

### A Systems Approach To Teaching Technical Skills

Industry 4.0 and other new technologies are helping industry advance at a rapid pace, creating a huge growth in the need for individuals with technical skills. The modern versions of technical occupations, such as technicians, technologists, engineers, and operators, all require individuals who possess technical depth and breadth, along with the ability to problem solve and optimize systems.

To address this demand, the Amatrol Learning System enables industry and educational organizations to rapidly implement high quality modern technical skills courses and training programs. The Amatrol Learning System includes all of the tools instructors need to be effective, including:

### The Amatrol Learning System

- Hands-On Workstations With Industrial Quality Equipment
- Task-Based Hands-On Exercises
- Interactive Multimedia Curriculum With Virtual Simulation
- Computerized Assessments With Pre- And Post- Testing
- Instructor Guides
- Instructor Training Courses
- Instructor Support Services

The elements of the Amatrol Learning System have been designed to work seamlessly with each other. The multimedia lessons directly apply to the hands-on skill exercises, and the computerized assessments directly tie to the objectives of the multimedia lessons. This makes it easy for instructors to implement even if they are new to the technology or even teaching itself.

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### **Key Learning System Features**

These key features have made the Amatrol Learning System a success for thousands of industry and educational organizations:

### **Industry-Driven - Relevant and Effective**

Amatrol hands-on workstations and learning content have been designed in partnership with major companies using task analyses of incumbent workers.

### **Real World Hands-On Training**

Heavy duty training equipment uses industrial quality components and a variety of brands to ensure learners have the skills for today's jobs.

### **Competency-Based Curriculum**

Competency-based curriculum teaches real world industry tasks with a Just-In-Time design that accelerates learning.

### Problem Solving / Computer-Based Troubleshooting

For systems equipped with FaultPro, problem solving exercises challenge learners to analyze systems and troubleshoot faults. Amatrol's FaultPro computerbased fault insertion system safely inserts faults and tracks learner progress.



### Individualized Learning Plans

Amatrol's eAssessment computer-based software accelerates learning by creating individual learning plans based on prior learner knowledge.

### **Industry Recognized Credentials**

Amatrol programs are aligned with industry-recognized credentials provided by leading credentialing organizations such as SACA, MSSC, PMMI, NIMS, and ASQC.



### **Hybrid Flexible Course Delivery**

Curriculum is delivered in interactive multimedia format with virtual hands-on simulators and integrated hands-on equipment exercises. This unique design supports both self-paced and group course delivery.

### Modularized Learning

Curriculum consists of a series of short lessons that can be easily customized into short courses to meet specific needs.



### **Teacher Support**

Amatrol offers year-round instructor schools, detailed instructor guides, and unparalleled client service.

### **Use The Most Engaging eLearning Available!**

### **Learning Management**

### Pre- and Post- Lesson Tests

The LMS includes pre- and post- tests that measure learning gains and provide learner feedback for remedial study.

### **Flexible Course Delivery**

Learners can access the interactive multimedia curriculum using Amatrol's free learning management system, a SCORM interface to another LMS, or a local server.





### **Custom Course Capability**

Amatrol's LMS makes it easy to customize courses. With over 10,000 hours of lesson content, Amatrol's vast curriculum library can support the technical course needs of entire degree programs.

### LMS Management Tools

Navigation is very user-friendly and many reports are available to analyze learner results.

### **Engaging Interactive Multimedia Curriculum**

### **True Multimedia**

Amatrol curriculum includes an extensive library of interactive multimedia courses that engage learners, making learning fun and easier. Multimedia lessons use a combination of voice, text, and many types of graphics including 3D animations, videos, photos, and colorful graphics.



### Virtual Trainers

### **Integrated Hands-On Option**

Interactive multimedia courses include an option for integrated skill procedures using hands-on training workstations to provide a seamless eLearning and hands-on experience.

### Safety and Workplace Effectiveness Skills

The Amatrol interactive multimedia library includes extensive safety and workplace effectiveness topics, including: communications, conflict resolution, teamwork, problem solving, and applied math.

Hands-On Skil Procedures



eAssessment



**Highly Interactive** 

the same behaviors.

**Virtual Hands-On Trainers** 

exercises.

