ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Career and Technical Programs

COURSE: ELT 1203; Industrial Instrumentation

Date: Fall 2011

Credit Hours: 2.5

Prerequisite(s): ELE-1201, Basic Industrial Electricity II

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:
This course is designed to cover the basic concepts of: temperature; pressure; flow and level and how each is measured; the operation and applications of transducers, meters, and control circuits; along with practical installation and troubleshooting techniques for instrumentation systems. Lecture, 2 hours; lab, 1 hour.

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:

- The student will learn the concepts of weight, density, mass, acceleration, relative and absolute temperature, relative and absolute pressure, relative and absolute humidity, ph specific gravity and viscosity.
- The student will learn how to use a tab le of coefficients of expansion to determine the change in volume of a material due to a change in temperature.
- The student must learn to convert between milli, micro, pico, meg, gign, Kilo/psi, psf/C˚F˚, etc.
- The student will learn the concepts of stress, strain, and yield point leverage.
- The student must know the relationship between various temperature scales.
- The student will learn the use principles and advantages and disadvantages of an orifice, venture, and a flow tube.
- The student will learn the use, advantages and disadvantages of thermistors, varistors, thermocouples, and RTDs.
- The student will learn the operation and use of piezo, photo, chemical, thermal, electromagnetic, electrostatic and inductive transducers.
- The student will learn the use of analog and digital multimeters and the effects of input impedance and ratings of ohm per volt.
- The student will learn how and why static and dynamic errors are created.
- The student will be introduced to the basics of fiber optics.

COURSE TOPICS AND CONTENT REQUIREMENTS:

1. Introduction to industrial instrumentation
2. Atom structure
3. Electricity

4. Electricity op amps
5. Behavior of materials
6. Basic principles
7. Pressure
8. Control
9. Temperature
10. Level
11. Flow
12. Humidity
13. Analysis
14. Fiber optic concepts
15. Fiber optic applications

INSTRUCTIONAL METHODS:

1. Laboratory work
2. Demonstrations
3. Lecture—discussion
4. Reading assignments
5. Homework
6. Quizzes

INSTRUCTIONAL MATERIALS:

Instrumentations and Process Control, Bartelt, Delmar, 1-4180-4171-8

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:

1. The students must meet the objectives of the course stated previously.
2. Laboratory reports must be completed as directed and receive an evaluation for accuracy of 100% using criteria set forth in the laboratory directions.
3. Grade for course will be based upon the following:
    a. Laboratory Work
    b. Written tests and quizzes
    c. Attendance and attitude
    d. Homework assignments
    e. Final 50%
    f. Midterm 25%
    g. Labs, homework, quiz, class participation 25%

OTHER REFERENCES

Course Competency/Assessment Methods Matrix

ELT 1203; Industrial Instrumentation	**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					
• The student will learn the concepts of weight, density, mass, acceleration, relative and absolute temperature, relative and absolute pressure, relative and absolute humidity, ph specific gravity and viscosity.					X																										
• The student will learn how to use a tab le of coefficients of expansion to determine the change in volume of a material due to a change in temperature.								X	X																						
• The student must learn to convert between milli, micro, pico, meg, gign, Kilo/psi, psf/C˚F˚, etc.								X	X																						
• The student must know the relationship between various temperature scales.								X	X																						

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