



COURSE SYLLABUS FOR

# PROCESS INSTRUMENTATION I

PTAC 1432

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COURSE NUMBER: PTAC 1432

CREDIT HOURS: 4 (3/3)

PREREQUISITE: none

CATALOGUE DESCRIPTION: : Study of the instruments and control systems used in the process industry including terminology, process variables, symbology, control loops, and basic troubleshooting. (ICO's 1,2,3,4,)

TEXTBOOK NONE

SUPPLIES: None

LEARNING OUTCOMES:

: Explain the function of the various instruments used in the process industry; diagram the process control elements in a control loop; and apply terms and symbols used in instrumentation.

After completing this course, the student should be able to demonstrate competency in:

- **Basics of I&C including the different control functions, the types of control loops, and continuous vs. discrete control.**
- **Identification and symbols used in I&C.**
- **Different types of field instrumentation.**
- **Requirements for control rooms and the design of control panels.**
- **Concepts and implementation of alarm and trip systems.**
- **Different types of computer-based control systems including PLCs and DCSs as well as review the basic requirements for good operator interface.**
- **Documentation required for I&C**
- **Requirements for a successful installation, instrument checkout, and controller tuning.**

COURSE REQUIREMENTS:

- Complete all scheduled homework
- Complete all scheduled labs
- Complete written\lab tests
- Complete a written\lab final test

METHODS OF EVALUATION:

GRADING SCALE	
POINTS	GRADE
90-100	A
80-89	B
70-79	C
65-69	D
0-64	F

WEIGHT OF COURSE REQUIREMENTS	
AREA	GRADE WEIGHT
LAB ASSIGNMENTS	25%
TESTS	25%
FINAL TEST	25%
PROFESSIONALISM	25%
TOTAL	100%

ATTENDANCE POLICY\PROFESSIONALISM POLICY

**Attendance** is the greatest predictor of your **success**. Your attendance at EVERY ONE of the classes and labs is **important** and **expected**. A substantial grade penalty will be assessed to late work; including homework, lab assignments, and test. The “Professionalism Grade” will be determined by such factors as attendance, tardiness, class participation, and other classroom factors.

The following chart is a syllabus outline for topics and task. Each topic may include labs, lab questions, and other requirements.

LESSON #	GENERAL TOPIC	SPECIFIC TOPIC	LAB\TASK\INFO
1	Intro Syllabus Review Introduction to Process Equipment The Nature of Process Control	<ul style="list-style-type: none"> <li>✓ Process Variables</li> <li>✓ Process Control</li> <li>✓ PLC ( Industrial Computer)</li> <li>✓ Measuring Data</li> <li>✓ Open/closed loop Control System</li> </ul>	<ul style="list-style-type: none"> <li>➤ LAB 1.1</li> <li>➤ Key Terms</li> <li>➤ Basic Hand Tools</li> <li>➤ Stationary/Rotary Equipment</li> </ul>
2	Process Variables, Elements, and Instruments: <b>PRESSURE</b>	<ul style="list-style-type: none"> <li>✓ Key Terms</li> <li>✓ Pressure Defined</li> <li>✓ Calculating Pressure</li> <li>✓ Pressure Instruments</li> </ul>	<ul style="list-style-type: none"> <li>➤ LAB 2.1</li> <li>➤ Key Terms</li> </ul>
3	Process Variables, Elements, and Instruments: <b>TEMPERATURE</b>	<ul style="list-style-type: none"> <li>✓ Key Terms</li> <li>✓ Temperature Defined</li> <li>✓ Temperature Measurements</li> <li>✓ Temperature Instruments</li> </ul>	➤ LAB 3.1
4	Process Variables, Elements, and Instruments: <b>LEVEL</b>	<ul style="list-style-type: none"> <li>✓ Key Terms</li> <li>✓ Level-sensing and Measurement Instruments</li> </ul>	➤ LAB 4.1
		<b>TEST</b>	
5	Process Variables, Elements, and Instruments: <b>FLOW</b>	<ul style="list-style-type: none"> <li>✓ Key terms</li> <li>✓ Flow-sensing and Measurement Instruments</li> <li>✓ Total Volume Flow, Flow Rate, and Volumetric Flow</li> </ul>	➤ LAB 5.1
6	Process Variables, Elements, and Instruments: <b>ANALYTICAL</b>	<ul style="list-style-type: none"> <li>✓ Key Terms</li> <li>✓ Introduction to Analytical instruments</li> <li>✓ Analytical Instruments and the role of the Process Technician</li> </ul>	<ul style="list-style-type: none"> <li>➤ LAB 6.</li> <li>➤</li> </ul>
7	Miscellaneous Measuring Devices	<ul style="list-style-type: none"> <li>✓ Key Terms</li> <li>✓ Vibration</li> <li>✓ speed</li> </ul>	➤ LAB 7.1
		<b>TEST</b>	➤
8	Introduction to Control Loops: Simple Loop Theory	<ul style="list-style-type: none"> <li>✓ Key Terms</li> <li>✓ Control Loops</li> <li>✓ Components and Signal</li> </ul>	➤ Lab 8.1
9	Control Loops: Primary Sensors, Transducers and Transmitters	<ul style="list-style-type: none"> <li>✓ Key Terms</li> <li>✓ Components</li> <li>✓ Transmitter and transducer Signals</li> <li>✓ Pneumatic and Electrical</li> </ul>	➤ LAB 9.

