



## Course Syllabus

### **PTRT 1324 – Petroleum Instrumentation**

**Catalog Description:** Surveys the instruments, measurements, and control devices used within the major aspects of the petroleum industry. Basic terminology, functions, and applications of the various instruments will be discussed.

Lecture Hrs = 2, Lab Hrs = 2

**Prerequisites:** PTRT 1301

**Semester Credit Hours:** 3

**Lecture Hours per Week:** 2

**Contact Hours per Semester:** 64

**State Approval Code:** 1509030000

**Course Subject/Catalog Number:** PTRT 1318

**Course Title:** Natural Gas Production

**Course Rationale:** Provides the student basic knowledge of instrumentation required to operate and manage of petroleum facilities.

**Instructional Goals and Purposes:** The purpose of this course is to provide the student with skills in identifying, utilizing, and troubleshooting instrumentation used in hydrocarbon production.

**Learning Objectives:** Upon completion of this course, the student will be able to accomplish the following competencies.

1. Identify instrumentation and its application to Gas Production

SCANS (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1biv, 1bv, 1bvi, 1ci, 1civ, 1cv, 2ai, 2aii, 2aiii, 2bi, 2bii, 2biii, 2ci, 2cii, 2ciii, 2civ, 2di, 2dii, 2diii, 2ei, 2eii, 2eiii)

2. Demonstrate the application of RTU's and PLC's and their advantages

SCANS (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1biv, 1bv, 1bvi, 1ci, 1civ, 1cv, 2ai, 2aii, 2aiii, 2bi, 2bii, 2biii, 2ci, 2cii, 2ciii, 2civ, 2di, 2dii, 2diii, 2ei, 2eii, 2eiii)

3. Describe the use of pneumatic control systems

SCANS (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1biv, 1bv, 1bvi, 1ci, 1civ, 1cv, 2ai, 2aii, 2aiii, 2bi, 2bii, 2biii, 2ci, 2cii, 2ciii, 2civ, 2di, 2dii, 2diii, 2ei, 2eii, 2eiii)

4. Describe the use of electronic control systems

SCANS (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1biv, 1bv, 1bvi, 1ci, 1civ, 1cv, 2ai, 2aii, 2aiii, 2bi, 2bii, 2biii, 2ci, 2cii, 2ciii, 2civ, 2di, 2dii, 2diii, 2ei, 2eii, 2eiii)

5. Explain pressure measurement and control

SCANS (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1biv, 1bv, 1bvi, 1ci, 1civ, 1cv, 2ai, 2aii, 2aiii, 2bi, 2bii, 2biii, 2ci, 2cii, 2ciii, 2civ, 2di, 2dii, 2diii, 2ei, 2eii, 2eiii)

6. Identify the application of temperature measurement and control

SCANS (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1biv, 1bv, 1bvi, 1ci, 1civ, 1cv, 2ai, 2aii, 2aiii, 2bi, 2bii, 2biii, 2ci, 2cii, 2ciii, 2civ, 2di, 2dii, 2diii, 2ei, 2eii, 2eiii)

7. Identify the application of level measurement and control

SCANS (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1biv, 1bv, 1bvi, 1ci, 1civ, 1cv, 2ai, 2aii, 2aiii, 2bi, 2bii, 2biii, 2ci, 2cii, 2ciii, 2civ, 2di, 2dii, 2diii, 2ei, 2eii, 2eiii)

8. Identify the application of flow measurement and control

SCANS (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1biv, 1bv, 1bvi, 1ci, 1civ, 1cv, 2ai, 2aii, 2aiii, 2bi, 2bii, 2biii, 2ci, 2cii, 2ciii, 2civ, 2di, 2dii, 2diii, 2ei, 2eii, 2eiii)

9. Explain the importance of gravity, viscosity, humidity, and ph in automation

SCANS (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1biv, 1bv, 1bvi, 1ci, 1civ, 1cv, 2ai, 2aii, 2aiii, 2bi, 2bii, 2biii, 2ci, 2cii, 2ciii, 2civ, 2di, 2dii, 2diii, 2ei, 2eii, 2eiii)

10. Identify the difference in bus systems

SCANS (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1biv, 1bv, 1bvi, 1ci, 1civ, 1cv, 2ai, 2aii, 2aiii, 2bi, 2bii, 2biii, 2ci, 2cii, 2ciii, 2civ, 2di, 2dii, 2diii, 2ei, 2eii, 2eiii)

**Methods of Instruction/Course Format/Delivery:** Class will meet weekly for lecture and labs. Additional lab work and research projects will be assigned.

