1. General Information:
   Alpha-numeric codification: INEL 5415
   Course Title: Power System Protection
   Number of credits: 3
   Contact Period: 45

2. Course Description:
   English: Design and selection of protective devices used in generation, transmission, and distribution for electrical systems: relays, fuses, breakers, reclosers, arresters. Protection coordination. Selection of other system components such as sectionalizers and throw-overs. Insulation coordination.


3. Pre/Co-requisites and other requirements:
   INEL 4415

4. Course Objectives:
   This is a course for majors in electric power engineering. After completing the course, the student should be able to specify and set up relays for the protection of a power system.

5. Instructional Strategies:
   ☑ conference ☐ discussion ☐ computation ☐ laboratory
   ☐ seminar with formal presentation ☐ seminar without formal presentation ☐ workshop
   ☐ art workshop ☐ practice ☐ trip ☐ thesis ☐ special problems ☐ tutoring
   ☐ research ☐ other, please specify:

6. Minimum or Required Resources Available:
   All students are expected to bring a solid background in electric power systems fundamentals. Students must always bring to class the textbook and a scientific calculator (preferably one that handles complex numbers).

7. Course time frame and thematic outline
<table>
<thead>
<tr>
<th>Outline</th>
<th>Contact Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective Relaying Introduction &amp; Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>CT Performance</td>
<td>3</td>
</tr>
<tr>
<td>Operating Principles of Electro-Magnetic Relays</td>
<td>3</td>
</tr>
</tbody>
</table>
Current Differential Relaying, Transformer Protection, Bus Protection | 7
Electromagnetic Induction Relays | 3
Directional Relays, Application of Overcurrent Relays, Case Studies | 9
Distance Relays, Application Case Study | 5
Step Distance Protection, Pilot Relaying, Case Study | 9
Generator Protection Survey | 3

Total hours: (equivalent to contact period) | 45

8. Grading System
☒ Quantifiable (letters) ☐ Not Quantifiable

9. Evaluation Strategies

<table>
<thead>
<tr>
<th></th>
<th>Quantity</th>
<th>Percent</th>
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<tbody>
<tr>
<td>☒ Exams</td>
<td></td>
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<tr>
<td>☒ Final Exam</td>
<td></td>
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<tr>
<td>☒ Short Quizzes</td>
<td><strong>7</strong>_</td>
<td>80%</td>
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<tr>
<td>☐ Oral Reports</td>
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<td>☐ Monographies</td>
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<td>☐ Portfolio</td>
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<tr>
<td>☒ Projects</td>
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<td>20%</td>
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<tr>
<td>☐ Journals</td>
<td></td>
<td></td>
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<tr>
<td>☐ Other, specify:</td>
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<td></td>
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<tr>
<td>Homework</td>
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</tbody>
</table>

TOTAL: 100%

10. Bibliography:


11. According to Law 51
Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Chemistry Building, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

12. Course Outcomes

1. Possess sufficient knowledge of power system analysis and
operation, including short circuits to specify the set up and coordination of protective relaying.

2. Understand faulted electric power system to successfully identify applicable protection schemes.

3. Be able to apply complex variable concepts to the solution of relaying coordination problems.

4. Be able to follow logical and orderly design procedures to choose the best solution for the relaying of the power system.

5. Be able to determine criteria to compare the designed outcome.