Discipline	Course Number	Title
Electricity/Electronics	134	ELE 134 11/23/2016-Motors and Controls
Division	Department	Faculty Preparer
Advanced Technologies and Public Service Careers	Industrial Technology	Dale Petty
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Recognize the principles of operation of DC and AC electrical machines including: motors, motor controls, generators, and transformers.

- Assessment Plan

    o Assessment Tool: A departmental final exam will be used to assess understanding of key concepts.

    o Assessment Date: Winter

    o Course section(s)/other population: all

    o Number students to be assessed: 12-24 per semester

    o How the assessment will be scored:

    o Standard of success to be used for this assessment:

    o Who will score and analyze the data:

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)
	2015, 2014, 2013, 2012	

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

# of students enrolled	# of students assessed
36	24

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.

> Withdrawals before 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 who took the final exan were included.

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

> All questions on the final exam were scored according to an answer key. Average percent wrong for each question related to Outcome 1 was determined for each class using Scantron Item Analysis. Average percent right for each question was calculated with Excel over all classes. The percent of Outcome 1 questions answered correctly by 75% of students was determined.

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
>
> 59% of the questions were answered correctly by 75% of the students. This outcome has a lot of theory in it which is typically difficult for our students who are more "hands-on" learners, so I was not surprised or too disappointed by the results.

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

> Strengths varied considerbly over different topics and question types. As expected students generally did better on the "plug and chug" questions, but not true for all such questions.

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.

> Three-phase power was an area of weakness. It's student's first exposure to this challengin topic and even though it's hit several times during the semester, students have a hard time with it on the final.

Outcome 2: Select and wire motors, motor controls, generators and transformers utilizing nameplate information, code books and electrical diagrams.

- Assessment Plan

    o Assessment Tool: A departmental final exam will be used to assess understanding of key concepts.

    o Assessment Date: Winter

    o Course section(s)/other population: all

    o Number students to be assessed: 12-24 per semester

    o How the assessment will be scored:

    o Standard of success to be used for this assessment:

    o Who will score and analyze the data:

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)
	2015, 2014, 2013, 2012	

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

# of students enrolled	# of students assessed
36	24

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.

Withdrawals before 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 who took the final exam were included.

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

All questions on the Final Exam were scored according to an answer key. Average percent wrong for each question related to Outcome 2 was

determined for each class using Scantron Item Analysis. Average percent right for each question was calculated with Excel over all classes. The percent of Outcome 2 questions answered correctly by 75% of students was determined.

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

69% of the questions were answered correctly by 75% of the students. This is a higher-level skill that provides a foundation to the kind of problems students would be solving after they receive more on the job exposure, so I don't expect mastery at this point. Students with better math skills, more OJT experience and more ability to answer multi-step problems did better on these questions.

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

No obvious trend here.

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.

Sizing conductors and short circuit protection involves a multi-step process, distinguishing between different cases, looking up information in tables and doing some calculations. Many of our students are challenged by this. It is covered in lecture, reading, homework, lab, on the quiz, and on the final exam already so I don't know what more I can do.

Outcome 3: Test and troubleshoot motors, motor controls, generators and transformers utilizing electrical diagrams and test equipment.

- Assessment Plan

  - o Assessment Tool: A departmental final exam will be used to assess understanding of key concepts.

  - o Assessment Date: Winter

  - o Course section(s)/other population: all

  - o Number students to be assessed: 12-24 per semester

  - o How the assessment will be scored:

  - o Standard of success to be used for this assessment:

  - o Who will score and analyze the data:

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)
	2015, 2014, 2013, 2012	

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

# of students enrolled	# of students assessed
36	24

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.

Withdrawals before 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 who took the final exam were included

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

All questions on the final exam were scored according to an answer key. Average percent wrong for each question related to Outcome 3 was determined for each class using Scantron Item Analysis. Average percent right for each question was calculated with Excel over all classes. The percent of Outcome 3 questions answered correctly by 75% of students was determined.

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

 100% of the questions were answered correctly by 75% of the students. This outcome is at the heart of what students are expected to do on the job, so I was pleased with this result.

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

Really all areas were pretty strong, which is good since troubleshooting is really at the heart of what we try to teach.

