Faculty members are required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Academic Affairs and Standards Council.

DEPT. ELUT COURSE NUMBER: 2121

NUMBER OF CREDITS: 2 Lecture: 1 Lab: 1 OJT 0

Course Title: Protective Relays

Catalog Description:
Designed to give a broad understanding of simple relays that are used in the protection of high voltage lines and substations. Emphasis is on understanding design, construction, and application, performing testing, calibrating, cleaning and adjusting relays. The following relays will be studied if time allows: overcurrent induction disc, thermal overcurrent, induction disc voltage, over/under voltage, voltage restraint, percentage differential, and transformer differential relays.

Prerequisites or Necessary Entry Skills/Knowledge:
None

FULFILLS MN TRANSFER CURRICULUM AREA(S)
Goal 1: Communication: ____ by meeting the following competencies:

Goal 2: Critical Thinking: ____ by meeting the following competencies:

Goal 3: Natural Sciences: ____ by meeting the following competencies:

Goal 4: Mathematics/Logical Reasoning: ____ by meeting the following competencies:

Goal 5: History and the Social and Behavioral Sciences: ____ by meeting the following competencies:

Goal 6: The Humanities and Fine Arts: ____ by meeting the following competencies:

Goal 7: Human Diversity: ____ by meeting the following competencies:

Goal 8: Global Perspective: ____ by meeting the following competencies:

Goal 9: Ethical and Civic Responsibility: ____ by meeting the following competencies:

Goal 10: People and the Environment: ____ by meeting the following competencies:

Topics to be Covered
Installation, testing and calibrating of simple and compound relays.

### Student Learning Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>1.</td>
<td>Describe the design, construction, application, function, and perform testing of overcurrent induction disc relays.</td>
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<tr>
<td>2.</td>
<td>Describe the design, construction, application, function, and perform testing of thermal overcurrent relays.</td>
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<tr>
<td>3.</td>
<td>Describe the design, construction, application, function, and perform testing of induction disc voltage relays.</td>
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<tr>
<td>4.</td>
<td>Describe the design, construction, application, function, and perform testing of voltage controlled overcurrent induction disc relays.</td>
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<tr>
<td>5.</td>
<td>Describe the design, construction, application, function, and perform testing of voltage restraint overcurrent induction disc relays.</td>
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<tr>
<td>6.</td>
<td>Describe the design, construction, application, function, and perform testing of directional overcurrent induction relays.</td>
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<tr>
<td>7.</td>
<td>Describe the design, construction, application, function, and perform testing of percentage differential relays and transformer differential relays.</td>
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</tbody>
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### Is this course part of a transfer pathway: Yes ☐ No ☒

Revised Date: October, 2020