3	2			

V. Constituencies

Faculty, students, alumni, and industrial employers are the program's primary constituencies who provide both informal and formal input to the assessment process.

VI. Assessment Tools

The department ensures that graduates achieve learning outcomes in two ways: first, by offering a coherent program of study that provides an opportunity for learning (Table 2), and second, by developing and applying ***direct*** and ***indirect*** assessment techniques to determine the success of students in fulfilling learning outcomes. Table 3 summarizes the assessment tools.

Direct Assessment Tools:

1. *Culminating Experience* (ECE 186) is assessed through *Capstone Design Reports*. *Capstone Design Reports* provide a strong indicator for many of the outcomes indicated in Table 4. Applying engineering science, open-ended problem solving, use of modern engineering tools, computation competence, problem solving, written communication, and team skills for group projects are elements that can be accessed through oral progress reports and written final reports. Sample reports will be made available during the site visit. (*Scoring rubrics applied*.)
2. *Embedded Questions* provide a moderate indicator for breadth and depth in electrical engineering subjects. Table 4 shows where direct assessment data is collected throughout the curriculum. (*Scoring rubrics applied*.)
3. *Lab Reports* are strong monitoring instruments for hands-on experiences, use of modern engineering tools, following technical instructions, written communication, and teamwork skills. *(Scoring rubrics applied.)*
4. *Poster Sessions/Oral Presentations* strongly demonstrate the student's written and oral communication skills. These sessions also show examples of hands-on experiences, engineering design, use of modern engineering tools, and teamwork skills. (*Scoring rubric applied*.)

Indirect Assessment Tools:

1. *Course Assessment* demonstrates the accomplishment of course objectives as related to learning outcomes in individual courses. The level of student satisfaction is an indicator of relevant knowledge gained. Survey forms are administered in individual courses in which students appraise the contribution of the course to each educational outcome.
2. *Student/Faculty Forum* is administered in an open forum where students from all levels are present. Most of the outcomes can be monitored by such student input. In these meetings students typically tend to discuss issues like laboratory facilities, curriculum, internships and job opportunities, hands-on experience, available modern tools, lab upgrades, communication skills, ethics, and teamwork.

3. *Exit Interviews/Surveys* address most of the outcomes and document students' level of satisfaction with the learning attributes at the time of graduation. Graduating seniors typically spend between 2-4 years in the department. Therefore, their experiences, usually in the form of oral comments expressed during exit interviews are much more telling and useful than numeric scores on survey sheets. Electrical and Computer Engineering faculty members spend time discussing these comments while placing them in context of other assessment data before considering any changes or adjustments.

4. *Alumni Survey* helps assess program objectives and student learning outcomes.

5. *Industry Advisory Council* provides the industry perspective on several related issues including program objectives.

Table 3 Assessment Tools

SLO	Culminating Experience	Embedded Questions	Lab Reports	Poster Presentations	Course Assessment	Student/ Faculty Forum	Exit Survey	Alumni Survey
1	●	●	●		●	●	●	●
2	●	●	●		●	●	●	●
3	●	●	●	●	●	●	●	●
4	●				●	●	●	●
5	●	●	●		●	●	●	●
6	●		●		●	●	●	●
7						●	●	●

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
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5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Table 4 Electrical Engineering Direct Assessment												
SLO	**ECE 1**	**ECE 71**	**ECE 85**	**ECE 85L**	**ECE 90**	**ECE 90L**	**ECE 102**	**ECE 103**	**ECE 118**	**ECE 118L**	**ECE 124**	**ECE 125**
1					•		•				•	
2			•							•		
3	•							•	•			
4	•							•	•			
5				•				•				
6						•						
7		•										•

SLO	ECE 126	ECE 128	ECE 128L	ECE 134	*ECE 138*	*ECE 138L*	*ECE 155*	*ECE 186*
1	•	•			•		•	•
2					•		•	•
3			•					•
4				•			•	•
5						•		•
6			•			•		•
7								•

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
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7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

VIII. Assessment Process

The department established the following comprehensive process to assess students' learning according to the aforementioned 11 SLOs. The current assessment process has been in place since the year 2000.

