# County College of Morris

## ACADEMIC OUTCOMES ASSESSMENT SUMMARY FORM

Please complete a separate form for each department and each program. Summary forms are due each year on June 15. Completed forms should be submitted electronically to Academicaffairs2@ccm.edu and to your division.

ACADEMIC YEAR: 2023/2024
DEPARTMENT: Engineering Technologies / Engineering Science
PROGRAM: P3600 Electronics Engineering Technology including P3601 (EET w/ Biomed Equipment Option)
SUBMITTED BY: Raed Awawdeh
PERSON RESPONSIBLE FOR ASSESSMENT: Raed Awawdeh

**PART ONE**

***What was our plan?*** **Describe the department/program assessment plan you employed over the past year.**

The Student Outcome was assessed during the spring 2024 semester. Active circuit design (ELT 213) was used to assess outcomes 1 to 5 in the list below.

**Identify and list the learning outcomes that were assessed.**

**Table 1**

| Program Learning Outcome | Course (s) Assessed | Timeline |
|---|---|---|
| 1. An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering problems appropriate to the discipline. | ELT 100, PHY112, ELT 213 | Spring 2024 |
| 2. An ability to design solutions for well-defined technical problems and assist with engineering design of systems, components, or processes appropriate to the discipline. | ELT 213 | Spring 2024 |
| 3. An ability to apply written, oral, and graphical communication in well-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature. | ELT 213 | Spring 2024 |
| 4. An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results. | ELT100, PHY112, ELT 213 | Spring 2024 |
| 5. An ability to function effectively as a member of a technical team. | ELT 213 | Spring 2024 |

**How were these outcomes assessed?**

- **Rubrics and Ratings (ELT 213)**
- Embedded Items
- **Portfolio/Performance (ELT 213)**
- **Internally Developed Test (ELT 213, ELT 100)**
- Externally Developed Test *(i.e. – Publisher)*
- Test Results or Term Paper that counts toward a Student's Grade
- Gateway Course
- Capstone Course
- **Lab Report (ELT 100)**

**Describe your department's assessment process including courses where the assessment occurs, a description of the assessment instrument, and identification of the instrument by type(s) as listed in 1 – 9 above.**

*ELT 213 Assessment Process*

Outcomes for each course are assessed using internally developed test and design project activities. Students receive grades for each course based on the scores shown in Table 2.

Table 2

| *Letter Grade* | *Number Grade* | *Quality Points* |
|---|---|---|
| A | 90-100 | 4.0 |
| B+ | 85-89 | 3.5 |
| B | 80-84 | 3.0 |
| C+ | 75-79 | 2.5 |
| C | 70-74 | 2.0 |
| D+ | 65-69 | 1.5 |
| D | 60-64 | 1.0 |
| F | Below 60 | 0 |

Each assessment instrument has a weight that determines the degree to which the assessment influences the final grade for the course. Table 3 shows an example of the weights for each assessment.

Table 3

| *Activity* | *Percent* | *Assessment* |
|---|---|---|
| Test 1, Test 2 | 20% | Individual Grading |
| Labs | 20% | Group Grading |
| Final Exam | 25% | Individual Grading |
| Homework Assignments | 5% | Individual Grading |
| Research &Presentation | 30% | Group Grading |
| **Total** | **100%** | |

In ELT 213, a final design project/competition was implemented as a summative assessment for the course, as well as a formative assessment of student's abilities thus far in the program. A rubric was used for assessment of the project and evaluated team performance. The rubric

evaluated 6 key process gates in the project and aligned with a set deliverable timeline. The areas evaluated were:

- ✓ Design Phase (Brainstorm, Concept Selection, Research, Initial, and Final Design)
- ✓ Functional/Operational capabilities of the design
- ✓ Competition Performance
- ✓ Ability to foster, work in, and succeed in, a team environment.
- ✓ Presentation Skills
- ✓ Final Report

Team members would meet for weekly sessions during lab hours for individualized team meetings that would be "checked in" by the instructor. Students were required to independently meet deliverables according to a weekly schedule, culminating in the competition (aka data collection) and presentation of results. This was done in the form of a product pitch and encompassed an abridged version of the engineering design cycle. As the course is an analytical course, particular focus was given to their analysis and the decision making which arose from it.

