DAY 1

Introduction – Basic Fluid and Gas Laws

- Custody Transfer Principles and Requirements
- Pressure, Viscosity, Flow Volume, Continuity Principle, Energy Law *(Bernoulli's)*
- Flow Configurations (Flow Profiles), Laminar Flow, Turbulent Flow
- Reynold's Number, Flow Losses *(Friction Losses)*
- Ideal and Real Gases, Gas Laws, Boyle's Law, Charles's Law, Gay-Lussac's Law

DAY 2

General Characteristics and Performance of Flow Meters

- System Characteristics and Flow Range
- Performance, Accuracy, Stability and Repeatability, Sensitivity, Noise, Linearity, Reliability
- Flow Modification and Meter Runs
- Applications and Usage, Sizing
- Temperature and Pressure Measurements

DAY 3

Types and Applications of Flow Meters

- Differential Pressure (DP) Flow Meters, Orifice, Venturi, Nozzles, Pitot Tubes
- Positive Displacement (PD) Flow Meters, Rotor, Oscillating Piston, Oval Gear
- Turbine Flow Meters, Conventional and Helical
- Problems with Erosion, Corrosion, Cavitation and Obstructions
- Uses and Applications, Installation Requirements and Standards

DAY 4

Types and Applications of Flow Meters (continued)

- Ultrasonic Flow Meters
- Magnetic Flow Meters
- Coriolis Flow Meters
- Uses and Applications, Installation Requirements and Standards
- Straight Run Requirement

DAY 5

Flow Measurement Systems and Custody Transfer Considerations

- Custody Transfer Requirements
- Meter Factor
- Proving Systems: Direct, Indirect, Master Meter, Volume, Displacement
- Custody Transfer Skids
- Flow Computers and Communication
- Temperature and Pressure Measurements