1. Reevaluation of the mission statement, program objectives, and student learning outcomes. (This is done with the input from the advisory council, faculty, and survey response from the alumni and the employers.)
2. Reevaluation of surveys and scoring rubrics will be done by faculty during the scheduled faculty retreat sessions.
3. Data is collected using the assessment tools and according to the established time schedule.
4. Data is analyzed according to the established time schedule. (This is done by faculty and advisory council members.)
5. The action items are determined to close the loop of the assessment.
6. Progress is monitored based on the action items.

Standard: On a scale of 1 (poor) to 4 (excellent), the faculty members consider a rating of 3.5 or higher to be satisfactory. An overall rating below 2.5 for any of the outcomes requires immediate attention, and a rating between 2.5 and 3.5 requires further observation as a "carry over item" in the next evaluation cycle.

Rubrics for assessing student learning outcomes have been developed and utilized. (Attached)

IX. Assessment Activities Timeline

The department collects and analyzes data according to the following schedule:

1. Every semester

(a) Exit Surveys (Spring and Fall Graduates)
The exit survey questionnaire is a useful tool because it can address most of the student learning outcomes and document students' level of satisfaction with their level of attainment at the time of graduation. Graduating seniors typically spend between 2-4 years as students in the department. Exit survey is conducted every year.

(b) Embedded questions
This tool is well suited to evaluate many of the program student learning outcomes. These embedded questions are specifically targeted to a learning outcome and the degree of attainment is determined through the use of a consistent scoring rubric. Student learning outcomes such as formulating and solving engineering problems, or developing breadth and

depth in electrical engineering subjects, are easily assessed through embedded questions. Table 4 shows the mapping between the student learning outcomes and those courses where embedded questions are used to assess them. Student learning outcomes are supported in lower division courses and continue to be reinforced in upper division courses as the curriculum progresses toward the culminating experience. Embedded questions represent an efficient method for assessing a significant number of the program's student learning outcomes.

2. Annually

(a) Culminating Experience

(ECE186 A & B: Senior Design I & II). This tool is directly connected to Senior Design sequence of courses each student must complete. The courses are project oriented and require initial investigation, design, implementation, integration, troubleshooting, demonstration, (to include oral presentations) and documentation (written report) of an engineering product. The culminating experience is a useful tool that provides strong indication about attainment of many of the student learning outcomes indicated in Table 4-4. Applying engineering science, open-ended problem solving, use of modern engineering tools, computation competence, problem solving, written communication, and team skills for group projects are elements that can be accessed throughout the course, and also through the oral progress reports, the final project presentation, the written final report, and the demonstration of a working engineering product. Sample senior project reports will be made available during the site visit. (*Scoring rubrics are applied for the evaluation*.)

(b) Poster Sessions/Oral Presentations

This tool is directly connected to the college's Project Day that occurs toward the end of each Spring Semester. During Project's Day students each senior project student team displays and demonstrates (as necessary) their developed engineering product. A poster is used to highlight the key features and accomplishments of the project. Faculty, visitors, and invited members from industry (practicing engineers) evaluate each poster and student project according to a set of guidelines, (scoring rubric). Students demonstrate their working engineering product and answer questions (as necessary) to each visitor. This tool is therefore useful in not only assessing the student's written and oral communication skills, but also the attainment level of student learning outcomes dealing with engineering design, use of modern engineering tools, solution to engineering problems, application of engineering science, and teamwork skills. (Sample posters will be available to the visiting team during the site visit.)

(c) Student/Faculty Forums

The Student/Faculty forum is conducted once each semester of each academic year. It is conducted as an open forum where students from all levels (entering freshmen to students about to graduate) are invited (encouraged) to attend and provide input on any matter affecting their educational progress. During the Student/Faculty Forum students are surveyed on the program educational objectives and the student learning outcomes. Students are asked to rate the level of importance they place on the program educational

objectives (what the program is preparing them for) and most importantly on the level of satisfaction regarding degree to which the program of study is preparing them to achieve the student learning outcomes. At these meetings, students are typically given the opportunity to express any concerns affecting their progress toward the degree, such as availability of courses for timely graduation, upgrading of laboratory facilities, the curriculum, internships and job opportunities, opportunities for hands-on experience, availability of modern engineering tools, improvement of communication skills, ethics, and teamwork.