Amatrol multimedia courses are unparalleled in their interactivity. Learners operate machines,

analyze circuits, and perform troubleshooting

Many courses include online virtual trainers, which are digital twins of hands-on training

workstations. Learners can perform the same

exercises as on actual training equipment with



Relay Troubleshooting (990-EC1F)

6

7

COMPUTER-BASED FAULT INSERTION

### **MOTOR CONTROL**



### Level 1 Electrical Motor Control > 85-MT5

- Ladder Diagrams
- Control Relay Circuits
  Control Relays / Manual Switches
- Float, Limit, Pressure, Liquid Level Switches
- Magnetic Motor Starters
- Control Transformers
- Lockout / Tagout
- Reversing Motor Control

### Level 2 Electrical Motor Control

- Motor Braking > 85-MT5-A
- Reduced Voltage Starting > 85-MT5-B
- Variable Frequency AC Drive > 85-MT5-C
- Electronic Sensors > 85-MT5-D
   Electronic Counter > 85-MT5-E
- DC Drive with SCR Speed Control > 85-MT5-F



### PLC Motor Control > 85-MT5AB8

- PLC Orientation
   Timer Instructions
- PLC Operation
   Time-Driven Sequencing
- Motor Control Basics
   Count Up Instructions





990-MC1F

**ELECTRONIC DRIVES** 

### AC Electronic Drives > 85-MT10-1

- Inverter-Rated and Servo AC Motors
- Inverter and Vector (Spindle) Drives
- Servo Axis Drives
- Resolvers and Encoders
  Velocity and Position Servo Control
- Velocity and Position Servo Co
   Torque Control
- Iorque Control
- Parameters and Configuration
  Drive Troubleshooting

### DC Electronic Drives 85-MT10-2

- Servo Axis Drives
- Spindle Drives
- PWM Drives
- SCR Drives
- DC Permanent Magnet Motors
- Inner Loop Compensation
- Torque Control
- Position and Velocity Servo Control
- Tachometers, Resolvers and
- Encoders
- Parameters and Configuration
- Drive Troubleshooting



### Portable Variable Frequency AC Drives Troubleshooting > 990-DRV1F

- AC Variable Frequency Drive Operation
- 2 & 3 Wire Motor Control
- Jogging Control
- Motor Ramping
- Drive Input Troubleshooting
- Motor Input Troubleshooting
- Drive Relay Troubleshooting
- · Parameters and Configuration



ELECTRONIC DRIVES SYSTEM

-



85-MT10-1



▶ 990-MC1F

Ladder Diagrams
 Control Relay Circuits
 Control Relays / Manual Switches
 Float, Limit, Pressure, Liquid Level Switches

Magnetic Motor Starters

Reversing Motor Control

COMPUTER-BASED FAULT INSERTION

IILT PRO

Control Transformers

Lockout / Tagout

85-MT5, 85-MT5-A and Options

COMPUTER-BASED FAULT INSERTION

Fault Troubleshooting System > 890-FTS

Portable Electrical Motor Control Troubleshooting

· Performance Tracking

Adds Electronic Fault Insertion to 85-MT5

990-MC1F Multimedia Included









### **Fluid Power Training for Every Need**

Amatrol's fluid learning systems provide learners of all skill levels with the opportunity to develop and enhance their knowledge and hands-on skills in the fluid power industry. These training solutions cover basic to advanced hydraulics and pneumatics, as well as pumps and piping. Multiple options include FaultPro, Amatrol's computer-based fault insertion system.

### **HYDRAULICS**

· Power Devices

Control Relays

Multiple Cylinder Control

Sensor Applications

Reducing Valves

Circuit Protection

▶ 990-BH1



85-EH Multimedia Included

### **Basic Hydraulics - Double-Sided** ▶ 850-HD1

- (Single-Sided 850-H1 model also available)
- · Pumps / Cylinders / Motors
- Directional Control Valves
- · Check, Relief, and Pressure Reducing Valves · Sequence and Flow Control Valves
- Hydraulic Circuit Applications





85-IH Multimedia Included

### Intermediate Hydraulics ▶ 85-IH

- · Accumulators
- · Pilot-Operated DCVs and Check Valves
- · Direct-Operated Relief Valves
- Rapid Traverse Slow Feed Circuits
- Cylinder Sequencing CAM-Operated DCVs
- Remote Pressure Control / Pump Unloading Circuits

### Advanced Hydraulics

- Motor Applications Hydraulic Pump and Motor
- Performance · Fluids and Conditioning
- · Heat Exchangers