**Table 4. Rubric**

| SCORE | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| DESIGN PHASE (Bb SUBMISSIONS) | Completed none of the required Project Milestone Submissions | Completed some of the submissions but with little work/effort shown | Completed some of the submission with a minimal amount of support material | Completed some of the submission with an adequate amount of support material | Completed all of the required Project Milestone Submissions with adequate support | Completed all of the required Project Milestone Submissions with effort going above and beyond to be thorough |
| FUNCTION | Did not build the Design project; Did not provide a working, functional prototype | Partially built Design project, on the road to implementing design; Does not function | Built Design project according to designs and materials; Design project fails to function; no firing mechanism | Built Design project and it is operable; Fires precariously/haphazardly; no firing mechanism | Design project is built and operating, but is inconsistent; none/insufficient firing mechanism | Solid build, functions as designed and has firing mechanism |
| COMPETITION | Does not bring Design project, is incomplete or inoperable, is unable to compete | Design project is incomplete or inoperable during competition | Design project is available for competition but breaks/fails and is unable to participate in all activities | Design project is available for competition but breaks/fails and is only able to participate in some activities | Design project is present at competition, and is operational but precarious/finicky | Design project is present at competition, is robust for use, and can be controlled by team |
| TEAMWORK | No group organization or distribution of tasks; splintering; independent work; Bickering | No group organization or distribution of tasks, but all work towards common goal; counterproductive | Somewhat organized, almost fair distribution of tasks/responsibilities and work somewhat cohesively | Some organization, fair distribution of tasks; cohesive effort; work somewhat cohesively | Works very well as a group; well distributed tasks and responsibilities; work somewhat well together | Works very well as a group; well distributed tasks and responsibilities; good report and symbiotic understanding/effort |

| | | | | | | |
|---|---|---|---|---|---|---|
| **PRESENTATION (ENGINEERING CONTENT)** | Poor statement and criteria. Missing analysis or the reasoning is flawed. Missing drawing, list of resources or the budget | Statement and criteria confusing or incomplete, missing only some of supporting materials | Statement and criteria confusing or incomplete, analysis poorly applied/accurate, incomplete drawings and/or budget | Statement and criteria good but analysis is partially developed, incomplete drawings and/or budget | Statement and criteria good, analysis well thought out and accurate, drawings available, partial budget/resources | Excellent statement and criteria, alternatives presented, analysis accurate, complete drawings, budget, resources |
| **PRESENTATION (TEAM SKILL)** | Poor organization, no transition in topics or speakers; inadequate visuals; significant errors; over/under time | Lacking some organization; inadequate transitions people and topics; poor visuals; many errors; over/under time | Some organization; inadequate transitions people and topics; poor visuals; many errors; over/under time | Some organization; good transitions' OK visuals' minimal errors' over/under time limit | Some organization; good transitions' OK visuals' minimal errors; appropriate time | Clear organization; excellent transitions; good visuals; no errors; appropriate time |
| **PRESENTATION (INDIVIDUAL CONTRIBUTION)** | Significant grammatical errors, too low/loud; fast/slow; monotone, no eye contact, excessive ums, no questions answered | Simplistic use of language, some errors, volume too low or loud, too fast and/or slow, some eye contact, lots of ums, poor responses | Simplistic use of language, some errors, too fast and/or slow, OK eye contact, lots of ums, poor responses | Good use of language with few errors, volume not too soft or loud, speed OK, good eye contact, minimal ums, OK responses | Good use of language with few errors, volume OK, speed OK good eye contact, minimal ums, OK responses | Excellent use of language without grammatical errors, volume/tone emphasis, enthusiastic, eye contact, no ums, good responses to?'s |
| **FINAL REPORT** | No Report | Report Submitted; poor quality; missing sections; no images; not professional | Report submitted but of poor quality; has all necessary components | Report Submission with all components; adequate effort/quality | Report organized and contained all necessary items; sufficient effort and if presentable. | Well organized and documents entire project timeline; good use of images and graphs; easy to read; professional and thorough |

Using a combination of progress reports, deliverables review, self-reflection, and the final portfolio rubric, students were assigned a group score. Based upon the individual contribution, performance, and reflection, this score would be adjusted if it failed to meet any component of assessment.

