Dual Credit

Industrial Maintenance Technology

Course Syllabus

Fall 2016 / Spring 2017

**Course** **Industrial Maintenance Electrical Principles & Lab**

IMT 110 Lecture 3 credit hours

IMT 111 Lab 2 credit hours

**Date/Time**  Monday - Friday

### **Course**

**Description** IMT 110 - This course introduces the theory of electricity and magnetism and the relationship of voltage, current, resistance, and power in electrical circuits. The course is designed to develop an understanding of alternating and direct current fundamentals. Students will apply formulas to analyze the operation of AC and DC circuits.

IMT 111 - Verifies knowledge of basic theory by making measurements in working AC and DC circuits. Various types of circuits are constructed and their parameters measured. The use of test equipment, safety, and troubleshooting are stressed.

# **INSTRUCTOR** Paul Spears

#  Allen County Career & Technical Center

# Room 135

 270-622-4711

#  Office Hours:

#  Monday – Friday 7:20 – 9:50

#

# **COLLEGE**

**CONTACT** Brian Sparks, Assistant to the Dean

Transpark

270-901-1228

brian.sparks@kctcs.edu

**PRE-**

#### **REQUISITES** None

## COURSE

## OBJECTIVES

1. Develop an understanding of alternating and direct current fundamentals.
2. Students will apply formulas to analyze the operation of AC and DC circuits.
3. Students will be able to safely use test equipment.
4. Develop troubleshooting strategies for electrical circuits.

**COURSE**

**competencies**

Upon completion of the course, the student will have developed and demonstrated an understanding of the following:

1. Apply shop and electrical safety practices

2. Identify and use basic hand tools

3. Care for and maintain hand tools

4. Solder and de-solder electrical connections

5. Setup power supplies

6. Compute, measure and identify conductance, resistance of conductors and insulators

7. Measure properties of circuits using ohms law

8. Solve electrical circuit problems using ohms law

9. Analyze, construct and troubleshoot series circuits

10. Analyze, construct and troubleshoot Series/Parallel circuits

11. Analyze, construct and troubleshoot Parallel circuits

12. Determine physical/electrical characteristics of capacitors and inductors

13. Write technical reports

14. Use Oscilloscope to verify properties of an AC signal

15. Determine physical/electrical characteristics of transformers

16. Compute and measure power in AC circuits

17. Apply and demonstrate the Edison System

18. Apply and demonstrate the three phase systems

19. Analyze and Identify circuit protection

20. Connect various transformer configurations

21. Wire two and three way switches

22. Wire single phase circuit

**COURSE**

**OUTLINE**

1. Introduction
2. Safety Training
3. Equipment Familiarization
4. Electrical Terminology
5. Forms of electricity
6. Properties of conductors, insulators, and semiconductors
7. Theories of current flow
8. Basic Quantities
9. Potential vs Kinetic energy
10. AC and DC voltage
11. Resistive, Inductive, and Capacitive circuits
12. Power Factor
13. Conductors and Insulators
14. Ohm’s Law and the Power Formula
15. Calculate voltage, current, and resistance
16. Importance of Ohm’s Law in circuit design and troubleshooting
17. Calculate power
18. Electrical connections
19. Making splices
20. Soldering
21. Using wire connectors
22. Numbering Systems and Codes
23. Decimal
24. Binary
25. Hexadecimal
26. Octal
27. Resistor color codes
28. Using Test Equipment
29. Taking Measurements
30. Multimeter
31. Test lights
32. Megohmmeter
33. Oscilloscopes
34. Symbols and Print Reading
35. Common symbols and acronyms

**BLACKBOARD**

 Blackboard is not available for this dual credit class.

**COURSE STRUCTURE**

**Exams**: There will be exams given throughout the semester. All exams will be based on material covered in the textbook. **No make-up exams** will be given **unless prior arrangements** have been made with your instructor. All make-up exams must be made up within 5 calendar days of the scheduled exam date; failure to do so will result in the student receiving a zero for that exam.

