Engineering Technology (Electronics Engineering Technology, BS)

College of Arts and Sciences

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Northwestern Mission. Northwestern State University is a responsive, student-oriented institution that is committed to the creation, dissemination, and acquisition of knowledge through teaching, research, and service. The University maintains as its highest priority excellence in teaching in graduate and undergraduate programs. Northwestern State University prepares its students to become productive members of society and promotes economic development and improvements in the quality of life of the citizens in its region.

College of Arts and Sciences Mission. The College of Arts & Sciences, the largest college at Northwestern State University, is a diverse community of scholars, teachers, and students, working collaboratively to acquire, create, and disseminate knowledge through transformational, high-impact experiential learning practices, research, and service. The College strives to produce graduates who are productive members of society equipped with the capability to promote economic and social development and improve the overall quality of life in the region. The College provides an unequaled undergraduate education in the social and behavioral sciences, English, communication, journalism, media arts, biological and physical sciences, and the creative and performing arts, and at the graduate level in the creative and performing arts, English, TESOL, and Homeland Security. Uniquely, the College houses the Louisiana Scholars' College (the State's designated Honors College), the Louisiana Folklife Center, and the Creole Center, demonstrating its commitment to community service, research, and preservation of Louisiana's precious resources.

Engineering Technology Department Mission: The Engineering Technology Department is dedicated to delivering high quality education in the areas of engineering technology, electronics engineering technology, and industrial engineering technology, as well as pre-engineering preparation. The department prepares students for successful careers and enriched lives in the public, private and nonprofit sectors, and promotes economic development and enrichment of the communities we serve.

Electronics Engineering Technology Mission Statement: The mission of BS in Electronics Engineering Technology is to produce four-year graduates with the breadth and depth of knowledge in electronics engineering technology to become lifelong productive members of the regional workforce and the local society.

Purpose: The Bachelor of Science in electronics engineering technology program will prepare students to: 1) Analyze, test, build, operate, and maintain electronic systems, and 2) Manage, maintain and install low voltage/power systems, automation, and controls. It prepares students for entry positions in government and the private sector in which the ability to implement changes, upgrade operations, set-up equipment, analyze problems, and modify if necessary is increasingly critical. It will also prepare interested students for the pursuit of advanced degrees in Engineering and Technology at other institutions.

Methodology: The assessment process for the BS in Electronics Engineering Technology program is as follows:

(1) Data from assessment tools (both direct – indirect, quantitative and qualitative) are collected and returned to the department head and ET ABET committee

(2) The department head and ET ABET committee analyze the data to determine whether students have met measurable outcomes

(3) Results from the assessment are discussed with the program faculty

(4) The department head, in consultation with the Engineering Technology Advisory Board, will propose changes to measurable outcomes, assessment tools for the next assessment period and, where needed, curricula and program changes

Student Learning Outcomes (SLOs):

Student learning outcome data was collected, analyzed, and reported for the Electronics Engineering Technology degree program. Measures used to collect data include reports, case studies, projects, exams, presentations, and written exercises. Assessment data for academic year 2019-2020 show that targets were met or exceeded and, in some case, not met. Most of the students' performance indices for all SLOs were found to be satisfactory. For those assessments, where the targets are not met, actions plans were devised and will be implement in the next cycle.

From these results, there were several key actions recommended and decisions made to enhance the student experience and student-learning outcomes with the focus on assuring students meet and exceed target expectations.

SLO 1. Ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline (ETAC of ABET Outcome 1).

Measure 1.1. Every spring semester, students in EET 3340 are graded based on rubrics on their ability to design Integrator Circuits. The acceptable target is 80% of students scoring 9 out of 12 (75%) on rubric-based assessment of projects.

Finding: The target was met.