### HVAC-R LEARNING SYSTEMS APPLIED THERMAL SCIENCE 1708 THERMAL SCIENCE THERMAL SCIENCE T7081 STEAM SYSTEMS 950-SH1 HVAG-R Thermal Science > T7081 · Temperature and Pressure Measurement Thermal Expansion · Enthalpy, Phase Change AC / HEAT PUMP TROUBLESHOOTING T7082A HVAC CONTROLS T7300 85-MT5 RESIDENTIAL HEAT PUMP RESIDENTIAL MINI-SPLIT BASIC REFRIGERATION T7045 Heat Transfer. Thermodynamic Laws · Gas Laws and Phase Equilibrium HEAT PUMP ROUBLESHOOTING ENVIRONMENTAL APPLICATIONS T7083 R-134a REFRIGERANT R-410a REFRIGERANT COMBINED REFRIGERATION COMMERCIAL REFRIGERATION **RECOVERY & RECOVERY &** INSTALLATION ROUBLESHOOTIN ROUBLESHOOTIN CHARGING T7031 CHARGING T7032 T7200 T7400 T7500 🚽 GEOTHERMAL GEOTHERMAL TROUBLESHOOTIN 950-GEO2D 🖶 95-GEO3 T7081 Multimedia Included T7081 Includes Troubleshooting Skills HEAT PUMPS AND REFRIGERATION **Environmental Applications T7083** ENVIRONMENTAL APPLICATION SYSTEM THERMAL TROUBLESHOOTING SYSTEM Insulation · Psychrometrics · Residential Heating and Cooling Thermal System Performance - - -T7082-A T7083 VERMAN PROBABLISHOOTING STOTION adds to T7082-A FAILT PRO T7083 Multimedia Included Heat Pump Troubleshooting ▶ T7082-A HVAC-R Skills Are Vital for Industrial & (Also available as a T7082 without Troubleshooting) Thermal Energy and Heat Transfer I-TRUCTION IN T7082-A

· Thermodynamic Laws and Properties · Refrigeration Thermodynamics

ALL

T7082-A includes

FaultPro Electronic Fault Insertion

 Heat Pump Operations Thermal System Troubleshooting

Phase Diagrams

Property Tables

Refrigerant Types

### **Residential Applications**

Heating, ventilation, air conditioning, and refrigeration (HVAC-R) skills, including thermal, geothermal, and steam power, are a unique skill set that demands a firm understanding of the principles involved. Amatrol's HVAC-R learning systems start with the basics, such as phase change, and continue into more advanced concepts such as enthalpy and the laws of thermodynamics. These systems teach hands-on skills related to pressure measurements, preventive maintenance, and troubleshooting.





### MASTERING INDUSTRY 4.0 & Advanced Materials Concepts for Next Generation Careers



Living with Fresh Water

IGNITE **O**UTCOMES

- Inspiration
- College Credit
- Career Exploration
- Industry-Recognized Certifications
- Collaborative & **Creative Thinking**
- **DIGITAL MANUFACTURING SYSTEMS**

Projects in Digital Enterprise Systems combining PLCs, Robotics, and Cloud Technologies. Introduces Networking, CAM, Cloud-Based Data Collection, and Lean Manufacturing.

Uh

Course 6

### **IIOT, DATA ANALYTICS,** & NÉTWORKING

A capstone course that enriches technical skills in Industry 4.0 systems and the Industrial Internet of Things using managed networks, data analytics software, cybersecurity, variable frequency drives, RFID, barcode, and smart sensors.



Industry 4.0 Fundamentals (I4F) teaches basic manufacturing skills and builds industrial competencies in areas like PLC troubleshooting, mechatronics, and data analytics, as well as how to program and operate a FANUC robot. I4F was developed by subject matter experts with real-world feedback from industry and educational institutions. This program for secondary or post-secondary education is divided into four major course areas.

### **INTERACTIVE MULTIMEDIA CURRICULUM**



### **VIRTUAL TRAINING**



### HANDS-ON INDUSTRIAL TRAINING



### Course 1 Course 4 Course 2 Course 3 Introduction to Introduction to Introduction to **Robot Operation & Industrial Control Industrial Internet** Programming **Mechatronics** of Things Systems **Topics Include:** 38 Lessons 33 Lessons 28 Lessons Robotic Safety & Components Frames Program Development • Inputs, Outputs, and Macros **Topics Include: Topics Include: Topics Include:** And More! • Introduction to Industry 4.0 • Industry 4.0 Principles Advanced Programmable Controllers Safety Mechanical Drives Data Analytics 1 Hand Tools Hydraulics Fluid Power Variable Frequency Drives Measurement Pneumatics **Certified Production** Bar Code Production Print Reading • Robotics Programming Technician Identification Electrical Relay Control Precision Measurement Mechatronics: Motors & Mechanical Drives Electronic Sensors Conveyors Fluid Power Ethernet Network Ethernet Network 2 Communications AC/DC Electricity RFID Product Identification **Topics Include:** • Programmable Controllers • Electrical Relay Control Smart Sensors CNC Programming Safety • Robotics Programming Programmable Controllers • Mechatronic Systems Electronic Sensors Quality Practices & System Optimization Measurement Manufacturing Processes &

Production

And More!

