ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Workforce Development Division

COURSE: ELE 1201; Basic Industrial Electricity II

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:

This course is a continuation of Basic Industrial Electricity I with the introduction of capacitive and inductive circuit elements and how they react to sinusoidal and unit step voltages. Practical application to industrial type circuits will be emphasized. Necessary mathematics, safety, 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:

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1. Understand the characteristics of basic AC circuit elements.
   - Competency 1.1. Correctly state the relationship of time and frequency.
   - Competency 1.2. Calculate inductive and Capacitive reactance.
   - Competency 1.3. Explain the use of and measurements of transformers.
   - Competency 1.4. Calculate and measure impedance and phase angle.
   - Competency 1.5. Calculate charge and discharge times.
2. Analyze and troubleshoot an AC circuit containing resistive, capacitive and inductive elements.
   - Competency 2.1. Build, measure and calculate a RCL circuit.
   - Competency 2.2. Correctly use Pythagorean theorem for impedance, voltage and current.
   - Competency 2.3. Calculate and measure phase angles.
   - Competency 2.4. Recognize simple XY plot curves.
   - Competency 2.5. Use the correct formulas to correctly calculate admittance and impedance in a complex RCL circuit.
3. Understand and be able to analyze series and parallel resonant circuits.
   - Competency 3.1. Derive the resonant frequency.
   - Competency 3.2. Explain Power Factor.
   - Competency 3.3. Build and measure a resonant circuit.
   - Competency 3.4. Use an Oscilloscope correctly to confirm or deign resonance.
4. Understand and be able to analyze basic types of passive filters.
   - Competency 4.1. Recognize scope readings and graphs of each main filter.
   - Competency 4.2. Describe how to remove a DC signal from an AC signal.
   - Competency 4.3. Describe how a Filter separates different AC signals.
   - Competency 4.4. Calculate cutoff and Bandwidth of a filter circuit.

COURSE TOPICS AND CONTENT REQUIREMENTS÷
Chapters 9 to end of text.
Labs #31 - 60

Week

1 & 2 Transformers

3 & 4 Capacitors in AC Circuits

5 Inductors in AC Circuits

6, 7, 8 RLC Circuits

MIDTERM EXAM

9 "J" Operator

10 Polar Notation

11 X-Y Coordinate System

12 Admittance

13 Conductance

14 Impedance

15 Reactance

16 Practical Applications

FINAL EXAM

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

Electrical Principles and Practices, fouth edition, Mazur, Zurlis
Lab Manual

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:
A= 90-100
B= 80-89
C= 70-79
D= 60-69
F= 0-59

OTHER REFERENCES

NEC
NFPA 70e

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Course Competency/Assessment Methods Matrix

ELE-1201; Basic Industrial Electricity 2	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							
Competency 1.1. Correctly state the relationship of time and frequency.					X			X	X																								
Competency 1.2. Calculate inductive and capacitive reactance.					X			X	X																								
Competency 1.3. Explain the use of and measurements of transformers.					X			X	X																								
Competency 1.4. Calculate and measure impedance and phase angle.					X			X	X																								
Competency 2.1. Build, measure and calculate a RCL circuit.				X	X			X	X																								
Competency 2.2. Correctly use Pythagorean theorem for impedance, voltage and current.				X	X			X	X																								
Competency 2.3. Calculate and measure phase angles.				X	X			X	X																								
Competency 2.4. Recognize simple XY plot curves.				X	X			X	X																								
Competency 2.5. Use the correct formulas to correctly calculate admittance and impedance in a complex RCL circuit.				X	X			X	X																								

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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							
Competency 3.1. Derive the resonant frequency.				X	X			X	X									X		X												
Competency 3.2. Explain Power Factor.				X	X			X	X									X		X												
Competency 3.3. Build and measure a resonant circuit.				X	X			X	X									X		X												
Competency 3.4. Use an Oscilloscope correctly to confirm or deign resonance.				X	X			X	X									X		X												
Competency 4.1. Recognize scope readings and graphs of each main filter.				X	X		X	X	X			X						X		X												
Competency 4.2. Describe how to remove a DC signal from an AC signal.				X	X		X	X	X			X						X		X												
Competency 4.3. Describe how a Filter separates different AC signals.				X	X		X	X	X			X						X		X												
Competency 4.4. Calculate cutoff and Bandwidth of a filter circuit.				X	X		X	X	X			X						X		X												