SAINT LOUIS UNIVERSITY.

Program-Level Assessment: Annual Report

Program Name (no acronyms): Electrical Engineering	Department: School of Engineering
Degree or Certificate Level: Undergraduate	College/School: Parks College of Engineering, Aviation and Technology
Date (Month/Year): 08/2021	Assessment Contact: Dr. Kyle Mitchell
In what year was the data upon which this report is based collected? AY 20/21	
In what year was the program's assessment plan most recently reviewed/updated? Major Update Presently In progress	

1. Student Learning Outcomes

Which of the program's student learning outcomes were assessed in this annual assessment cycle? (Please list the full, complete learning outcome statements and not just numbers, e.g., Outcomes 1 and 2.)

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

Historic Outcomes
g - an ability to communicate effectively
f - an understanding of professional and ethical responsibility
h - the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
j - a knowledge of contemporary issues

2. Assessment Methods: Artifacts of Student Learning

Which artifacts of student learning were used to determine if students achieved the outcome(s)? Please describe and identify the course(s) in which these artifacts were collected. Clarify if any such courses were offered a) online, b) at the Madrid campus, or c) at any other off-campus location.

3 - ECE 3090, battery experiment technical report
   ECE 4800, Final Design Report and Poster Presentation

4 – ECE 1001, Current Trends in Battery Technology Paper
   ECE 4800, Final Design Report

All classes assessed were taught in a Hybrid Flex modality.

3. Assessment Methods: Evaluation Process

What process was used to evaluate the artifacts of student learning, and by whom? Please identify the tools(s) (e.g., a rubric) used in the process and **include them in/with this report document** (do not just refer to the assessment plan).

Each of the artifacts were assessed by three faculty members from the program. These assessments were collated and presented to the entire program faculty. The recommendations from these three assessments were discussed by the full program faculty and program improvements developed.

For details on assessment material, rubrics and process see attached document starting on page 4.

4. Data/Results

What were the results of the assessment of the learning outcome(s)? Please be specific. Does achievement differ by teaching modality (e.g., online vs. face-to-face) or on-ground location (e.g., STL campus, Madrid campus, other off-campus site)?

There is no difference in teaching modality as the majority of these classes only have one section.

For data see results pages – Starting on Page 11.

We assessed a total of 3 samples from 3 assignments of outcome 3. All of these samples did not meet expectations.

We assessed a total of 13 samples from 5 assignments of outcome 3. About 20% of these samples did not meet expectations.

5. Findings: Interpretations & Conclusions

What have you learned from these results? What does the data tell you?

For findings see results pages – Starting on Page 11.

6. Closing the Loop: Dissemination and Use of Current Assessment Findings

A. When and how did your program faculty share and discuss these results and findings from this cycle of assessment?

In a meeting on August 18, the results of the assessment activities were discussed. The recommendations were used to determine actions.

To see the determined actions please see attached – Starting on Page 17

B. How specifically have you decided to use these findings to improve teaching and learning in your program? For example, perhaps you've initiated one or more of the following:

Changes to the Curriculum or Pedagogies	• Course content	• Course sequence
	• Teaching techniques	• New courses
	• Improvements in technology	• Deletion of courses
	• Prerequisites	• Changes in frequency or scheduling of course offerings

Changes to the Assessment Plan	• Student learning outcomes	• Evaluation tools (e.g., rubrics)
	• Artifacts of student learning	• Data collection methods
	• Evaluation process	• Frequency of data collection

Please describe the actions you are taking as a result of these findings.

To see the determined actions please see attached – Starting on Page 17

If no changes are being made, please explain why.

7. Closing the Loop: Review of Previous Assessment Findings and Changes

A. What is at least one change your program has implemented in recent years as a result of assessment data?

When reviewing outcome b.2 in AY20 a decision was made to; modify the experiment to have the students assess if they have recorded bad data, discuss how they arrived at this assessment and discuss what should be done about it.