Maintenance Awareness

Smart

Sensor

### **From Training to Factory Floor**





PLC Troubleshooting

### **INSTRUMENTATION & PROCESS CONTROL LEARNING SYSTEMS**

### Instrumentation and **Process Control Skills for Rewarding Jobs**

Instrumentation and process control is a versatile and vital part of major industries such as power generation, petrochemicals, food processing and bottling, chemical manufacturing, bio-technology, pharmaceuticals, and refineries.

Amatrol has developed the largest and most in-depth instrumentation and process control training options available including level and flow, temperature, analytical, and pressure.

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Includes Troubleshooting Skills

### PROCESS CONTROL TROUBLESHOOTING

Level / Flow Process Control Troubleshooting

- ▶ T5552F
- P&I Diagrams · Flow & Liquid Level Measurements
- Transducers / Transmitters
- Component Level Troubleshooting
- System Level Troubleshooting
- In-Circuit Testing
- · Out-of-Circuit Testing



FAILT PRO

OMPUTER-BASED FAULT INSERTIO

### ControlLogix Process Control

> 89-PC-AB5500 (Connects to the T5552 and T5553)

- · On / Off Control with Discrete and
- Analog Input
- Open Loop PLC Control
- · Closed Loop PLC Control

### **PLC PROCESS CONTROL**



T5552F

89-PC-AB5500

PID Control

INCOME ADVITED A STATE





### **Connect All Four Systems to Create an Entire Process Plant!**



### MANUFACTURING MATERIALS AND **PROCESSES LEARNING SYSTEMS**



### From Design to Deliverable -A Spectrum of Manufacturing Skills

Today's high standards for production require a solid grasp on a wide range of skills, including CAD and CAM design, material properties, product assembly, and quality assurance. Amatrol's learning systems provide the knowledge and hands-on experience that will prepare learners to work in these different areas of machining and manufacturing processes.



### MANUAL AND CNC MACHINE TOOLS



- > 950-CNCOP2 (HAAS)
- · CNC Mill, Lathe, and Grinder Set-up and Operation
- Tool Identification, Set-up, Use and Management
- · Fixture Set-up and Operation
- CNC Troubleshooting and Maintenance for Operators
- · Precision Measurement and Gauging
- Print Reading
- Geometric Dimensioning and Tolerancing
- Machining Processes
- Statistical Process Control
- · Quality and Cycle Time Optimization
- CNC Program Operation

Manual Machine Tools

▶ 95-MP1 · Bandsaws

- Drill Presses
- Hand Tools Manual Mills
- Manual Lathe

(Equipment is

not shown)



95-CNC1D Micromill and Tooling

Multimedia Included

ICE?



DENED

950-CNCOP1 & 950-CNCOP2





95-CNC1D Multimedia Included

### **PRINCIPLES OF CNC MACHINING**

CNC ▶ CN101 Tooling > TL101 Grinding ► PE203 Tooling for Grinding ► TL204 Coolants & Oils > PT202 Work Holding > PT201 Gear Manufacturing ▶ PT404 Tooling for Tapping ► TL307 Turning > PE101 Machining Centers 
 PE102 Tooling for Machining Centers > TL203 Tooling for Turning Centers > TL202 Fanuc CNC Control ▶ CN102



### CAD & CAM

Computer Aided Design 1 > 96-CAD1B Computer Aided Design 2 > 96-CAD2B Print Reading 1 > 950-PR1 Computer-Aided Machining > 96-CAM1



Computer-Aided Machining > 96-CAM1



ISO 9000 > QS101 Statistical Process Control 1 > QS202 Statistical Process Control 2 > QS304 Quality Tools > QS305



Quality Tools > QS305



### **PRINCIPLES OF MATERIALS**

Ferrous Metals > ML201 Non-Ferrous Metals > ML202 Heat Treatment > ML203 Plastics > ML204 Composites > ML205 Ceramics > ML205