Table 5. Project Grade Breakdown

| | |
|---|---|
| Project Deliverables/Milestones (5 x 5%) | 25% |
| Progress Reports | 25% |
| Project Portfolio Review | 50% |

*ELT 100 Assessment Process*

The Student Outcome was assessed during the spring 2024 semester. Circuit Analysis DC/AC (ELT 100) was used to assess outcomes 1 and 4 in table 1.

Outcomes for each course are assessed using internally developed tests and lab activities. Students receive grades for each course based on the scores shown in table 1.

Each assessment instrument has a weight that determines the degree to which the assessment influences the final grade for the course. Table 6 shows an example of the weights for each assessment.

Table 6

| Assessment Instrument | Weight |
|---|---|
| Test 1 | 15% |
| Test 2 | 15% |
| Lab Activities | 30% |
| Quizzes | 20% |
| Final Exam | 20% |
| TOTAL SCORE | 100% |

*PHY 112 Assessment Process*

The assessment employed in PHY 112 took place in the Spring 2024 semester.
Learning Outcomes were assessed via an internally developed test and lab activities. Student output from the test was analyzed by each question and used as indicators for PLO 1. Lab activities were assessed in the form of lab report. Report grades were assigned based on document completeness, analysis of results, and appropriate conclusions. Additionally, considerations were given for formatting and presentation. Grades of six lab reports were compiled and used as indicator for PLO 4.

**For each of the methods you've employed, include an Expected Level of Achievement (ELA)—what you regard to be an acceptable standard for students to meet.**

For ELT 213, students must receive a minimum score of 70% to pass each assessment – final exam and final design project.

For ELT 100, students must receive a minimum score of 70% to pass each assessment – final exam and lab report.

For PHY12, Students must receive a minimum score of 70% to pass each assessment. test and the lab reports.

**When were these outcomes assessed?**
The outcomes were assessed at the end of the Spring 2024 semesters.

# County College of Morris

ACADEMIC OUTCOMES ASSESSMENT SUMMARY FORM Part 2

ACADEMIC YEAR: 2023/2024
DEPARTMENT: Engineering Technologies / Engineering Science
PROGRAM: P3600 Electronics Engineering Technology including P3601 (EET w/ Biomed Equipment Option)

**PART TWO**

*What were this year's results? Present and reflect on the outcomes of implementing the assessment plan detailed in PART ONE above.*

**What are the results of your outcomes assessment process this year? Please include all data collected.**

*ELT 213 Assessment Results*

Table 7 shows the result of the final exam for the ELT 213 course in the Spring 2024 semester. The students received ten problems. More than 50% of the students responded correctly to all problems except problems 3 and 4.

**Table 7**

| Final Exam Problem Number | Number of Students Out of 11 with Correct Response | Percentage of Students Out of 11 with Correct Response | Threshold of 50% of Students Giving Correct Response Met (Yes = 1, No = 0) |
|---|---|---|---|
| 1 | 8 | 73% | 1 |
| 2 | 6 | 55% | 1 |
| 3 | 5 | 45% | 0 |
| 4 | 5 | 45% | 0 |
| 5 | 8 | 73% | 1 |
| 6 | 11 | 100% | 1 |
| 7 | 11 | 100% | 1 |
| 8 | 10 | 91% | 1 |
| 9 | 8 | 73% | 1 |
| 10 | 9 | 82% | 1 |

The final exam assessed the outcomes 1 and 2. These outcomes are restated in Table 1. The exam questions/problems are included in the Appendix. Each question/problem met both outcomes.

Table 8 provides more details about the results of the final exam.

**Table 8**

| Measures for Final Exam | Score |
|---|---|
| Number of students taking the final exam | 11 |
| Number of students passing the final exam | 11 |
| Percentage of students passing the final exam | 100% |
| Median score | 85% |
| Mean score | 88% |
| Standard deviation | 11.58 |
| Number of problems | 10 |
| Number of problems meeting 50% threshold^ | 9 |
| Percentage of problems meeting 50% threshold^ | 90% |
| ^ At least 50% of students should be able to give a correct response to each question. | |

Table 9 (last column) shows the sections in the final design project where 50% or more of the students met the threshold score. The second column of Table 9 shows the maximum score for each section of the report. The third column of Table 9 shows the threshold score for each section of the report. Out of 8 sections, 6 sections (75% of sections) met the 50% threshold.