This is a change in the specific request for the data analysis section of the experiment report. This change will cause students to perform additional analysis on the quality of the data they have recorded. This additional analysis should better demonstrate mastery of analyzing and interpreting data.

B. How has this change/have these changes been assessed?

The new version of outcome b.2 is not scheduled to be re-assessed until May 2022.

C. What were the findings of the assessment?

D. How do you plan to (continue to) use this information moving forward?

As we continue to execute our assessment plan we will continue to use the prescribed assignment for outcomes 3 and 4 to gather data on the students' ability to engage in lifelong learning. The hope is that in May 2024 we will see improvement and continue to deliver the course with the implemented change, otherwise we will look at the evidence and see if there evidence this has helped at all and suggest further changes in this and other courses.

IMPORTANT: Please submit any assessment tools (e.g., rubrics) with this report as separate attachments or copied and pasted into this Word document. Please do not just refer to the assessment plan; the report should serve as a stand-alone document.

(3) an ability to communicate effectively with a range of audiences

- (g) an ability to communicate effectively

TABLE 10 Student Outcome (3) assessment indicators and descriptions.

Indicator	Course	Assessment Description
1. Ability to write a technical report that details a design including the constraints, solution, performance results and conclusions.	ECE3090	The battery experiment technical report.
	ECE4800/ ECE4810	The PDR, CDR, and/or FDR technical reports.
2. Ability to communicate, in written and/or verbal forms, with non-technical people such as vendors, lawyers, non-technical supervisors, etc.	ECE4800/ ECE4810	Exhibit through a poster presentation given to the public at large at a year-end conference.
3. Ability to write and deliver an effective technical presentation.	ECE3090	The battery experiment presentations.
	ECE4800/ ECE4810	The PDR, CDR, and/or FDR presentations.

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This outcome refers to an ability to communicate in a variety of forms and to a variety of people. The phrase "variety of people" can refer to technical people such as peer students and instructors. It can also refer to non-technical people such as vendors, lawyers, etc.

For example, students communicate with one another in team meetings carried out as part of the ECE3090 and ECE4800/ECE4810 courses.

Indicator #1: This refers to an ability to write a technical report to peers and faculty. The technical report is to be written with an appropriate format, with appropriate section headings, and with appropriate writing in each section.

- ECE3090: Student are required to measure the internal resistance of a battery. Besides submitting the experiment document and the experiment report, students are also to turn in a design report that describes details of the experimental design development. *Students will demonstrate an ability to write a technical report as evidenced by a report detailing their design process for the battery experiment*.
- ECE4800/ECE4810: Students are required to write a Preliminary Design Review (PDR) report, a Critical Design Review (CDR) report, and a Final Design Review (FDR) report. These reports collectively contain all the details of the engineering design work carried out as part of the culminating senior design experience. *Students will demonstrate an ability to write a technical report as evidenced by the PDR, CDR or FDR*.

Indicator #2: This refers to an ability to communicate, in written and verbal form, to non-technical people. Each year, all senior design student groups across the University present their projects at a University sponsored symposium targeting both technical and non-technical people

- ECE4800/ECE4810: Students are required to publish their projects at a University symposium through a poster presentation which targets both technical and non-technical people. *Students will demonstrate an ability to communicate, in written form, to non-technical people as evidenced in the poster presentations.*

Indicator #3: This refers to an ability to write and deliver an effective presentation. An effective presentation is evaluated in three main areas: (1) the presentation visual style, (2) the presentation technical content, and (3) the presentation speaker delivery.

- ECE3090: *Student will demonstrate an ability to write and deliver an effective presentation as evidenced by the presentation written and delivered as part of the battery experiment.*

- ECE4800/ECE4810: *Students will demonstrate an ability to write and deliver an effective presentation as evidenced by the presentation written and delivered for the PDR, CDR, or FDR.*

The assessment rubrics are given in the following table

TABLE 11 Assessment rubrics for Student Outcome (3).

