ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Workforce Developement Division

COURSE: ELE 1202; Motors and Controls I

Date: Fall 2013

Credit Hours: 2.5

Prerequisite(s): ELE 1200 or ELT 1204

Delivery Method:		
	☒ **Lecture**	**2 Contact Hours (1 contact = 1 credit hour)**
	☐ **Seminar**	**0 Contact Hours (1 contact = 1 credit hour)**
	☒ **Lab**	**1 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:
Principles of operation and control of DC and single phase AC motors and generators are studied. Additional topics include: J.I.C. symbols, power and control wiring in ladder diagram format, and wiring techniques for forward-reverse and speed-control operations. Troubleshooting techniques will be emphasized throughout this course.

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:

Outcome 1 Choose the right tool for the task

Competency 1.1 Choosing the proper Screw Drivers
Competency 1.2 Choosing the proper Pliers
Competency 1.3 Choosing the right Wrenches
Competency 1.4 Choosing the right Miscellaneous tools

Outcome 2 Properly use the correct Test Instruments

Competency 2.1 Using a Voltage tester
Competency 2.2 Using a test lead set
Competency 2.3 Using a Phase sequence tester
Competency 2.4 Using the Oscilloscope

Outcome 3 State and Use proper Electrical Safety procedures

Competency 3.1 Properly inspect and use a ground
Competency 3.2 Properly find codes in using the NEC
Competency 3.3 Correctly interpret data from a motor name plate
Competency 3.4 Pass a Safety Exam on Fuses, GFI's, Shock, Lockout/Tagout clothing and personal Equipment, and Fire safety

Outcome 4 Correctly interpret symbols on a line diagram

Competency 4.1 Correctly choose components based on a line diagram
Competency 4.2 Correctly write a line diagram from a wired circuit

Outcome 5 Use logic to Predict to outcomes based on line diagrams

Competency 5.1 Convert wirering diagrams to line diagrams
Competency 5.2 Program a Manual control circuit
Competency 5.3 Program an Automatic control circuit
Competency 5.4 Correctly use Line numbers and the Cross-Reference System
Competency 5.5 Properly use Wire and Manufacturer's Terminal Numbers

Outcome 6 Properly choose and wire AC Contactors and Starters

Competency 6.1 Define a Contact and a Starter
Competency 6.2 Properly choose and Install a Manual Contactor
Competency 6.3 Properly choose and install a Manual Starter

Outcome 7 Explain the relationship between Magnetism and Solenoids

Competency 7.1 Properly state and use the FBI rule
Competency 7.2 Define Magnitism
Competency 7.3 Define a Solenoid
Competency 7.4 Apply Solenoid rules for proper selection
Competency 7.5 Correctly Troubleshoot a Solenoid Circuit

Outcome 8 Properly use Time delay relay in a logic circuit

Competency 8.1 Explain the uses for the Timimg Functions
Competency 8.2 Correctly wire a timing circuit from a Line Diagram
Competency 8.3 Program a line diagram to perform a given task
Competency 8.4 Correctly Troubleshoot a Timing Circuit

Outcome 9 Properly use Quality terms and technics

Competency 9.1 Properly develope a working definition for Quality
Competency 9.2 Properly Benchmark the quality of a product
Competency 9.3 Perform Quality testing and Analisis

COURSE TOPICS AND CONTENT REQUIREMENTS:

I. Electrical Tool, Instruments, and Safety

II. Industrial Electrical Symbols and Line Diagrams

III. Introduction to Logic as Applied to Line Diagrams

IV. AC Manual Contactors Motor Starters

V. Magnetism and Magnetic Solenoids

VI. AC/DC Contactors and Magnetic Motor Starters

VII. Time Delay and Logic Applied to More Complex Line Diagrams and Control Circuits

VIII Quality

INSTRUCTIONAL METHODS:

1. Laboratory work
2. Demonstrations
3. Lecture - discussion
4. Reading assignments
5. Homework
6. Quizzes
7. Team Work
8. Socratic Method

INSTRUCTIONAL MATERIALS:

Electrical Motor Controls, 5th edition. Rockis, Gary and Glen Mazur, American Technical Publishers, Inc., 2014.

Lab Manual

Quality Foundations, Constable, Hershey, Houdeshell, Seery, Sinclair Community College, 1998

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:

The student must meet the objectives of the course stated previously.

Laboratory reports must be completed as directed and receive an evaluation for accuracy of 70% or more using criteria set forth in the laboratory directions.

Required assignments:	Methods of Evaluation:
Mandatory lab attendance	Team projects
Weekly lab assignments	Short quizzes
Assigned reading	Midterm exams
Lab practical exams	Completion of homework assignments
Final exam	Midterm, final, and lab final exams
Tests	

Laboratory work	50%
Written tests and quizzes	30%
Attendance	10%
Homework assignments	10%

OTHER REFERENCES

Library
Internet sites
Product Vendors

Course Competency/Assessment Methods Matrix

ELE 1202; Motors and Controls I	**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 Choosing the proper Screw Drivers					X										X																	
Competency 1.2 Choosing the proper Pliers					X										X																	
Competency 1.3 Choosing the right Wrenches					X										X																	
Competency 1.4 Choosing the right Miscellaneous tools					X			X							X																	
Competency 2.1 Using a Voltage tester					X										X																	
Competency 2.2 Using a test lead set					X																											
Competency 2.3 Using a Phase sequence tester				X	X																											
Competency 2.4 Using the Oscilloscope					X										X																	
Competency 3.1 Properly inspect and use a ground					X										X																	
Competency 3.2 Properly find codes in using the NEC				X	X																											
Competency 3.3 Correctly interpret data from a motor name plate					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 3.4 Pass a Safety Exam on Fuses, GFI's, Shock, Lockout/Tagout								X	X											X												
Competency 4.1 Correctly choose components based on a line diagram					X															X												
Competency 4.2 Correctly write a line diagram from a wired circuit					X										X					X												
Competency 5.1 Convert wirering diagrams to line diagrams					X				X											X												X
Competency 5.2 Program a Manual control circuit				X	X										X					X												
Competency 5.3 Program an Automatic control circuit					X				X											X												
Competency 5.4 Correctly use Line numbers and the Cross-Reference System					X			X	X						X					X												
Competency 5.5 Properly use Wire and Manufacturer's Terminal Numbers					X				X						X					X												X
Competency 6.1 Define a Contact and a Starter								X	X											X												
Competency 6.2 Properly choose and Install a Manual Contactor					X										X																	

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Competency 6.3 Properly choose and install a Manual Starter				X	X										X					X														
Competency 7.1 Properly state and use the FBI rule									X																										
Competency 7.2 Define Magnitism								X																											
Competency 7.3 Define a Solenoid								X																											
Competency 7.4 Apply Solenoid rules for proper selection					X																														
Competency 7.5 Correctly Troubleshoot a Solenoid Circuit				X	X										X					X														
Competency 8.1 Explain the uses for the Timimg Functions								X																											
Competency 8.2 Correctly wire a timing circuit from a Line Diagram					X																														
Competency 8.3 Program a line diagram to perform a given task					X										X					X														
Competency 8.4 Correctly Troubleshoot a Timing Circuit				X	X										X																			
Competency 9.1 Properly develope a working definition for Quality				X																												X		

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Competency 9.2 Properly Benchmark the quality of a product				X	X																											
Competency 9.3 Perform Quality testing and Analisis				X	X																											