**Homework Assignments**: Students will be required to submit occasional homework, performed outside of class.

**Class Activities**: Students will be required to participate in all class activity assignments given throughout the semester. **Missed class activities may not be made-up and all absent students will receive a zero for each missed assignment.**

**Technology:**

Students are encouraged to utilize the instructor’s email with any questions or concerns regarding the course. Computers are in the resource room (ROOM 119) and classroom for any computer work; hours for the lab are posted.

**No student is to be in the lab without the instructor & PPE must be worn at all times in the lab**

**Lab Behavior**: While in the lab each student shall act in a mature manner. Do not operate any equipment when the instructor is not present. Do not operate any equipment unless you have been trained to operate it, ask the instructor for help.

**Course Requirements and Evaluation/Grading:**

**Late Coursework:** All assignments, projects, and daily exercises are to be completed/turned in on the due date. Late work is not accepted without prior approval from the instructor.

**\*\*\***It is important to know that if a grade of **“C” or better is not attained,** the course will not count for credit towards a credential.**\*\*\***

**GRADING** Grading Scale Evaluation IMT 110 Evaluation IMT 111

A 90-100 Tests/Quizzes 20% Graded Projects 30%

B 80-89 Daily Grades 40% Daily Grades 30%

C 70-79 Final Exam 40% Final Exam 40%

D 60-69

F Below 60

**Required Text and Materials/Supplies:**

Electrical Principles and Practices by Mazur, **ISBN** 978-0-8269-1811-6 (Provided)

Electrical Principles and Practices by Mazur Workbook, **ISBN** 978-0-8269-1812-3 (Provided)

Notebook

Pencil

Calculator

 (Optional) - *Wire strippers, Needle nose pliers, Calculator, Meter, Screwdrivers-(Large Phillips, precision Phillips, medium flat, and precision flat)*

**Technical/**

**Media Component:** Videos will be used as needed.

**WORKPLACE ETHICS AGREEMENT**

***Introduction***

Southcentral Kentucky Community & Technical College (SKY CTC) is committed to student success and improving employability of the students. Based on feedback from educators, community leaders, and business and industry partners, workplace ethics practices promoting success in the classroom are incorporated into course expectations. In addition to course and program competencies, student success will be measured by:

* being present and punctual
* participating in academic activities
* maintaining professional behavior

***Present and Punctual***

Students are expected to demonstrate a strong work ethic by being present and punctual for all class sessions. Students will be considered absent if they are tardy or leave before class is dismissed. If a student is absent for more than 15% of the scheduled class sessions, the student will be withdrawn from the course. If this occurs prior to the official withdrawal date, the student will be withdrawn from the course and a “W” issued on their transcript. After the official withdrawal date, the student will be issued a failing grade “E” on their transcript.

\*Note: Due to programmatic requirements, some programs may require students to be present for a higher percentage of classes (more than 85 percent).

***Participation***

Students are expected to demonstrate strong work ethics by actively participating in all class sessions and completing academic activities. Participation includes but is not limited to:

* engaging in and completing activities
* putting forth full effort for the entire class session
* seeking assistance when needed
* maintaining clean and orderly work areas

If at any time a student does not participate in a class session, laboratory, clinical or other scheduled academic activity, it is the student’s responsibility to make satisfactory arrangements for any make-up work, if permitted by the instructor.

***Professional Conduct***

Students are expected to conduct themselves professionally, as outlined in the [Student Code of Conduct](http://www.kctcs.edu/en/Students/Admissions/Academic_Policies/~/media/System_Office/Academics/StudentCode2010.ashx) located on the KCTCS website. Professional conduct includes but is not limited to:

* dressing appropriately
* engaging instructors, college employees, and students with respect
* utilizing technology appropriately
* refraining from disruptive behavior
* modeling behavior appropriate to his/her chosen profession

Any conduct within a course that disrupts the learning environment will result in the student being dismissed, counted absent, and may result in disciplinary action.

**Safety glasses are required in all labs. As well as, leather shoes or steel toe shoes are required in labs. However, leather tennis shoes or athletic shoes are not acceptable in labs.  Ear plugs required where applicable.**

**CLASSROOM**

**ETIQUETTE:** Cell phones should be either turned off or set to vibrate

 mode during class. And usage should be to a minimum.