**Table 9**

| Design Project Report Section | Maximum Score | Threshold | Number of Students Out of 11 Meeting Threshold | Percentage of Students Out of 11 Meeting Threshold | Threshold of 50% Met^ (Yes = 1, No = 0) |
|---|---|---|---|---|---|
| Cover Page | 10 | 7 | 11 | 100% | 1 |
| Abstract | 5 | 3.5 | 9 | 82% | 1 |
| Table of Content | 5 | 3.5 | 11 | 100% | 1 |
| Introduction | 15 | 10.5 | 11 | 100% | 1 |
| Methods | 15 | 10.5 | 11 | 100% | 1 |
| Results | 20 | 14 | 11 | 100% | 1 |
| Discussion | 15 | 10.5 | 11 | 100% | 1 |
| Appendices | 15 | 10.5 | 8 | 73% | 1 |
| Total | 100 | 70 | | | 8 |

The design project activity assessed outcomes 3 and 4. Both outcomes are restated in Table 1. To meet these outcomes student had to meet the following objectives that were taken from the "Laboratory Manual for Electronic Principles" by Albert Malvino, David Bates and Patrick Hoppe:

1. Construct and test various circuits using laboratory equipment and semiconductor components.
2. Mastery of biasing methods both theory and application of active circuit components such as Bipolar Junction Transistors, Junction Field Effect Transistors, and Field Effect Transistors.
3. Design amplifiers based on transistors.
4. Analyze these circuits using DC methods such as Ohm's Law, Kirchhoff's Voltage and Current Laws, Thevenin, and Power formulas.
5. Analyze these circuits using AC methods such as the calculation of cut off frequencies of filters as well as the design and development of Bode Plots and small signal AC redraw of circuits.

The design project report displays how well the students met the foregoing objectives.

Students conducted the lab activities and lab reports in groups of three. This team effort met outcome 5. Table 10 provides more details of the performance of the students on the design project activity.

**Table 10**

| Measures for Lab Report | Score |
|---|---|
| Number of students submitting the design project ~ | 11 |
| Number of students passing the design project report activity | 11 |
| Percentage of students passing the design project report activity | 100% |
| Median score | 83% |
| Mean score | 78% |
| Standard deviation | 10% |
| Number of sections in design project report | 8 |
| Number of sections in design project report meeting 50% threshold^ | 3 |
| Percentage of sections in design project report meeting 50% threshold^ | 100% |

Table 11 shows the results for each team. Teams 1 and 2 were comprised of 4 members, a, and Team 3 was comprised of 3 members.

**Table 11**

| **Evaluation Criteria** | **Points** | **Team 1** | **Team 2** | **Team 3** | **Avg** | **Avg (%)** |
|---|---|---|---|---|---|---|
| *Design Phase* | 20 | 15 | 10 | 20 | 15 | 75% |
| *Function* | 10 | 6 | 5 | 10 | 7 | 70% |
| *Competition* | 15 | 9 | 6 | 15 | 10 | 66.7% |
| *Teamwork* | 5 | 5 | 5 | 5 | 5 | 100% |
| *Presentation (Content)* | 10 | 10 | 10 | 10 | 10 | 100% |
| *Presentation (Team)* | 5 | 5 | 5 | 5 | 5 | 100% |
| *Presentation (Individual)* | 5 | 5 | 5 | 5 | 5 | 100% |
| *Report* | 30 | 30 | 24 | 30 | 28 | 93.3% |
| *Total* | 100 | 85 | 70 | 100 | 85 | 85% |

The evaluative project in ELT 213 is used assessed outcome 5. The outcome is restated in table 1.

*ELT 100 Assessment Results*

Table 12 shows the result of the final exam for the ELT 100 course in the Spring 2024 semester. The students received eight problems and one extra credit. More than 50% of the students responded correctly to all problems except problems 5 and 9.

**Table 12**

| Final Exam Problem Number | Number of Students Out of 20 with Correct Response | Percentage of Students Out of 20 with Correct Response | Threshold of 50% of Students Giving Correct Response Met (Yes = 1, No = 0) |
|---|---|---|---|
| 1 | 18 | 90% | 1 |
| 2 | 17 | 85% | 1 |
| 3 | 19 | 95% | 1 |
| 4 | 10 | 50% | 1 |
| 5 | 9 | 45% | 0 |
| 6 | 17 | 85% | 1 |
| 7 | 16 | 80% | 1 |
| 8 | 14 | 70% | 1 |
| 9 | 8 | 40% | 0 |
| Total | | | 7 |

The final exam assessed the outcomes 1 and 2. These outcomes are restated in Table 1. The exam questions/problems are included in the Appendix. Each question/problem met both outcomes. Table 13 provides more details about the results of the final exam.