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 weakest areas were the more complex troubleshooting, and some of the 'on paper' voltage measurements. Time is of the essence, but I will continue to try and reinforce these concepts in lab.

Outcome 4: Configure and troubleshoot electronic motor drives.

- Assessment Plan
  - o Assessment Tool: A departmental final exam will be used to assess understanding of key concepts.
  - o Assessment Date: Winter
  - o Course section(s)/other population: all
  - o Number students to be assessed: 12-24 per semester
  - o How the assessment will be scored:
  - o Standard of success to be used for this assessment:
  - o Who will score and analyze the data:

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)
	2015, 2014, 2013, 2012	

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

# of students enrolled	# of students assessed
36	24

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.

Withdrawals before 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 who took the final exam were included,

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

All questions on the final exam were scored according to an answer key. Average percent wrong for each question related to Outcome 4 was determined for each class using Scantron Item Analysis. Average percent right for each question was calculated with Excel over all classes. The percent of Outcome 4 questions answered correctly by 75% of students was determined.

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

100% of the questions were answered correctly by 75% of the students. This is a very practical skill and I was pleased with the results. In the future, this will be rolled into outcome 3, but since this was new material in 2012, we included it as a separate outcome.

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

Students did well in all areas.

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.

> I plan to roll this outcome into outcome 3 next time. Also, intend to up the information and rigor for this topic.

II. Course Summary and Action Plans Based on Assessment Results

1. 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?

> Though it is an optional part of our certificate and associates degrees, many students take this because they recognize its importance on the job. It is also required for some students who are apprentices. Therefore, we know the topic is important. I have personally gotten good feedback from students who use the information immediately on the job, before or after graduation. The assessment process was not especially helpful. I am pretty clear already where students have difficulties and we know that the current students are a lot less prepared than the kind of students who came to us 10 years ago. Looking at all the outcomes together, 76% of students earned 75% or better on the final exam, so I believe overall we are meeting our standard, though outcomes 1 and 2 need to be improved.

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

> Will report at Department Meeting. Will discuss with instructor of pre-req class to see if he can help at the front end.

3.
Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
No changes intended.			

4. Is there anything that you would like to mention that was not already captured?

> none

III. Attached Files

Faculty/Preparer: Dale Petty **Date:** 01/02/2017
Department Chair: Thomas Penird **Date:** 02/01/2017
Dean: Brandon Tucker **Date:** 03/01/2017
Assessment Committee Chair: Ruth Walsh **Date:** 03/19/2017

COURSE ASSESSMENT REPORT

Background Information

I.   **Course assessed:**

Course Discipline Code and Number: _ELE 134_____

Course Title: _Motors and Controls_____

Division Code: _BCT_____   Department Code: _ELE_____

II. **Semester assessment was administered (check one):**

☐ Fall 20__
☒ Winter 2001 – Fall 2004
☐ Spring/Summer 20__

III. **Assessment tool used (check one):**
     Please attach a copy of the tool and scoring rubric used.

☐ Portfolio
☐ Standardized test
☐ Other external certification/licensure exam (please describe):_____
☐ Survey
☐ Prompt
☒ Departmental exam
☐ Capstone experience (please describe):_____
☐ Other (please describe):_____

Has this tool been used before?
☒ Yes
☐ No

If yes, has this tool been altered since its last administration? If so, briefly describe changes made.

