Washington State University  
School of EECS  
Electrical Engineering Course Assessment Report

Course Number   EE494  
Course Title   Protective Relaying Laboratory  
Semester Offered: Spring 2009  
Instructor: Luis Pérez  
10th Day Enrollment: 7  
Number Completing Successfully (C grade or better): 7

I. Assessment Outcomes from the Course Syllabus

X (A) Ability to apply knowledge of mathematics, science and engineering.

X (B) Ability to design and conduct experiments as well as analyze and interpret data.

□ (C) Ability to design a system, component, or process to meet desired needs.

□ (D) Ability to function on multidisciplinary teams.

□ (E) Ability to identify, formulate, and solve engineering problems.

□ (F) An understanding of professional and ethical responsibility.

X (G) Ability to communicate effectively in written and oral formats.

□ (H) A broad education necessary to understand the impact of engineering solutions in global, economic, and societal context.

□ (I) Recognize the need for, and have the ability to engage in lifelong learning.

□ (J) Have a broad education and knowledge of contemporary issues.

□ (K) Ability to use techniques, skills and modern engineering tools necessary for engineering practices.

II. List of Course Topics from the Course Syllabus

1. Wire heating and fuse elements (1 week)
2. I. Use of relay testing equipment (1 week). II. Testing Auxiliary relays (1 week)
3. ASPEN OneLiner fault simulation in radial system (1 week)
4. ASPEN OneLiner fault simulation in looped system (1 week)
5. Electromechanical time overcurrent relays (2 weeks)
6. Coordination of time overcurrent relay in radial systems (1 week)
7. Directional electromechanical overcurrent relays (1 week)
8. Digital overcurrent relays (3 weeks)
9. Coordination of time overcurrent relay in looped systems (1 week)
10. Final Project – Choice of Line or Generator digital relay
III. Course Assessment Summary Table: one row of the table should be devoted to each of the checked outcomes in part I. (Feel free to delete unused rows.)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Topics</th>
<th>Specific Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Ability to apply knowledge of mathematics, science and engineering.</td>
<td>1-10</td>
<td>Permanent personal assessment in the laboratory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Laboratory reports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Final project report</td>
</tr>
<tr>
<td>(B) Ability to design and conduct experiments as well as analyze and interpret data.</td>
<td>1-10</td>
<td>Permanent personal assessment in the laboratory.</td>
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<tr>
<td></td>
<td></td>
<td>Laboratory reports</td>
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<tr>
<td></td>
<td></td>
<td>Final project report</td>
</tr>
<tr>
<td>(G) Ability to communicate effectively in written and oral formats.</td>
<td>1-10</td>
<td>Permanent personal assessment in the laboratory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Laboratory reports</td>
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<tr>
<td></td>
<td></td>
<td>Final project report</td>
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</tbody>
</table>

IV. Using the table as a guide, for each outcome summarize your evaluation of the students’ achievement of that outcome; cite student performance on the identified measures as evidence to support your conclusions.

The students obtained relatively high grades (A … B). These results were obtained by grading the students’ reports and continuous interrogation in the laboratory. In general, the results can be summarized as indicated in the following table:

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Approximate Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Ability to apply knowledge of mathematics, science and engineering.</td>
<td>95%</td>
</tr>
<tr>
<td>(B) Ability to design and conduct experiments as well as analyze and interpret data.</td>
<td>90%</td>
</tr>
<tr>
<td>(G) Ability to communicate effectively in written and oral formats.</td>
<td>88%</td>
</tr>
</tbody>
</table>

V. Qualitative Assessment of Student Performance: using the arguments above and other data support the claim that students who completed this course with a grade of C or better have achieved each of the intended outcomes of this course.

The students learned to use tools and analyze data produced by professional and commercial programs and protective devices. The reports and response to oral questions in class showed an very satisfactory level of knowledge for an undergraduate class. The following three figures show examples of the results presented by the students in the application of a short-circuit analysis and...
relay analysis program (FIGS. 1 and 3 of this report); and the output obtained form a digital relay event report and oscillogram for a simulated fault (FIG. 2 of this report).

FIGURE 1

FIGURE 2
VI. Concerns: state any concerns you may hold about this class – were the students adequately prepared coming into it? Are there topics or outcomes where (some) students were weak after completing the course? Other concerns? Were there any comments on students’ course evaluations that should be addressed in future instances of the course? This section is very important for improving our program: it provides critical input to the curriculum committee for identifying areas requiring attention.

There was one student who took the theory (EE493) the year before. He was the only student who had problems following the laboratory exercises. However, with the help of the instructor and the Teaching Assistant, the student made satisfactory progress along the semester.

Signature __Luis Pérez___ Date: 10/20/2009