



Reedley College
State Center Community College District
MFGT-92-56093 Motor Controls 2

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CLASS MEETING:
Tuesdays and Thursdays, 6:00 pm – 8:30 pm
January 11th – March 11th
Location: Reedley College
995 North Reed Ave
Reedley, CA 93654

Room: AER 3

Syllabus Spring 2016

Course Title: MFGT-92-56093 Motor Controls 2

Prerequisite: Manufacturing Technology 91 Motor Controls 1

Course Description: The study of intermediate motor controls found in commercial/manufacturing use and the methods used to diagram, wire, operate, and troubleshoot intermediate motor controls and accessories in a safe manner.

Instructional Materials:

Textbook: Electrical Motor Controls 5th Edition
Workbook: Electrical Motor Controls Workbook 5th Ed
Recommended: Ugly's for Electric Motors and Controls

ISBN: 978-08269-1226-8

ISBN: 978-0-8269-1218-3

ISBN: 978-0-7637-7254-3

Student Supplied Materials:

1. Notebook
2. Graph paper
3. Calculator
4. Writing instruments

Methods of Instruction:

1. Lecture/Discussion, Classroom samples and demonstration
2. In class wiring assignments
3. Hands-On Practice

Methods of Evaluation:

1. Student will pass safety exam with 70% or better proficiency
2. Homework / Class work
3. Written exams in all areas of course content
4. Practical lab assignments and wiring
5. Class participation and attendance



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

- A. Identify types of motors and their characteristics.
- B. Identify control system components such as solid state devices, sensing devices, and motor controls.
- C. Design motor control circuits such as start stop circuits, holding circuits, and motor overload circuits.
- D. Diagram and document motor control circuits that have been designed.
- E. Assemble motor control system components using safe practices into working, fully operational subsystems in a lab environment.

Lecture Content:

- 1. Review
 - a. Electrical fundamentals
 - b. Using test instruments
 - c. Safety
- 2. Transformers
 - a. Principles of operation
 - b. Buck / Boost
 - d. Connections
- 3. Motors
 - a. DC
 - b. AC
 - c. Design considerations
- 4. Loads and Torque Requirements
 - a. Variable torque
 - b. Constant torque
 - c. Constant HP
- 5. Contactors and Magnetic Starters
- 6. Reversing & 2 Speed Starters
- 7. Timers & Counters
 - a. TON
 - b. TOF
 - c. RTO
- 8. Semiconductor Input Devices
 - a. NPN
 - b. PNP
- 10. Electronic Motor Drives
 - a. DC / SCR
 - b. VFD
 - 1. PWM
 - c. V/Hz – Sensor less Vector – Closed Loop Vector
 - d. External I/O

Lab Content:

1. Transformers
2. Load Calculations
3. 3 wire / memory control
4. Multi-station wiring – 3 wire control
5. Multi-contactor control for multiple motors
6. Jog Circuits
 - a. Shared operators – Run/Jog Switch
 - b. Separate Jog buttons
7. VFD Local Operation Lab
8. VFD Remote Operation Lab
9. VFD Sensor Lab
10. VFD Relay & Starter Lab

ATTENDANCE:

- Arrive on time and prepared to attend class.
- Campus policy requires all students who miss 2 consecutive weeks before the add/drop deadline must be dropped. (2 class sessions for a 9 week class)
- Campus policy requires students who have nonconsecutive absences which total the equivalent of two or more weeks are subject to being dropped. (2 class sessions)
- Two tardies are equivalent to ONE absence. If you are tardy you must check with the instructor to ensure you are not marked absent.
- Contact the instructor if you know you will be missing two classes.

GRADING PROCEDURE:

Grades are based on your combined points earned in Lab and Lecture:

- | | |
|-----------------------|--------------|
| • Homework | 20% of grade |
| • Lab work | 40% of grade |
| • Tests | 20% of grade |
| • Class Participation | 20% of grade |

Grades are calculated on the total amount of points available.

100%-90% =A 89%-80% =B 79%-70% =C 69%-60% =D 59%-0% =F

NOTE:

- Tests cannot be made up but may be taken early if required.
- Cell phones are off and out of site during tests.
- Computers are to remain off during tests.
- Homework will have an announced due date.
- Homework & assignments will be deducted 1 grade equivalent for per day late.
- Students are expected to arrive at class on time and be prepared.
- Reading assignments and essays will be announced, stay current with lectures.
- Class participation is essential to earning a passing grade.
- Cell phones and pagers are strictly prohibited. If family or work requires you have your cell phone on then place in vibrate or silent mode and text or take call outside.

