## Minnesota State University Moorhead

# CM 254: Mechanical/Electrical Systems

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 35

Lab Hours/Week: 20

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

A study of mechanical and electrical construction, emphasizing principles of heating, cooling, ventilation, water supply, waste disposal, electrical distribution and code requirements.

## B. COURSE EFFECTIVE DATES: 08/22/2011 - Present

## C. OUTLINE OF MAJOR CONTENT AREAS

- 1. Students will be able to identify and understand fundamental terminology used by construction professionals in describing mechanical and electrical environmental systems.
- 2. Students will be able to identify common HVAC, plumbing and electrical equipment and their applications.
- 3. Students will examine the fundamental principles of building energy, the requirements for human occupied space comfort, and the effects of climate on structures.
- 4. Students will examine and have the ability to calculate the properties of moist air using available software.
- 5. Students will understand and have the ability to calculate heating and cooling requirements for a simple building structures using available software.
- 6. Students will be able to analyze and calculate code requirements for the use of water and the removal of waste water in a simple structure.
- 7.

Students will recognize the use of electrical energy, lighting and communication systems within a building.

- 8. Understand electrical transmission to and distribution within a building.
- 9. Students will be able to conceptually design the complete HVAC, plumbing and electrical building environmental system for a simple structure. This will include the determination of all equipment requirements and sizing of major components.
- 10.

Students will complete a quantity survey for a simple building is mechanical and electrical environmental control system.

11. Students will be able to interpret construction document specifications requirements construction documents related to the installation of a complex building environmental control system.

### **D. LEARNING OUTCOMES (General)**

- 1. The student can apply oral, written, graphic and, listening skills to enhance the communication process.
- 2. The student will apply scientific knowledge to applications of applied mechanics, engineering design fundamentals, and associated mathematics to the construction practices and processes.
- 3. The student can demonstrate knowledge of the science of materials and methods of construction as they apply to the Construction Specifications Institute (CSI) Divisions designated for the construction industry.
- 4. The student can demonstrate estimating skills including interpreting plans, construction documents, performing quantity take-offs, analyzing productivity and pricing, identifying appropriate codes, identifying site conditions, applying value engineering, and developing detailed project proposals and documentation necessary for construction job acquisition and completion.
- 5. The student will demonstrate knowledge of overall field administration at the construction site including developing a site plan, evaluating vendors and subcontractors, processing payment applications, maintaining field records such as purchase orders, change orders subcontract agreements, shop drawings, as-built drawings, daily job reports, and construction reports.

#### E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

#### F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

#### **G. SPECIAL INFORMATION**

None noted