Analysis: In AC 2018-2019 the target was met. In AC 2018-2019, 16 out of 19 (84%) had scored a C (70%) or better on Test 1. This is the last time the assessment was done based on test score. Starting from AC 2019-2020, the rubric based assessment has been adapted for this measure. In AC 2018-2019, some students were not that serious as they missed several classes in the beginning of the semester and were lagging.

Based on the analysis of the AC 2018-2019 results, the faculty made the following changes in 2019-2020 to drive the cycle of improvement: the faculty spent additional time reviewing the concept covered in the previous class before teaching new concepts. Faculty focused on teaching the materials at a pace that students could more easily learn. Faculty ensured that students were more familiar with the basic concepts before moving on to more complex materials.

As a result of these changes, in 2019-2020, the target was met. In AC 2019-2020, 18 out of 22 (82%) students scored at least 9 out of 12 (75%) on rubric based assessment on the integrator circuit. The results were about the same with only a mild decrease in AC 2019-2020. Faculty attribute this decline to the negative impact of the COVID-19 Pandemic, as some of the students relied on department resources such as computer software to successfully complete the assignments.

Decision: In AC 2019-2020 the target was met. Based on the analysis of AC 2019-2020, the faculty will implement the following changes in 2020-2021 to drive the cycle of improvement. The instructor will guide students to first perform theoretical design and analysis of circuits using Algebra and Calculus and then use MultiSim simulation program to verify their findings. The instructor will design comprehensive projects in integrator circuits. These projects will enhance the ability of students to design real-life application-based circuits.

These changes will improve the student's ability to acquire necessary concepts to perform well in projects thereby continuing to push the cycle of improvement forward.

SLO 1. Ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline (ETAC of ABET Outcome 1).

Measure 1.2. Every fall semester, students in EET 4310 are graded based on rubrics on their ability to design FM receivers. The acceptable target is 80% of students scoring 9 out of 12 (75%) on rubric-based assessment of semester project.

Finding: The target was met.

Analysis: In AC 2018-2019 the target was met. In AC 2018-2019, 8 out of 10 (80%) of the students were rated at least 80 out of 100 on final exam. This is the last time this assessment was done based on test score. Starting from AC 2019-2020, the rubric-based assessment was adapted. Two students did not take the final exam seriously as they missed the final week classes. It was also observed that the layout of the textbook was found to be not conducive to students' learning. The resources for the students from the publisher were not adequate.

Based on the analysis of the AC 2018-2019, the faculty made the following changes in 2019-2020 to drive the cycle of improvement. The instructor adopted a new textbook. The instructor introduced newer concepts and materials. Students were provided with the resources such as PowerPoint presentations (during class lectures and for their study). The combination of solving problems on the board augmented with Power Point were used.

As a result of these changes, in AC 2019-2020, the target was met. In AC 2019-2020, 12 out of 14 (86%) students scored at least 9 out of 12 (75%) on rubric-based assessment of assignment on design of FM receivers. Two students did not submit this assignment and were assigned zero for the assignment. Generally, the semester project is assigned to students at the end of the fourth week of the semester.

Decision: In AC 2019-2020 the target was met. Based on the analysis of AC 2019-2020, the faculty will implement the following changes in AC 2020-2021 to drive the cycle of improvement. Instructors will mandate students to submit written status report on semester project at the end of the 10^{th} week. Instructors will send a reminder email to students about the upcoming deadline of the semester project one week before the due date.

These changes will improve the student's ability to complete semester project on or before the due date thereby continuing to push the cycle of improvement forward.

SLO 2. An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes (ETAC of ABET Outcome 4).

Measure 2.1. Every spring semester, students in EET 3341 are graded based on rubrics on their ability to design Op-Amp Circuits. The acceptable target is 80% of students scoring 9 out of 12 (75%) on rubric-based assessment of projects.

Finding: The target was not met.