Ind	Rubric		
	1 = Does not meet Expectations	**2 = Meets expectations**	**3 = Exceeds expectations**
	ECE3090		
1	There is evidence that the technical report for the development of the battery experiment exhibits one or fewer of the following three: (a) has at most very few grammatical or spelling mistakes and the meaning of sentences are mostly clear, (b) is mostly well organized with clear and appropriately defined sections and with mostly appropriate material in each section (c) contains mostly correct technical content, has appropriate conclusions, and it fully complete.	There is evidence that the technical report for the development of the battery experiment exhibits 2 of the following three: (a) has at most very few grammatical or spelling mistakes and the meaning of sentences are mostly clear, (b) is mostly well organized with clear and appropriately defined sections and with mostly appropriate material in each section (c) contains mostly correct technical content, has appropriate conclusions, and it fully complete.	There is evidence that the technical report for the development of the battery experiment exhibits all three of the following: (a) has at most very few grammatical or spelling mistakes and the meaning of sentences are mostly clear, (b) is mostly well organized with clear and appropriately defined sections and with mostly appropriate material in each section (c) contains mostly correct technical content, has appropriate conclusions, and it fully complete.
3	There is evidence that the technical presentation exhibits one or fewer of the following: (a) is mostly well organized by containing a logical thought progression by beginning with a title slides, outlines/goals, design definition, followed by appropriately sequenced technical details, and ends with a summary/conclusions, (b) contains appropriate design technical details such as a well conceived design solution, sufficient technical details to assess the feasibility of the solution, and containing critical issues, (c) the speakers spoke clearly, chose effective words, demonstrated a command of the technical material, and answered questions effectively and clearly.	There is evidence that the technical presentation exhibits 2 of the following: (a) is mostly well organized by containing a logical thought progression by beginning with a title slides, outlines/goals, design definition, followed by appropriately sequenced technical details, and ends with a summary/conclusions, (b) contains appropriate design technical details such as a well conceived design solution, sufficient technical details to assess the feasibility of the solution, and containing critical issues, (c) the speakers spoke clearly, chose effective words, demonstrated a command of the technical material, and answered questions effectively and clearly.	There is evidence that the technical presentation exhibits all three of the following: (a) is mostly well organized by containing a logical thought progression by beginning with a title slides, outlines/goals, design definition, followed by appropriately sequenced technical details, and ends with a summary/conclusions, (b) contains appropriate design technical details such as a well conceived design solution, sufficient technical details to assess the feasibility of the solution, and containing critical issues, (c) the speakers spoke clearly, chose effective words, demonstrated a command of the technical material, and answered questions effectively and clearly.
	ECE4800/4810		

1	There is evidence that the PDR, CDR, and/or FDR technical report exhibits one or fewer of the following three: (a) has at most very few grammatical or spelling mistakes and the meaning of sentences are mostly clear, (b) is mostly well organized with clear and appropriately defined sections and with mostly appropriate material in each section (c) contains mostly correct technical content, has appropriate conclusions, and it fully complete.	There is evidence that the PDR, CDR, and/or FDR technical report exhibits 2 of the following three: (a) has at most very few grammatical or spelling mistakes and the meaning of sentences are mostly clear, (b) is mostly well organized with clear and appropriately defined sections and with mostly appropriate material in each section (c) contains mostly correct technical content, has appropriate conclusions, and it fully complete.	There is evidence that the PDR, CDR and/or FDR technical report exhibits all three of the following: (a) has at most very few grammatical or spelling mistakes and the meaning of sentences are mostly clear, (b) is mostly well organized with clear and appropriately defined sections and with mostly appropriate material in each section (c) contains mostly correct technical content, has appropriate conclusions, and it fully complete.
2	There is evidence that the poster presentation is not appropriate for communicating with non-technical people by exhibiting no more than one of the following: (a) The presentation contains mostly broad design details such as constraints, solution structure, assumptions, performance parameters, and conclusions, (b) Non-technical words are chosen as much as possible or highly technical words are explained, (c) highly technical concepts are presented in non-technical and simplified terms, (d) Conclusions are easily understood by non-technical people	There is evidence that the poster presentation is appropriate for communicating with non-technical people by exhibiting 2 or 3 of the following: (a) The presentation contains mostly broad design details such as constraints, solution structure, assumptions, performance parameters, and conclusions, (b) Non-technical words are chosen as much as possible or highly technical words are explained, (c) highly technical concepts are presented in non-technical and simplified terms, (d) Conclusions are easily understood by non-technical people	There is evidence that the poster presentation is appropriate for communicating with non-technical people by exhibiting all 4 of the following: (a) The presentation contains mostly broad design details such as constraints, solution structure, assumptions, performance parameters, and conclusions, (b) Non-technical words are chosen as much as possible or highly technical words are explained, (c) highly technical concepts are presented in non-technical and simplified terms, (d) Conclusions are easily understood by non-technical people

