I. Assessment Outcomes from the Course Syllabus

☐ (A) Ability to apply knowledge of mathematics, science and engineering.
☐ (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.
☒ (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 life long 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

The course content has not changed from the previous semester. What follows is the repetition from the previous report. The course includes 9 different experiments and one final “design project”. The experiments are designed to augment the material taught in EE 361 on electromechanical energy conversion, and introduce concepts of measurements and instrumentation, and simple control methods. Experiments are performed on single phase and three phase low a.c. voltage (120/208 V) power system devices: transformers, a.c. machines, loads, and low voltage (245 V) d.c. machines. Eight of the nine experiments are explained in details with complete procedures. One experiment is left open ended so that students must decide on proper procedures and appropriate measurements. The students work in groups of 3 or less to perform the assignments.

1. Introduction: presentation of safety and equipment protection in lab procedures, introduction to lab facilities, three phase loads.
2. Introduction to the fundamentals of LabView.
4. Transformers: calculation of losses and impedances in positive sequence three phase connections.
5. General rotating machinery and induction machines: calculation of parameters and measurement of performance.
6. Synchronous machines and DC supplies modeling.
7. DC machines: machine parameters, investigation of series and shunt connections.
8. Controller design in LabView.
9. Simulation of dynamic systems.
10. Project design: machine control - primary and supplementary frequency control of synchronous machine.

III. Course Assessment Summary Table: one row of the table should be devoted to each of the checked outcomes in part I.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Topics</th>
<th>Specific Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C) Ability to design a system, component, or process to meet desired needs.</td>
<td>1-10</td>
<td>Lab reports, Quizzes, Final project report</td>
</tr>
<tr>
<td>(G) Ability to communicate effectively in written and oral formats.</td>
<td>1-10</td>
<td>Lab reports, Final project report</td>
</tr>
</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.

(C) Ability to design a system, component, or process to meet desired needs.
As usual, during the first 2, 3 experiments, the students needed a lot of assistance from the TAs. After that period, most of the students felt more comfortable in the lab and were able to perform the tasks with less help. After completion of the first 7 experiments, most of the students were able to function independently in the lab. They understood the equipment and software, and how to employ it to achieve different lab objectives.

(Outcome G) Ability to communicate effectively in written and oral formats.
Students typically come into this course with a poor understanding of how to present an effective lab report. These problems range from an inability to use professional language (as opposed to slang), lack of judgment on what information is salient to the particular hand and various difficulties with organization of the report. The students are given a detailed handout on the expectations for the lab reports but feedback on submitted reports is needed for this to be fully understood by the students. The first few labs are graded closely and most students demonstrate significant improvement by the 5th or 6th lab report. Only students who are able to effectively present their ideas are given a passing grade in the course.
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.

In general, as demonstrated in the final project, the students showed good understanding of the design parameters, sensing and control variables. Most of them showed good problem solving capability in determining the flaws in their approach. As usual, there was variability among groups in terms of teamwork. Some groups relied on one or two more capable individuals to guide the work.

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.

Besides the concerns already stated in the previous reports, it has become clear from students’ comments that if the lab is left to be run mostly by the TAs, as was the case this time, the following changes need to be made:
- The procedures need to be very detailed and should include step-by-step instruction as well as wiring diagrams.
- A brief review of the related theoretical concepts should be provided along with the procedures.

Signature __________________________________________ Date: _______________________

Please email a copy of the completed form to Patricia Arnold, patricia@eecs.wsu.edu and deliver a signed hardcopy to her mailbox.