**Table 13**

| Measures for Final Exam | Score |
|---|---|
| Number of students taking the final exam | 20 |
| Number of students passing the final exam | 16 |
| Percentage of students passing the final exam | 80% |
| Median score | 73% |
| Mean score | 70% |
| Standard deviation | 21% |
| Number of problems (including extra credits) | 9 |
| Number of problems (including extra credits) meeting 50% threshold^ | 7 |
| Percentage of problems meeting 50% threshold^ | 78% |

Table 14 (last column) shows the sections in the lab report where 50% or more of the students met the threshold score. The second column of the Table shows the maximum score for each section of the report. The third column of Table shows the threshold score for each section of the report. Out of 8 sections, 6 sections (75% of sections) met the 50% threshold.

**Table 14**

| Lab Report Section | Maximum Score | Threshold | Number of Students Out of 20 Meeting Threshold | Percentage of Students Out of 20 Meeting Threshold | Threshold of 50% Met^ (Yes = 1, No = 0) |
|---|---|---|---|---|---|
| Cover Page | 10 | 7 | 20 | 100% | 1 |
| Abstract | 5 | 3.5 | 12 | 60% | 1 |
| Table of Content | 5 | 3.5 | 20 | 100% | 1 |
| Introduction | 15 | 10.5 | 15 | 75% | 1 |
| Methods | 15 | 10.5 | 17 | 85% | 1 |
| Results | 20 | 14 | 18 | 90% | 1 |
| Discussion | 15 | 10.5 | 15 | 75% | 1 |
| Appendices | 15 | 10.5 | 10 | 50% | 1 |
| Total | 100 | 70 | | | 8 |

The lab activity assessed outcomes 3 and 4. Both outcomes are restated in Table 1. To meet these outcomes student had to meet the following objectives that were taken from the "Laboratory Manual for Introductory Circuit Analysis" by Robert Boylestad and Gabriel Kousourou:

1. Test the theoretical analysis of series-parallel networks through direct measurements.
2. Improve skills of identifying series or parallel elements.
3. Measure properly the voltages and currents of a series-parallel network.
4. Practice applying Kirchhoff's voltage and current laws, current divider rule, and the voltage divider rule.

The lab report displays how well the students met the foregoing objectives. Students conducted the lab activities and lab reports in groups of two. This team effort met outcome 5. Table 15 provides more details of the performance of the students on the lab activity.

**Table 15**

| Measures for Lab Report | Score |
|---|---|
| Number of students submitting the lab reports~ | 20 |
| Number of students passing the lab report activity | 18 |
| Percentage of students passing the lab report activity | 90% |
| Median score | 83% |
| Mean score | 78% |
| Standard deviation | 10% |
| Number of sections in lab report | 8 |
| Number of sections in lab report meeting 50% threshold^ | 6 |
| Percentage of sections in lab report meeting 50% threshold^ | 75% |

*PHY 112 Assessment Results*

The results collected from PHY 112 Assessment Test administrated in Spring 2024 are summarized in Figure 1. The test consisted of nineteen questions and twenty students took the test. The Expected Level of Achievement for the program was to have 70% of the students deliver a satisfactory output from this test.