Gaskets > 950-GSS1 Fasteners > 950-FNS1 Contamination > 950-CNS1



Gaskets > 950-GSS1



Lean Overview > LM100 Introduction to Lean > LM101 55 > LM102 Total Productive Maintenance > LM103 Poka-Yoke > LM104 Lean Theory > LM203 Lean Process Flow > LM204 Visual Workplace > LM205 Standardized Work > LM206 Kaizen > LM307 Value Stream Mapping > LM308 Set-Up Reduction > LM409



Plastics Technology > 94-MP3T INDUSTRIAL PLASTICS CENTER T9013-P Chemistry and Properties Manufacturing Characteristics of Plastics Injection Molding Blow Molding Extrusion 94-MP3T 育 Mold Design > 94-DFM3 Injection Mold Design / Part Design Multi-Cavity Molds Inserts & Undercuts · Thermoplastics Molding Materials Blow Molding Design 94-MP3T Accessories 94-DFM3 Multimedia Included

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PLASTICS AND MOLD DESIGN



### Mechanical Learning Systems





Includes Troubleshooting Skills



Lubrication



970-ME1 Multimedia Included



### Mechanical Drives 3 ▶ 97-ME3

- · Plain, Ball, Roller, Tapered Bearings
- · Angular Contact Bearings
- · Seals and Gaskets
- · Miter, Helical, and Worm Gears Gearboxes



97-ME3 Multimedia Included



### Mechanical Drives 4 > 97-ME4

- · Precision Ball Screws
- · Linear Ball Bearings Linear Axis Slides
- Cam Clutches
- · Electric Clutches
- Electric Brakes

### Mechanical Skills are Essential to Manufacturing

Amatrol's mechanical learning systems are truly unique in that they provide knowledge and hands-on skill building opportunities. The skills taught in these systems, whether how to assemble a belt drive or rig a load, are derived from task analyses that identify skill sets desperately needed by employers.

As an example, Amatrol's 970 Mechanical Drives Level 1 Learning System contains seven modules providing approximately 65 hours of hands-on training. Moreover, this base learning system can be expanded to a staggering 34 modules providing over 300 hours of step-by-step, hands-on training to make learners job-ready on Day 1.





### Smart Automation and Robotics Learning Systems





### Maintain Real-World Automation Skills with Expansive Training Options

Amatrol's smart automation and robotics learning systems are constantly evolving to allow learners to gain hands-on experience with the technology they will see on the plant floor. With these

systems, learners can develop skills in many areas of automation, including mechatronics, logistics, RFID, network security, and smart manufacturing.

Technology continues to advance, and Amatrol's incredible range of learning solutions ensures that you will be able to provide a seamless learning experience.

### **TABLETOP ROBOTICS**

### **Robotics and Computer Programming**

- 94-RCP1
  Basic Robot Operation and
- Programming
- Interfacing and Material Handling
- Application Development
- Flexible Manufacturing Cells
  Quality Control
- Production Control

### **Flexible Manufacturing**

- 94-FMS1A
- Robotic Assembly / Linear Motion
   Point Arrays / Palletizing
- World & Tool Coordinates
- Servo Traverse Axes
- CNC / FMS I/O Interfacing
- Serial Communications
- Barcode Readers
- ASCII Data Manipulation
- Digital Indicators / Automated Gauging
  Multitasking / Program Interrupts
- Multitasking / Program Interrupts

### Robotics Simulation > 88-RSS1

- Basic Robot Operation
- Movement & End Effector Commands
- Interfacing
  Flexible Manufacturing Cells
- Cartesian Coordinate Programming



88-RSS1 Multimedia Included

### **SKILL BOSS MANUFACTURING**

- Skill Boss Manufacturing > 95-MSB2
- Safety
- Quality Practices & Measurement
- Production & Processes
- Machine Operation
- Maintenance Awareness



Skill Boss Manufacturing Required by MSSC for CPT Plus Certification Assessment



94-RCP1

shown with 94-FMS1A

95-MSB2AF

### **TABLETOP SMART FACTORY MECHATRONICS**

### Tabletop Smart Factory Mechatronics ▶ 870-PTAB82

- Industrial Sensors
- I/O Link
- · Cloud-Based Software
- Inventory Feeding
- Inspection & Indexing
- · Sorting & Distribution



Multimedia Included for 870-T Series and Selected Options

### Smart Sensors 87-TMS5AB1

- RFID Programming RFID Operation
- Photoelectric Sensors
- Pressure / Vacuum Sensors