(d) Course Evaluations (2 semesters)
This tool assesses the accomplishment of student learning objectives in courses that support specific student learning objectives. The implementation of this tool involves each student expressing his/her level of attainment student learning outcomes and satisfaction about the degree to which the course supported a given student learning outcome, on a scale of 1 to 4). For those student learning outcomes that the course does not support, low scores (1 or 2) on attainment are normal and expected.

(e) Industrial Advisory Meeting
Meetings with the IAC occur on a regular basis (once a year) during which one of the agenda items is a review of the program educational objectives in terms of their current relevance and need for updating. Discussions also focus on components of the educational program that contribute toward attainment of the program educational objectives that need modification or strengthening in order to insure that program educational objectives continue to be met

3. Every third year (2018, 2021, 2024)

(a) Alumni survey
Every three years an extensive alumni survey is conducted. Alumni similarly rate each program educational outcome in terms of its relevance to their needs as practicing engineers and furthermore in terms of the level to which they have attained such objective.

(b) Lab report (ECE90L, or ECE128L)
This tool is very useful as an instrument to monitor a student's ability to design, conduct, and evaluate the results of experiments, to use of modern engineering tools, to follow technical instructions, and to write effectively. Furthermore, the hands-on activities in the lab allow the instructing faculty member to monitor and enhance student teamwork skills. For most of these student learning outcomes, scoring rubrics are applied in evaluating lab reports.

4.Every sixth years (2012, 2018, 2024)

(a) Review of a mission statement and program objectives
(b) Assembly of course assessment data of the overall success

SLO 1

SLO1-Math Science Engineering Rubric

An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

Course: ECE _____ Date: _____

Evaluate on a scale of 1-4 (4 is highest); check the proper box

	1	2	3	4	N/A
Awareness and identification of the key elements of the problem	Inability to properly understand the essence of the problem	Minimal understanding of the key elements of the problem	General but not complete understanding of the essence of the problem	Clear and unambiguous understanding of the problem presented	
Recognition of one or more methods that can lead to a problem solution using appropriate principles of engineering, science and mathematics	Unable to identify an appropriate solution using principles of engineering, science and mathematics	Partial or incomplete recognition of a method that leads to a solution of the problem	Able to identify one solution method based on established principles but offering no alternatives	Able to identify an appropriate solution including alternatives based on established principles	
Application of engineering, science, and mathematics principles toward analyzing and solving a problem	Utilization of an incorrect methodology in the analysis and solution of a problem	Application of engineering, science, and mathematics principles that are largely incorrect	A mostly correct application of appropriate methods except for some errors	Correct utilization of appropriate methods to analyze and fully solve a problem	
Presentation of a solution that is justifiable and based on a logical and methodical application of engineering, science, and mathematics principles	No solution presented that can be justified by engineering, science, and mathematics principles	Presentation of a solution that is mostly incorrect and cannot be logically justified	Presentation of a solution that is generally correct except for some errors in logic and/or mathematics	Presentation of a complete solution that is correct and logical from an engineering science and mathematics perspective	

Overall average score _____

Evaluator _____ Date _____

SLO 2 - Engineering Design Rubric

An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

Course#: ECE _____

Evaluate on a scale of 1 – 4 (4 is for excellent); check the proper box

	1	2	3	4	pts
Design Statement (Problem explanation and identification of its constraints and specifications)	**No clear** objectives or identified needs	Unclear objective statement or **not appropriate** for the level of the activity	Clear objectives but **no identified** needs or constraints	**Clear** objectives and needs within realistic constraints including at least two of the following: public health, safety, welfare as well as global, cultural, social, environmental, and economic factors.	
Design Process including alternative solutions considering factors including public health, safety, and welfare, as well as global, cultural, social, environmental, and economics	**No evidence of ability** to understand the design requirements, limitations, analyze different alternatives, and provide a feasible design considering the factors	**Little evidence of abilit**y to understand the design requirements, limitations, analyze different alternatives, and provide a feasible design considering the factors	**Some evidence of ability** to understand the design requirements, limitations, analyze different alternatives, and provide a feasible design considering the factors	**Clear evidence of ability** to understand the design requirements, limitations, analyze different alternatives, and provide a feasible design considering the factors	
Application of appropriate mathematical models and engineering concepts in the design process	**No evidence** of ability to identify and use engineering principles in design	**Identified** appropriate concepts and demonstrated some effort to apply them	**Some evidence of ability** to use engineering principles in design	**Clear evidence** of ability to use mathematical models and/or engineering principles to design components, devices or systems	
Delivery of the final Product	Final design is **lacking** and the final product doesn't meet expectations in format		**Acceptable** final product but needs better presentation format	**Optimal / creative** design in proper format	