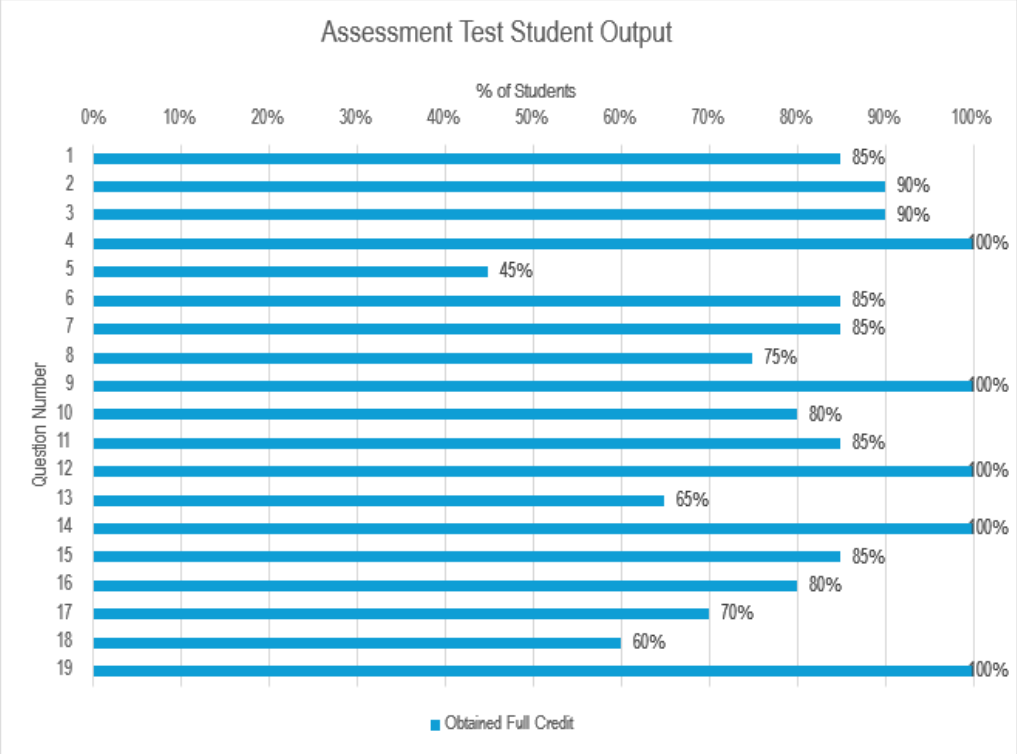


**Figure 1**

The results collected from the six lab reports are shown below. The Expected Level of Achievement for the program was to have 70% of the students deliver a satisfactory lab report.

**Table 16**

| Lab Assignment | Maximum Score | Threshold | Number of Students Evaluated | Number of Students Meeting Threshold | Percentage of Students Meeting Threshold | ELA Satisfied |
|---|---|---|---|---|---|---|
| Oscillation & Wave | 10 | 7 | 20 | 19 | 95% | √ |
| Lenses | 10 | 7 | 21 | 21 | 100% | √ |
| Electric Charge | 10 | 7 | 21 | 18 | 86% | √ |
| Magnetic Field | 10 | 7 | 21 | 20 | 95% | √ |
| Lab 9 | 10 | 7 | 21 | 20 | 95% | √ |
| Lab 10 | 10 | 7 | 21 | 20 | 95% | √ |

**Evaluate and reflect on the results. Are they favorable? Disappointing? About what was expected? If the results did not meet the ELA, provide an action plan that includes revisions to and/or further development of your assessment plan.**

*Reflection on ELT 213*

The ELA for the final exam was met. The expectation is that 70% of the students must pass the final exam. As shown in table 7, 100% of the students passed. Problems 3 and 4 did not meet

the 50% threshold. Problems 3 and 4 pertained to DC and AC analysis to Differential Amplifiers. DC and AC analysis to Differential Amplifiers appeared on the Homework. On the class and lab, 82% (9 out of 11) gave correct responses the problem. Students were advised to review their homework in preparation for the final exam.

The ELA for the design project activity was met. For the lab, 73% of students achieved a minimum score of 70%. To meet the ELA, 70% of the students must obtain a minimum score of 70%. Although the 50% threshold was met in all sections, which shows that all students passed this assessment.

Several students did not provide adequate theory for the Introduction section of the design project report. Students were missing or not adequate providing the information required for the Method section of the report. Although students were provided with documentation concerning the information required for each section of the report, some students failed to review the document. Early in the semester the instructor reviewed the report document with the students. Students must review the document again while compiling the design project report.

*Reflection on ELT 100*

The ELA for the final exam was met. The expectation is that 70% of the students must pass the final exam. As shown in Table 12, 80% of the students passed. Problems 5 and 9 did not meet the 50% threshold.

The ELA for the lab activity was met. For the lab, 90% of students achieved a minimum score of 70%. To meet the ELA, 70% of the students must obtain a minimum score of 70%. Although the 50% threshold was met in all sections 20% (4 out of 20) of the students did not pass this assessment.

