

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Electricity/Electronics	211	ELE 211 07/04/2023-Basic Electronics
College	Division	Department
Advanced Technologies and Public Service Careers	Advanced Technologies and Public Service Careers	Advanced Manufacturing
Faculty Preparer		Jim Popovich
Date of Last Filed Assessment Report		

I. Review previous assessment reports submitted for this course and provide the following information.

1. Was this course previously assessed and if so, when?

No

2. Briefly describe the results of previous assessment report(s).

3.

4. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

5.

II. Assessment Results per Student Learning Outcome

Outcome 1: Identify the properties of diodes and analyze their behavior in circuits.

- Assessment Plan
 - Assessment Tool: Standardized Final Exam
 - Assessment Date: Winter 2022
 - Course section(s)/other population: All sections
 - Number students to be assessed: All students
 - How the assessment will be scored: Departmentally-developed answer key
 - Standard of success to be used for this assessment: 70% of students will score 70% or better on the final exam questions relevant to this outcome.

(Each student's score for this outcome will be computed by averaging their scores on the final exam questions relevant to this outcome.)

- Who will score and analyze the data: Faculty who teach this course

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2023, 2022, 2021, 2017, 2016	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
98	90

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

All students who completed the Final Exam in these five sections were included in the assessment.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

The classes included in the assessment were on campus only due to the lab equipment necessary to conduct the hands-on portions of the class. Both afternoon and evening classes were included.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Questions on the final exam pertaining to this objective were identified/scored/and tabulated. A spreadsheet was developed to record the question success rate.

The number of questions assessed is slightly different from semester to semester due to my constant efforts to improve the course. However, the students are still being assessed on the same material and in a very consistent manner.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this

learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: <u>No</u>
41 of the 90 students (45 %) scored 70% or better on the questions identified. The standard of success was not met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

The students were able to identify the effect of forward and reverse biased diodes in a circuit.
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8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

The students scored poorly and demonstrated a lack of understanding of voltage divider concepts. Students' success may improve with the addition of worksheets/problems for students to work through. The greatly improved performance in the 2023 class indicates that this helps. Continued efforts will be made in the class/worksheets to improve student analysis skills.
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Outcome 2: Identify the properties of transistors and analyze their behavior in circuits.

- Assessment Plan
 - Assessment Tool: Standardized Final Exam
 - Assessment Date: Winter 2022
 - Course section(s)/other population: All sections
 - Number students to be assessed: All students
 - How the assessment will be scored: Departmentally-developed answer key
 - Standard of success to be used for this assessment: 70% of students will score 70% or better on the final exam questions relevant to this outcome. (Each student's score for this outcome will be computed by averaging their scores on the final exam questions relevant to this outcome.)
 - Who will score and analyze the data: Faculty who teach this course

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
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	2023, 2022, 2021, 2017, 2016	
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2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
98	90

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

All students who completed the final exam were assessed.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Students from five evening and afternoon sections were assessed. ELE 211 class is only held on campus due to lab equipment requirements.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Items/questions on the Final Exam that correlated with this outcome were scored and tabulated.

The number of questions assessed is slightly different from semester to semester due to my constant efforts to improve the course. However, the students are still being assessed on the same material and in a very consistent manner.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: No

The aggregate results for the five classes indicated that 53 of 90 (59 %) students met the standard of success, which was greater than or equal to 70%.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Analysis of BJT transistors and calculation of voltage/current values within those circuits was a strength (with the exception of the 2022 class).

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

With the inclusion of BJT transistor worksheets and included formulas on the class formula sheet, the improvement trend is indicated. Not sure what happened with the 2022 class.

Outcome 3: Identify the properties of operational amplifiers and analyze their behavior in circuits.

- Assessment Plan
 - Assessment Tool: Standardized Final Exam
 - Assessment Date: Winter 2022
 - Course section(s)/other population: All sections
 - Number students to be assessed: All students
 - How the assessment will be scored: Departmentally-developed answer key
 - Standard of success to be used for this assessment: 70% of students will score 70% or better on the final exam questions relevant to this outcome. (Each student's score for this outcome will be computed by averaging their scores on the final exam questions relevant to this outcome.)
 - Who will score and analyze the data: Faculty who teach this course

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2023, 2022, 2021, 2017, 2016	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
98	90

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

All students who completed the written final exam were part of this assessment activity.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All students in these school years were included in this assessment. Courses were on campus due to the lab equipment requirements and included afternoon and evening classes.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Questions on the written final exams that correspond with this outcome were identified and student performance on these questions were tabulated and recorded.

The number of questions assessed is slightly different from semester to semester due to my constant efforts to improve the course. However, the students are still being assessed on the same material and in a very consistent manner.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

76% of the students (69 out of 90) achieved this learning outcome.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

The students met the standard of success in identifying operational amplifier circuits (inverting amp, non-inverting amp and comparators).

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

With additional in-class and homework worksheets, focus on identifying the difference between circuit diagrams of inverting and non-inverting op amp circuits will be made when these are covered in class.

III. Course Summary and Intended Changes Based on Assessment Results

1. Based on the previous report's Intended Change(s) identified in Section I above, please discuss how effective the changes were in improving student learning.

Results were mixed. Students need more work in understanding/calculating voltage and different points in electronic circuits.

2. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

Students are challenged when they are asked to determine the effects of resistance/voltage changes within a circuit that includes multiple related variables.

3. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

Data and observations made in this assessment report will be shared with instructors who teach ELE 211.

- 4.

Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Outcome Language	Changing outcome 1 to "Experiment with diodes to observe response to changes in temperature and current flow conditions and analyze the diode voltage drops change for semiconductors placed in circuits." Changing the assessment tool to a lab project.	This change will better reflect the hands-on nature of the course.	2024
Course Assignments	Homework and in-class assignments will be added where circuit analysis and calculations will be made.	The ability to go beyond mere memorization of component symbols and their function(s) within operational	2023

		circuits will improve student understanding.	
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5. Is there anything that you would like to mention that was not already captured?

6.

III. Attached Files

[ELE 211 W2017](#)

[ELE 211 W2016](#)

[ELE 211 W2021](#)

[ELE 211 W2022](#)

[ELE 211 W2023](#)

Faculty/Preparer: Jim Popovich **Date:** 08/09/2023
Department Chair: Allan Coleman **Date:** 08/14/2023
Dean: Jimmie Baber **Date:** 08/28/2023
Assessment Committee Chair: Jessica Hale **Date:** 04/04/2024

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Electricity/Electronics	211	ELE 211 06/20/2019-Basic Electronics
Division	Department	Faculty Preparer
Advanced Technologies and Public Service Careers	Advanced Manufacturing	Dale Petty
Date of Last Filed Assessment Report		

I. Review previous assessment reports submitted for this course and provide the following information.

1. Was this course previously assessed and if so, when?

No

2. Briefly describe the results of previous assessment report(s).

3.

4. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

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II. Assessment Results per Student Learning Outcome

Outcome 1: Identify the properties of diodes and analyze their behavior in circuits.

- Assessment Plan
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 - Course section(s)/other population: All sections
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 - Standard of success to be used for this assessment: 70% of students will score 70% or better on the final exam questions relevant to this outcome.

(Each student's score for this outcome will be computed by averaging their scores on the final exam questions relevant to this outcome.)

- Who will score and analyze the data: Faculty who teach this course

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2018, 2017, 2019	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
60	56

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Four students did not complete the final exam.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All students included from all sections.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Final exam questions common to all three semesters were selected and categorized by outcome. Student scores for questions related to the outcome were calculated.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes
77% of students scored 70% or higher on the questions for this outcome.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Areas of strength were SCR circuit analysis (88, 82, 86%) and optoelectronic control of solid state relay circuit analysis (77%, 80%).

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Areas of weakness included analyzing LED (41%) and zener diode circuits (52%), and performing calculations on power supply circuits (41%).

We will expand on the lab exercises where students will calculate what the results should be and then measure to confirm.

Outcome 2: Identify the properties of transistors and analyze their behavior in circuits.

- Assessment Plan
 - Assessment Tool: Standardized Final Exam
 - Assessment Date: Winter 2022
 - Course section(s)/other population: All sections
 - Number students to be assessed: All students
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1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2018, 2017, 2019	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
60	56

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Four students did not complete final exam.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All students included from all sections.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Final exam questions common to all three semesters were selected and categorized by outcome. Student scores for questions related to the outcome were calculated.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: No

62% of students scored 70% or higher on the questions for this outcome.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Area of strength was in the definition of FWD and REV bias of BJT transistors (89%) and one of the circuit calculation problems (71%).

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Areas of weakness included other BJT circuit calculations (61, 64, 55%)

We will use worksheets to review this material prior to the final exam. BJT circuits are covered earlier in the course and students may not be remembering the material by the end of the semester.

Outcome 3: Identify the properties of operational amplifiers and analyze their behavior in circuits.

- Assessment Plan
 - Assessment Tool: Standardized Final Exam
 - Assessment Date: Winter 2022
 - Course section(s)/other population: All sections

- Number students to be assessed: All students
- How the assessment will be scored: Departmentally-developed answer key
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- Who will score and analyze the data: Faculty who teach this course

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2019, 2018, 2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
60	56

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Four students did not complete final exam.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All students included from all sections.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Final exam questions common to all three semesters were selected and categorized by outcome. Student scores for questions related to the outcome were calculated.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: No
65% of students scored 70% or higher on the questions for this outcome.

Overall the standard of success was not met for this outcome because students were only able to analyze the basic circuits.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Strengths were over all the different types of basic op amp circuits.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Areas of weakness included analysis of two circuits that were more complex (29%, 27%).

We will spend more time in class practicing analyzing circuits of similar complexity.

III. Course Summary and Intended Changes Based on Assessment Results

1. Based on the previous report's Intended Change(s) identified in Section I above, please discuss how effective the changes were in improving student learning.

n/a

2. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

We were pleased that students were able to analyze the basic circuits.

Analytical skills need to be improved. Students need to be able to look at a more complex circuit, understand the building blocks and how they work together. Some concepts that should have been learned in prior courses were not fully retained.

3. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

We will discuss these results with other faculty in a department meeting.

4. Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
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Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Regarding areas of weakness included analyzing LED (41%) and zener diode circuits (52%), and performing calculations on power supply circuits (41%): We will expand on the lab exercises where students will calculate what the results should be and then measure to confirm.	This will give students more practice in developing circuit calculation skills.	2020
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5. Is there anything that you would like to mention that was not already captured?

6.

III. Attached Files

[ELE 211 Assessment Analysis attachment_2017-2019.x](#)

Faculty/Preparer: Dale Petty **Date:** 06/26/2019

Department Chair: Thomas Penird **Date:** 07/02/2019

Dean: Brandon Tucker **Date:** 07/08/2019

Assessment Committee Chair: Shawn Deron **Date:** 08/19/2019