Basic and Advanced Mechanics Training Program Outline

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

Basic Mechanics Training Program Outline (Continued)

Volume 8: Machine Adjustment Fundamentals Using The STM
- **Unit 1**: Troubleshooting, Problem Solving, and Problem Identification Techniques
- **Unit 2**: Set Up Machine Standards Using the STM
- **Unit 3**: Problem Solving on Multiple Systems Using the STM

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**: Capacitors
- **Unit 4**: Inductors
- **Unit 5**: Power in AC Circuits
- **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 Types

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:** Digital Multimeter, Basic Measurements
- **Unit 2:** Input and Output Devices
- **Unit 3:** Electrical Schematics
- **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

Advanced Mechanics Training Program Outline (Continued)

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 of the PLC