3	There is evidence that the technical presentation exhibits one or fewer of the following: (a) is mostly well organized by containing a logical thought progression by beginning with a title slides, outlines/goals, design definition, followed by appropriately sequenced technical details, and ends with a summary/conclusions, (b) contains appropriate design technical details such as a well conceived design solution, sufficient technical details to assess the feasibility of the solution, and containing critical issues, (c) the speakers spoke clearly, chose effective words, demonstrated a command of the technical material, and answered questions effectively and clearly.	There is evidence that the technical presentation exhibits 2 of the following: (a) is mostly well organized by containing a logical thought progression by beginning with a title slides, outlines/goals, design definition, followed by appropriately sequenced technical details, and ends with a summary/conclusions, (b) contains appropriate design technical details such as a well conceived design solution, sufficient technical details to assess the feasibility of the solution, and containing critical issues, (c) the speakers spoke clearly, chose effective words, demonstrated a command of the technical material, and answered questions effectively and clearly.	There is evidence that the technical presentation exhibits all three of the following: (a) is mostly well organized by containing a logical thought progression by beginning with a title slides, outlines/goals, design definition, followed by appropriately sequenced technical details, and ends with a summary/conclusions, (b) contains appropriate design technical details such as a well conceived design solution, sufficient technical details to assess the feasibility of the solution, and containing critical issues, (c) the speakers spoke clearly, chose effective words, demonstrated a command of the technical material, and answered questions effectively and clearly.

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(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

Historical Outcomes:
- (f) an understanding of professional and ethical responsibility
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (j) a knowledge of contemporary issues

TABLE 12 Student Outcome (4) assessment indicators and descriptions.

Indicator	Course	Assessment Description
ECE4800/4810		
1. Ability to understand professional ethical responsibility	ECE4800/ ECE4810	Written analysis of Ethical case studies case study
2. Ability to understand the environmental impact of an engineering design.	ECE4800/ ECE4810	Write a PDR, CDR, and/or FDR reports.
3. Ability to understand the economic impact of an engineering design.	ECE4800/ ECE4810	Write a PDR, CDR, and/or FDR reports.
4. Ability to identify current trends in professionally-related industries.	ECE1001	Summarize a technical paper involving current trends in battery technology.
	ECE4800/ ECE4810	Exhibit through technical details found in the Project Notebook, technical reports, or technical presentations.

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This outcome refers to an awareness and understanding of professional and ethical responsibilities as they relate to the field of Computer Engineering and to professional engineers in general. There are two primary sources for guidelines that pertain to these:

- The National Society of Professional Engineers (NSPE)
     https://www.nspe.org/resources/ethics/code-ethics
- The Institute of Electrical and Electronics Engineers (IEEE)
     https://www.ieee.org/about/corporate/governance/p7-8.html

Students are made aware of the NSPE code of ethics in the senior design course ECE4800/ECE4810.

