Electrical Troubleshooting (ELTN 1443)

Credit: 4 semester credit hours (3 hours lecture, 2 hours lab)

Prerequisite/Co-requisite: INMT 1305

Course Description
Instruction in the maintenance, theory of operation, troubleshooting, and repair of circuits of various residential, commercial, and industrial electrical systems.

Required Textbook and Materials
   a. ISBN number is 0-7645-4171-4.

Course Objectives
Upon completion of this course, the student will be able to:
1. Use multimeters to perform tests on electrical equipment (SCANS C3.3; C5.3; C6.2; C7.3; C12.1; C14.3; C15.3; C16.3; C17.3; C18.4; C19.4; C20.5; F1.3; F2.2; F3.5; F4.5; F5.4; F6.3; F7.4; F8.4; F9.5; F10.5; F11.4; F12.4; F13.5; F14.5; F15.3; F16.4; F17.5)
2. Discuss various types of circuits and electrical systems (SCANS C2.2; C3.5; C4.3; C5.5; C6.5; C7.4; C8.1; C11.2; C14.3; C15.5; C16.4; C17.5; C18.5; C19.5; C20.5; F1.3; F2.2; F3.5; F4.5; F5.4; F6.3; F7.5; F8.4; F9.5; F10.5; F11.4; F12.4; F13.5; F14.4; F15.3; F16.4; F17.5)
3. Demonstrate the proper way to test transformers and motors (SCANS C1.3; C2.3; C3.5; C5.4; C6.4; C7.4; C8.1; C13.1; C14.3; C15.5; C16.5; C17.4; C18.4; C19.4; C20.5; F1.2; F2.4; F3.5; F4.5; F5.4; F6.5; F7.5; F8.4; F9.5; F10.5; F11.4; F12.4; F13.5; F14.5; F15.3; F16.4; F17.5)
4. Identify a short circuit, open circuit, and a closed circuit (SCANS C1.3; C3.5; C4.2; C5.5; C6.5; C7.3; C8.2; C13.1; C14.3; C15.5; C16.5; C17.4; C18.4; C19.4; C20.5; F1.2; F2.4; F3.5; F4.5; F5.4; F6.5; F7.5; F8.4; F9.5; F10.5; F11.4; F12.4; F13.5; F14.5; F15.3; F16.5; F17.5)
5. Troubleshoot electric motors and control circuits. (SCANS C1.3; C2.3; C3.5; C5.4; C6.4; C7.4; C8.1; C13.1; C14.3; C15.5; C16.5; C17.4; C18.4; C19.4; C20.5; F1.2; F2.4; F3.5; F4.5; F5.4; F6.5; F7.5; F8.4; F9.5; F10.5; F11.4; F12.4; F13.5; F14.5; F15.3; F16.5; F17.5)

SCANS Skills and Competencys
Beginning in the late 1980’s, the U.S. Department of Labor Secretary’s Commission on Achieving Necessary Skills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job. In 1991 the Commission announced its findings in *What Work Requires in Schools*. In its

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research, the Commission determined that “workplace know-how” consists of two elements: foundation skills and workplace competencies.

**Course Outline**

I. Introduction and safety
   A. Introduce the Faculty
   B. Discuss basic electrical safety

II. Terminology
   A. Discuss basic terminology
   B. Demonstrate props

III. Electrical Code
   A. Discuss the electrical Code
   B. Discuss code of Beaumont

IV. Circuit specification- AC and DC
   A. Define AC
   B. Define DC

V. Amperage and voltage testing instruments
   A. Explain Voltage and Amperage
   B. Test on a DC sys.

VI. Electrical systems, voltage ranges and safety

VII. Transformers and motors
   A. How transformers work
   B. How motors work

VIII. Circuit condition, Lockout / Tagout
   A. Explain LO/TO
   B. Demonstrate LO/TO

IX. Electrical trouble shooting
   A. Explain troubleshooting
   B. Demonstrate troubleshooting

X. Work permits
   A. Explain need of permits
   B. Explain authority of permits

XI. Inspection and testing – safety
   A. Inspect Circuit
   B. Test a permitted circuit

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**Course Evaluation**

Final grades will be calculated according to the following criteria:

- Major test: 75%
- Class participation: 25%

**Course Requirements**

1. The Student will be introduced to Electricity
2. Set up tools for safe work
3. Demonstrate the differences of AC/DC voltage
ELTN 1443
Course Syllabi

4. Use AC/DC testing instruments
5. Connect up wiring
6. Work above ground level

Attendance Policy
1. Missing more than 20% of classes will result in an automatic “F” for the course.
2. Absences are counted for unexcused, excused and coming to class late.
3. Missing more than 20% of a class period will count as an absence.
4. Being tardy 3 times equals 1 absence.

Course Policies
1. No food, drinks, or use of tobacco products in class.
2. No foul or harsh language will be tolerated
3. Turn off all cell phones during lectures
4. Headphones may be worn only upon Instructor approval
5. Do not bring children to class.
6. No Cheating of any kind will be tolerated. Students caught cheating or helping someone to cheat can and will be removed from the class for the semester. Cheating can result from expulsion from LIT.
7. If you wish to drop a course, the student is responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an ‘F’ in the course.
8. Proper Dress. It is the student’s responsibility to dress for work in an industrial atmosphere, long pants, shirts with sleeves, substantial footwear (no sandals, flip flops, cloth shoes), safety glasses and hard hats will be required. Students will be required to be clean shaven to be able to achieve a seal in respirators and fresh air packs.
9. Internet Usage
   a. Classroom computers have access to the internet.
   b. Student usage of the internet will be monitored.
   c. Proper usage of the internet will be allowed. Used for classroom research or as directed.
   d. Any unauthorized use of the internet will not be tolerated.
   e. Improper usage of the internet, such as profanity, pornography, gambling, etc… will result in disciplinary action not limited to expulsion from LIT.
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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 office in Student Services, Cecil Beeson Building.

Course Schedule

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<th>Week</th>
<th>Topic</th>
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<td>1-12</td>
<td>Course introduction</td>
<td>Chapter 22</td>
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<td>• Lecture</td>
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<td>• Lab: Practice</td>
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<td>13/16</td>
<td>A/C Motors</td>
<td>Chapter 23</td>
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