_____First time to assess ELE 134. A similar tool used for ELE 224 course._

IV. Please list the section(s) in which this tool was administered:

_01_____   _____   _____

_____   _____   _____

V.   How many students were assessed? _about 80_

COURSE ASSESSMENT REPORT

Results

> **I.** Briefly describe assessment results based on data collected for the course assessed, demonstrating to what extent students are achieving the learning outcomes as found in the master syllabus (see attached).
> Please attach any data collected.
>
>   Methods: (See attached spreadsheet). Each final exam question was categorized according to which objective it assessed. Trends of %wrong were examined over six semesters. Significant jumps in % wrong between semesters (>20%) were examined and addressed (highlighted in yellow). Overall averages were determined for each objective. Overall averages of >50% for any objective were examined (highlighted in red).
>
> Results: As can be seen from the accompanying chart, there was a lot of variation in the numbers between the semesters assessed (yellow and green transitions). This has more to do with the particular students in the class than anything else. A big change has occurred in the student population of the period assessed, with fewer Ford electrician apprentices in the group over time. The more recent students on average are younger, less dedicated and less experienced. Looking at the Average % Wrong Per Question column, there were a few poor scores (numbers highlighted in red). Question #29 (61 % wrong) is usually missed because the students are required to interpret results from a calculation and many of the students stop after doing the calculation. Question # 8 (51 % wrong) is missed probably because it requires a multi-step calculation. I wish our students were better at math, but I don't have time to teach it to them! Questions 22, 40 and 42 deal with more complex subject matter that is covered in lecture, but not in lab, so apparently the information is not getting across.
>
> The good news is that looking at the Average % Wrong Per Objective (far right column), all the scores were below 33%, with the relatively small number of high scores on individual questions becoming less important when averaged with the other questions related to that objective.
>
>
>
> **II.** Based on the outcomes outlined in the master syllabus for the course assessed, did students meet expectations of the learning outcomes of that course?
>   ☒ Yes
>   ☐ No
>
>   Percentage of students meeting outcomes: Depending on the objective, the average % success rate was 67 to 90 %. If all objectives are averaged,, the overall average success rate was 79%.
>
>
>
> **III.** What areas of strength and weakness in students' achievement of the learning outcomes of the assessed course (as stated in the master syllabus) did assessment results show?
>
>   **Strengths:** Three Phase Alternators,   Three Phase Squirrel Cage Induction Motors,
>
>   Three Phase Power
>
>   **Weaknesses:**   AC Motor Nameplates,   Solid State Motor Control

COURSE ASSESSMENT REPORT

Changes influenced by assessment results

I.   If weaknesses were found (see III above) or students did not meet expectations, what action will be taken to address this?

    The weaknesses were in areas that required more advanced problem analysis skills and that were more abstract. In the redesign of the course outcomes and objectives, more emphasis was placed on basic concepts and practical skills, and less on theory and calculations. There will continue to be strong emphasis on the kind of problem analysis involved in analyzing and troubleshooting motor control circuits.

    More emphasis will be placed on Motor Nameplates in the laboratory exercises. Also, an additional week of solid state motor control will be fit into the curriculum. The new approach to ELE 211 Industrial Electronics, emphasizing power electronics should also help students understand this material, although it won't necessary improve results in ELE 134 since it is not a pre-requisite.

II.   Identify any other intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.

    ☒ Master syllabus
    Description and rationale: The master syllabus is being updated. The Outcomes and Objectives in the new syllabus will be less detailed and group objectives more affectively. Having gotten pretty strong negative feedback from students when a part time instructor taught the course, I believe it is important to make the objectives clearer.

    ☒ Curriculum
    Description and rationale: see above

    ☒ Course syllabus
    Description and rationale: see above

    ☐ Course assignments
    Description and rationale: _____

    ☒ Course materials (check all that apply)
        ☒ Textbook
        ☐ Handouts
        ☒ Other:_Course Pack

    Description and rationale: I continue to look for a better textbook. The lab book will be re-written for Winter 2006.

    ☒ Teaching methodology
    Description and rationale: I am beginning to create PowerPoint presentations for the course. I feel that the colors and animations in PowerPoint can more effectively communicate some of the concepts than can the textbook or chalk drawings. _____

> This semester I have instituted weekly, rather than unit quizzes. I believe this is helping students more effectively master the material by taking it in smaller bites.

☐ Other: _____

Description and rationale: _____

_____

COURSE ASSESSMENT REPORT

Future plans

I. Was the assessment tool used effective in measuring student achievement of learning objectives for this course? If not, why?

Some kind of course assessment process is very important. Filling out this particular form after having already done the assessment work is much less so.

There is so much variation in the students between semesters that gathering statistical data is not very helpful.

II. If the assessment tool was not effective, what changes will be made in future assessments?

I will continue using the departmental final exam, although the questions will be correlated to the new objectives.

I will be adding a Task List of hands-on tasks that each student should accomplish. The Task List results will be included in the next Assessment report.

Submitted by:

Name: _____ Date: _10·23·05_

Department Chair: _Gary Downen_ Date: _9/18/06_

Dean: _Freeman Gleson_ Date: _9/25/06_

Please return completed form to the Office of Curriculum & Assessment, SC 247.