



MASTER COURSE OUTLINE

A. ARET 1175 Industrial Electricity and Electronics I

B. COURSE DESCRIPTION:

This course is designed for all students in the Manufacturing & Engineering Technology courses of study. Through the use of modern training systems students will gain an understanding of how electrical principles apply to automated production machines, packaging machinery, and robots. Students will demonstrate their ability to apply knowledge of electrical principles to increase sustainability and energy efficiency in a manufacturing environment. Through extensive hands-on use of digital meters and electrical tools students will be given the opportunity to perform wiring and setup operations and to troubleshoot electrical circuits. This course is part of a sequence of courses leading to Packaging Machinery Manufacturers Institute (PMMI) Industrial Electricity Certification.
(3 Cr – 2 lect, 1 lab)

C. Core Theme: Critical Thinking

D. RIVERLAND INSTITUTIONAL LEARNING OUTCOMES:

This course addresses the following Riverland Institutional Learning Outcome(s):

- ILO 1: critical thinking (*Core Theme Goal 2*)
- ILO 2: awareness of the larger global community (*Core Theme Goal 7 or 8*)
- ILO 3: ethical, engaged citizenship (*Core Theme Goal 9 or Goal 10*)
- ILO 4: communication and collaboration (*Discipline Goal 1 and by any learning outcome(s) involving communication or collaboration*)

E. MAJOR CONTENT AREAS:

- DC and AC circuits
- Circuit protection devices
- Electrical system components
- Power distribution
- Energy forms conversion processes
- Electrical measurement units, equations, tools, and calculations
- Electrical safety standards
- Energy systems circuits and devices
- Power management
- Ohm's law
- Kirchhoff's law
- Series, parallel, and series/parallel circuits

- Electrical schematics
- Electrical trouble-shooting techniques
- Electricity and electrical circuits to automation equipment
- Electrical output devices
- Power and circuit protection in series and parallel circuits
- Electromagnetism, inductance, and capacitance in automation circuits

F. GOAL TYPE, OBJECTIVES, AND OUTCOMES:

<u>GOAL TYPE</u>	<u>OBJECTIVES</u> Students will be able to	<u>OUTCOMES</u> The student will successfully
<u>**Critical Thinking</u>	gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive, and conscious of possible bias in the information selected.	<ol style="list-style-type: none"> 1. critique electromagnetism, inductance, and capacitance in automation circuits. 2. critique the differences between series, parallel and series/parallel circuits.
<u>CS</u>	define the operation of five types of electrical output devices.	<ol style="list-style-type: none"> 1. analyze the operation of electrical components. 2. apply electricity and electrical circuits to automation equipment. 3. explain the importance of power management.
<u>CS</u>	recognize automation circuits.	<ol style="list-style-type: none"> 1. identify the electromagnetism, inductance and capacitance in circuits. 2. analyze electrical schematics.
<u>CS</u>	recognize the importance of power management.	<ol style="list-style-type: none"> 1. articulate the safe, reliable, efficient and compliant operation of electrical distribution systems. 2. describe Ohm's law. 3. describe Kirchoff's law.

G. SPECIAL INFORMATION:

This course may require use of the Internet, the submission of electronically prepared documents and the use of a course management software program. Students who have a disability and need accommodations should contact Accessibility Services at the beginning of the semester. This information will be made available in alternative format, such as Braille, large print, or current media, upon request.

H. COURSE CODING INFORMATION: Course Code S/Class Maximum 24; Letter Grade

Revision date:

AASC Approval date: 02/15/22

*Riverland Community College Disciplines	MnTC Goal Number
Communication (CM)	1
Natural Sciences (NS)	3
Mathematics/Logical Reasoning (MA)	4
History and the Social & Behavioral Sciences (SS)	5
Humanities and Fine Arts (HU)	6

**Riverland Community College Core Themes	MnTC Goal Number
Critical Thinking (CT)	2
Human Diversity (HD)	7
Global Perspective (GP)	8
Ethical and Civic Responsibility (EC)	9
People and the Environment (PE)	10

*These five MnTC Goals have been identified as Riverland Community College Disciplines.

** These five MnTC Goals have been identified as Riverland Community College Core Themes.

NOTE: The Minnesota Transfer Curriculum “10 Goal Areas of Emphasis” are reflected in the five required discipline areas and five core themes noted in the Riverland Community College program of study guide and/or college catalog.