Analysis: In AC 2018-2019 the target was not met. In AC 2018-2019, 14 out of 19 (74%) of the students were rated at least 80 out of 100 on Test 1. This is the last time the assessment was done based on test score. Starting from AC 2019-2020, the rubric-based assessment has been adapted for this measure. In AC 2018-2019, five students performed poorly on the test problems on op-amps circuits because of their inability to apply calculus in engineering problems. The instructor also suspected that the pace of the teaching this concept might have been too rapid.

Based on the analysis of the AC 2018-2019 results, the faculty made the following changes in 2019-2020 to drive the cycle of improvement. The instructor put more emphasis on the skill/knowledge required to reach the solution of op-amp circuits. The instructor slowed down the pace of working with op-amps circuits from simple problems to more complicated ones. Students were provided with nongraded work problems to test out their skill in the subject matter.

In AC 2019-2020, the target was not met. In AC 2019-2020, 16 out of 22 (73%) students scored at least 9 out of 12 (75%) on rubric-based assessment of lab assignment on the analysis and design of op-amps circuits. The measures taken by the instructor were not sufficient to avoid one percentage point decrease. The impact of COVID-19 Pandemic might have played a role as some students show less enthusiasm in learning due to the lack of facilities such as MultiSim software, computers, and internet service.

Decision: In AC 2019-2020 the target was not met. Based on the analysis of AC 2019-2020, the faculty will implement the following changes in 2020-2021 to drive the cycle of improvement. In AC 2020-2021, the instructor will put more emphasis on the skill/knowledge required to reach the solution on amplifier, adder, integrator, and differentiator problems. The instructor will spend more time on explanation of the relevant mathematic behind the theory. For example, the instructor will explain the details of differentiation, integration of typical signals such as sinusoidal signal, square signal, triangular signals. Students will be provided with more excises to help their understanding of the concepts and methods related to lab assignments.

These changes will improve the student's ability to acquire necessary concepts to perform well in designing assigned lab circuits in op-amp thereby continuing to push the cycle of improvement forward.

SLO 2. An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes (ETAC of ABET Outcome 4).

Measure 2.2. Every fall semester, students in EET 4311 are graded based on rubrics on their ability to design FM Modulator. The acceptable target is 80% of students scoring 9 out of 12 (75%) on rubric-based assessment of projects.

Finding: The target was met.

Analysis: In AC 2018-2019 the target was met. In AC 2018-2019, 9 out of 10 (90 %) students received C or better on laboratory tests. This is the last time the assessment was done based on test score. Starting from AC 2019-2020, the rubric-based assessment has been adapted for this measure. The performance slightly declined as one student was not committed to the course and missed several other laboratory exercises.

Based on the results of the AC 2018-2019 assessment, in AC 2019-2020, the following strategies were implemented to drive the cycle of improvement. The instructor continued the prelab briefing. The instructor administered an informal survey of student regarding their experience and difficulty in carrying out lab assignments to understand where if anywhere could enhance their learning during the lab exercises.

As a result of these changes**,** In AC 2019-2020, the target was met. Ten (10) out 14 (71%) of the students scored at least 9 out of 12 (75%) on rubric-based assessment of FM Modulator design. The timing of the lab was towards the end of the semester. Some of the students did not appropriately manage their time at the end of the semester resulting in poorly written lab reports with missing design guidelines.

Decision: In AC 2019-2020 the target was met. Based on the analysis of AC 2019-2020, the faculty will implement the following changes in AC 2020-2021 to drive the cycle of improvement. In AC 2020-2021, the instructor will put more emphasis on the skill/knowledge required to reach the solution of FM modulator design problems. The instructor will remind the students from very beginning about the FM modulator design project which is normally assigned six weeks before the end of the semester. The instructor will remind the students by email once the assignment is posted on Moodle. This process will be repeated after three weeks.

These changes will improve the student's ability to complete the lab report on or before the due date thereby continuing to push the cycle of improvement forward.

SLO 3. An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline (ETAC of ABET Outcome 2).

