

Heartland Community College

Master Course Syllabus

Division name: Career and Technical Education
Course Prefix and Number: MAIN 201
Course Title: Electrical Wiring and Maintenance

DATE PREPARED: August 25, 1994
DATE REVIEWED: November 2020
DATE REVISED: October 1, 2020

PCS/CIP/ID NO: 12-470303

IAI NO. (if available):
EFFECTIVE DATE OF FIRST CLASS: January, 2021

CREDIT HOURS: 3
CONTACT HOURS: 4
LECTURE HOURS: 2
LABORATORY HOURS: 2

PREREQUISITE:
-Completion of MAIN 101

CATALOG DESCRIPTION:

Electrical Wiring and Maintenance covers electrical safety and components including principles of installation of electrical circuits within a facility. You will learn about the principles of component selection, as well as installation and maintenance of electrical distribution, application, and control systems.

TEXTBOOK:

Instructors for this class should use the following textbooks/online resources or comparable text/online resource that addresses at a minimum the topics listed in the Course Outline and that provides students with the opportunity to achieve the learning outcomes for this course:

Amatrol Learning Content (available via activation codes)

RELATIONSHIP TO ACADEMIC DEVELOPMENT PROGRAMS AND TRANSFERABILITY:

Electrical Wiring and Maintenance was designed to meet the specific needs of an Associate of Applied Science degree and not necessarily as a transfer course, particularly in relation to the Illinois Articulation Initiative. This course may transfer to various institutions in a variety of ways. Please see an academic advisor for an explanation concerning transfer options.

LEARNING OUTCOMES:

Course Outcomes	Essential Competencies	Range of Assessment Methods
1. Identify the basic Articles of the National Electrical Code		Exams/Quizzes Assignments
2. Interpret electrical prints and diagrams	PS/CT T	Exams/Quizzes Assignments Labs
3. Identify safe procedures to wire up electrical distribution, application, and control systems	PS/CT T	Exams/Quizzes Assignments
4. Physically demonstrate proper safety while wiring up electrical distribution, application, and control systems	PS/CT T	Labs
5. Select, install, and test electrical circuit protection	PS/CT T	Labs
6. Identify basic attributes of electrical wiring components		Assignments Labs
7. Evaluate faulty electrical distribution, application, and control systems; recognize and correct the fault to be compliant within NEC standards	PS/CT T	Assignments/ Final project
8. Research and apply, along with reflect and share, in written form, information about industrial technology as it relates to the student's field of study	C	Assignments

ESSENTIAL COMPETENCIES:

Communication (C) - Students communicate effectively.

Problem Solving/Critical Thinking (PS/CT) - Students think critically to solve problems or explore issues.

Technology (T) - Students appropriately utilize technology.

PROGRAM OUTCOME(S):

- Troubleshoot and repair electronic and mechanical systems. (MAIN 101, MAIN 102, MAIN 201, MAIN 202)
- Develop specialized technical skills in one or more areas (Design & Fabrication, Construction, Electronics, Renewable Energy, Facilities Maintenance, Industrial Maintenance, and/or Welding).

COURSE/LAB OUTLINE:

1. Electrical protection and safety
2. Power needs for industrial and building electrical machines and systems
3. Motor electrical loads and overload protection
4. Electrical distribution, application, and control systems
5. Electrical circuits for a building environment
6. Wiring sizing and methods for distributed energy systems
7. Switches, junction boxes and conduit
8. Light fixtures
9. NEC articles including, but not necessarily limited to:
 - a. 100 (Definitions)
 - b. 210 (Branch Circuits)
 - c. 215 (Feeders)
 - d. 220 (Branch-Circuit, Feeder, and Service Load Calculations)
 - e. 230 (Services)
 - f. 300 (General Requirements for Wiring Methods and Materials)
 - g. 310 (Conductors for General Wiring)
 - h. 430 (Motors, Motor Circuits, and Controllers)
 - i. 690 (Solar Photovoltaic (PV) Systems)
 - j. 694 (Wind Electrical Systems)
10. Wiring motors and panels

METHOD OF EVALUATION (Tests/Exams, Grading System):

Assessment Method	% of Final Grade
Exams/Quizzes	20-40%
Labs	20-40%
Assignments (may include a Final Project)	20-40%
TOTAL	100%

Course grades will be determined by the use of the following grading scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	Below 60%

REQUIRED WRITING AND READING:

Documentation is an important part of this course. All labs are to include descriptive comments within the write-up/answer section relating to each lab. Students will be expected to read assigned selections from the textbook and or labs, articles or other course related materials, at a minimum of 25 pages per week. Estimate is based on a 16-week course schedule. Please note if your class is not a 16-week class your weekly reading assignment will be increased. There is no formal research or writing assignments in this course. However, discipline specific writing and documentation is an important part of these courses, therefore discipline appropriate writing/reading methods will be taught and used in this course.

SAMPLE COURSE CALENDAR:

This sample course calendar is provided to guide instructors; each instructor will modify to suit.

Week	Topic
0	Orientation
1	Introduction to Electrical Wiring Control Segment 1 - Electrical Prints
2	Introduction to Electrical Wiring Control Segment 2 - Electrical Panels
3	Introduction to Electrical Wiring Control Segment 3 - Panel Wiring Fundamentals
4	Introduction to Electrical Wiring Control Segment 4 - Sizing Disconnects and Overcurrent Devices
5	Quiz #01 and Exam #01
6	Wiring Electrical Panels Segment 1 - Grounding Control Systems
7	Wiring Electrical Panels Segment 2 - Internal Panel Wiring
8	Wiring Electrical Panels Segment 3 - Wiring Between Electrical Panels
9	Wiring Electrical Panels Segment 4 - Wire Bundling
10	Wiring Electrical Panels Segment 5 - Wiring a Motor
11	Quiz #02 and Exam #02
12	Pneumatic Control Circuit Wiring Segment 1 - Introduction to Pneumatics
13	Pneumatic Control Circuit Wiring Segment 2 - Electro-Pneumatic Valves
14	Pneumatic Control Circuit Wiring Segment 3 - Pneumatic Schematics
15	Pneumatic Control Circuit Wiring Segment 4 - Electro-Pneumatic System Installation
16	Quiz #03 and Exam #03