An example of an ethical dilemma problem is the case involving Revlon and Logisticon. Logisticon was a small company that sold inventory software to Revlon. Revlon started using the software and quickly became very reliant upon it. Payment for the software was due but Revlon refused to pay for the inventory software claiming the software never worked properly. Logisticon hacked into Revlon's computers one night and "repossessed" the software without Revlon's knowledge. Logisticon not only issued a command that stopped the software from running, but they scrambled Revlon's computerized information about shipments/inventories. The result forced Revlon to shut down their 2 largest distribution centers (Phoenix, Edison NJ) and forced them to send 400 Revlon workers home for 3 days. Although Revlon was still able to ship products from Jacksonville FL and Oxford NC, they were unable to ship products from the North East US and Western US. Logisticon called their actions repossession, but Revlon called Logisticon's actions commercial terrorism. The questions are:

- Were Logisticon's actions to shut down the software ethical? Take a position and justify it using the NSPE code of ethics.
- Were Logisticon's actions to scramble Revlon's inventory ethical? Take a position and justify it using the NSPE code of ethics.
- Were Revlon's action not to pay ethical? Take a position and justify it using the NSPE code of ethics.

Indicator #1: These questions are evaluated in the context of the NSPE and IEEE code of ethics.

- ECE4800/ECE4810: *Student will demonstrate an understanding of professional and ethical responsibility as evidenced by a written response to a position paper on an ethical case study.*

This outcome refers to an ability to understand the impact of engineering solutions in a broader context.

Indicator #2: This indicator refers to an ability to understand the environmental impact of an engineering design.

- ECE4800/ECE4810: *Students will demonstrate an ability to understand the environmental impact of an engineering design as evidenced in the project notebooks, technical reports, or technical presentations.*

Indicator #3: This indicator refers to an ability to understand the economic impact of an engineering design

ECE4800/ECE4810: *Students will demonstrate an ability to understand the economic impact of an engineering design as evidenced in the project notebooks, technical reports, or technical presentations.*

This outcome refers to an ability to identify and converse about contemporary issues, such as battery technology for the electric car industry, renewable energy resources and their impact on the environment, or cybersecurity in a world heavily reliant on the internet.

Indicator #4: This indicator refers to an ability to identify current trends in professionally-related industries. These industries might involve battery technology, motor technology, speaker technology, etc.

- ECE1001: *Students will demonstrate an ability to identify current trends in battery technology and motor technology as evidenced by a brief synopsis of a technical paper involving each.*

ECE4800/ECE4810: *Students will demonstrate an ability to identify current trends in professionally-related industries as evidenced in the project notebooks, technical reports, or technical presentations.*

The assessment rubrics are given in the following table

TABLE 13 Assessment rubrics for Student Outcome (4).

Ind	Rubric		
	1 = Does not meet Expectations	2 = Meets expectations	3 = Exceeds expectations
ECE1001			
4	There is little or no evidence where current trends in a professionally-related industry have been identified.	There is evidence of one example where current trends in a professionally-related industry has been identified.	There is evidence of multiple examples where current trends in a professionally-related industry have been identified.
ECE4800/4810			
1	There is little or no evidence that any position regarding an ethical dilemma has been articulated nor that the position is defended with any reference to the NSPE code of ethics.	There is evidence that a somewhat clear position regarding an ethical dilemma has been articulated and that the position is defended with one direct or indirect reference to the NSPE code of ethics.	There is evidence that a clear position regarding an ethical dilemma has been articulated and that the position is defended with at least one direct reference and one indirect reference to the NSPE code of ethics.
2	There is little or no evidence that the environmental impact of a design is considered.	There is evidence that one aspect of the environmental impact of a design is considered in the design solution.	There is evidence that multiple aspects of the environmental impact of a design are considered in the design solution.

3	There is little or no evidence that the economic impact of a design is considered.	There is evidence that one aspect of the economic impact of a design is considered in the design solution.	There is evidence that multiple aspects of the economic impact of a design are considered in the design solution.
4	There is little or no evidence where current trends in a professionally-related industry have been identified.	There is evidence of one example where current trends in a professionally-related industry has been identified.	There is evidence of multiple examples where current trends in a professionally-related industry have been identified.