**LATE/MAKEUP**

**POLICY:** Assignments can be made-up with valid excuse (doctor’s notice, funeral announcement, immediate family illness, or other hard-copy proof).

Excerpts from the KCTCS Code of Student Conduct regarding academic honesty policy and academic offenses:

**Withdrawal Policy**: Through the midterm of the session, a student may officially withdraw from a course and receive a “W.” After this period, a student may officially request to withdraw from a course and receive a W which may be given at the discretion of the instructor. Each instructor shall state on the first or second class meeting the factors to be used in determining if a student will be allowed to withdraw during the discretionary period. The student must initiate the official withdrawal. Withdrawal from a course or courses is a serious decision and, in many cases, affects financial assistance and academic progress. In addition, withdrawal does not relieve students from their financial obligation. See the spring 2009 Schedule of Classes for dates.

**Financial Aid Statement**: PELL, SEOG, and Student Loan recipients (Title IV) who stop attending or withdraw prior to the 60% point in the semester may be obligated to repay a portion of their financial aid.

**KCTCS Code of Student Conduct**: Kentucky Community and Technical College System (KCTCS) faculty and students are bound by principles of truth and honesty that are recognized as fundamental for a community of teachers and scholars. The College expects students and faculty to honor, and faculty to enforce, these academic principles. The College affirms that it will not tolerate academic dishonesty including, but not limited to, violation of academic rights of students and student offenses. Students may refer to the KCTCS Code of Student Conduct, [www.kctcs.edu/student/code.htm](http://www.kctcs.edu/student/code.htm), for more information on student rights, academic offenses, and the student’s right to appeal. Further information on student rights is available on the BGTC website under the Become a Student tab, Student Services. ([http://www.kctcs.edu/student/studentcodeof conduct. PDF](http://www.kctcs.edu/student/studentcodeof%20conduct.pdf))

**6.6 Student Discrimination Grievance Procedure**

The Kentucky Community and Technical College System has zero tolerance for illegal discrimination of any kind. Any student who feels he/she may have been discriminated against or subjected to harassment by students or employees because of their race, color, national origin, sex, sexual orientation, marital status, religion, beliefs, political affiliation, veteran status, age, or disability (including denial of a request for an accommodation), has the right to pursue an informal and/or formal discrimination grievance. The informal student discrimination grievance procedure is described below.

The chief student affairs officer or his/her designee shall be responsible for investigating student discrimination grievances. If appropriate, this shall be conducted in collaboration with the college human resources director. Each college shall provide a letter, statement, or poster containing information regarding the KCTCS Student Discrimination Grievance Procedure with the name, address, and phone number of the local chief student affairs officer.

Most difficulties can be resolved by talking to someone. Therefore, students are encouraged to discuss these problems promptly and candidly with the chief student affairs officer or his/her designee.

1. If a student thinks that he/she has been discriminated against, the student shall inform the chief student affairs officer or his/her designee with thirty (30) calendar days of the occurrence of the alleged incident. The chief student affairs officer or

his/her designee shall conduct a preliminary investigation of the discrimination grievance.

1. The student, chief student affairs officer or his/her designee, and other involved

parties shall work informally to negotiate a solution within fourteen (14) calendar days. The informal student discrimination grievance procedure shall be completed within forty-four (44) calendar days of the occurrence of the alleged incident.

1. If the grievance is not resolved to the satisfaction of the student through the informal

grievance procedure, the student may file a formal appeal according to the *KCTCS Student Code of Conduct*.

Contact information: Mr. Kyle Barron

Southcentral Kentucky Community and Technical College

1845 Loop Drive

Bowling Green, Kentucky 42101

Office: (270) 901-4348

Email: kyle.barron@kctcs.edu

**DISABILITY STATEMENT:** Bowling Green Technical College would like to help students with disabilities achieve their highest potential in college. If you need an accommodation because of a documented disability, you are required to register with Disability Services **each semester**. Contact Pam Bulle, Disability Services Director at 901-1202. If you require assistance during an emergency evacuation, notify Disability Services immediately.

The information on this syllabus is subject to change at anytime. Each student will be notified of any changes during the semester.