

FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER:	EST 1520
COURSE TITLE:	Basics of Instrumentation
PREREQUISITE(S):	None
COREQUISITE(S):	None
CREDIT HOURS:	3
CONTACT HOURS/WEEK:	4
CONTACT HOUR BREAKDOWN:	
Lecture/Discussion:	3
Laboratory:	1
Other_____:	
FACULTY WORKLOAD POINTS:	3.67
STANDARDIZED CLASS SIZE ALLOCATION:	24
CATALOG COURSE DESCRIPTION:	
<p>Provides the student with a basic knowledge of instrumentation, and how sensors are used in the manufacturing field. Topics included are principles of temperature, pressure, flow, and level, and the relationship of devices used to measure these for control.</p>	
SUGGESTED TEXT(S):	<u>Process Instrumentation</u> , Vol. I, Schoolcraft Publisher
IMPLEMENTATION DATE:	Fall Term, 2002 (20031)
REVIEW OR MODIFICATION DATE:	Fall Term, 2009 (20101) - Proposal 2009-11

COURSE TOPICS	<u>CONTACT HOURS PER TOPIC</u>
I. Basics of Instrumentation	54
A. Introduction to Instrumentation	(5)
1. Terminology	
2. Definitions	
3. Concepts	
4. Systems	
B. Introduction to the Concepts of Hydraulics	(5)
1. Physics of Fluids	
2. Principles of Operation	
3. Component Parts	
4. Systems	
C. Introduction to the Concepts of Pneumatics	(5)
1. Physics of Air Pressure/Vacuum	
2. Principle of Operation	
3. Component Parts	
4. Systems	
D. Introduction to Mechanical Devices	(5)
E. Instruments Used	(34)
1. Pressure Sensing	
2. Liquid - Level	
3. Differential - Pressure	
4. Flow - Measuring	
5. Self - Balancing	
6. Pilot and Relays	
7. Control Valves	
8. Fundamentals of Controllers	
9. Control Theory	
10. Controller Functions and Mechanisms	
11. Universal Controller	
a. Description	
b. Function	
c. Components	
d. Automatic/Manual Operation	
12. Introduction to Process Control	
a. Control	
b. Open and Closed Loop	
c. Elements	
d. Automatic Control	

COURSE TOPICS (Continued)	<u>CONTACT HOURS PER TOPIC</u>
II. Personal Safety Devices	3
A. Ear Protection B. Eye Protection C. Chemical Protection D. Respiration	
III. Interpersonal Skills	3
A. Communication B. Listening C. Adversial Environment	

PROGRAM TITLE: Engineering Technology Specialization Tract
Advanced Manufacturing

COURSE TITLE: Basics of Instrumentation

CIP NUMBER: 1615.061300 AS

LIST PERFORMANCE STANDARDS ADDRESSED:
NUMBER(S): TITLE(S):

01.0 DEMONSTRATE KNOWLEDGE OF INDUSTRIAL PROCESSES and MATERIALS PROPERTIES - The student will be able to:

- 01.01 Demonstrate knowledge of current manufacturing processes.
- 01.02 Demonstrate knowledge of the use of current manufacturing machines, operating systems and mechanisms.
- 01.05 Demonstrate knowledge of gage design, usage and limitations.
- 01.06 Analyze and recommend the usage of jigs and fixtures, including effectors and special grippers for automated systems.
- 01.07 Demonstrate knowledge of processes used to ensure that changes do not negatively impact production or product.
- 01.09 Demonstrate knowledge of time and motion to enhance productivity.
- 01.10 Make continuous adjustments to equipment and procedures that result in improved productivity.
- 01.11 Demonstrate knowledge of how raw materials are moved.
- 01.12 Setup or modify new equipment per engineering specifications and documentations.
- 01.13 Demonstrate an understanding of the importance and impact of routine maintenance of machines and equipment on operations.

12.0 OPERATE, TROUBLESHOOT, AND MAINTAIN PNEUMATIC, HYDRAULIC AND ELECTROMECHANICAL COMPONENTS AND/OR SYSTEMS - The student will be able to:

- 12.01 Identify, classify and describe the function of pneumatic, hydraulic and electrical machines and components.
- 12.02 Construct flow diagrams and of pneumatic, hydraulic, and electromechanical systems.
- 12.03 Perform basic operation maintenance of pneumatic, hydraulic and electromechanical components, devices and/or machines.
- 12.04 Troubleshoot errors, faults, and inconsistencies of pneumatic, hydraulic and electromechanical components, machines and/or systems.
- 12.05 Define special applications of electromechanical, hydraulic and pneumatic machines and devices used process sheet metal, plastics, food and beverages, and other materials.
- 12.06 Describe important limitations of electromechanical, pneumatic and hydraulic machinery.
- 12.07 Operate independent pneumatic, hydraulic and electrical machines properly.
- 12.08 Describe the important operating parameters of pneumatic, hydraulic and electrical machines and/systems.
- 12.09 Identify and use appropriate monitoring gages for pneumatic, hydraulic, and electromechanical machines and/or systems.



NOTE: Use either the Tab key or mouse click to move from field to field. The box will expand to accommodate your entry.

Section 1	
COURSE PREFIX AND NUMBER: <u>EST 1520</u>	SEMESTER CREDIT HOURS: <u>3</u>
COURSE TITLE: <u>Basics of Instrumentation</u>	

Section 2

TYPE OF COURSE: (Click on the box to check all that apply)

AA Elective AS Required Professional Course College Prep
 AS Professional Elective AAS Required Professional Course Technical Certificate
 Other _____
 General Education: (For General Education courses, you must also complete Section 3 and Section 7)

Section 3 (If applicable)

INDICATE BELOW THE DISCIPLINE AREA FOR GENERAL EDUCATION COURSES:

Communications Social & Behavioral Sciences Mathematics
 Natural Sciences Humanities

Section 4

INTELLECTUAL COMPETENCIES:

Reading Speaking Critical Analysis Quantitative Skills Scientific Method of Inquiry
 Writing Listening Information Literacy Ethical Judgment Working Collaboratively

Section 5		
LEARNING OUTCOMES		METHOD OF ASSESSMENT
•	Demonstrate knowledge of gage design, usage and limitations.	Hands-on application exercises
•	Analyze and recommend the usage of jigs and fixtures, including effectors and special grippers for automated systems.	Hands-on application exercises
•	Make continuous adjustments to equipment and procedures that result in improved productivity.	Written quizzes, tests, and simulation hardware exercises
•	Setup or modify new equipment per engineering specifications and documentations	Hands-on application exercises
•	Troubleshoot errors, faults, and inconsistencies of pneumatic, hydraulic and electromechanical components, machines and/or systems.	Hands-on application trouble shooting exercises
•	Describe the important operating parameters of pneumatic, hydraulic and electrical machines and/systems.	Written quizzes, or test.
•	Identify and use appropriate monitoring gages for pneumatic, hydraulic, and electromechanical machines and/or systems.	Hands-on application exercises
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Section 6 Name of Person Completing This Form: Evan Kuharich Date: 04/30/08