

# Customer Training 2004

Technical Courses  
for Engineering &  
Maintenance Personnel

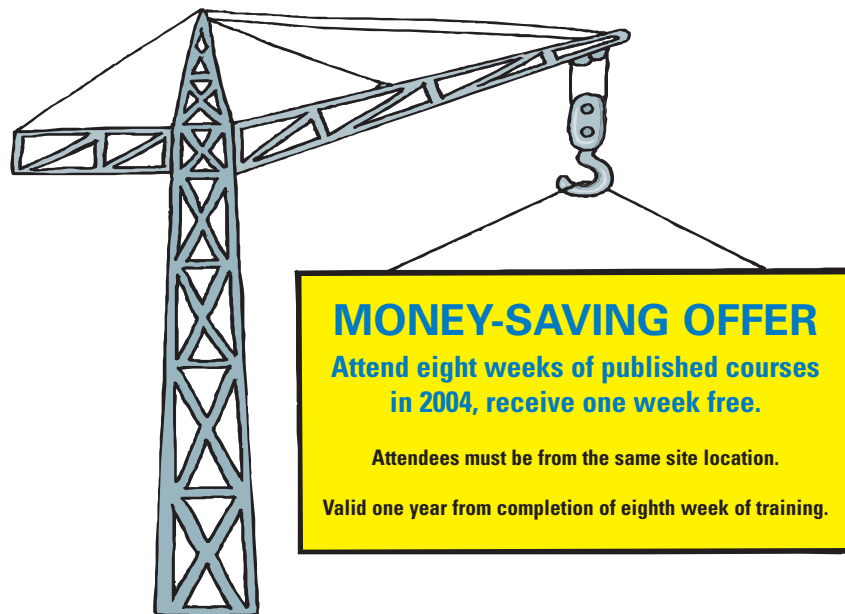
**Free Week of Training**  
See inside for details.

imagination at work



## TABLE OF CONTENTS

Topic	Page
Drives and Controls	3
Turbine Control Products	4
Power Equipment and Power Management	6
GE Fanuc	8
GE Multilin	9
General Information and How to Register	10
Registration Form	11



**Don't see what you are looking for? Give us a call!**

### TRADEMARKS:

AF-300ES, AF-300 G11, and AF-300 P11 are trademarks of GE Fuji Drives USA, Inc.  
 American Express is a registered trademark of American Express Company.  
 AV-300, AV-300i, DC-300, DV-300, EX2100, LS2100, Magne Blast, and  
 SPEEDTRONIC are trademarks of General Electric Company, USA.  
 CIMPPLICITY, Genius, and VersaMax are registered trademarks of GE Fanuc  
 Automation North America, Inc.  
 CimWorks is a registered trademark of Gage Talker, Inc.  
 HyperTerminal is a registered trademark of Hilgraeve, Inc.  
 Dura-Bilt5 MV is a trademark of GE Toshiba Automation Systems LLC.  
 Innovation Series, Limitamp, and LM6000 are registered trademarks of  
 General Electric Company, USA.

MasterCard is a registered trademark of MasterCard International Incorporated.  
 MS-DOS and Windows are registered trademarks of Microsoft Corporation.  
 PI is a trademark and PI-ProcessBook is a registered trademark of  
 OSI Software, Inc.  
 Series 90 is a trademark of GE Fanuc Automation North America, Inc.  
 TOSVERT is a registered trademark of Toshiba Corporation.  
 Unix is a registered trademark of Unix System Laboratories, Inc.  
 Visa is a registered trademark of Visa International Service Association.

## DRIVES AND CONTROLS

### AC/DC2000 Drive Hardware

**LENGTH:** 3 days **TUITION:** \$1500

This course is designed for maintenance personnel who configure and maintain the AC/DC2000 drive. Topics include drive application, drive power components circuit cards and their descriptive operation, elementaries, SCR, IGBT and related information. The keypad operation will be covered extensively as a means of troubleshooting and interrogating the drive. Laboratory assignments include setting up and starting the drive, autotune and serial commands. The GE Control System Toolbox software is not necessary in this course and will not be taught.

**Prerequisite:** Electrical experience/education

LOCATION:	CLASS STARTS:
Salem, VA	02/10/04 08/17/04 11/30/04
Pittsburgh, PA	05/11/04 10/19/04

### AC/DC2000 Drive Software Tools

**LENGTH:** 4 1/2 days **TUITION:** \$2250

This course is designed for maintenance and engineering personnel to understand how to use the features of the GE Control System Toolbox running under the Windows system, which applies to the AC/DC2000 drive in order to operate, maintain and troubleshoot the drive. Topics include AC/DC2000 overview, AC/DC2000 hardware, terminology, block diagram, I/O programming, serial monitor commands, trending and circular lists.