### Manufacturing Execution ▶ 87-TMEAB

- Order Entry
- Scheduling
- Schedule Status
- · Production Statistics Alarms



Manufacturing Execution Software

### Ethernet > 87-TENAB82

- Industrial Networks
- Ethernet IP Addresses
- Network Performance · Managed Switch Ethernet
- Switch Diagnostics





## 87-SWPF1V Safety PLCs







**CTSCA-EM - Equipment Maintenance** Maintaining, Operating, & Adjusting Equipment

CTSCA-ER - Equipment Repair Installing, Troubleshooting, & Repairing Equipment

### CTSCA-NR - Network Repair

Installing, Troubleshooting, & Repairing Basic Controllers & Networks







# SMART MANUFACTURING, MATERIAL HANDLING, AND ROBOTICS

## ENTERPRISE

The Smart Factory Enterprise system seamlessly Mobile Robot System, and Machining Centers to with the Autonomous Mobile Robot System and





Smart Conveyor (87-PC23AB1) shown with Smart Machining (87-PCM), Smart Robot Workstation (87-SWF), and Autonomous Mobile Robot (87-AR13)

### Smart Product ID

- Smart product identification integrated with the Smart Conveyor
- System
   Multiple RFID sensors
- Pallet tracking capabilities

### Ethernet Communications & Network Security

- Ethernet communications with network security are integrated with the Smart Conveyor System, which can be located in a different room - or even building
- Enables networked, secure communications all the way down to the pneumatic valves

### Integration & Flexibility

- The Smart Conveyor System integrates seamlessly with the other Enterprise components
   The conveyor and AMR can
- other Enterprise components • The conveyor and AMR can also be used as standalone systems or in other combinations

Smart Robot Workcell (87-SWF1) and Robotic Application Kit (88-AW4) available with Smart Factory Mechatronics

optimize processes & improve workflows in a Smart Factory environment • Use as a standalone system or integrate in various combinations with other Smart Factory Enterprise components

Create & configure custom applications to learn how to

& inventory between Smart Factory Manufacturing & Assembly systems, which can be located in different rooms

or buildings

Teach autonomous mobile robot (AMR) programming skills
 Automated internal transportation of materials, parts,

Autonomous Mobile Robot System



## Smart Robot Workstations

- Teach industrial robot programming skills
   Variety of industrial FANUC robots, including the 200in / 4C 200in and SCARA SR-EiA available
- 200iD / 4S, 200iD, and SCARA SR-6iA available • Laser scanners allow safe operation without bulky guards

Sample AMR Path

Q

- Optional vision system cameras for advanced pick and place applications
- Discrete I/O, pneumatics, Ethernet, & Lockout / Tagout controls on front interface panel for easy
- access & use
  Can be integrated in various combination with other Smart Factory Enterprise components







## Solar and Wind Energy Skills for a Growing Field

alternative energy concepts as well as more advanced topics, including troubleshooting wind energy learning systems teach the skills needed for success in this field through a combination of eLearning and hands-on training. These learning solutions cover basic every year, creating a high demand for green energy technicians. Amatrol's solar and Renewable energy sources, like solar and wind energy, are becoming more popular for solar photovoltaic and thermal systems and wind turbine systems.



## SOLAR AND WIND SYSTEM PRINCIPLES

## Alternative Energy 850-AEC

Solar Panel Operation and Performance

ACTION

FLAM THERE'S TRANSMOM SAFELEN

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I.

- PV Array Connection
- Wind Turbine Operation, Performance, and
- Connection
- Solar and Wind Batteries
- Charge Controllers
- Inverters
- Balance of System Components
- AC / DC Solar Systems
   AC / DC Wind Systems
- Energy Conservation and Demand
- System Performance

...

\*

850-AEC



## SOLAR AND WIND CONCEPTS SOFTWARE

850-AEC Multimedia Included

### Solar Concepts 950-SC1

- Introduction to Photovoltaic Systems
- Introduction to Solar Thermal Systems
- Solar Radiation Fundamentals
   Sun Path Characteristics Solar Panel Orientation









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950-WC1 Multimedia Included







### Not sure where to start? Here are some options:

- Visit Amatrol.com for additional product information and fill out a contact form
- Request a 30-day eLearning demo
- Visit Jeffersonville, Indiana to tour Amatrol's manufacturing facility and meet the curriculum developers
- Inquire about Amatrol's In-House or On-Site Instructor Training courses

### **Contact Amatrol Today**

Email: Contact@amatrol.com Phone: 800-264-8285





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AMATROL

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