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TABLE 36 Assessment for Student Outcome (3).

Ind	Artifact Value	Material Assessed	Observations	Recommendations
			ECE3090	
1	1. Blank 2. Blank 3. Blank		---------------------------- ----------------------------	------------------------- -------------------------
3	1. Blank 2. Blank 3. Blank		---------------------------- ----------------------------	------------------------- -------------------------

TABLE 37 Assessment for Student Outcome (3).

Ind	Value	Material Assessed	Observations	Recommendations
			ECE4800/4810	
1	1. 3 2. 3 3. 3	PDR, CDR, and FDR (FDR which is the final version of the report is used)	It is clear from written, oral, and poster presentations that students have a clear understanding of presenting a detail technical reports addressing constraints, solution, performance results and a meaningful conclusion. ---------------------------- ---------------------------- The executive summaries do not contain sufficient details in a concise format.	Keep emphasizing various aspects of a successful communication in various format. No further recommendations are needed. ------------------------- -------------------------
2	1. 3 2. 3 3. 3	Poster presentations are used.	It is clear from reports and poster presentations that students are able to communicate effectively with both technical and non-technical people. ---------------------------- ----------------------------	No further suggestions on improvement are needed. ------------------------- -------------------------

3	1. 3	PDR, CDR, and FDR (FDR which is the final version of the report is used)	It is clear that students have the ability to write and deliver technical papers. ---------------------------- ----------------------------	No further recommendations are needed. --------------------------- ---------------------------
	2. 3			
	3. 3			

TABLE 39 Assessment for Student Outcome (4).

Ind	Value	Material Assessed	Observations	Recommendations
			ECE1001	
4	1. 3 Blank Blank 3		No Observations --------------------------- There is evidence of multiple examples where current trends in a professionally-related industry have been identified. --------------------------- No Observations --------------------------- One student explicitly stated the industry trend while the other two did not explicitly state a trend	No Recommendations --------------------------- Three papers are considered of which the second paper has no title and the associated authors for any references whatsoever. The first and the third papers have been well chosen to identify the professionally related industries where students have properly mentioned the current trends. --------------------------- No Recommendations --------------------------- I think I need to explicitly tell them that they need to be specific when they summarize the paper and avoid general statements. This might be a place where an active learning method can be used to help the students process the information from the paper.
	2. 1 Blank Blank 1			
	3. 3 Blank Blank 1			

TABLE 40 Assessment for Student Outcome (4).

Ind	Value	Material Assessed	Observations	Recommendations
			ECE4800/4810	

1	1. 3 Blank 3 3 2. 3 Blank 3 3 3. 3 Blank 3 3	Ethics case studies, and in the FDR	No Observations --------------------------- There is evidence that a somewhat clear position regarding an ethical dilemma has been articulated and that the position is defended with one direct or indirect reference to the NSPE code of ethics. --------------------------- Based on the cases presented and analyzed by students, I would recommend continuing this practice. --------------------------- All students identified at least one item in the NSPE Code of Ethics.	No Recommendations --------------------------- All three papers by selected three students well studied on ethical issues. Only reservations lies in the ethical paper Akash who should have stated the ethical rules rather than the numbers. --------------------------- We may increase the number of cases to more than 5 ethics cases to allow greater flexibility. --------------------------- All 3 students did case 1 but selected a different 2nd case to evaluate. I'm not sure if all students are required to do case 1 but I would recommend that be the case. Also, the rubric states that there to get a 3 a student must directly reference one item and indirectly reference another. I'm not sure what "indirect" means here.
2	1. N/A Blank 3 1 2. N/A Blank 3 1		The table of contents in the FDRs do not include this indicator. Group-1 discusses this indicator briefly. --------------------------- There is evidence that multiple aspects of the environmental impact of a design are considered in the design solution. --------------------------- In the Final Design Review report students show a clear understanding of engineering product and practice. Continue	No Recommendations --------------------------- All three selected projects are impressive and have demonstrated the