ACADEMIC DISHONESTY:

Students at Reedley College are entitled to the best education that the college can make available to them, and they, their instructors, and their fellow students share the responsibility to ensure that this education is honestly attained. Because cheating, plagiarism, and collusion in dishonest activities erode the integrity of the college, each student is expected to exert an entirely honest effort in all academic endeavors. Academic dishonesty in any form is a very serious offense and will incur serious consequences.

CHEATING:

Cheating is the act or attempted act of taking an examination or performing an assigned, evaluated task in a fraudulent or deceptive manner, such as having improper access to answers, in an attempt to gain an unearned academic advantage. Cheating may include, but is not limited to, copying from another's work, supplying one's work to another, giving or receiving copies of examinations without an instructor's permission, using or displaying notes or devices inappropriate to the conditions of the examination, allowing someone other than the officially enrolled student to represent the student, or failing to disclose research results completely.

PLAGIARISM:

Plagiarism is a specific form of cheating and is the use of another's words or ideas without identifying them as such or giving credit to the source. Plagiarism may include, but is not limited to, failing to provide complete citations and references for all work that draws on the ideas, words, or work of others, failing to identify the contributors to work done in collaboration, submitting duplicate work to be evaluated in different courses without the knowledge and consent of the instructors involved, or failing to observe computer security systems and software copyrights.

Incidents of cheating and plagiarism may result in a variety of sanctions and penalties that may range from a failing grade on the particular examination, paper, project, or assignment in question to a failing grade in the course, at the discretion of the instructor and depending on the severity and frequency of the incidents.

Disabled Students Programs and Services (DSP&S):

Reedley College offers services designed to assist students with disabilities in their pursuit of a community college education. Such students are assigned to a disabled student counselor, who can arrange such services as college program planning, vocational career information, priority registration, special parking permits, learning disabilities testing, interpreters for the deaf, note takers and other appropriate supportive services. Students will develop a specialized educational contract. The student with a disability seeking admission to Reedley College must meet the following levels of independence:

1. The ability to negotiate the campus facilities independently or with the assistance of an attendant (to be provided by the student);
2. The ability to take care of his/her personal needs independently or with assistance of a personal attendant; and
3. The possession of a stable level of health in order to benefit from a full semester's work.

Each student with a disability must sign an authorization at the time of registration which would allow Reedley College, in the absence of a personal attendant, to seek emergency medical treatment and/or ambulance services in the event it is deemed necessary by Reedley College. (All costs associated with such medical treatment/transportation are the sole responsibility of the student.) Medical verification of disability must be provided to the Disabled Students Programs & Services office to qualify for any of the following supportive services:

1. Special classes
2. On campus mobility assistance
3. Use of special equipment (i.e., tape recorders and adaptive software)
4. Alternate media production
5. Special parking permit
6. Priority registration
7. Interpreters for the deaf
8. Note takers
9. Liaison/Referral with community agencies
10. Test taking accommodations

Architectural barriers have been eliminated through the use of low gradient ramps and automatic doors. The college maintains relationships with the Department of Rehabilitation, California Association for the Physically Handicapped and similar agencies. Call 442-8237 for additional information.

State Center Community College District (SCCCD) Policy Statement:

Once a student enrolls in courses on a campus of the State Center Community College District, that individual accepts both the rights and responsibilities associated with that enrollment. The State Center Community College District exists to educate individuals in our community. All other considerations are secondary. The district will not infringe on anyone's constitutional rights and the right to dissent and to protest. However, the right to dissent and to protest must not be construed as a right to disrupt operation of the institution. No individual or group can be permitted to infringe on the rights of others to secure an education.

These conduct standards, and Administrative Regulation 5520 which defines discipline procedures, apply to all students who are enrolled in courses offered by either college of the State Center Community College District. Any student will be subject to discipline who, in any way:

1. Prevents other students from pursuing their authorized curricular or co-curricular interests;
2. Interferes with or disrupts faculty and administrators who are fulfilling their professional responsibilities;
3. Prevents classified employees from fulfilling their prescribed duties;
4. Disrupts presentations by authorized guests; or
5. Deliberately endangers the safety of persons, or the security of college property.

Holidays and Breaks:

MLK Day	January 18
Lincoln Day	February 12
Washington Day	February 15
Spring Break	March 21-24