**Prerequisite:** Electrical experience/education and familiarity with Windows

LOCATION:	CLASS STARTS:
Salem, VA	02/16/04 08/23/04 12/06/04
Pittsburgh, PA	05/17/04 10/25/04

### AF-300E<sup>TM</sup>, AF-300 G11<sup>TM</sup> and AF-300 P11<sup>TM</sup>

**LENGTH:** 2 days **TUITION:** \$1000

This course is for original equipment manufacturers and end users who need to implement basic drive configuration and the drive start-up procedures. Topics include keypad programming, hardware overview, applications, startup and troubleshooting.

**Prerequisite:** None

LOCATION:	CLASS STARTS:
Salem, VA	03/10/04 05/05/04 08/04/04 09/22/04

### AV-300<sup>TM</sup>, AV-300i<sup>TM</sup> and DV-300<sup>TM</sup> Drives

**LENGTH:** 4 days **TUITION:** \$2000

This course is designed for engineering and maintenance personnel who configure, setup, install and maintain the AV and DV drive. Topics include motor theory, drive power components, configuration and keypad operation. The drive software to set up, tune and maintain the drive will also be presented. Laboratory assignments will include setting up and starting the drive from the default configuration.

**Prerequisite:** Electrical experience/education and familiarity with Windows

LOCATION:	CLASS STARTS:
Salem, VA	08/23/04 12/06/04

### CIMPLICITY<sup>®</sup> HMI

**LENGTH:** 4 days **TUITION:** \$2000

The Introduction to CIMPLICITY HMI course is a beginning level course focusing on the multiple aspects of project configuration. Valuable hands-on lab exercises are provided which guide students through the building and modification of the HMI application.

**Prerequisite:** Electrical experience/education and familiarity with Windows

LOCATION:	CLASS STARTS:
Salem, VA	03/01/04 08/02/04 11/08/04

### DC-300<sup>TM</sup> Adjustable Speed Drive

**LENGTH:** 3 1/2 days **TUITION:** \$1750

This course is designed for engineering and maintenance personnel who install, tune-up, maintain and troubleshoot the DC-300 Drive. Topics include dc motor theory, drive power components, keypad operation, interface signals, feedback calibration, tune-up and troubleshooting. Laboratory assignments include component identification, operation, calibration and tune-up.

**Prerequisite:** Electrical experience/education

LOCATION:	CLASS STARTS:
Salem, VA	03/22/04 08/09/04 10/11/04

### DC Innovation Drive

**LENGTH:** 3 1/2 days **TUITION:** \$1750

This course is designed for maintenance personnel who configure, maintain and troubleshoot the DC Innovation drives. Topics include retrofit modifications, I/O configuration, signal interface, drive circuit cards and their descriptive operation. The keypad operation will be covered as a means of troubleshooting and interrogating the drive. Laboratory assignments include setting up and starting the drive, tune-up and wizard use. The GE Control System Toolbox software will also be covered.

**Prerequisite:** Electrical experience/education and familiarity with Windows

LOCATION:	CLASS STARTS:
Salem, VA	04/12/04 06/21/04 09/27/04

### Dura-Bilt 5i MV<sup>TM</sup> Drive

**LENGTH:** 3 1/2 days **TUITION:** \$1750

This course is designed for engineering and maintenance personnel who configure, set up, install and maintain the Dura-Bilt 5i medium voltage drive. Topics include ac motor theory, power components, configuration and keypad operation. The GE Control System Toolbox software will be used to set up and maintain the drive. Laboratory assignments include hardware identification, programming I/O and working with the regulator patterns.

**Prerequisite:** Electrical experience/education and familiarity with Windows

LOCATION:	CLASS STARTS:
Salem, VA	01/19/04 06/14/04 11/01/04

### NEW Fundamentals of Drives

**LENGTH:** 2 days **TUITION:** \$1000

This course is most helpful to personnel with work responsibilities involving drives and control equipment. The course reviews fundamentals with an emphasis on practical application to the maintenance and troubleshooting of drives and control equipment. The course applies to old and new ac and dc drive technologies.

**Prerequisite:** Electrical experience/education

LOCATION:	CLASS STARTS:
Augusta, MA	02/17/04 05/25/04
Salem, VA	09/22/04

### Innovation Series<sup>TM</sup> Controller

**LENGTH:** 4 1/2 days **TUITION:** \$2250

This course is for engineering and maintenance personnel who are responsible for configuring, maintaining or troubleshooting a system that includes the Innovation Series Controller with or without the operator's console. Through a series of lectures and hands-on laboratory assignments, the student will learn to use the many functions and features of the controller, including software changes, I/O modifications using Genius<sup>®</sup> blocks, trending, diagnostics and troubleshooting techniques using the GE Control System Toolbox. The student will feel confident in using these tools for monitoring and diagnosing of a system. Choose this course to learn the basics of the Innovation Series Controller (UC2000).