			to emphasis environmental impact of engineering on our world. ---------------------------- I really didn't see anything about the environmental impact.	multiple aspects of the environmental impact of the design projects. --------------------------- No further recommendations are needed. --------------------------- No Recommendations
	3. N/A Blank 3 1			
3	1. 3 Blank 3 2		No Observations ---------------------------- There is little or no evidence that the economic impact of a design is considered. ---------------------------- It is clear from the report that students are aware of economic impact of engineering. ---------------------------- I saw statements that talk about the problem that the design is addressing, but not numbers that talk about, for example, what would change if the product went to market and was widely used by the public. Or how the cost would change if this architecture were used rather than that one. This might be a bit nit-picky.	No Recommendations --------------------------- All three designs are deficient in identifying the economic impacts, and, therefore, should explicitly address this issue . --------------------------- No further action is needed. --------------------------- I'm not sure if teams are coached/told to put in the economic impact, but if not then this might help improve this outcome.
	2. 3 Blank 3 1			
	3. 3 Blank 3 3			
4	1. N/A Blank 2 3		Group-1 discusses this indicator briefly. ---------------------------- There is evidence of multiple examples where current trends in a professionally-related industry have been identified. ---------------------------- It is clear from students' notebooks, PDR, CDR, and FDR, as well as oral presentations students have clear under-standing of current trends in industries. ---------------------------- I usually found these in the "Market, Social, Ethical Con-cerns" section of the PDR.	Assessment Description: Exhibit through technical details found in the Project Notebook, technical reports, or technical presentations. Only the course instructor can evaluate this indicator. Only the FDRs are provided for the other evaluators.
	2. N/A Blank 2 3			
	3. 3 Blank 2 3			

				--------------------------- All designs have well addresses the trends in professionally related industry. --------------------------- Continue to emphasis the need to understand and update the current trends in industry. Provide guidance on what to look for and emphasis in their reports and presentations. --------------------------- No Recommendations

TABLE 38 Improvement Plans for Student Outcome (3).

Ind	Observations Drawn From Course / Indicator	Improvements
1	ECE 3090 Report on experiment design -------------- ECE 4810 FDR	There is a operating the experiment report from the battery project that would look more like a report we are looking for (Laboratory report), Change this to use the technical report format that is being developed. -------------- Add items like: Design Constraints, Numbers indicating how well the constrains were met, to the executive summary
2		
3	ECE 3090 Battery Experiment presentation -----------	Try to improve the quality of the video and audio to make the assessment easier --------------

TABLE 41 Improvement Plans for Student Outcome (4).

Ind	Observations Drawn From Course / Indicator	Improvements
1	ECE 4800 Ethics Paper	We should reconsider what an indirect reference would be. Suggest to change indirect reference to multiple or appropriate number. ------------------------------ While reporting the ethical dilemma, the rules should be stated as appeared in the professional institutions.
2	ECE FDR section on ethics	Can we recast this indicator as a question that must be required as a section of the web page, to facilitate more and more complete answers Change the language to "design life cycle" ------------------------------ Environmental impacts when more precisely addressed could have enhanced the design objectives.
3	ECE FDR	Make sure the Design Report asks for a section on this topic The follow through on economic discussion all the way to impact is lost some times. Maybe revise the economic requirement to make it a little more pointed, or ask them to answer a question posed. ------------------------------ More attentions should be diverted towards the economic impact of the design.
4	ECE 1001 Battery Paper ---------------- ECE FDR	The assignment needs to be reworked to instruct the students to answer the indicator posed as a question. This indicator needs to be modified to ask that those trends be placed in the context of the responsibilities of engineers to control the impact of there actions. ---------------- Need to change the indicator to only suggest it will be found in the FDR This indicator is well addressed in all the design projects.