Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Electricity/Electronics	224	ELE 224 11/25/2016-Introduction to PLCs
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: Troubleshoot PLC controlled systems by applying knowledge of PLC: hardware, electrical prints, programs, monitoring software, and troubleshooting procedures.

- Assessment Plan
    - Assessment Tool: A departmenal final exam will be used to assess understanding of key concepts.
    - Assessment Date: Winter
    - Course section(s)/other population: all
    - Number students to be assessed: 12-24 per semester
    - How the assessment will be scored:
    - Standard of success to be used for this assessment:
    - 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	2016, 2015	

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

# of students enrolled	# of students assessed
52	44

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 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: Yes
37% of the questions were answered correctly by 75% of the students. This outcome required students to be able to translate lab skills to knowledge on a written test. For many of our students, this is quite difficult. 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 disappointed, but not too surprised by the results. Comparing this to the Task checkups (Hands-on quizzes), student did much better with the actual hands-on tasks. In all but one of the six hands-on quizzes in all four sections more than 75% of students scored higher than 75%. Because students did well on the hands on task, I believe the standard of success for this outcome was met.

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

Students did much better on the hands-on evaluation of this knowledge than on the written evaluation. This is consistent with what I know of our students, predominant learning style. I think both evaluations are meaningful, since more depth can be easily covered in the written exam, and the hands-on test gives a better idea of how students might perform on the job on the primary skills.

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 include translating the in the field skills to on-paper tests, PLC-5 addressing (which is not used in lab), and on-paper (conceptual) troubleshooting.

Outcome 2: Develop and manage PLC programs.

- Assessment Plan
    - Assessment Tool: A departmenal final exam will be used to assess understanding of key concepts.
    - Assessment Date: Winter
    - Course section(s)/other population: all
    - Number students to be assessed: 12-24 per semester
    - How the assessment will be scored:
    - Standard of success to be used for this assessment:
    - 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	2016, 2015	

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

# of students enrolled	# of students assessed
52	44

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.

Withdrawal 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..

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: Yes
62% of the questions were answered correctly by 75% of the students. This outcome involved understanding the ladder logic programming instructions and other software related issues. Students did well for the most part, but faltered on the more conceptual rather than hardware related instructions, and on the tricky TOF (backwards) timer instruction. Comparing this to the Task checkups (Hands-on quizzes), student did better with the actual hands-on tasks. In all but one of the four hands-on quizzes in all four sections more than 75% of students scored higher than 75%. Because students did well on the hands-on task, I believe the standard of success for this outcome was met.

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

Students did better on the hands on evaluation of this knowledge than on the written evaluation as with outcome 1.

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.

Students faltered on the more conceptual rather than hardware related instructions, and on the tricky TOF (backwards) timer instruction.

Outcome 3: Perform installation and maintenance tasks on PLC's.

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

- Assessment Date: Winter
- Course section(s)/other population:
- Number students to be assessed:
- How the assessment will be scored:
- Standard of success to be used for this assessment:
- 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	2016, 2015	

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

# of students enrolled	# of students assessed
52	44

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 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: No
50% of the questions were answered correctly by 75% of the students. This outcome was not easily assessed by a written final exam and I do not believe it reflects student knowledge in this area very well. In the future, this should be rolled into Outcome 1.

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

Students did very well on the battery replacement question and the DH+ (network) addressing question.

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.

Students had difficulty with grounding and EMI reduction, neither of which we are effectively able to include in lab exercises so their understanding relies on comprehending the lecture material and reading.

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?

After 20 years, there is not a lot that surprises me about student comprehension of PLCs. The biggest factor by far is what the students bring to the table. Our more mature students who are working in the field are generally very dedicated to learning the material in spite of often having full-time work, families and long commutes. The younger students don't have this ethic as often and also have difficulty working methodically step-by-step and sticking with a problem. Looking at the green (> 20% decrease in % wrong) and yellow (> 20% increase in % wrong) shading on the attachment, shows how variable results are from class to class. Some of the variability may be due to having a part-time instructor in F2015. Students did much better on the hands-on evaluation of this knowledge than on the written evaluation. This is consistent with what I know of our students' predominant learning style. I think both evaluations are meaningful, since more depth can be easily covered in the written exam, and the hands-on test gives a better idea of how students might perform on the job on the primary skills.

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

This information will be shared with the other ELE instructors, in a department meeting and with our outside advisors.

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?

no

III. Attached Files

ELE 224 Assessment Analysis attchd to report.xlsx
ele 224 final exam

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 224

Course Title: Introduction to PLCs

Division Code: BCT Department Code: ELE

II. Semester assessment was administered (check one):

- ☐ Fall 20__
- ☒ Winter 2000-2004
- ☐ 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.

The wording on some of the questions was changed to make them clearer. The order of the questions was changed to group questions by content..

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

01 _____ _____

_____ _____ _____

V. How many students were assessed? 12-24 per semester

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 seven 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 >25% for any objective were examined (highlighted in red).

Results: As can be seen from the accompanying chart, most of the numbers improved over the semesters assessed (yellow to green transitions). There is a LOT of semester to semester variation. This has more to do with the particular students in the class than anything else. A big variation occurs typically between winter (day classes) and fall (evening classes), since the winter students on average are younger, less dedicated and less experienced.

I believe the overall improvement has been due to significant improvements in the lab equipment used. The new equipment is much more like the "real world" and offers numerous opportunities to teach troubleshooting. It has taken me a few semesters to effectively put this equipment to use, but it is now well integrated into the course. The weaknesses were all in areas where the material is more abstract.

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 64 to 97%. If all objectives are averaged,, the overall average success rate was 81 %

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: Hardware and Wiring, hardware characteristics, internal operation, relay type instructions, troubleshooting systems

Weaknesses: Data manipulation instructions, program control instructions, sequencer instructions

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 all in areas where the material is more abstract. Since ELE 224 is now the first course in PLCs, it is more appropriate to move this more difficult material to the advanced course, ELE 254. This will be done in the 2004-2005 school year.

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: New master syllabus is due for an update. Textbook, labs, lab equipment and objectives have changed. New objective list will be less detailed and group objectives more affectively. ELE 137 will no longer be a pre-requisite.

☒ Curriculum
Description and rationale: see above

☒ Course syllabus
Description and rationale: see above

☒ Course assignments
Description and rationale: Most of the assignments are now selections from the new textbook, with some of my own assignments for topics not covered by the text.

☒ Course materials (check all that apply)
- ☒ Textbook
- ☒ Handouts
- ☒ Other: Coursepack

Description and rationale: A new textbook was selected this semester which has better illustrations and numerous examples.

☒ Teaching methodology
Description and rationale: A PowerPoint presentation is being developed this semester to replace the overhead transparencies used in lecture. I have gotten good feedback from students regarding the presentation. The animations and color offer a significant improvement in my ability to illustrate a point.

This semester I have also instituted weekly (rather than bi-weekly) quizzes. Students seem to be doing better on the quizzes when there is less material covered on each quiz.

☐ 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?

It basically told me what I already knew.

There is so much variation in the students between semesters that 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 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: 11-12-04

Department Chair: Gary Downey Date: 1/7/05

Dean: _____ Date: _____

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