Several students did not provide adequate theory for the Introduction section of the lab report. Students were missing or not adequate providing the information required for the Method section of the report. Although students were provided with documentation concerning the information required for each section of the report, some students failed to review the document. Early in the semester the instructor reviewed the report document with the students. Students must review the document again while compiling the report.

*Reflection on PHY 112*

The ELA for the assessment test was met. The result indicates that 80% of the students passed the assessment test, which is more than the 70% benchmark. As we analyzed the result more in depth by looking at each question individually, 70% or more of the students received full credit in all questions except Question 5, 13, and 18. In Question 5, students were asked to describe the process for measuring current; Question 13 was related to interpretation of scientific notation; Question 18 asked students to identify parallel circuits.

The ELA for lab reports was met. Students delivered satisfactory lab reports in all six lab exercises and more than 86% of the students received a score higher than the established benchmark, 7 out of 10, from each report.

The assessment result indicated this cohort retained a reasonable level of understanding of the material covered by the course. Students demonstrated the basic ability to apply knowledge, techniques, and skills of physics to solve well-defined engineering problems and the ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results as required in each lab exercise.

**How are results shared within department and/or with students?**

During the semester other assessment tools are used for the same outcomes. Examples of the other assessment tools include quizzes, homework assignments, and midterm exam. These assessments were returned to the students to make them aware of their strengths and weaknesses. Students meet one-on-one with the instructor to turn the areas of weakness into strengths. Depending on the results of the assessments the instructor reviews the students at the next meeting.

The final exams are not returned to the students. They are retained as part of the program assessment at the end of the semester. Students may request to see their final exams. The instructor will arrange with the students and review areas of weakness. Since all courses can be seen as prerequisites to other courses, it is recommended that students know their strengths and weaknesses in all areas.

# County College of Morris

ACADEMIC OUTCOMES ASSESSMENT SUMMARY FORM Part 3

ACADEMIC YEAR: 2023/2024
DEPARTMENT: Engineering Technologies / Engineering Science
PROGRAM: P3600 Electronics Engineering Technology including P3601 (EET w/ Biomed Equipment Option)

**PART THREE**

***How can we use the results?*** **Reflect on the changes in curriculum based on assessment, and on future goals.**

The unwillingness to use the checklist provided resulted in some students failing the lab reports activity assessment. The checklist includes the scores for each section and subsection of the report. By going through the checklist students can grade themselves. Those who followed the checklist got high scores. To help more students to do well, more emphasis will be placed on the checklist. More emphasis will be given to the sections of the report to ensure that students understand the requirements for each section.

No changes to the curriculum, based on this assessment, is recommended.

## APPENDIX

| Problem Number | ELT 213 Final Exam Problems |
|---|---|
| 1 | Find the common-mode voltage and the output voltage for the circuit shown. |
| 2 | Determine the following for the circuit shown below: (Use the 2nd approximation for the transistors.)<br>a) The tail current (IT)<br>b) The emitter current (IE)<br>c) The collector current (IC)<br>d) The quiescent voltage (VC) for each collector |
| 3 | Determine the following for the circuit shown below: (Use the 2nd approximation for the transistors.)<br>a) The tail current (IT)<br>b) The emitter current (IE)<br>c) The ac emitter resistance (r'e)<br>d) The voltage gain (AV)<br>e) The ac output voltage (vout)<br>f) The input impedance of the diff amp (Zin(base)). Given: $\beta = 300$ |
| 4 | Determine the following for the circuit shown below:<br>a) The closed-loop voltage gain (AV(CL))<br>b) The closed-loop input impedance (Zin(CL)) |
| 5 | Determine the closed-loop voltage gain (AV(CL)) for the circuit shown below. |
| 6 | Determine the value of the compensating resistor (RB2)) for the circuit shown below |
| 7 | Determine the closed-loop voltage gain (AV(CL)) for the circuit shown below. |
| 8 | Determine the output voltage (vout) for the circuit shown below. |
| 9 | Determine the followings:<br>a) The cutoff frequency (f1) for C1,<br>b) The cutoff frequency (f1) for C2,<br>c) The cutoff frequency (f1) for C3,<br>d) The cutoff frequency (f1) for C4, |
| 10 | For the two-stage, capacitively coupled amplifier find the following:<br>a) Voltage gain of each stage<br>b) Overall voltage gain<br>c) Express the gain found in dB |