

TDSTI 60-Day I & C Training Outline

Time Range	Section	Subjects	Format(s)
<p>Ninety percent of all training will take place in the calibration lab, including the CBT. The instructor will lecture and demonstrate methods of teaching on the actual course materials. The students will then reverse rolls and teach the instructor. Later in the course the instructor will observe the students teaching mock classes and will grade the students on their ability to teach, construct exams, ect.....</p>			
TE- Text Book	IF- Instructor Facilitated	CBT- Computer Based Training	H/O- Hands On
Day 1-7	1 - Teaching Basics	Teaching Methods and Applications of This	IF
		Observing Your Class	IF
		Materials Presentation	IF
		Recognizing Achievement	IF
		Creating Quizzes/Exams	IF
	2 - Industrial Electricity	Matter and Its Properties	TE, IF
		What Is Matter?	TE, IF
		Forms of Matter	TE, IF
		Properties of Matter	TE, IF
		Physical Properties	TE, IF
		Chemical Properties Molecules	TE, IF
		Elements	TE, IF
		Effect of Thermal Energy on Molecules	TE, IF
		Understanding Shape and Volume	TE, IF
		Fluids Energy	TE, IF
		Potential Energy	TE, IF
		Kinetic Energy	TE, IF
		Internal Energy	TE, IF
		Create a Quiz	IF

	3 - Process Variables	Process Variables	TE, IF, CBT
		Processes	TE, IF, CBT
		Variables	TE, IF, CBT
		Function of Instruments	TE, IF, CBT
		Temperature	TE, IF, CBT
		Properties and Temperature Changes	TE, IF, CBT
		Temperature Scales	TE, IF, CBT
		Weight	TE, IF, CBT
		Mass and Weight	TE, IF, CBT
		Density	TE, IF, CBT
		Pressure	TE, IF, CBT
		Pressure and Force	TE, IF, CBT
		Units of Pressure	TE, IF, CBT
		Atmospheric Pressure	TE, IF, CBT
		Gauge Pressure	TE, IF, CBT
		Vacuum and Absolute Pressure	TE, IF, CBT
		Absolute Pressure	TE, IF, CBT
		Barometric Pressure	TE, IF, CBT
		Calculating the Amount of Pressure	TE, IF, CBT
		Differential Pressure	TE, IF, CBT
		Flow	TE, IF, CBT
		Flow Rate	TE, IF, CBT
		Units of Flow	TE, IF, CBT
		Effect of Energy	TE, IF, CBT
		Standard and Actual Readings	TE, IF, CBT
		Flow of Gases	TE, IF, CBT
		Flow of Liquids Level Other Process Variables	TE, IF, CBT
		Students Teach the Teacher	TE, IF, CBT, H/O

		Create a Quiz	IF
Day 8-13	4 - Direct Read	Teaching Methods and Applications of This	IF
		Observing Your Class	IF
		Materials Presentation	IF
		Class Safety	IF
		Pressure	TE, IF, CBT, H/O
		Pressure Gauges	TE, IF, CBT, H/O
		Bourdon Tubes	TE, IF, CBT, H/O
		Manometers	TE, IF, H/O
		U-Tube Manometers	TE, IF, H/O
		Reservoir or Well-Type Manometers	TE, IF, H/O
		Inclined Manometers	TE, IF, H/O
		Level	TE, IF, CBT, H/O
		Flow	TE, IF, CBT, H/O
		Rotameters	TE, IF, H/O
		Floats	TE, IF, H/O
		Temperature	TE, IF, CBT, H/O
		Filled-System Thermometers	TE, IF, H/O
		Bimetallic Thermometers	TE, IF, H/O
		Weight	TE, IF, H/O
		Lever	TE, IF, H/O
		Classes of Levers	TE, IF, H/O
		The Law of Moments	TE, IF, H/O
		Using Levers in Scales	TE, IF, H/O
		Possible Sources of Error	TE, IF, H/O
		Create a Quiz	IF
	5 - Elements of Control	Teaching Methods and Applications of This	IF
		Observing Your Class	IF

		Materials Presentation	IF
		Why Instruments Are Important	TE, IF, H/O
		Safety	TE, IF, H/O
		Product Specifications	TE, IF, H/O
		Basic Function of Control Systems	TE, IF, H/O
		Control Steps	TE, IF, H/O
		Control Loops	TE, IF, CBT, H/O
		Input and Output	TE, IF, H/O
		Signal Transfer	TE, IF, H/O
		Transfer Medium	TE, IF, H/O
		Types of Signals	TE, IF, H/O
		Basic Elements of Control Loops	TE, IF, H/O
		Sensors	TE, IF, CBT, H/O
		Indicators and Recorders	TE, IF, CBT, H/O
		Flow Transmitters	TE, IF, CBT, H/O
		Controllers	TE, IF, CBT, H/O
		Final Control Elements	TE, IF, H/O
		Students Teach the Teacher	TE, IF, CBT, H/O
		Create a Quiz	IF
Day 14-17	6 - Temperature Sensors	Teaching Methods and Applications of This	IF
		Observing Your Class	IF
		Materials Presentation	IF
		Class Safety	IF
		Thermocouples	TE, IF, CBT, H/O
		Operation	TE, IF, CBT, H/O
		Types of Thermocouples Using Conversion	TE, IF, CBT, H/O
		Thermocouple Construction	TE, IF, CBT, H/O
		Resistance Temperature Detectors Measuring	TE, IF, CBT, H/O

		Wire-Wrapped RTDs	TE, IF, CBT, H/O
		Thin-Film RTDs	TE, IF, CBT, H/O
		Filled Thermal Systems	TE, IF, CBT, H/O
		Thermowells	TE, IF, CBT, H/O
		Create a Quiz	IF
		Students Teach the Teacher	TE, IF, CBT, H/O
		Students Teach Mock Class	TE, IF, CBT, H/O
Day 18-21	7 - Pressure Sensors	Teaching Methods and Applications of This	IF
		Observing Your Class	IF
		Materials Presentation	IF
		Class Safety	IF
		Pressure Transducers	TE, IF, CBT, H/O
		Strain Gages	TE, IF, CBT, H/O
		Capacitance Pressure Sensors	TE, IF, CBT, H/O
		Operation	TE, IF, CBT, H/O
		Measuring Differential Pressure	TE, IF, CBT, H/O
		Applications	TE, IF, CBT, H/O
		Create a Quiz	IF
		Students Teach the Teacher	TE, IF, CBT, H/O
		Students Teach Mock Class	TE, IF, CBT, H/O
Day 22-25	8 - Level Sensors	Teaching Methods and Applications of This	IF
		Observing Your Class	IF
		Materials Presentation	IF
		Class Safety	IF
		Types of Level Sensors	TE, IF, CBT, H/O
		Using Differential Pressure Bubblers	TE, IF, CBT, H/O
		Floats	TE, IF, CBT, H/O
		Floats and Cables	TE, IF, CBT, H/O

		Magnetic Floats	TE, IF, CBT, H/O
		Floats with Levers	TE, IF, CBT, H/O
		Floats with Switches	TE, IF, CBT, H/O
		Displacement Sensors	TE, IF, CBT, H/O
		Capacitance	TE, IF, CBT, H/O
		Conductivity Probes	TE, IF, CBT, H/O
		Ultrasonic and Radar Sensors	TE, IF, CBT, H/O
		Other Single Point Level Sensors	TE, IF, CBT, H/O
		Create a Quiz	IF
		Students Teach the Teacher	TE, IF, CBT, H/O
		Students Teach Mock Class	TE, IF, CBT, H/O
Day 26-31	9 - Flow Sensors	Teaching Methods and Applications of This	IF
		Observing Your Class	IF
		Materials Presentation	IF
		Class Safety	IF
		Rate and Velocity	TE, IF, CBT, H/O
		Factors to Consider	TE, IF, CBT, H/O
		Pressure/Velocity Relationship	TE, IF, CBT, H/O
		Viscosity	TE, IF, CBT, H/O
		Density	TE, IF, CBT, H/O
		Friction	TE, IF, CBT, H/O
		Patterns of Flow	TE, IF, CBT, H/O
		Differential Pressure Sensors	TE, IF, CBT, H/O
		Vortex Sensors	TE, IF, CBT, H/O
		Magnetic Flow Sensors	TE, IF, CBT, H/O
		Positive Displacement Sensors	TE, IF, CBT, H/O
		Turbine Flow Sensors	TE, IF, CBT, H/O
		Mass Flow Sensors	TE, IF, CBT, H/O

		Coriolis-Based	TE, IF, CBT, H/O
		Thermal-Based	TE, IF, CBT, H/O
		Create a Quiz	IF
		Students Teach the Teacher	TE, IF, CBT, H/O
		Students Teach Mock Class	TE, IF, CBT, H/O
Day 32	10 - Weight Sensors	Basic Fundamentals	TE, IF, H/O
Day 33 - 37	11 - Transmitters	Teaching Methods and Applications of This	IF
		Observing Your Class	IF
		Materials Presentation	IF
		Class Safety	IF
		Function of Transmitters	TE, IF, CBT, H/O
		In the Control Loop	TE, IF, CBT, H/O
		Types of Transmitters	TE, IF, CBT, H/O
		Pneumatic Transmitters	TE, IF, CBT, H/O
		Standard Signal Range	TE, IF, CBT, H/O
		Operation	TE, IF, CBT, H/O
		A Proportional Relationship	TE, IF, CBT, H/O
		Calibration	TE, IF, CBT, H/O
		Zero Adjustment	TE, IF, CBT, H/O
		Range Adjustment	TE, IF, CBT, H/O
		Electronic Transmitters	TE, IF, CBT, H/O
		Adjusting Electronic Transmitters	TE, IF, CBT, H/O
		Power Supply	TE, IF, CBT, H/O
		Input and Output Transducers and Converters	TE, IF, CBT, H/O
		I/P and P/I Converters	TE, IF, CBT, H/O
		I/I Converter	TE, IF, CBT, H/O
		Create a Quiz	IF
		Students Teach the Teacher	TE, IF, CBT, H/O

		Students Teach Mock Class	TE, IF, CBT, H/O
Day 38	12 - Recorders	Basic Fundamentals	TE, IF, H/O
Day 39-44	13 - Controllers	Teaching Methods and Applications of This	IF
		Observing Your Class	IF
		Materials Presentation	IF
		Class Safety	IF
		Function of Controllers	TE, IF, CBT, H/O
		Direct- or Reverse-Acting	TE, IF, CBT, H/O
		Considering Time	TE, IF, CBT, H/O
		Types of Control Modes	TE, IF, CBT, H/O
		Control Modes	TE, IF, CBT, H/O
		On-Off Control	TE, IF, CBT, H/O
		Proportional Band Control	TE, IF, CBT, H/O
		Reset or Integral Mode	TE, IF, CBT, H/O
		Derivative or Rate Mode	TE, IF, CBT, H/O
		Tuning	TE, IF, CBT, H/O
		Programmable Logic Controllers	TE, IF, CBT, H/O
		Create a Quiz	IF
		Students Teach the Teacher	TE, IF, CBT, H/O
		Students Teach Mock Class	TE, IF, CBT, H/O
Day 45 - 49	14 - Final Control	Teaching Methods and Applications of This	IF
		Observing Your Class	IF
		Materials Presentation	IF
		Class Safety	IF
		Function of Final Control Elements	TE, IF, CBT, H/O
		Actuators	TE, IF, CBT, H/O
		Diaphragm Design	TE, IF, CBT, H/O
		Adding a Valve Positioner	TE, IF, CBT, H/O

		Hydraulic Piston Actuators	TE, IF, CBT, H/O
		Motor Actuators	TE, IF, CBT, H/O
		Performance Characteristics	TE, IF, CBT, H/O
		Other Final Control Elements	TE, IF, CBT, H/O
		Create a Quiz	IF
		Students Teach the Teacher	TE, IF, CBT, H/O
		Students Teach Mock Class	TE, IF, CBT, H/O
Day 50 - 53	15 - Control Loops	Teaching Methods and Applications of This	IF
		Observing Your Class	IF
		Materials Presentation	IF
		Class Safety	IF
		Single Element Control Loops	TE, IF, CBT, H/O
		Cascade Control	TE, IF, CBT, H/O
		Feedforward Control	TE, IF, CBT, H/O
		Ratio Control	TE, IF, CBT, H/O
		Create a Quiz	IF
		Students Teach the Teacher	TE, IF, CBT, H/O
		Students Teach Mock Class	TE, IF, CBT, H/O
Day 54 - 56	16 - Use and Care of	Use and Care of Test Equipment	TE, IF, H/O
Day 57 - 59	17 - Record	Record Keeping/Data Sheets	TE, IF, H/O
		Students Teach the Teacher	TE, IF, CBT, H/O
		Students Teach Mock Class	TE, IF, CBT, H/O
Day 60	18 - Final Review and	Final Review and Exam	IF