Overall average score: _____

Evaluator: _____ Date: _____

SLO3-Oral Communication Rubric

Course #: ECE _____ Date: _____

Evaluate on a scale of 1-4 (4 is for excellent); check the proper box

	1	2	3	4	pts
Written communication **a) Organization** **b) Logic** **c) Supporting data and inform** **d) Proper use of the English language, spelling, grammar** **e) Clarity** **f) Formality** **g) Depth**	**Lacks** organization and supporting information. **Does not follow** principles of logic and makes improper use of English	**Limited ability** to organize basic ideas in a logical manner and to properly use the English language	**Satisfactory ability** to present ideas logically with supporting data however there is evidence of improper use of the English language due to grammar and spelling errors	Shows **clear evidence** and understanding of appropriate writing techniques that include a logical development of ideas, organization, and proper use of the English language including grammar, spelling, and punctuation	
Oral communication **a) Confidence** **b) Voice** **c) Gestures** **d) Connection with audience** **e) Engagement** **f) Comprehension** **g) Content appropriate to audience** h) **Conclusions**	Voice **lacks** projection and a display of confidence, speaker appears nervous, maintains no eye contact and uses **inappropriate** gestures. Appears disengaged	**Limited ability** to present technical ideas with confidence, free of inappropriate gestures, while showing connection with the audience and maintaining eye contact	**Satisfactory ability** to present technical ideas but lacks the ability to speak with enough confidence to engage with the audience and avoid inappropriate gestures	Shows **clear evidence** of being able to deliver a technical presentation with confidence, with appropriate eye contact, voice projection, free of inappropriate gestures or display of nervousness	

Overall average score _____

Evaluator _____ Date _____

SLO4-Ethical and Professional Responsibilities

To make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

Course #: ECE _____ Date: _____

Evaluate on a scale of 1-4 (4 is for excellent); check the proper box

	1	2	3	4	pts
Able to analyze a situation for potential ethical problems	Students show no awareness of potential ethical problems in their response to the case studies	Students appear to be aware of some ethical problems in the case studies but are not using appropriate tools to analyze the problem(s).	Students demonstrate understanding of the major ethical problems in the case studies and are applying the tools they have learned to analyze the situation.	Students are able to analyze a complex ethical situation and demonstrate an understanding of major and subtle ethical problems in the case studies.	
Analysis of ethical and professional responsibility in a case study	No evidence that the students are aware of the IEEE Code of Ethics.	Students appear to be aware of the IEEE Code of Ethics, but are not making use of it as they approach ethical problems.	Students are aware of the IEEE Code of Ethics, and use it to when faced with a potentially unethical situation.	Students are aware of the IEEE Code of Ethics, and use it to routinely to work in a professional and ethical manner.	
Make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	No evidence that the students consider ethics or professionalism as they consider the case studies.	The responses to the case studies indicate that the students do not fully understand what it means to work in an ethical and professional manner.	The responses to the case studies indicate that the students are aware that engineers have a responsibility to work in an ethical and in a professional manner.	The students demonstrate ethical and professional engineering work in their responses to the case studies.	