Measure 3.1. Every fall semester, students in EET 4311 are graded based on rubrics on their ability to design AM Modulator. The acceptable target is 80% of students scoring 9 out of 12 (75%) on rubric-based assessment of projects.

Finding: The target was met.

Analysis: In AC 2018-2019 the target was met. In AC 2018-2019, 9 out of 10 (90%) students received C or better on the technical component of formal laboratory report. This is the last time the assessment was done based on test score. Starting from AC 2019-2020, the rubric-based assessment has been adapted for this measure. 10% of the students (1 student) scored less than 70% in AC 2018-2019.

Based on the results of the AC 2018-2019 assessment, in AC 2019-2020, the following strategies were implemented to drive the cycle of improvement. The faculty reviewed the handout and made some changes to the handwritten problems to enhance their learning. The instructor of the course implemented a standardized format for the formal project report in the course. The instructor noted that the rigor of the project was apparently not challenging enough as expected. Increasing the rigor was done by throwing in some more constraints in the design parameters.

As a result of these changes, in AC 2019-2020, the target was 80%. In AC 2019-2020, 14 out 14 (100%) of the students scored at least 9 out of 12 (75%) on rubric-based assessment of AM Modulator design. Instructor of the course noted that the rigor of the lab was apparently not as challenging as expected.

Decision: In AC 2019-2020 the target was met. Based on the analysis of AC 2019-2020, the faculty will implement the following changes in AC 2020-2021 to drive the cycle of improvement. The instructor will provide more detailed guidelines about formatting of the semester project report. The instructor will first prepare students with lab exercises before assigning the semester project. Since the rigor of the project will be increased, these labs will cover necessary concepts and theory to successfully complete the semester project. The instructor will send a reminder email to students about the upcoming deadline one week before the due date.

These changes will improve the student's ability to complete the semester project on or before the due date thereby continuing to push the cycle of improvement forward.

SLO 3. An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline (ETAC of ABET Outcome 2).

Measure 3.2. Every spring semester, students in EET 4351 are graded based on rubrics on their ability to design Two-way Traffic Controllers with PLCs. The acceptable target is 80% of students scoring 9 out of 12 (75%) on rubric-based assessment of project.

Finding: The target was met.

Analysis: In AC 2018-2019 the target was met. In AC 2018-2019, 14 out of 14 (100%) students scored a C or better on the technical component of the formal laboratory report. This is the last time this assessment was done on based on the total report score. Going forward, the assessment will be based on the rubric. As compared to previous year, the faculty increased one-on-one time with the students in the laboratory. Additionally, the instructor used new equipment (AMATROL PLC Trainers bought through funds awarded by Board of Regents) for the second time in this course and had learned a better way to explain the equipment and course material to the students. Past students' experiences were very helpful in designing the experiments and the way to explain to the new batch of students.

Based on the results of the AC 2018-2019 assessment, in AC 2019-2020, the following strategies were implemented to drive the cycle of improvement. Students were advised to properly run grammar and spell check before submitting their reports. Students were made aware of resources such as writing center and writing tutors.

As a result of these changes, in AC 2019-2020 the target was 80%. In AC 2019-2020, 8 out of 12 students (67%) of the students scored at least 9 out of 12 (75%) on rubric-based assessment of the project to design Two-way Traffic Controllers with PLCs. The timing of the labs to help doing the project was towards the end of the semester. Some of the students did not appropriately manage their time at the end of the semester resulting in not submitting the project reports and missing design guidelines. For the last 6 weeks of the semester, the students could not use the Amatrol trainer in the department lab because of lock down for COVID-19 Pandemic. The free simulation software for PLCs did not help them much as the students reported computer and internet problems.

Decision: In AC 2019-2020 the target was met. Based on the analysis of AC 2019-2020, the faculty will implement the following changes in AC 2020-2021 to drive the cycle of improvement. The instructor will continue emphasizing the practice of using grammar and spell check of the laboratory project report. Instructor will investigate alternative methods of completing the PLC assignments in case of the similar situation (COVID -19 Pandemic) that prohibits students from using departmental resources (computers and relevant software/hardware). Instructor will inquire about the use of lab fees to reimburse students for having to purchase off-campus software.

