Instrumentation
Level

Course Objectives

1. Define and differentiate level, continuous level measurement, and single-point level detection.
2. Identify common methods and instruments for measuring level including: sticking a tank; plumb bob; level gauges/sight glasses; float and tape; magnetic; conductivity probe; and level transmitters using bubble system, D/P cell, radar, sonar, and radioactive sensing elements; and weight-based level instruments
3. Describe the operation of common level measurement instruments.
4. Describe typical applications for common level measurement instruments.
5. Describe safety concerns for common level measurement instruments.
6. Describe typical malfunctions for common level measurement instruments.
7. Identify common level instrument symbols on P&IDs.
8. Measure level using concepts and principles of measurement for common instruments.
9. Solve common problems encountered when using level measurement instruments.

Key Terms (Define the following)

head pressure - _____

_____

ullage - _____

_____

innage - _____

_____

Principles

Level Instrumentation Categories				
Visual inspection	**Electromechanical**	**Pressure-based**	**Electronic**	**Weight-based**
Level gauges	Float and tape gauges	Differential pressure transmitters	Capacitive sensors	Load cells
Dip sticks	Plumb bobs	Bubble systems	Ultrasonic sensors	
		Displacers	Radar sensors	
			Radiation sensors	

Questions

1. A bubbler system measures _____ pressure using a gas flow.

2. A nuclear level instrument uses a radiation source and a
   - ☐ radar wave
   - ☐ detector
   - ☐ conductor
   - ☐ displacer

3. Pressure exerted by a liquid is called _____ or _____ pressure.

4. Displacers are a popular level instrument for slurries.
   - ☐ True
   - ☐ False