



## MASTER COURSE OUTLINE

A. ELEC 2703 Electric Motor Controls I

B. COURSE DESCRIPTION:

This course introduces the basic construction and operation of motor control equipment, including different types of electrical diagrams, protective devices, application and connection of controls for single-phase and three-phase alternating current (AC) motors. Prerequisite: ELEC 1746. Co-requisite: ELEC 2745 and ELEC 2701.  
**(3 Cr – 1 lect, 2 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:

- Basic principles of motor controllers
- Motor control symbols and diagrams
- Manual and magnetic devices
- Types of control devices
- Variable frequency drives

F. GOAL TYPE, OBJECTIVES, AND OUTCOMES:

| <u>GOAL TYPE</u>          | <u>OBJECTIVES</u>  | <u>OUTCOMES</u>   |
|---------------------------|--|---|
|                           | <b>Students will be able to</b>  | <b>The student will successfully</b>  |
| <u>*Critical Thinking</u> | analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them. | 1. demonstrate the basic principles of different motor controllers.<br>2. identify symbols, diagrams, and types of control devices. |
| <u>CS</u>                 | understand basic principles of motor controllers.  | 1. demonstrate basic understanding of motor controllers.  |
| <u>CS</u>                 | understand electrical symbols and different types of electrical diagrams.  | 1. demonstrate knowledge of electrical symbols and diagrams.  |

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|-----------|---|--|
|           |   | 2. draw line diagrams of motor control circuits.   |
| <u>CS</u> | understand and apply applications, operation and connections of manual and magnetic motor starters.                                   | 1. wire and connect manual and magnetic starters.  |
| <u>CS</u> | understand applications, operation and connections of pilot control devices such as relays, timers, switches and pushbutton stations. | 1. wire and connect pushbutton stations, selector switches, relays, and timers.  |
| <u>CS</u> | understand the principles and control of variable frequency drives.   | 1. connect a variable frequency drive with a single phase power source, convert the power to a three phase motor, and control the speed of the motor.<br>2. install a three phase variable frequency drive with a three phase motor. |

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: 11/25/19; 03/03/26

AASC Approval date: 11/18/14; 12/17/19; 03/17/26

\*These five MnTC Goals have been identified as Riverland Community College Core Themes. Every course in the Riverland Community College curriculum shall meet outcomes from one of these themes.

\*\*These five MnTC Goals have been identified as Riverland Community College Disciplines. Riverland's MnTC courses also shall meet outcomes from a Discipline Area.

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.

| <b>*Riverland Community College Core Themes</b> | <b>MnTC Goal Number</b> |
|---|-------------------------|
| Critical Thinking (CT)                          | 2                       |
| Human Diversity (HD)                            | 7A, 7B, 7A/B            |
| Global Perspective (GP)                         | 8                       |
| Ethical and Civic Responsibility (EC)           | 9                       |
| People and the Environment (PE)                 | 10                      |

| <b>**Riverland Community College<br/>Discipline Areas</b> | <b>MnTC Goal<br/>Number</b> |
|---|-----------------------------|
| Communication (CM)  | <b>1</b>                    |
| Natural Sciences (NS)                                     | <b>3</b>                    |
| Mathematics/Logical Reasoning (MA)                        | <b>4</b>                    |
| History and the Social & Behavioral<br>Sciences (SS)      | <b>5</b>                    |
| Humanities and Fine Arts (HU)                             | <b>6</b>                    |

Riverland