

7700011

TROUBLESHOOTING MOTORS AND CONTROLS

COURSE INFORMATION

Credits: 2

PREREQUISITES AND/OR COREQUISITES

A minimum of C in 7700005 Motors and Controls, and 7700006 Instrumentation

COURSE DESCRIPTION

This class emphasizes the many facets of troubleshooting in today's manufacturing and processing facilities. Specific topics will include electrical safety, various troubleshooting techniques for industrial controls, motors, power distribution, plant lighting, photo and proximity sensors, and solenoid valves. Extensive laboratory exercises using industrial-grade components will enhance classroom studies.

COURSE GOALS

This course will:

1. Explain the various methods of troubleshooting
2. Offer hands on troubleshooting training using advanced meter skills
3. Strengthen industrial component troubleshooting methods
4. Develop electrical and mechanical motor troubleshooting skills
5. Identify Power Distribution potential trouble spots and correction measures
6. Sharpen troubleshooting skills in industrial lighting and plant lighting systems
7. Provide understanding and testing methods for many solenoid-operated valves
8. Develop troubleshooting techniques for Industrial electric heating elements
9. Explain troubleshooting of mechanical and solid state switches and sensors

STUDENT LEARNING OUTCOMES

- I. Troubleshooting methods and procedures
 - A. Safety in working on electrical systems
 - B. Safety in working around machinery
 - C. Diagnostic Equipment symptoms
 - D. Troubleshooters responsibilities
- II. Metering
 - A. Measurement precautions
 - B. Meter symbols
 - C. Various test meters
 - D. Specialty meters

- III. Relay and Starter Troubleshooting
 - A. Electromechanical Relays
 - B. Solid-state relays
 - C. Contactors
 - D. Overloads
- IV. Troubleshooting motor problems
 - A. Motor variables
 - B. Mechanical problems
 - C. Troubleshooting DC motors
 - D. Troubleshooting AC motors
- V. Power distribution troubleshooting
 - A. Power quality issues
 - B. Transformer loading
 - C. Transformer connections
 - D. Harmonics
- VI. Troubleshooting Lighting Circuits
 - A. Fluorescent lighting
 - B. HID lighting
- VII. Solenoids and heating elements
 - A. Troubleshooting valves
 - B. Troubleshooting various heating elements
- VIII. Mechanical and solid-state switches
 - A. Mechanical limit switches
 - B. Solid-state switches
 - C. Protecting switching contacts
 - D. Protecting pressure and level switches

COURSE MATERIALS

Troubleshooting Electrical/Electronic Systems 3rd edition, Glen A. Mazur, American Technical Publishers, ISBN# 978-0-8269-1791-1 and, Troubleshooting Electrical/Electronic Systems Workbook 3rd edition, Glen A. Mazur, American Technical Publishers, ISBN#978-0-8269-1793-5

GRADING CRITERIA

Students can expect to be graded on Written Assignments, Quizzes, Tests, Lab Activities, and Attendance. There is currently no scheduled time available to makeup classes or labs that are missed.

PARTICIPATION/ATTENDANCE POLICY

Students can expect that attendance/participation will be a part of their final grade, and determined by the instructor at his/her discretion. Students are encouraged to attend every class as regular attendance as it contributes to successful course completion and will impact the final grade.

COURSE EXPECTATIONS

For successful completion of this course, students are expected to Read Course Material, Complete all Assignments, Take Notes, Study and Participate in classroom discussions.

ACADEMIC INTEGRITY AND CONDUCT POLICY

The integrity of a class and program rests on the principle that the grades awarded to students must reflect only their own individual efforts and achievement. Students are required to perform the work specified by the instructor and are responsible for the content of work submitted, such as papers, reports, examinations, and other work. Violations of academic integrity include various types of plagiarism and cheating.

Plagiarism

Plagiarism includes, but is not limited to:

- Using exact words from a source without appropriate crediting
- Cutting and pasting electronically from any source without appropriate crediting
- Using wording and/or sentence structure too close to the original in paraphrasing
- Using visual images in whole or in part created by someone else without appropriate crediting
- Buying a paper and presenting any part of it as your own
- Borrowing any part of a paper and presenting it as your own without appropriate crediting
- Falsifying or inventing any information or citation in an academic exercise

Cheating

Cheating includes, but is not limited to:

- Obtaining or giving assistance in any academic work such as on quizzes, tests, homework, etc., without instructor's consent
- Taking a test or course or turning in work for someone else
- Allowing someone to take a test or course or turn in work in your name
- Using crib notes or electronic devices to get unauthorized assistance on tests or other in-class work
- Using work from another class or previous semester without instructor consent

CLASS CANCELLATION POLICY

Class meetings can occasionally be called off due to bad weather, check the local news and radio for information or call 319-296-4444 for the current status of college closings, class cancellations, delay start, or early dismissal information.

STUDENTS' SPECIAL NEEDS STATEMENT

Hawkeye Community College (HCC) strives for student-centered, quality education with flexibility to allow for students' special needs. Students with physical, mental, or learning disabilities should contact the Special Needs Coordinator in Student Services at 319-296-4014 or specialneeds@hawkeyecollege.edu to learn how to apply for accommodations at HCC. Or, visit our website for more information and forms: <http://www.hawkeyecollege.edu/students/services/student-disability-services/default.aspx>

NONDISCRIMINATION STATEMENT

Hawkeye Community College does not discriminate on the basis of sex; race; age; color; creed; national origin; religion; disability; sexual orientation; gender identity; genetic information; political affiliation; or actual or potential parental, family, or marital status in its programs, activities, or employment practices as required by Iowa Code §§ 216.6 and 216.9, Titles VI and VII of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d and 2000e), the Equal Pay Act of 1973 (29 U.S.C. § 206, et seq.), Title IX (Educational Amendments, 20 U.S.C. §§ 1681-1688), Section 504 (Rehabilitation Act of 1973, 29 U.S.C. § 794), and Title II of the Americans with Disabilities Act (42 U.S.C. § 12101, et seq.). Veteran status is also included to the extent covered by law. Any person alleging a violation of equity regulations shall have the right to file a formal complaint. Inquiries concerning application of this statement should be addressed to: John Clopton (Equity Coordinator and Title IX Coordinator for Employees) or Nancy Henderson (Title IX Coordinator for Students), Hawkeye Community College, 1501 East Orange Road, P.O. Box 8015, Waterloo, Iowa 50704-8015, telephone 319-296-4405, email: equity-titleIX@hawkeyecollege.edu, or the Director of the Office for Civil Rights, U.S. Department of Education, Citigroup Center, 500 W. Madison, Suite 1475, Chicago, IL 60661, phone number 312/730-1560, fax 312/730-1576.

DISCLAIMER

This syllabus is believed to be accurate at the time it was written. However, the instructor reserves the right to make changes as deemed necessary, provided notification is given to the students.

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