**Course Outline**

**Course Title:** Electrical and Electronic Theory  
**Submitted By:** SRN  
**Semester Course Prefix and Number:** ECM 1264  
**Old Quarter Course Prefix and Number:**  
**Approval Date:** 11/12/19  
**Revision Date:**  

<table>
<thead>
<tr>
<th>Number of Credits:</th>
<th>7</th>
<th>Number of Lecture Credits:</th>
<th>2</th>
<th>Number of Lab Credits:</th>
<th>5</th>
<th>Number of Lab Hours:</th>
<th>10</th>
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<tbody>
<tr>
<td>Semester(s) Offered:</td>
<td>Fall</td>
<td>Class Size:</td>
<td>24</td>
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Negotiated by AASC on: (11/12/19)

**Course Purpose Code:**  
- 0 – Developmental Courses  
- 1 – Non-transferable  
- **X** 2 – Technical course related to career programs  
- 3 – College course which has the primary goal of applying certain concepts (e.g. vocal ensemble)  
- 4 – Other college course not considered a part of MNTC (e.g. computer science, health, physical education)  
- 5 – Course which is intended to fulfill the Minnesota Transfer Curriculum (MNTC) requirements or intended for transfer.  
- 6 – Continuing Education/Customized Training specialized credit course (not occurring in 0-5)

**Catalog Description:**  
This course is designed to provide foundational knowledge of electronic/electrical theory to students preparing for entry level employment in the fields of industrial electrical maintenance and industrial process automation. Areas of focus will be the theory related to AC, DC, Solid State and Digital circuits. The students will apply instruction received in the classroom to the construction, analysis and troubleshooting of circuits in a laboratory setting. This course is not designed to provide the level of expertise required to design, build or troubleshoot electronic circuits to the component level.

**Prerequisites and/or recommended entry skills/knowledge:**  
- Course Prerequisite(s): None  
- Reading Prerequisite:  
- Composition Prerequisite:  
- Mathematics Prerequisite:  

**Career Programs and Transfer Majors Accessing this Course:**  
Electrical Controls and Maintenance Diploma and Electrical Controls and Maintenance AAS

**Minnesota Transfer Curriculum Goal(s) partially met by this course if applicable:**  
(Notes: No more than two goals may be met by any one course. AASC review and the Chief Academic Officer's approval are required.)

<table>
<thead>
<tr>
<th>Goal</th>
<th>Partially Met by this Course</th>
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<tbody>
<tr>
<td>0. X</td>
<td>None</td>
</tr>
<tr>
<td>1.</td>
<td>Communications</td>
</tr>
<tr>
<td>2.</td>
<td>Critical Thinking</td>
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<tr>
<td>3.</td>
<td>Natural Sciences</td>
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<tr>
<td>4.</td>
<td>Mathematical/Logical Reasoning</td>
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<td>5.</td>
<td>History and the Social and Behavioral Sciences</td>
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<tr>
<td>6.</td>
<td>The Humanities and Fine Arts</td>
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<td>7.</td>
<td>Human Diversity</td>
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<tr>
<td>8.</td>
<td>Global Perspectives</td>
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<td>9.</td>
<td>Ethical and Civic Responsibility</td>
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<tr>
<td>10.</td>
<td>People and the Environment</td>
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**Learning Outcomes:** (including any relevant competencies listed in the Minnesota Transfer Curriculum)
Upon completion of this course, the student will be able to:

1.) Understand the hazards related to working with, and around, electrical systems, and the appropriate precautions to be taken to protect against these hazards.
2.) Apply basic algebra and right angle trigonometry to the theoretical analysis of electronic and electrical circuits.
3.) Identify basic electronic and electrical components and their schematic symbols.
4.) Read, and generate using AutoCAD, two dimensional schematics related to electronic and electrical circuits and systems.
5.) Understand basic circuit configurations, (Series, Parallel and Series-Parallel).
6.) Differentiate between DC and AC current.
7.) Explain the different sources of DC and AC current, (AC generators and rectifier circuits).
8.) Understand and apply concepts related to overcurrent protection.
9.) Construct basic DC, AC, Solid State and Digital circuits.
10.) Analyze and troubleshoot basic DC, AC, Solid State and Digital circuits.
11.) Understand the practical applications of basic electronic/electrical devices and circuits.
12.) Properly use test equipment to measure voltage, current, resistance, digital logic states and phase relationships.
13.) Observe proper safety procedures.
14.) Work cooperatively.
15.) Apply critical thinking skills.

Student Assessment Methods May Include:

Lab and Homework Assignments, Quizzes and Written Tests

Use of Instructional Technology May Include: (includes software, interactive video and other instructional technologies):

PowerPoint, PC Based Exercises and Sourcing of Online Information.

Additional Special Information: (special fees, directives on hazardous materials, etc.)

Transfer Information: (Please list colleges/majors that accept this course in transfer.)

Bemidji State University's Applied Engineering BS degree and Technology Management BS degree.

Affiliated Mesabi Range College Courses and Programs:

Approvals:

<table>
<thead>
<tr>
<th>Body</th>
<th>Representative Signatures</th>
<th>Date</th>
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<tbody>
<tr>
<td>Faculty Association</td>
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<td>Academic Affairs Standards Committee</td>
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<td>Chief Academic Officer</td>
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Distribution: Original – Instructional Services
Copies: Transfer Specialist, Originating Faculty Member, Records
Revised: February 2019