Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: AET
Course and Section #: AET-1280-001
Course Title: Electrical Motor Control
Credits: 4

Course Description

Covers installation, troubleshooting, preventive maintenance, and theory on DC/AC motors, generators, and associated industrial control circuitry. Expands on ladder logic, controls, sensors, motor starters, overloads, and electronic devices used to control and protect DC/AC Machines. Describes three phase systems, transformers, and delta-wye connections. Introduces AC variable speed drives. Supports hands-on labs and projects

Course Attributes

This course has the following attributes:

☐ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☒ Discipline Core Requirements in Program
☐ Elective Core Requirements in Program
☐ Open Elective

Other: *Click here to enter text.*

Instructor Information

Instructor Name: Scott L. Searle - Lecturer

Student Learning Outcomes

1. Analyze the operation of DC and AC motors.
2. Describe DC and AC Motors and their associated control circuitry.
3. Create operationally correct logic and ladder diagrams.
4. Use sensing devices, timers, relays, solenoids, and starters to design industrial control circuitry.
5. Troubleshoot electrical motor control circuitry.
6. Analyze three phase electrical and transformer connections.

Course Materials and Texts

Electrical Motor Control for Integrated Systems Workbook 5th Edition
Electrical Motor Control for Integrated Systems Text 5th Edition

Course Requirements

Course Assignments, Assessments, and Grading Policy

- Homework: Weekly practice problems related to topics under study. (20% of overall grade)
- Attendance: Attendance is very important, there are discussions in class and on the board (20% of overall grade)
- Exams: Eleven unit exams that are similar to problems from homework or discussed in class. Exams are open book, open notes, and taken in class. (20% of overall grade)
- Final Exam: A comprehensive exam that covers all course topics. (30% of overall grade)

A = 95-100	B - = 80-82	D+ = 67-69
A - = 90-94	C+ = 77-79	D = 63-66
B+ = 87-89	C = 73-76	D- = 60-62
B = 83-86	C - = 70-72	F = 0-59

Required or Recommended Reading Assignments

All required readings use chapters from the course text that align with the lectures below.

General Description of the Subject Matter of Each Lecture or Discussion

Chapter 8: Direct-Current Motors – (Adams Book)
A DC motor is a machine that converts electric energy to mechanical energy.

Chapter 11: Direct Current Motor Controls – (Adams Book)
On a constant voltage system, control is provided for each individual motor operating on a constant-voltage line.

Chapter 14: Transformers – (Adams Book)
The transformer has led to alternating – current systems replacing direct -current systems for most residential, commercial, and industrial applications.

Chapter 2: Symbols and Diagrams
Identify the differences between pictorial drawings, wiring diagrams, schematic, line, block, and flow charts.

Chapter 5: Control Logic
Before a load turns ON, there must be a control circuit that determines just how, when, and what environment and operating conditions must occur for that to happen.

Chapter 6: Mechanical Input control Devices
Industrial Pushbuttons, Selector Switches, Temperature Switches, Flow Switches, preventing problems when installing control devices.

Chapter 7: Electromagnets, Solenoids
Solenoids are the devices used to convert electrical energy into a linear mechanical force.

Chapter 8: Electro-mechanical Relays
Relays amplify small voltage input results in large output.

Chapter 9: DC Generators
DC generators consist of field windings, armature, a commutator and brushes.

Chapter 10: AC Generator
AC generators consist of field windings, an armature(coil), slip rings and brushes.

Chapter 11: Transformer
Transformers are used to increase voltage to high levels for transmission across the country and then decrease to a low level for use by electrical loads.

Chapter 12: Contactors and Magnetic Motors Starters
Motor starters are used to control and provide running protection for motors.

Chapter 13: DC Motor operation
DC motors consist of field windings, an armature, commutator, and brushes that makes contact with the successive copper bars of the commutator as the shaft, armature, and commutator rotate.

Chapter 14: AC Motors
Alternating current (AC) motors are the most common type of motor used to produce work

Chapter 15: Reversing Motors
Some motor applications require the motor to operate in only one direction and other applications require the motor to be reversible.

Chapter 16: Timing and Counting Functions
Time-and count-controlled events are electronically controlled by timers and counters.

Chapter 19: Reduced Voltage Starting Circuits
Reduced voltage starting reduces the amount of current a motor draws on when starting.

Chapter 21: Semiconductor Input Devices
Semiconductor input devices are often referred to as transducers.

Chapter 26: Motor Drives
motor drives can turn a motor on and off and provide overload protection from high operating currents.

Chapter 28: Power Distribution and Smart Grid Systems
Power distribution system operates, problems that may occur along the system, how measurements are taken.

Chapter 30: Predictive Maintenance
The understanding of electrical theory, components, and circuits

Required Course Syllabus Statements

Generative AI
This class will take the opportunity to utilize AI training, and any knowledge gained for AI training. This course requires you to complete assignments that assess your understanding and application of the material. You are expected to do your own work, and the use of artificial intelligence (AI) tools, such as chatbots, text generators, paraphrasers, summarizers, or solvers, is strictly prohibited for any part of your assignments. Using these tools will be considered academic dishonesty and will be handled according to the university's policy. If you have questions about acceptable use of AI tools, please consult the instructor before submitting your work.

Using Remote Testing Software
☒ This course does not use remote testing software.

☐ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may require the microphone be on while taking an exam, or may require other practices to confirm academic honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities
Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity
At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX

Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation

UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.

To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.