ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Workforce Development

COURSE: ELT 2254 – Electrical Capstone

Date: Fall 2017

Credit Hours: 3

Prerequisite(s):   Consent of ELE/ELT Program Coordinator

Delivery Method: ☒ **Lecture**   **2 Contact Hours** (1 contact = 1 credit hour)

☐ **Seminar**   **0 Contact Hours** (1 contact = 1 credit hour)

☒ **Lab**   **2 Contact Hours** (2-3 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 will give the student the opportunity to apply the knowledge and training obtained in the preceding courses culminating in two capstone projects. One project will be an industrial group project. One project will be an automation project utilizing a micro-controller or PIC. Assignments will consist of analysis, synthesis, design, flow-charting, programming, and construction of an automation project. I/O interfaces and optical isolators in connection with any programmale interface controller will be utilized.

GENERAL EDUCATION GOALS ADDRESSED

[See last page for Course Competency/Assessment Methods Matrix.]

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

[Choose up to three goals that will be formally assessed in this course.]

☐ To apply analytical and problem solving skills to personal, social, and professional issues and situations.

☒ To communicate successfully, both orally and in writing, to a variety of audiences.

☐ To construct a critical awareness of and appreciate diversity.

☒ To understand and use technology effectively and to understand its impact on the individual and society.

☐ To develop interpersonal capacity.

☐ To recognize what it means to act ethically and responsibly as an individual and as a member of society.

☐ To recognize what it means to develop and maintain a healthy lifestyle in terms of mind, body, and spirit.

☐ To connect learning to life.

EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

[Outcomes related to course specific goals. See last page for more information.]

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

1. Correctly state and apply quality theories.
   Competency 1.1 State Demings twelve Quality steps.
   Competency 1.2 Synthesize a use for each step.
   Competency 1.3 Explain the correct use for four basic PC charts.
   Competency 1.4 State the steps required for TQI

2. Program and flowchart simple Basic programs.
   Competency 2.1 Define major Basic Commands
   Competency 2.2 Define and Use Major Flowcharting symbols
   Competency 2.3 Program a Basic program from a Flowchart
   Competency 2.4 Program and flowchart final project

3. Correctly explain and use optical isolators.
   Competency 3.1 Explain Theory of operation
   Competency 3.2 Use Discrete and Analog signal converters
   Competency 3.3 Design and use an Input Conditioner
   Competency 3.4 Design and use an Output Conditioner
   Competency 3.5 Build appropriate interfaces for Final Project

4. Utilize and build communication interfaces.
   Competency 4.1 Design and build Communication hardware
   Competency 4.2 Connect appropriate cabling to allow for programming

5. Design, Build and Present an automation project.
   Competency 5.1 Design an automation project
   Competency 5.2 Prototype and build a final project
   Competency 5.3 Explain and present project and theory of operation

6. Utilize Work Place Skills
   Competency 6.1 Perform each position in a small group
   Competency 6.2 Give Oral and written reports

MAPPING LEARNING OUTCOMES TO GENERAL EDUCATION GOALS
[For each of the goals selected above, indicate which outcomes align with the goal.]

Goals	Outcomes
First Goal	
To communicate orally and in writing, socially and interpersonally.	Competency 5.1 Design an automation project Competency 5.2 Prototype and build a final project Competency 5.3 Explain and present project and theory of operation
Second Goal	
To understand and use technology effectively and to understand its impact on the individual and society.	Competency 6.1 Perform each position in a small group Competency 6.2 Give Oral and written reports

COURSE TOPICS AND CONTENT REQUIREMENTS:
1. Quality / Total Quality Improvement
2. College to Industry Concepts
3. Process Control Charts
4. Q & P Basic
5. Flowcharting
6. Optical isolators
7. Discrete input devices
8. Analog input devices
9. Output devices
10. Communications
11. Project Design / Brain Storming
12. Stamp programming
13. Prototyping
14. Analysis / Synthesis
15. Construction
16. Presentation

INSTRUCTIONAL METHODS:

1. Lecture - Discussion
2. Laboratory sessions with practical applications stressed
3. Required reading assignments
4. Special Projects
5. Socratic method
6. Group work
7. Think Tank Modules
8. Tours / Guest Speakers

INSTRUCTIONAL MATERIALS:
1. Internet
2. Qbasic & Pbasic software
3. Paralax Stamp experiment boards
4. SIU website
5. Think Tank Modules

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:
1. Completion of laboratory reports as assigned.
2. Meeting objectives as indicated by responses to written questions and performance examinations.
3. Completion of final Automation Project.
4. Completion of Industrial Group Project.
5. <u>Industrial Group Project and Automation Project</u>:

Lab	30 %
Quizzes and Tests	20 %
Capstone Project	30 %
Speech and Presentation	20 %

OTHER REFERENCES
- DC/AC Foundations of Electronics. R. Jesse Phagan, G-W Publishing
- Digital Computer Electronics, Malvino, Glenco Publishing
- Modern Residential Wiring, Henke-Konopasek/Holzman, G-W Publishing
- Fundamentals of Linear Electronics, Cox, Delmar Publishing
- Instrumentation, Kirk/Rimboi, ATP Publishing

Course Competency/Assessment Methods Matrix

(Dept/# Course Name)	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. Correctly state and apply quality theories				x	x						x				x													x				x
2. Program and flowchart simple Basic programs				x							x																					x
3. Correctly explain and use optical isolators				x							x																					x
4. Utilize and build communication interfaces				x		x					x																					x
5. Design, build and present an automation project.				x		x			x		x																					x
6. Utilize workplace skills				x		x					x				x																	x