

**Each training unit consists of a student study guide, student test booklet, many power points, hands-on training aid kit, and an instructor guide.**

## **Level One – Basic Mechanics Training Program**

### **Volume 1: Shop Mathematics**

- Unit 1:** Base 10, Decimals, Decimal Equivalents, Percentages
- Unit 2:** Fractions
- Unit 3:** Algebraic Expressions, Simple Equations, Ratio, Proportion
- Unit 4:** Graphs, Charts, Data Handling
- Unit 5:** Weights, Measures, Metric Conversion
- Unit 6:** Exponents, Square Roots, Right Triangles
- Unit 7:** Angles, Plane Figures, Area
- Unit 8:** Measurement of Solid Figures, Volume, Intro. To Trig.
- Unit 9:** Trigonometric Tables

### **Volume 2: Blueprint Reading & Machine Drawing**

- Unit 1:** Elements of Blueprints and Machine Drawing I

### **Volume 3: Measurement**

- Unit 1:** Linear Measurement

### **Volume 4: Hand Tools**

- Unit 1:** Care and Use of Hand Tools
- Unit 2:** Mechanical Fasteners

### **Volume 5: Basic Mechanical Components I**

- Unit 1:** Basic Machines
- Unit 2:** Shafts, Couplings, Pulleys, Belts and Chain Drives
- Unit 3:** Gears and Gear Ratios
- Unit 4:** Advanced Couplings
- Unit 5:** Basic Alignment

### **Volume 6: Bearings & Lubrication**

- Unit 1:** Principles of Bearing Operation, Components, Bearings
- Unit 2:** Principles of Friction and Lubricants

### **Volume 7: Basic Mechanical Components II**

- Unit 1:** Levers, Cranks, Linkages, and Springs
- Unit 2:** Types and Uses of Cams, Timing Adjustments
- Unit 3:** Use of Elementary Timing Model in Timing Adjustments

### **Volume 8: Machine Adjustment Fundamentals Using The ATM**

- Unit 1:** Troubleshooting, Problem Solving, and Problem Identification Techniques
- Unit 2:** Set Up Machine Standards Using the ATM
- Unit 3:** Problem Solving on Multiple Systems Using the ATM

### **Volume 8-A: Basic Pneumatics & Hydraulics**

- Unit 2A:** Air Compression, Properties of Air
- Unit 2B:** Basic Pneumatics, Compressors, and Air Pressure Gauges
- Unit 3A:** Hydraulic Flow and Control

### **Volume 9: Electrical Components**

- Unit 1:** Principles of Electricity, AC & DC Circuits
- Unit 2:** Basic Circuit Components, Switches, and Relays
- Unit 3:** Digital Multimeter, Basic Measurements
- Unit 4:** Input and Output Devices
- Unit 5:** Electrical Schematics
- Unit 6:** Generators & Transformers
- Unit 7:** DC Machines
- Unit 8:** Three-Phase AC & DC Motors

### **Volume 10: Pump Basics**

- Unit 1:** Pumping Basics

### **Volume 11: Valve Operation & Types**

- Unit 1:** Valve Operation and Type

### **Vol 11A: Basic Process Control**

- Unit 1:** Introduction to Process Control
- Unit 2:** Basic Definitions
- Unit 3:** Pressure
- Unit 4:** Temperature
- Unit 5:** Level
- Unit 6:** Flow
- Unit 7:** Analytical instruments and Terminology
- Unit 8:** Transmitters
- Unit 9:** Controllers
- Unit 10:** Process Control and Control Loops
- Unit 11:** Control Schemes

## **Level Two – Advanced Mechanics Training Program**

### **Volume 12: Introduction to Industrial Maintenance**

- Unit 1:** Failure Analysis

### **Volume 13: Gearbox Maintenance**

- Unit 1:** Gear Maintenance

### **Volume 14: Bearing Maintenance**

- Unit 1:** Bearing Maintenance

### **Volume 15: Advanced Pneumatic Fundamentals**

- Unit 1:** Control Components, Pneumatic Drives
- Unit 2:** Circuit Design

### **Volume 16: Advanced Hydraulic Fundamentals**

- Unit 1:** Control Components, Hydraulic Drives
- Unit 2:** Circuit Design

### **Volume 17: Advanced Electrical**

- Unit 1:** Capacitors
- Unit 2:** Inductors
- Unit 3:** Power in AC Circuits
- Unit 4:** Electrical Troubleshooting Using the ESTD
- Unit 5:** Troubleshooting, AC Motors
- Unit 6:** Troubleshooting, DC Motors

### **Volume 18: Pump Maintenance**

- Unit 1:** Pump Maintenance

### **Volume 19: Introduction to Welding**

- Unit 1:** Welding Safety
- Unit 2:** Gas Welding, Cutting, and Heating
- Unit 3:** Introduction to Arc Welding, MIG - TIG

### **Volume 20: Machine Shop Practices**

- Unit 1:** Machine Shop Safety
- Unit 2:** Hand Tools and Bench Work
- Unit 3:** Metal Cutting
- Unit 4:** The Lathe
- Unit 5:** The Milling Machine
- Unit 6:** The Drilling Machine
- Unit 7:** The Grinding Machine

### **Volume 21: Advanced Machine Adjustment Fundamentals Using the PMS**

- Unit 1:** Troubleshooting, Problem Solving, and Problem Identification Techniques
- Unit 2:** Set Up Machine Standards Using The Packaging Machine Simulator
- Unit 3:** Problem Solving on Multiple Systems Using the Packaging Machine Simulator

### **Volume 22: Ladder Logic**

- Unit 1:** Basic Ladder Logic
- Unit 2:** Planning and I/O Symbols
- Unit 3:** Numbering Systems, Codes, and Logic
- Unit 4:** Symbols and Ladder Logic Basics
- Unit 5:** Ladder Logic Format
- Unit 6:** Program Functions
- Unit 7:** Program Examples
- Unit 8:** Glossary of Terms

### **Volume 23: PLC Advanced Electrical**

- Unit 1:** Introduction to the PLC
- Unit 2:** PLC Programming and Operation
- Unit 3:** Maintenance and Troubleshooting

### **VOLUME 24: Advanced Process Control**

- Unit 1:** Process Control- Intro Advanced
- Unit 2:** Advanced Pressure
- Unit 3:** Advanced Level
- Unit 4:** Advanced Flow Measurement
- Unit 5:** Advanced Temperature
- Unit 6:** Analytical-PH
- Unit 7:** Advanced Actuators
- Unit 8:** Advanced Process Control-Frequency Drives
- Unit 9:** Heat Exchangers
- Unit 10:** Hazardous Applications
- Unit 11:** Flowmeter Installation
- Unit 12:** Instrument calibration