



COURSE SYLLABUS FOR

PROCESS INSTRUMENTATION II

PTAC 2436

INSTRUCTOR: Pete Barrera Office Phone: 335-6495 Cell Phone: 413-4927 Office Hours: As Posted

COURSE NUMBER: PTAC 2436

CREDIT HOURS: 4 (3/3)

PREREQUISITE: Process Instrumentation I

CATALOGUE DESCRIPTION: : Study of the instruments and control systems used in the process industry including terminology, process variables, symbology, control loops, and basic troubleshooting.

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.

| TEST | | | |
|------|-------------------------------------|--|---|
| 1 | Pressure Sensors | <ul style="list-style-type: none"> } Functions of Measuring Instruments } Manometers } Burbon Tubes } Diaphragm-Pressure Sensors } Calibration } Pressure Switches | <ul style="list-style-type: none"> ↪ LAB 12.1 ↪ |
| 2 | Pressure Transducers | <ul style="list-style-type: none"> } Pressure Conversion } Types of Pressure Transducers | <ul style="list-style-type: none"> ↪ Lab 13.1 ↪ |
| 3 | Low-Pressure Measurement | <ul style="list-style-type: none"> } Vacuum } Low pressure } Methods of conversions | ↪ Lab 14.1 |
| | | TEST | |
| 4 | Principles of Level Measurement | <ul style="list-style-type: none"> } Measuring Liquid Level } Types of Gauges used } Level Switches } Level Control Loop | ↪ Lab 15.1 |
| 5 | Electrical Level Instruments | <ul style="list-style-type: none"> } Conductivity/Liquid Level } Types of Level Detectors | <ul style="list-style-type: none"> ↪ Lab 16.1 ↪ |
| 6 | Pressure Head Instruments | <ul style="list-style-type: none"> } Hydrostatic Pressure | ↪ Lab 17.1 |
| 7 | Solid Level Measurement | <ul style="list-style-type: none"> } Using weight to Determine Level } Types of Solid Level Measurements/Detectors | ↪ Lab 18.1 |
| 8 | Other Level Measurement Instruments | <ul style="list-style-type: none"> } Radiation } Ionization } infrared | Lab 19.1 |
| | | TEST | |
| 9 | Properties of Fluid Flow | <ul style="list-style-type: none"> } Importance of Flow Measurements } Basic Properties of Fluids | ↪ LAB 20.1 |
| 10 | Primary Flow Measuring Devices | <ul style="list-style-type: none"> } Measurement Methods | ↪ LAB 21.1 |
| 11 | Secondary Flow Measuring Devices | <ul style="list-style-type: none"> } Measuring Devices | ↪ LAB 22.1 |
| 12 | Variable-Area Instruments | <ul style="list-style-type: none"> } Rotameter } Piston and Vane } | ↪ LAB 23.1 |
| 13 | Positive-Displacement Meters | <ul style="list-style-type: none"> } Operation } Advantages/Disadvantages | ↪ LAB 24.1 |

| | | | |
|------------|---|---|--|
| | | <ul style="list-style-type: none"> Piston Meters | |
| 14 | Turbine and Magnetic Flowmeters | <ul style="list-style-type: none"> Operation Kinds of Turbine/Magnetic Flowmeters Advantages/Disadvantages | <ul style="list-style-type: none"> LAB 24.1 |
| | | TEST | |
| 15 | Introduction to Controllers | <ul style="list-style-type: none"> Development of Controllers Purpose of Automatic Controllers Kinds of Controllers Variables | <ul style="list-style-type: none"> LAB 24.1 |
| 16 | Controller Operation | <ul style="list-style-type: none"> Kinds of Controllers | <ul style="list-style-type: none"> LAB 24.1 |
| 17 | Controller Modes and Tuning | <ul style="list-style-type: none"> Controller tuning Types of Controllers | <ul style="list-style-type: none"> LAB 24.1 |
| 18 | Final Control Elements in Process Loops | <ul style="list-style-type: none"> Definition Types | <ul style="list-style-type: none"> LAB 24.1 |
| 19 | Control Valves | <ul style="list-style-type: none"> Control Valves Components Kinds of Control Vaves | <ul style="list-style-type: none"> LAB 24.1 |
| 20 | Electric Actuators | <ul style="list-style-type: none"> Solenoids Electric Motors AC/DC | <ul style="list-style-type: none"> LAB 24.1 |
| FINAL TEST | | | |
| | | | |

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 abd student email account contact the Student Success Center at 432-335-6878 or online at 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](#).