These changes will improve the student's ability to complete the semester project report on or before the due date thereby continuing to push the cycle of improvement forward.

SLO 4. Ability to function effectively as a member of a team or as its leader (ETAC of ABET Outcome 5).

Measure 4.1. Every spring semester, instructor of the course rates students in EET 4950 based on their ability and skill as a member or a leader of the team on a checklist-based review survey. Instructor will use the overall impression of the team based on a semester long interaction with the team to rate the team members and leaders. The acceptable target is 80% of students are rated at least 20 out of 25 on checklist-based survey.

Finding: The target was met.

Analysis: In AC 2018-2019 the target was met. The target was set to at least 80% of the students are rated at least 4 out of 7 by their peers. In AC 2018-2019, the overall results for this SLO were that 17 out of 17 (100%) of the students were rated at least 4 out 7 by their peers in EET 4940.

Based on the analysis of AC 2018-2019 the faculty made the following changes in AC 2019-2020. Clearly defined roles and responsibilities of the team members as well as the leader of the team were developed, distributed, explained to the students at the beginning of the semester. Communication channel (proper procedure) were established for the team members to notify instructor of any conflicts in the group and/or stagnancy in project progress so that the instructor can mediate the situation in a timely manner.

As a result of these changes, in 2019-2020 the target was at least 80% of the students are rated at least 20 out of 25 on checklist-based peer review survey. In AC 2019-2020, 14 out of 17 (82%) of the students were rated at least 20 out of 25 on checklist-based peer review survey. This is the first time a new assessment methodology was used to assess the ability and skill as a member or a leader of the team. Students who did not meet the target were either fulltime working students or in one case, the leader of the team did not delegate work and did not communicate in time with the fellow team members. Instructor of the course recommended to have a clearly defined roles for the leader and the members to be provided and explained at the beginning of the semester. Instructor also recommended to open channel of communications with the team members in addition to the existing communication with the team leaders so that the late learning of the conflicts within the group can be avoided.

Decision: In AC 2019-2020 the target was met. Based on the analysis of AC 2019-2020, the faculty will implement the following changes in AC 2020-2021 to drive the cycle of improvement. Clearly defined roles and responsibilities of the team members as well as the leader of the team will be developed, distributed, explained to the students at the beginning of the semester. Communication channel (proper procedure) will be established for the team members to notify instructor of any conflicts in the group and/or stagnancy in project progress so that the instructor can mediate the situation in a timely manner. All groups will now be required to use MS Teams or similar software for the

projects.

These changes will improve the student's ability in oral communication. This will allow them to learn and experience how to be an effective member or the leader of the technical project team.

SLO 4. Ability to function effectively as a member of a team or as its leader (ETAC of ABET Outcome 5).

Measure 4.2. Every spring semester, students in EET 3361 assess their peers in a technical team with respect to their ability and skill as a member or a leader of the team based on a checklist-based peer review survey. The acceptable target is 80% of EET students are rated at least 20 out of 25 on checklist-based peer review survey.

Finding: The target was met.

Analysis: In AC 2018-2019 the target was met. In AC 2018-2019, this measure was not assessed using EET 3361. Based on the instructor experience in teaching lab courses involving group projects, in AC 2019-2020, the following strategies were implemented to drive the cycle of improvement. Team leaders were assigned by the instructor in all project groups based on the groups' recommendation. Team leaders communicated to members about the requirements of the projects which included report guidelines, and the deliverables.

As a result of these changes, in 2019-2020 the target was 80%. In AC 2019-2020, the target was met. Only 16 out of 20 (80%) students scored at least 20 out of 25 (80%) on check-list based peer reviewed survey. This result could have been better if not for the impact of the COVID-19 Pandemic. Students were concerned about not being able to communicate with team members effectively during this difficult period.

Decision: In AC 2019-2020 the target was met. Based on the analysis of AC 2019-2020, the faculty will implement the following changes in 2020-2021 to drive the cycle of improvement. The class will be changed from online to onsite if the situation of the COVID-19 pandemic is improved. The students will be provided with necessary hardware and software. Specially, the ET department will make effort to make the software Simulink available to every student or every group of students. In the worst case that the class cannot be switched from online to onsite and the software Simulink cannot be installed for the personal computers of students, the instructor will try to have the students install the trial version of MATLAB. In the worst case that the software Simulink is not available, the instructor will design lab projects which can be solved with MATLAB programming instead of Simulink. Students will be asked to use MS Team for communications.

These changes will help the student to perform effectively as a member or a leader of the technical team thereby continuing to push the cycle of improvement forward.

SLO 5. An ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature (ETAC of ABET Outcome 3).

Measure 5.1. Every fall semester, students in EET 4940 assess their peers in a technical team with respect to their ability and skill as a member or a leader of the team based on a checklist-based peer review survey. The acceptable target is 80% of EET students are rated at least 20 out of 25 on checklist-based peer review survey.

Finding: The target was not met.

Analysis: In AC 2018-2019 the target was met. The target was set to at least 80% of the students are rated at least 4 out of 7. In AC 2018-2019, the overall results were that 17 out of 17 (100%) students rated at least 4 out of 7 with respect to the ability communicate effectively in EET 4940.

Based on the analysis of AC-2018-2019 the faculty made the following changes in in AC 2019-2020 to drive the cycle of improvement. There was a mock presentation before the actual presentation. Faculty feedback on PowerPoint slides and oral presentations were given before the actual presentation.

As a result of the changes, in AC 2019-2020, the target was 80%. In AC 2019-2020, 13 out of 17 (76%) of the students are rated at least 80 out of 100 on checklist- based assessment on oral presentation. This is the first time a new assessment methodology was used to assess ability to communicate effectively. One group of four students that was also rated poor in peer evaluation (SLO 4) was the only group that was not rated at least 80% by the faculty in their oral presentation of the technical report. It is noted that this group did not participate in a practice session of oral presentation.

Decision: In AC 2019-2020 the target was not met. Based on the analysis of AC 2019-2020, the faculty will implement the following changes in AC 2020-2021 to drive the cycle of improvement. All groups will now be required to participate in the mock presentation. Mock presentations will be graded, and students will be provided feedback by the faculty.

These changes will improve the student's ability in oral communication. This will allow them to learn proper technical report preparation following the accepted writing style thereby continuing to push the cycle of improvement forward.

SLO 5. An ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature (ETAC of ABET Outcome 3).

Measure 5.2. Every spring semester, upon submission of capstone project reports in EET 4950, ET faculty evaluate students with respect to their ability to write a technical

report using relevant literature, graphs, charts, results, and recommendations adhering to the format prescribed by the instructor to assess the attainment of SLO 5. The acceptable target is 80% of EET students rated at least 80 out of 100 on checklist-based assessment of the written project report.

Finding: The target was not met.

Analysis: In AC 2018-2019 the target was met. In AC 2018-2019, 17 out of 17 (100%) of the students were rated at least 80% on the final project report. Based on the analysis of AC-2018-2019 the faculty made the following changes in in AC 2019-2020 to drive the cycle of improvement. A project team-leader responsibility was communicated clearly to the team leaders. Work was evenly distributed among the team members without overwhelming any team members.

As a result of the changes, in AC 2019-2020, the target was 80%. In AC 2019-2020, the overall results were that only 14 out of 18 (78%) of the students were rated at least 80 out 100 on the checklist-based assessment of the written project report. One project team of four students failed to be rated at least 80% however, they were rated at 78%. This team had several meetings with the instructor of the course before the lockdown because of the pandemic. The team had a clear action plan but did not deliver the required materials in the format prescribed by the department. One possible reason instructor suspected is that the leader of the team did not properly delegate the tasks in time and later scrambled to finalize the report with the help of one other group member. Communication among members was severely impacted by the COVID 19 pandemic.

Decision: In AC 2019-2020 the target was not met. Based on the analysis of AC 2019-2020, the faculty will implement the following changes in AC 2020-2021 to drive the cycle of improvement. All groups will now be required to submit a mid-semester project report adhering to the guidelines. This report will be used as a part of the midterm grade. Faculty will provide feedback on the quality of the contents and the formatting of the report. A written responsibility of team leader/members will be made available in the Moodle and students will be reminded of it from time to time. Faculty will also provide feedback on the quality of the contents and the formatting of the final draft at least two weeks before the due date to provide students ample time for addressing changes and comments.

These changes will improve the student's ability in written communication. This will allow them to learn proper technical report preparation following the accepted writing style thereby continuing to push the cycle of improvement forward.

Comprehensive Summary of Key evidence of seeking improvement based on the analysis of the results:

- The faculty spent additional time reviewing the last concept covered in the

previous class before teaching new concepts. This practice was enhanced over the previous year with even more time spent on review.

- Focus on teaching the materials at a pace that students could more easily learn.
- Ensure that students were more familiar with basic concepts before moving on to more complex material.
- The instructor adopted a new textbook.
- The instructor introduced newer concepts and materials.
- Students were provided with the resources such as PowerPoint presentations (during class lectures and for their study).
- The combination of solving problems on the board augmented with Power Point were used.
- Instructor put more emphasis on the skill/knowledge required to reach the solution of integrator and differentiator problems.
- Instructor slowed down the pace of working with op-amps from simple problems to more complicated ones.
- Students were provided with nongraded work problems to test out their skill in the subject matter.
- The instructor continued the prelab briefing.
- Instructor administered an informal survey of student regarding their experience and difficulty in carrying out lab assignments to understand where if anywhere could enhance their learning during the lab exercises.
- In AC 2020-2021, the instructor put more emphasis on the skill/knowledge required to reach the solution of amplifier, adder, integrator, and differentiator problems.
- Instructor spent more time on explanation of the relevant mathematic behind the theory. For example, the instructor will explain the details of differentiation, integration of typical signals such as sinusoidal signal, square signal, triangular signals.
- Students were provided with more excises to help their understanding of the concepts and methods related to lab assignments.
- Students were provided necessary hardware and software to complete their lab assignments.
- The faculty reviewed the handout to see if any other additions to the handwritten problems could be made that would further help improve student learning.
- The instructor of the course implemented a standardized format for the formal

project report in the course.

- The instructor noted that the rigor of the project was apparently not challenging enough as expected. Increasing the rigor will be done by throwing in some more constraints in the design parameters.

- Students were advised to properly run grammar and spell check before submitting their reports and they will be advised about the existence of the writing center and availability of writing tutors.

- The faculty noted that the results increased from 91% to 100%, and therefore, one more AC of results will be gathered before any drastic modifications are proposed.
- Clearly defined roles and responsibilities of the team members as well as the leader of the team will be developed, distributed, explained to the students at the beginning of the semester.
- Communication channel (proper procedure) will be established for the team members to notify instructor of any conflicts in the group and/or stagnancy in project progress so that the instructor can mediate the situation in a timely manner.

- Team leaders were assigned by the instructor in all project groups. Students will no longer pick their own group leaders.

- Team leaders were informed that they must share in work breakdown structure to ensure that students performing team leader duties are not overloaded with work as compared to their peers.

