ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Workforce Development Division

COURSE: ELE 1200; Fundamentals of Electricity

Date: Fall 2013

Credit Hours: 4.0

Prerequisite(s):

Delivery Method:	☒ **Lecture**	**2 Contact Hours (1 contact = 1 credit hour)**
	☐ **Seminar**	**0 Contact Hours (1 contact = 1 credit hour)**
	☒ **Lab**	**4 Contact Hours (2 contact = 1 credit hour)**
	☐ **Clinical**	**0 Contact Hours (3 contact = 1 credit hour)**
	☐ **Online**	
	☐ **Blended**	

Offered: ☒ **Fall** ☒ **Spring** ☐ **Summer**

IAI Equivalent –***Only for Transfer Courses***-go to *http://www.itransfer.org*:

CATALOG DESCRIPTION:
The first in a series of two basic electricity for industrial electricians courses. It includes a study of electricity from its basic nature through resistive circuits with AC and DC voltages applied, and finally basic transformers. Practical applications are emphasized. Necessary math and print reading are integrated.

GENERAL EDUCATION GOALS ADDRESSED

[See the last page of this form for more information.]

Upon completion of the course, the student will be able:

[Choose those goals that apply to this course.]

☒ To apply analytical and problem solving skills to personal, social and professional issues and situations.
☐ To communicate orally and in writing, socially and interpersonally.
☐ To develop an awareness of the contributions made to civilization by the diverse cultures of the world.
☐ To understand and use contemporary technology effectively and to understand its impact on the individual and society.
☒ To work and study effectively both individually and in collaboration with others.
☐ To understand what it means to act ethically and responsibly as an individual in one's career and as a member of society.
☐ To develop and maintain a healthy lifestyle physically, mentally, and spiritually.
☐ To appreciate the ongoing values of learning, self-improvement, and career planning.

EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

[Outcomes related to course specific goals.]

Upon completion of the course, the student will be able to:

1. Analyze and troubleshoot basic resistive AC and DC circuits.
   - Competency 1.1. Calculate using scientific notation.
   - Competency 1.2. Interpret resistor color codes.
   - Competency 1.3. Explain relationships between voltage current and resistance using Ohms law.
   - Competency 1.4. Correctly use a DMM.
   - Competency 1.5. Calculate and measure volts, ohms, and amps in series and parallel circuits.
2. Analyze complex resistive AC and DC circuits.
   - Competency 2.1. Correctly use Kirchhoff's laws
   - Competency 2.2. Correctly design equivalent circuits.
   - Competency 2.3. Correctly use network theorems.
   - Competency 2.4. Build and measure a complex DC circuit.
3. Understand the characteristics of basic AC circuit elements.
   - Competency 3.1. Correctly state the relationship of time and frequency.
   - Competency 3.2. Explain the use of and measurements of transformers.
4. Analyze and troubleshoot an AC circuit containing a Transformer.
   - Competency 4.1. Build measure and calculate a step down circuit.
   - Competency 4.2. Correctly build, measure and calculate a step up circuit.
   - Competency 4.3. Calculate and measure power efficiencies.

COURSE TOPICS AND CONTENT REQUIREMENTS:

Orientation - Lab Equipment Identification - Safety Rules

Chapter 1	Atom
Workbook	Electrical Circuits
Lab #1	Electrical Circuits
Chapter 2	Dynamic Electricity
Lab #2	Multimeters
Lab #3	Ohm's Law
Chapter 3	Ohm's Law in DC Applications
Lab #4	Series Circuits
Chapter 4	Electrical Circuits
Chapter 5	Magnetism and Electro-Magnetism
Lab #5	Parallel Circuits
Chapter 6	Simple Electrical Generators
Lab #6	Series - Parallel, Combination Circuits
Lab #7	Kirchoff's Voltage Law
Chapter 7	Direct Current Generators
Lab #8	Kirchoff's Current Law
Lab #9	Voltage Dividers
Lab #10	Power
Chapter 8	Alternating Current Principles
Lab	Transformers

INSTRUCTIONAL METHODS:

A combination of lecture-demonstration, problem solving, and laboratory work will be used. Emphasis will be placed on practical applications. Approximately one-third of the total time will be devoted to laboratory work. Students will be encouraged to bring related problems to class for discussion. Field trips will be used when it is deemed beneficial to classroom work.

INSTRUCTIONAL MATERIALS:

The student will be issued a series of 16 laboratory assignments to complete. Each will contain its objective, directions for its completion and a number of questions relations to its objective. The student must respond to each with 80 percent accuracy.

Students responding with a degree of accuracy between 80 and 89 percent will receive a grade of "B" - 90 to 100 percent, a grade of "A."

Point system and curve:

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

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:
Electrical Principles and Practices, fouth edition, Mazur, Zurlis
Lab Manual

OTHER REFERENCES

Course Competency/Assessment Methods Matrix

ELE 1200; Fundamentals of Electricity	**Assessment Options**																																		
For each competency/outcome place an "X" below the method of assessment to be used.	**Assessment of Student Learning**	Article Review	Case Studies	Group Projects	Lab Work	Oral Presentations	Pre-Post Tests	Quizzes	Written Exams	Artifact Self Reflection of Growth	Capstone Projects	Comprehensive Written Exit Exam	Course Embedded Questions	Multi-Media Projects	Observation	Writing Samples	Portfolio Evaluation	Real World Projects	Reflective Journals	Applied Application (skills) Test	Oral Exit Interviews	Accreditation Reviews/Reports	Advisory Council Feedback	Employer Surveys	Graduate Surveys	Internship/Practicum /Site Supervisor Evaluation	Licensing Exam	In Class Feedback	Simulation	Interview	Written Report	Assignment
Assessment Measures – Are direct or indirect as indicated. List competencies/outcomes below.	**Direct/ Indirect**	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	I	I	I	I	D	D								
1.1 Calculate using scientific notation				X	X			X	X																									
1.2 Interpret resistor color codes.					X			x																										
1.3 Explain E, I, R using Ohms law.					X		X	X	X																									
1.4 Correctly use a DMM.					X										X					X														
1.5 Calculate and measure volts, ohms, and amps in series and parallel circuits.				X	X										X			X		X													
2.1 Correctly use Kirchhoff's laws					X			X	X																									
2.2 Correctly design equivalent circuits.					X			X	X																									
2.3 Correctly use network theorems.					X			X	X																									
2.4 Build and measure a complex DC circuit.				X	X																													
3.1 Correctly state the relationship of T, Fr..								X	X																									
3.2 Explain transformers.				X	X				X																									
4.1 Build step down circuit				X	X			X	X									X		X													
4.2 Build Step up circuit				X	X			X	X									X		X													
4.3 Power efficiencies				X	X				X											X													