**Course Grade:**

Note: The instructor may implement a different grading policy.

Attendance and Participation: 10 %

Weekly assignments: 50 %

Exams: 40 %

Assignments are due as assigned and 10 points for each day the work is late.

Exams: Any test missed by the student will be counted as a 0 unless prior arrangements have been made with the instructor

**Texts, Materials, and Supplies:**

Title: *Basic Instrumentation 4<sup>th</sup> edition*

Publisher: PETEX

Catalog Number: ISBN 0-88698-197-2

Note: See student counselor or instructor concerning the acquisition of the books for this course.

Supplies: Scientific calculator

## Secretary of Labor's Commission on Achieving Necessary Skills (SCANS)

### 1. BASIC SKILL COMPETENCIES

#### A. Basic Skills

- i. **Reading:** Locate, understand and interpret written information in prose and in documents such as manuals, graphs and schedules.
- ii. **Writing:** Communicate thoughts, ideas, information and messages in writing, and create documents such as letters, directions, manuals, reports, graphs, and flow charts.
- iii. **Arithmetic & Mathematical Operations:** Perform basic computations and approach practical problems by choosing appropriately from a variety of mathematical techniques.
- iv. **Listening:** Receive, attend to, interpret, and respond to verbal messages and other cues.
- v. **Speaking:** Organize ideas and communicate orally.

#### B. Thinking Skills

- i. **Creative Thinking:** Generate new ideas.
- ii. **Decision Making:** Specify goals and constraints generate alternatives, consider risks and evaluate and choose the best alternative.
- iii. **Problem Solving:** Recognize problems and devise and implement plan of action.
- iv. **Visualize ("Seeing Things in the Mind's Eye"):** Organize and process symbols, pictures, graphs, objects, and other information.
- v. **Reasoning:** Discover a rule or principle underlying the relationship between two or more objects and apply it when solving a problem.

#### C. Personal Qualities

- i. **Responsibility:** Exert a high level of effort and persevere toward goal attainment.
- ii. **Self-Esteem:** Believe in one's own self-worth and maintain a positive view of oneself.
- iii. **Sociability:** Demonstrate understanding, friendliness, adaptability, empathy, and politeness in group settings.
- iv. **Self-Management:** Assess oneself, set personal goals, monitor progress, and exhibit self-control.
- v. **Integrity & Honesty:** Choose ethical courses of action.

## 2. WORKPLACE COMPETENCIES

### A. Resources:

- i. **Time:** Select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
- ii. **Money:** Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
- iii. **Material & Facilities:** Acquire, store, allocate, and use materials or space efficiently.
- iv. **Human Resources:** Assess skills and distribute work accordingly, evaluate performance and provide feedback.

### B. Interpersonal Skills:

- i. **Participate as Member of a Team:** Contribute to group effort.
- ii. **Teach Others New Skills.**
- iii. **Serve Clients/ Customers:** Work to satisfy customers' expectations.
- iv. **Exercise Leadership:** Communicate ideas to justify position, persuade & convince others, responsibly challenge existing procedures & policies.
- v. **Negotiate:** Work toward agreements involving exchange of resources, resolve divergent interests.
- vi. **Work with Diversity:** Work well with men and women from diverse backgrounds.

### C. Information:

- i. **Acquire and Evaluate Information.**
- ii. **Organize and Maintain Information.**
- iii. **Interpret and Communicate Information.**
- iv. **Use computers to process information.**

### D. Systems:

- i. **Understand Systems:** Know how social, organizational and technological systems work and operate effectively with them.
- ii. **Monitor & Correct Performance:** Distinguish trends, predict impacts on system operations, and diagnose deviations in systems' performance.
- iii. **Improve or Design Systems:** Suggest modifications to existing systems and develop new or alternative systems to improve performance.

### E. Technology

- i. **Select Technology:** Choose procedures, tools or equipment including computers and related technologies.
- ii. **Apply Technologies to Task:** Understand overall intent and proper procedures for setup and operation of equipment.
- iii. **Maintain and Troubleshoot Equipment:** Prevent, identify, or solve problems with equipment, including computers and other technologies.