MESABI RANGE COMMUNITY & TECHNICAL COLLEGE

# Course Outline

**Course Title:** Electrical/Mechanical Tools, Equipment and Systems
**Submitted By:** Scott Norcia
**Semester Course Prefix and Number:** PAS 1276
**Approval Date:**
**Old Quarter Course Prefix and Number:**
**Revision Date:** 11/23/11

**Number of Credits:** 2
**Semester(s) Offered:** Spring
**Class Size:** 24
Negotiated by AASC on: (date)
**Number of Lecture Credits:** 0
**Number of Lab Credits:** 2 **Number of Lab Hours:** 4
**Number of Studio/Demonstration/Internship Credits:**

**Course Purpose Code:**

_____ **0** – Developmental Courses
_____ **1** – Non-transferable, General Education
__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 general education (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.
_____ **9** – Continuing Education/Customized Training specialized credit course (not occurring in 0-5)

**Catalog Description:**

This course is designed to familiarize the student with tools, materials, and procedures used in the installation and maintenance of electrical systems and equipment. Instruction includes the safe and proper usage of specialized tools and test equipment used in electrical work. The student will gain a working knowledge of the specifications, application, and standards related to materials used in electrical distribution. The course examines the mechanical applications and procedures used in the installation of electrical equipment and systems.

**Prerequisites and/or recommended entry skills/knowledge:**

Course Prerequisite(s): EIAT/PAS 1253, EIAT/PAS 1233, EIAT/PAS 1243, EIAT/PAS 1295, & EIAT/PAS 1244
Reading Prerequisite: None
Composition Prerequisite: None
Mathematics Prerequisite: None

**Career Programs and Transfer Majors Accessing this Course:**

Process Automation Systems Diploma
Process Automation Systems 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. Curriculum Committee review and the Chief Academic Officer's approval are required.)

0. X None
1. ____ Communications
2. ____ Critical Thinking
3. ____ Natural Sciences
4. ____ Mathematical/Logical Reasoning
5. ____ History and the Social and Behavioral Sciences
6. ____ The Humanities and Fine Arts
7. ____ Human Diversity
8. ____ Global Perspectives
9. ____ Ethical and Civic Responsibility
10. ____ People and the Environment

**Learning Outcomes**: (including any relevant competencies listed in the Minnesota Transfer Curriculum)

Following the completion of this course the student will be able to demonstrate the ability to:

1. Identify specialized hand tools used in the electrical trade
2. Demonstrate hand tool selection, application and care.
3. Describe safe handling of tools
4. Identify proper usage and care of power tools
5. Identify drill sizes, (factional, number, and letter sizes)
6. Identify metal fasteners
7. Identify machine screw sizes
8. Demonstrate proper tap and die techniques
9. Demonstrate metal layout techniques
10. Demonstrate tools and techniques used in metal fabrication
11. Identify methods for anchoring into concrete and steel structure
12. Identify raceway used in electrical installations
13. Identify anchoring and support for electrical
14. Identify conduit fittings
15. Demonstrate conduit bending and threading
16. Identify NEMA enclosure standard
17. Identify methods of wire instillation
18. Identify wire types and proper application
19. Identify wire sizes
20. Demonstrate wire spicing and termination techniques
21. Calculate wire ampacity and voltage drop
22. Identify methods of overcurrent protection
23. Identify overcurrent protective device selection criteria
24. Identify the proper application of electrical testing equipment
25. Demonstrate procedures for the safe and proper use of electrical test equipment including:
    a. Voltage testers
    b. Multimeters
    c. Amp probes
    d. Megohmmeters
    e. Circuit tracing equipment
26. Demonstrate the application of oscilloscopes in power application circuits

**Student Assessment Methods:**

Lab assignments, worksheets, papers, and tests.

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

Web research, videos, interactive PC based learning modules, lab facilities and equipment

**Outline or Statement of Major Course Content:**

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

Laptop Computer Lease

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

None

**Approvals:**

| Body | Representative Signatures | Date |
|---|---|---|
| Curriculum Committee | | |
| Faculty Association | | |
| Academic Affairs Standards Committee | | |
| Chief Academic Officer | | |

**Distribution**: Original – Administrative Office
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**Revised**: October 2006