		Signals	
10	Control Loops: Controllers and Final Control Element Overview	<ul style="list-style-type: none"> <li>✓ Key Terms</li> <li>✓ Characteristics</li> <li>✓ Switching</li> <li>✓ Types of Controllers</li> </ul>	➤ LAB 10.1 LAB 10.1
11	Control Loops: Control Valves and Regulators	<ul style="list-style-type: none"> <li>✓ Key Terms</li> <li>✓ Control Valve</li> <li>✓ Actuators</li> <li>✓ Positioners</li> <li>✓ Air Regulators</li> </ul>	➤ LAB 11.1
<b>TEST</b>			
FINAL TEST			

### Expectations for Engagement – Face to Face Learning

To help make the learning experience fulfilling and rewarding, the following Expectations for Engagement provide the parameters for reasonable engagement between students and instructors for the learning environment. Students and instructors are welcome to exceed these requirements.

#### Reasonable Expectations of Engagement for Instructors

1. As an instructor, I understand the importance of clear, timely communication with my students. In order to maintain sufficient communication, I will
  - provided my contact information at the beginning of the syllabus;
  - respond to all messages in a timely manner through telephone, email, or next classroom contact; and,
  - notify students of any extended times that I will be unavailable and provide them with alternative contact information (for me or for my supervisor) in case of emergencies during the time I'm unavailable.
2. As an instructor, I understand that my students will work to the best of their abilities to fulfill the course requirements. In order to help them in this area, I will
  - provide clear information about grading policies and assignment requirements in the course syllabus, and
  - communicate any changes to assignments and/or to the course calendar to students as quickly as possible.
3. As an instructor, I understand that I need to provide regular, timely feedback to students about their performance in the course. To keep students informed about their progress, I will
  - return classroom activities and homework within one week of the due date and
  - provide grades for major assignments within 2 weeks of the due date or at least 3 days before the next major assignment is due, whichever comes first.

#### Reasonable Expectations of Engagement for Students

1. As a student, I understand that I am responsible for keeping up with the course. To help with this, I will
  - attend the course regularly and line up alternative transportation in case my primary means of transportation is unavailable;
  - recognize that the college provides free wi-fi, computer labs, and library resources during regular campus hours to help me with completing my assignments; and,
  - understand that my instructor does not have to accept my technical issues as a legitimate reason for late or missing work if my personal computer equipment or internet service is unreliable.

2. As a student, I understand that it is my responsibility to communicate quickly with the instructor any issue or emergency that will impact my involvement with or performance in the class. This includes, but is not limited to,
  - missing class when a major test is planned or a major assignment is due;
  - having trouble submitting assignments;
  - dealing with a traumatic personal event; and,
  - having my work or childcare schedule changed so that my classroom attendance is affected.
3. As a student, I understand that it is my responsibility to understand course material and requirements and to keep up with the course calendar. While my instructor is available for help and clarification, I will
  - seek out help from my instructor and/or from tutors;
  - ask questions if I don't understand; and,
  - attend class regularly to keep up with assignments and announcements.

### **Special Needs**

Odessa College complies with Section 504 of the Vocational Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. If you have any special needs or issues pertaining to your access to and participation in this or any other class at Odessa College, please feel free to contact me to discuss your concerns. You may also call the Office of Disability services at 432-335-6861 to request assistance and accommodations.

### **Learning Resource Center (Library)**

The Library, known as the [Learning Resources Center](#), provides research assistance via the [LRC's catalog \(print books, videos, e-books\)](#) and [databases \(journal and magazine articles\)](#). [Research guides](#) covering specific subject areas, [tutorials](#), and the "Ask a Librarian " service provide additional help.

### **Student E-mail**

Please access your [Odessa College Student E-mail](#), by following the link to either set up or update your account: <http://www.odessa.edu/gmail/>. **All assignments or correspondence will be submitted using your Odessa College email.**

### **Student Portal**

Please access your [Odessa College Student E-mail](#), by following the link to either set up or update your account: <http://www.odessa.edu/gmail/>. **All assignments or correspondence will be submitted using your Odessa College email.**

### **Technical Support**

For Blackboard username and password help and for help accessing your online course availability and student email account contact the Student Success Center at 432-335-6878 or online at [https://www.odessa.edu/dept/ssc/helpdesk\\_form.htm](https://www.odessa.edu/dept/ssc/helpdesk_form.htm).

### **Important School Policies**

For information regarding student support services, academic dishonesty, disciplinary actions, special accommodations, or student's and instructors' right to academic freedom can be found in the [Odessa College Student Handbook](#).

## **Odessa College's Institutional Core Objectives (ICOs):**

- 1) *Critical Thinking Skills - to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information*
- 2) *Communication Skills - to include effective development, interpretation and expression of ideas through written, oral and visual communication*
- 3) *Empirical and Quantitative Skills – to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions*
- 4) *Teamwork - to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal*
- 5) *Personal Responsibility - to include the ability to connect choices, actions and consequences to ethical decision-making*

*6) Social Responsibility - to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities*