

BASIC SKILLS

WORKPLACE MATHEMATICS

- ▶ Whole Numbers
- ▶ Fractions
- ▶ Decimals
- ▶ Algebra

MECHANICAL PRINT READING

- ▶ Orthographic Projection
- ▶ Format and Dimension
- ▶ Types and Symbols
- ▶ Thread Specifications

WORKPLACE READING

- ▶ Basic Skills
- ▶ Literal Comprehension - Main Idea
- ▶ Literal Comprehension - Relationships
- ▶ Inference
- ▶ Study Skills

PROCESS OPERATIONS TRAINING

- ▶ Applied Chemistry: General Chemistry

ELECTRICAL MAINTENANCE

AC/DC ELECTRONICS

- ▶ Current
- ▶ Voltage
- ▶ Resistance
- ▶ Ohm's Law
- ▶ Magnetism
- ▶ Electrical Measurements
- ▶ DC Circuits
- ▶ Inductance & Capacitance
- ▶ Alternating Current
- ▶ AC Measurements
- ▶ Capacitive Circuits
- ▶ Inductive Circuits
- ▶ Transformers
- ▶ Tuned Circuits

APPLIED DC FUNDAMENTALS

- ▶ Voltage, Resistance, and Current
- ▶ Electronic Components and Magnetism
- ▶ Electronic Schematics and Circuit Analysis
- ▶ Ohm's Law and DC Circuits

BASIC ELECTRONIC COMPONENTS

- ▶ Types and Diagrams
- ▶ Controls and Application
- ▶ Operation and Troubleshooting

DC MOTOR CONTROLLERS

- ▶ Controller Function and Operation
- ▶ Maintenance and Troubleshooting

DC MOTORS

- ▶ Basics and Internal Parts of DC Motors
- ▶ Wiring Diagrams and Troubleshooting

ELECTRONIC CIRCUITS

- ▶ Basic Principles
- ▶ Characteristics and Operations
- ▶ Logic Fundamentals, Types & Application

ELECTRICAL MAINTENANCE

INDUSTRIAL ELECTRICITY

- ▶ Basic Principles
- ▶ Alternating Current
- ▶ Conductors
- ▶ Wiring
- ▶ Installation, Distribution and Lighting
- ▶ Generators and Motors
- ▶ AC Motor Control and Current Measurement

MECHANICAL ELECTRICAL CONTROL SYSTEMS

- ▶ Introduction to Control Schematics
- ▶ Electrical Lockout
- ▶ Design And Troubleshooting
- ▶ Energy Management
- ▶ Electronic Controls
- ▶ Responsive Systems
- ▶ Creating Schematics

PROGRAMMABLE LOGIC CONTROLLERS

- ▶ Fundamentals
- ▶ Programming
- ▶ Inputs and Outputs
- ▶ Troubleshooting
- ▶ Communications and Advanced Programming

MOTOR CONTROLS

- ▶ Basic Motor Controls & Relays
- ▶ Overload Protection Devices
- ▶ Time Delay Relays
- ▶ Schematic Symbols
- ▶ Schematics and Wiring Diagrams
- ▶ Starting Methods for Squirrel Cage Motors
- ▶ Wye-Delta, Synchronous & Wound Rotor Controls
- ▶ Installing & Troubleshooting Control Systems

MOTOR DRIVES

- ▶ Motor Drive Identification
- ▶ Open and Closed Loop Systems
- ▶ Variable Speed AC Drives
- ▶ Servo and Stepper Motors
- ▶ AC Motor Operation
- ▶ AC Drive Selection and Setup

CONTROLLOGIX

- ▶ Introduction To The ControlLogix PLC Family
- ▶ Introduction to RSLogix 5000 Software
- ▶ Creating & Using Tags & the Program Editor
- ▶ Basic Instructions
- ▶ Advanced Programming & Analog Devices
- ▶ PLC Troubleshooting

MECHANICAL MAINTENANCE

INDUSTRIAL BEARINGS

- ▶ Application and Technology
- ▶ Maintenance and Installation
- ▶ Troubleshooting

INDUSTRIAL DRIVES

- ▶ Belt Drives
- ▶ Chain Drives
- ▶ Complete Drive Packages
- ▶ Enclosed Drive Systems
- ▶ Gears & Gear Systems
- ▶ Shaft Joining and Coupling Devices

INDUSTRIAL SEALS

- ▶ Gaskets & Packings - Inspection & Installation
- ▶ Mechanical Face Seals -
Troubleshooting & Installation
- ▶ Types, Materials & Properties

PIPEFITTING

- ▶ Introduction to Pipefitting
- ▶ Piping Systems and Standards
- ▶ Pipe Fittings & Joints
- ▶ Measuring Pipe and Drawings
- ▶ Offsets
- ▶ Manual and Electric Threaded Pipe
- ▶ Flanged Pipe
- ▶ Plastic Pipe
- ▶ Accessories and Specialty Equipment
- ▶ Tubing
- ▶ Hoses

BOILERS

- ▶ Introduction to Boilers - An Overview
- ▶ Introduction to Boilers: Design and Construction
- ▶ Boilers: Feedwater and Steam
- ▶ Boilers: Boiler Fuel and Air – Controlling for Safety and Efficiency
- ▶ Boiler Operations

INDUSTRIAL HYDRAULICS

- ▶ Basic Principles and Application
- ▶ Function and Operating Principles
- ▶ Maintenance & Troubleshooting
- ▶ Types & Concepts

HYDRAULICS

- ▶ Harnessing Hydraulic Power
- ▶ The Hydraulic Circuit
- ▶ Pumps and Actuators
- ▶ Control Valves
- ▶ Hydraulic Fluid
- ▶ System Safety and Maintenance
- ▶ Hydraulic System Troubleshooting

HYDRAULIC POWER SYSTEMS & TROUBLESHOOTING

- ▶ Identification and Operation
- ▶ Troubleshooting Techniques
- ▶ Maintenance Troubleshooting Skills: Hydraulic Circuits and HVAC

MACHINERY LUBRICATION

- ▶ Lubricating Oil - Types, Properties & Handling
- ▶ Lubricating Oil - Equipment & Procedures
- ▶ Lubricating Greases -
Types, Application & Equipment

STEAM TRAPS

- ▶ Types, Principles, and Functions
- ▶ Sizing, Installation and Monitoring
- ▶ Diagnostics & Troubleshooting

CENTRIFUGAL PUMPS

- ▶ Design and Function
- ▶ System Characteristics and Selection
- ▶ Operation and Maintenance
- ▶ Troubleshooting & Disassembly
- ▶ Reassembling and Installation

MECHANICAL MAINTENANCE

HVAC&R

- ▶ Condensers - Maintenance & Troubleshooting
- ▶ Cooling Towers - Maintenance & Troubleshooting
- ▶ Complete System Troubleshooting
- ▶ Chillers - Leak Check and Electrical
- ▶ Air Handlers - Mechanical Systems

ULTRASONICS

- ▶ Basic Principles
- ▶ Leak Detection
- ▶ Mechanical & Electrical Inspection

CLUTCHES & BRAKES

- ▶ Types, Principles and Functions
- ▶ Troubleshooting

PNEUMATICS

- ▶ The Power of Compressed Air
- ▶ The Pneumatic Circuit
- ▶ Processing Air
- ▶ Actuators
- ▶ Pneumatic Control Valves
- ▶ Working Safely with Pneumatic Systems
- ▶ Pneumatic System Maintenance
- ▶ Pneumatic System Troubleshooting

PREDICTIVE MAINTENANCE

MACHINERY OIL ANALYSIS

- ▶ Fundamentals and Methods
- ▶ Strategies, Options and Testing
- ▶ Establishing an Effective Program

THERMOGRAPHY

- ▶ Basic Operations
- ▶ Operating Procedures and Implementation
- ▶ Practical Applications

ADVANCED VIBRATION ANALYSIS

- ▶ AC Induction Motors Part 1
- ▶ AC Induction Motors Part 2

VIBRATION ANALYSIS

- ▶ Predictive Maintenance and Machine Vibration
- ▶ Machine Vibration Basic Theory
- ▶ Preparing for Data Collection
- ▶ The Data Processing System
- ▶ Data Collection
- ▶ Data Analysis

MACHINE TECHNOLOGY

BASIC MACHINE TECHNOLOGY

- ▶ Safety Procedures & Guidelines
- ▶ Hand Tools & Their Uses
- ▶ The Use of Measuring Tools
- ▶ The Vertical Milling Machine
- ▶ The Vernier Caliper & Vernier Protractor
- ▶ The Pedestal Grinder
- ▶ Sharpening Drill Bits by Hand & Machine
- ▶ Drill Presses - Sensitive & Radial Arm
- ▶ Drill Press Operations
- ▶ Vertical Band Saws - Parts, Accessories & Operation

BASIC ENGINE LATHE

- ▶ Accessories
- ▶ Identification of Parts and Care
- ▶ Speed and Feed
- ▶ Grinding a Right – Hand Roughing Tool
- ▶ Grinding a Round – Nose Finishing Tool
- ▶ Three Methods of Facing Work to Length
- ▶ Straight Turning Work of Two Diameters
- ▶ Straight Turning Between Centers
- ▶ Drilling, Boring, and Reaming Work
- ▶ Turning a Radius
- ▶ Turning Tapers
- ▶ Filing and Polishing
- ▶ Knurling

COMPUTER NUMERICAL CONTROL

- ▶ Introduction
- ▶ Preparing for Programming
- ▶ Absolute and Incremental Positioning
- ▶ One and Two Axis Linear Milling
- ▶ Three Axis Linear and Circular Milling
- ▶ Complete Milling Programs
- ▶ Drilling, Boring, and Spot-Facing
- ▶ Subroutines
- ▶ Special Cycles
- ▶ Mirror Image Special Cycles
- ▶ Quick Code
- ▶ Polar Coordinate Programming
- ▶ Scaling & Engraving Programming
- ▶ Rotation
- ▶ Cutter Compensation

SUSTAINABILITY

ENERGY MANAGEMENT

- ▶ Energy Smart
- ▶ Best Practices
- ▶ Instrumentation and Controls
- ▶ Theory of Steam Generation
- ▶ Fuels and the Combustion Process
- ▶ Boilers and Auxiliaries
- ▶ Emissions Control and Ash Handling
- ▶ Steam Distribution
- ▶ Steam Turbines and Condensers
- ▶ Electricity Generation and Distribution
- ▶ Pumping Systems
- ▶ Cooling Towers
- ▶ Raw Water Treatment
- ▶ Compressed Air
- ▶ Refrigeration
- ▶ HVAC and Indoor Air Quality

INSTRUMENTATION & CONTROL

ELECTRONIC MAINTENANCE

- ▶ Solid-State Devices
- ▶ Integrated Circuits and Op Amps
- ▶ Sensor and Transducer Principles
- ▶ Transmitters
- ▶ Transducers
- ▶ Controllers, Indicators, and Recorders
- ▶ Tuning
- ▶ Sampling Systems & Gas Chromatograph Valves
- ▶ Gas Chromatograph Ovens and Controllers
- ▶ Spectroscopic Analyzers
- ▶ Electrochemical Analyzers
- ▶ Instrument Loop Troubleshooting

SMART DIGITAL INSTRUMENTATION

- ▶ Understanding HART Protocol
- ▶ Applications of HART Smart Field Device
- ▶ Configuring, Calibrating & Testing HART Smart Field Devices
- ▶ Foundation Fieldbus

CONTINUOUS PROCESS CONTROL

- ▶ Principles of Continuous Control
- ▶ Applications of Heat Exchanger Control
- ▶ Applications of Distillation Control
- ▶ Applications of pH Control

CONTROL VALVES & ACTUATORS

- ▶ Basics & Function
- ▶ Types & Design
- ▶ Fundamentals & Selection
- ▶ Sizing & Installation

BASIC PROCESS CONTROL

- ▶ Feedback Control
- ▶ Process Control Modes
- ▶ Process Characteristics
- ▶ Process Variables
- ▶ Instrumentation Symbols
- ▶ Instrumentation Loop Diagrams
- ▶ Piping and Instrumentation Diagrams
- ▶ Mechanical Connections
- ▶ Electrical Connections

CALIBRATION TEST EQUIPMENT

- ▶ Primary Calibration Standards
- ▶ Pneumatic Test Equipment
- ▶ Electronic Test Equipment
- ▶ Instrumentation Errors
- ▶ Instrument Calibration

PROCESS MEASUREMENT

- ▶ Temp 1 - Thermometers and Thermocouples
- ▶ Temp 2 - Resistance and Radiation Devices
- ▶ Pressure 1 - Manometers and Gages
- ▶ Pressure 2 - Indicators and Transmitters
- ▶ Level 1 - Measurement and Gages
- ▶ Level 2 - Indicators and Transmitters
- ▶ Flow 1 - Measurement Overview
- ▶ Flow 2 - Flow Sensors

GAGING & MEASUREMENT

- ▶ Type and Fundamentals
- ▶ Procedures and Operation

USING RSLOGIX

- ▶ Configuring Hardware and Software
- ▶ Programming and Editing
- ▶ Testing/Troubleshooting Functions

INSTRUMENTATION & CONTROL

FIELDBUS

- ▶ Fieldbus: Fieldbus Curriculum Overview
- ▶ Fieldbus: The Road To Fieldbus
- ▶ Fieldbus: Fieldbus Wiring
- ▶ Fieldbus: Fieldbus Devices
- ▶ Fieldbus: Introduction to Configuration
- ▶ Fieldbus: Introduction to Control Strategy
- ▶ Fieldbus: Control Strategy
- ▶ Fieldbus: Data Flow & Communications

- ▶ Fieldbus: Fieldbus Calibration
- ▶ Fieldbus: OPC
- ▶ Fieldbus: Introduction To Troubleshooting
- ▶ Fieldbus: Troubleshooting
- ▶ Fieldbus: Fieldbus Maintenance
- ▶ Fieldbus: Maintenance Exercises



GENERAL MAINTENANCE

MAINTENANCE PRINCIPLES

- ▶ Maintenance Principles

OPERATOR INSPECTION

- ▶ Pneumatic System Inspection
- ▶ Vacuum System Inspection
- ▶ Air Compression System Inspection
- ▶ Fastener & Equipment Structure Inspection
- ▶ Electrical Equipment & Control System Inspection
- ▶ Motor & Drive System Inspection
- ▶ Belt Drive, Chain Drive & Gear Box Inspection
- ▶ Clutch & Brake Inspection
- ▶ Lubrication System Inspection

MAINTENANCE AND RELIABILITY PRINCIPLES

- ▶ People
- ▶ Processes
- ▶ Technologies

INTRODUCTORY OPERATOR TRAINING

- ▶ Abnormal Operations
- ▶ Properties of Fluids
- ▶ Physical Force
- ▶ Organic Chemistry
- ▶ Normal Operations
- ▶ Start-Up Operations
- ▶ Equipment Care
- ▶ Quantify Physical Characteristics
- ▶ Temperature and Heat
- ▶ General Chemistry
- ▶ Inorganic Chemistry of Water
- ▶ Shutdown Operations
- ▶ Hand Tools

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