

AC/DC Motor Controls (INTC 1457)



Credit: 4 semester credit hours (3 hours lecture, 4 hours lab)

Prerequisite/Co-requisite: CETT 1403 and 1405

Course Description

A study of electric motors and motor control devices common to a modern industrial environment. A presentation of motor characteristics with emphasis on starting, speed control, and stopping systems.

Required Textbook and Materials

1. *Electrical Motor Controls 5th Edition* by Gary J. Rockis & Glen A. Mazur
 - a. ISBN number is 9780826912268
2. *Electrical Motor Controls 5th Edition Workbook*
 - a. ISBN number is 9780826912275
3. Scientific calculator
4. Notebook.

Course Objectives

Upon completion of this course, the student will be able to:

1. Describe the types of electric motors.
2. Explain the operation and function of various motor control devices.

Course Outline

- A. Introduction
 1. Introduction of faculty and students
 2. Review Syllabus
 3. Review Class Policies
 4. Review Lab Assignment
- B. Electrical Tools and Test Instruments
 1. Tools
 2. Electrical Test Instruments
- C. Electrical Safety
 1. Electrical Safety
 2. Personal Protective Equipment
 3. Lockout/Tagout
 4. Lockout Devices
 5. Fire Safety
 6. Confined Spaces
- D. Electrical Symbols and Diagrams
 1. Language of Control
 2. Electrical Circuits
- E. Control Logic

INCR 1457
Course Syllabus

1. Basic Rules of Line Diagrams
2. Signals, Decisions, and Actions
3. Logic Functions
4. Common Control Circuits
5. Control Circuit Troubleshooting
- F. Solenoids, DC Generators, and DC Motors
 1. Magnetism & Electromagnetism
 2. Solenoids, Characteristics, Selection, and Applications
 3. DC Generators
 4. DC Motors
- G. AC Generators, Transformers, and AC Motors
 1. AC Generators
 2. Transformers
 3. AC Motors
 4. Maintenance and Troubleshooting
- H. Power Distribution Systems
 1. Power Distribution Systems
 2. Troubleshooting PDS
- I. Contactors and Magnetic Motor Starters
 1. Manual Switching
 2. Magnetic Contactors
 3. Magnetic Motor Starters
 4. Modifications
 5. Troubleshooting
- J. Reversing Motor Circuits
 1. Manual Starters
 2. Drum Switches
 3. Magnetic Starters
 4. Wiring Methods
 5. Troubleshooting
- K. Timing and Counting Functions
 1. Timers
 2. Timing Functions
 3. Wiring Diagrams
 4. Counters
 5. Troubleshooting

Grade Scale

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Course Requirements

1. Apply Ohm's law and the power formula to determine expected circuit values.
2. Identify types of electrical tools.
3. State the reason for grounding.

INCR 1457
Course Syllabus

4. Identify electrical symbols in electrical power and control circuits.
5. Wire up a control circuit by following a line diagram.
6. Connect a dual-voltage wye-connected motor for high and low voltage.
7. Connect a dual-voltage delta-connected motor for high and low voltage.
8. Troubleshoot a Hand/Off/Auto circuit.
9. Hard wire and troubleshoot a reversing motor circuit.
10. Apply On-delay and Off-delay timers and troubleshoot timer circuits.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the online resource:

<http://www.lit.edu/depts/stuserv/special/defaults.aspx>

Student Code of Conduct Statement

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the *LIT Catalog and Student Handbook*. The *LIT Catalog and Student Handbook* may be accessed at www.lit.edu or obtained in print upon request at the Student Services Office.

Course Schedule

Week	Topic	Reference
1	Course introduction, policies, and safety. <ul style="list-style-type: none">• Lecture• Lab: Examine Tools and Test Instruments	Handouts Chapters 2 & 3
2	Electrical symbols and diagrams <ul style="list-style-type: none">• Lecture• Lab: Workbook exercises• Test 1	Chapter 4
3/4	Control Logic <ul style="list-style-type: none">• Lecture• Lab: Motor Starting with memory and overload protection..• Workbook excersises; Not,Nand, Nor,And, Or, Combo & Memory	Chapter 5
5/6	Solenoids, DC generators & DC motors	Chapter 6

INCR 1457
Course Syllabus

Week	Topic	Reference
	<ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises and Workbook exercises 	
7/8	AC generators, Transformers & AC motors <ul style="list-style-type: none"> • Lecture • Lab: Wire Wye and Delta Motors • Test 2 	Chapter 7
9/10	Power Distribution <ul style="list-style-type: none"> • Lecture • Lab: Workbook Exercises 	Chapters 8
11/12	Contactors and Motor Starters <ul style="list-style-type: none"> • Lecture • Lab: Workbook Exercises • Test 3 	Chapter 9
14	Reversing Motor Circuits <ul style="list-style-type: none"> • Lecture • Lab: Workbook exercises 	Chapter 12
15	Timing and Counting Functions <ul style="list-style-type: none"> • Lecture • Lab: Workbook exercises • Test 4 	Chapter 14
16	Review for Final Exam	All Chapters