Overall average score _____

Evaluator _____ Date _____

SLO5-Teamwork Rubric

Course: ECE _____ Date: _____

Evaluate on a scale of 1-5 (5 is for excellent); check the proper box

	1	2	3	4	pts
Synergy and Attendance: Establish a collaborative and inclusive environment	**Unaware** of responsibilities and does not help other teammates or demonstrate leadership.	**Sometimes** provide encouragement and listen to other teammates and share knowledge.	**Frequently** provides encouragement or listen to other teammates and share knowledge.	**Always** engaging and bringing new ideas to the table. Always listen and help other teammates and demonstrate leadership	
Responsibility and Helpfulness: Fulfill individual accountability and contribute to the team's success.	**Does not** complete individual tasks timely. Does not interact with other members or contribute to the team efforts.	**Contribute little** to the team efforts and interact little with other team members	**Complete and deliver** tasks timely. Engage and contribute regularly with other team members.	**Always** on top of what is going on and delivers on time. Always contribute and interact with other team members.	
Establish goals, initiative and Quality of Work: plan tasks, organize and facilitate effective and productive team meetings	**Does not define** any goals or deadlines. Does not plan shared tasks nor facilitate any part of any team meeting.	**Define at least one goal** with a deadline. Plans at least one shared and one individual task. Organizes and facilitates at least one part of one team meeting.	**Participates** in setting necessary goals and plans a few necessary shared and individual tasks. Organizes and facilitates a few parts of a few team meetings	**Actively** set goals and make shared task plans. Organizes and facilitates several parts of several team meetings.	

Overall average score _____

Evaluator _____ Date _____

SLO6- Hands-on Experiment Rubric
SLO 6

Course: ECE _____ Date: _____

Evaluate on a scale of 1-4 (4 is for excellent); check the proper box

	1	2	3	4	pts
Designing Experiments: Develop a methodology to test concepts and produce data to evaluate a specific process	**Unable** to develop a methodology to test concepts and produce useful data	**Incomplete** or inappropriate methodology to test concepts	**Partial** development and design of a methodology to test concepts	**Appropriate** development of a methodology or technique to evaluate a specific process	
Conducting Experiments: Operate appropriate laboratory equipment or hardware/software tools to collect data	**Unable** to operate equipment or software tools to collect data	**Limited** ability to operate equipment and use software tools	**Moderate** ability to operate equipment and use software tools	**Appropriate** use of equipment and software tools	
Analysis and interpretation of Data	**Unable** to analyze and interpret data	**Improper** or incomplete data analysis and interpretation	**Moderate** ability to analyze and interpret data	**Appropriate** data analysis and interpretation	
Engineering judgment to draw conclusions	**Unable** to draw conclusions on observations or experimental results	**Incorrect** or incomplete conclusions on the experimental results	**Moderate** ability to judge the experimental results and draw conclusions	**Appropriate** judgment of the experimental result and able to draw appropriate conclusions	

Overall average score _____

Evaluator _____ Date _____

SLO7 Acquire and apply new knowledge as needed using appropriate learning strategies

Course#: ECE _____ Date: _____

Evaluate on a scale of 1-4 (4 is highest); check the proper box

	1	2	3	4	pts
Ability to use an existing knowledge base of techniques and tools for the purpose of acquiring new knowledge and strategies that can be applied to analyzing a problem that has not been previously encountered	Inability to use existing knowledge base for acquisition of new knowledge	Minimal ability to use knowledge base for the acquisition of new knowledge	Significant but not full capability to use know-ledge base toward the acquisition of new knowledge	Demonstrated capability to use acquired knowledge and tools for developing strategies to be applied to new problems	
Identify appropriate techniques and tools to apply to analyze a new problem or situation	Inability to identify known techniques and tools to be applied to the analysis of a new problem	Partial or limited ability to identify tools and techniques toward the analysis of a new problem	Generally able to identify at least one technique to analyze a new problem	Fully able to and cognizant of techniques and tools that can be applied to the analysis of a new problem	
Ability to use and explain appropriate techniques and learning strategies applied in the solution of a new problem	Inability to use appropriate techniques and learning strategies toward the solution of a new problem	Limited ability to demonstrate an understanding of appropriate strategies applied in the solution of a new problem	Able to use and explain at least one technique that can be applied to the solution of a new problem	Clearly demonstrates an ability to use appropriate techniques and learning strategies to the solution of a new problem	
Application of acquired knowledge to the solution of a new problem or situation	Inability to analyze and solve a new problem due a lack of new knowledge	Limited ability to analyze a new situation due to minimal acquired new knowledge	Mostly able to analyze a new problem using acquired knowledge	Able to apply new knowledge toward the analysis and solution of a problem or new situation	

Overall average score _____

Evaluator _____ Date _____