- A new written document outlining group leader responsibilities were created and improved based on the results of AC 19-20. While the addition of team leaders has been successful, another year of data and experience with this practice will help find ways that the team leader role may be improved for the enhancement of the student learning process for all students.
- Mock presentation was done before the actual presentation.
- Faculty feedback on PowerPoint slides and oral presentation before the actual presentation was given.
- A project team-leader responsibility to be communicated clearly to the team leaders.
- Work should be evenly distributed among the team members without overwhelming any team members.
- Target to be revised after one more assessment cycle.

Plan of action moving forward.

Electronic Engineering Assessment data for academic year 2019-2020 showed that targets were met or exceeded for most courses. Targets are not met for a few courses due to the negative impact of Covid-19 pandemic. The Department of Engineering Technology is encouraged by the improvements made by faculty during the AC 2019-2020 and recognizes it is necessary to strive for continuous improvement needed every year to achieve model student learning outcomes. The following paragraphs summarize the changes for next cycle based on this year's analysis of the assessment results

In all classes, students will be emphasized on being punctual and aware of their responsibility. Comprehensive review sessions will be provided to students in some classes such as EET 3340 to allow them focus on important topics and guide their study before the final exam. The instructor will design comprehensive projects in important circuits such as Power amplifier, FET amplifiers, Integrators, Differentiators, and Scaling adder. These projects will enhance the ability of students to design complicated circuits of real-life applications.

For courses, which assess communication skills such as EET 4311, the instructor will be using standardized lab format and provide students with a sample of well-written report as an example. The faculty will review the handout and see if any other additions to the handwritten problems could be made that would further help improve student learning.

For lab courses with hands-on experiences such as EET 4311, EET 4351, pre-lab review will be practiced. Hand-notes with examples will be distributed to students in EET 4311. An instruction manual will be developed for the new PLC trainers in EET 4351. The instructor will provide more detailed guidelines about formatting of the final project report. The instructor will assign the lab necessary to complete the project right after the midterm allowing the students to have enough time to complete the project.

In several classes, new apparatus, software, and teaching methodologies will be adopted to enhance student learning and utilize new technologies. In EET 3361, the ET department will try to make Simulink software available for students to solve problems on the analysis and design of control systems. In the worst case that the software Simulink is not available, the instructor will design lab projects which can be solved with MATLAB programming instead of Simulink.

In EET 4310, instructor will be combining PowerPoint and board while delivering his lecture. In addition, faculty will open source relevant videos to explain Fourier series and Bessel functions further in EET 4310. Instructor will mandate students to submit written status report on semester project and send a reminder email to students about the upcoming deadline of the semester project.

For senior design projects which include EET 4940, EET 4950, or IET 4960, instructor will supervise group formation for the project so that each group can fulfill their project obligation in timely manner. Students will be advised to Mock presentation before the actual presentation. Faculty will provide feedback on PowerPoint slides and oral presentation before the actual presentation.

In addition, different students' skills will complement each other and will enhance the quality of projects. Additionally, the instructor will be emphasizing team effort to achieve a common goal in solving engineering problems by assigning/requiring team leaders, meeting agenda, and meeting minutes. Students will continue 'mock' presentation several times before the actual presentation to enhance their presentation skills. Instructor will continue good practices such team leader assignment, providing enhanced itemized budget in the project proposal and the final project report and administer 'mock' presentation before final presentation.

For the performance indices, which were at 100% level, will be continually monitored. A possible change in the performance targets will be discussed in the faculty meeting and Industrial Advisory Committee meeting in fall 2021 and decisions will be made based on the committee's recommendation for each of the performance targets.

Due to small sample size in some of the EET courses, it is evident that the performance index is very sensitive to the sample size. Enrollment in ET department has shown continuous increase, and this may be reflected on future results. However, faculty agreed to monitor performance index for small classes before discussing possible alterations in target as well as action plans development.

In conclusion, ET faculty has reflected on the assessment results from the current as well as previous years and identified some explicit changes to improve student learning. Continued commitment and attention to assessment will improve the quality of education. Data will be continually analyzed to ensure continuous improvement and moving forward.