**Prerequisite:** Electrical experience/education and familiarity with Windows

LOCATION:	CLASS STARTS:
Salem, VA	02/02/04 06/28/04 10/25/04

### Innovation Series Low Voltage Drive

**LENGTH:** 3 1/2 days **TUITION:** \$1750

This course is designed for engineering and maintenance personnel who configure, set up, install and maintain the low voltage ac drive. Topics include ac motor theory, drive power components configuration and keypad operation. The GE Control System Toolbox software to set up, tune and maintain the drive will also be presented. Laboratory assignments include hardware identification, programming I/O, startup wizards and changing the regulator patterns via keypad and GE Control System Toolbox.

**Prerequisite:** Electrical experience/education and familiarity with Windows

**LOCATION:** Salem, VA **CLASS STARTS:** 03/22/04 05/10/04 10/04/04

### **NEW** Innovation Series Low Voltage Drive System

**LENGTH:** 4 1/2 days **TUITION:** \$2250

This is a system level course for engineering and maintenance personnel who are responsible for configuring, maintaining or troubleshooting a system that includes the Innovation Series Controller and Low Voltage Innovation drives. The classroom and lab utilize Innovation Series Drive simulators and controllers. This is a practical "how to" course on the essentials, developed for Innovation Series Drive Systems.

**Prerequisite:** Electrical experience/education and familiarity with Windows

**LOCATION:** Augusta, MA **CLASS STARTS:** 03/15/04 06/14/04  
Salem, VA 10/11/04

### Innovation Series Medium Voltage Drive Type GP

**LENGTH:** 3 days **TUITION:** \$1500

This course is designed for engineering and maintenance personnel who configure, set up, install and maintain the ac drive. Topics include ac motor theory, drive power components (IGBT), configuration and keypad operation. The GE Control System Toolbox software will be used to setup, tune and maintain the drive. Laboratory assignments will include hardware identification, programming I/O, start-up wizards (fiber-optic, cell test, etc.) and changing the regulator patterns via keypad and GE Control System Toolbox.

**Prerequisite:** Electrical experience/education and familiarity with Windows

**LOCATION:** Salem, VA **CLASS STARTS:** 09/14/04

### LCI Drives (Innovation Series) for fan, pump and compressor applications

**LENGTH:** 3 days **TUITION:** \$1500

This course is designed for engineering and maintenance personnel who configure, set up, install and maintain the LCI drive. Topics include synchronous ac motor theory, drive power components (SCR, line filters and snubbers) and the water-cooled system. The AFE Datapanel/90-30 and/or VersaMax® configuration will be used in the lab and Innovation Series controller interfacing components will be discussed. The HyperTerminal® monitor mode to set up, tune and maintain the drive will also be presented. Laboratory assignments include hardware identification, programming DACs and circular list. Laboratory time will be provided on a working LCI drive.

**Prerequisite:** Electrical experience/education and familiarity with Windows

**LOCATION:** Salem, VA **CLASS STARTS:** 07/27/04

### LCI Second Generation (pre-1997: has door mounted printer)

**LENGTH:** 3 days **TUITION:** \$1500

This course is designed for engineering and maintenance personnel who configure, set up, install and maintain the LCI drive. Topics include synchronous ac motor theory, drive power components (SCR, line filters and snubbers), the water-cooled system and door-mounted printer operation. The monitor modes to set up, tune and maintain the drive will also be presented. Laboratory assignments include hardware identification, programming DACs and circular list. Laboratory time will be provided on a working LCI drive.

**Prerequisite:** Electrical experience/education

**LOCATION:** Salem, VA **CLASS STARTS:** 06/29/04

### Programmable Controls Series 90-70 and 90-30

**LENGTH:** 4 1/2 days **TUITION:** \$2250

This course is for engineers and electricians responsible for maintaining Series 90-70 and/or Series 90-30 controls. The course includes hands-on demos and troubleshooting techniques. Topics include 90-70 and 90-30 hardware overview, comparisons between 90-70 and 90-30, ladder logic programming, troubleshooting and diagnostics.

**Prerequisite:** Familiarity with relay logic

**LOCATION:** Salem, VA **CLASS STARTS:** 03/08/04 06/14/04 11/15/04

### TOSVERT® 250Wi

**LENGTH:** 3 1/2 days **TUITION:** \$1750

This course is designed for engineering and maintenance personnel who configure, set up, install and maintain the TOSVERT 250Wi source and inverter. Topics include ac motor theory, power components, configuration and keypad operation. The GE Control System Toolbox software is used to set up and maintain the drive. Laboratory assignments include hardware identification, programming I/O and working with the regulator patterns using the GE Control System Toolbox.

**Prerequisite:** Electrical experience/education and familiarity with Windows

**LOCATION:** Salem, VA **CLASS STARTS:** 02/23/04 04/12/04 07/19/04 10/18/04

## TURBINE CONTROL PRODUCTS

### EX2000

**LENGTH:** 4 1/2 days **TUITION:** \$2700

This course is designed to provide technicians and engineers with an adequate understanding of the EX2000 based regulator in order to maintain and troubleshoot the system. Topics include excitation and generator theory, power conversion, sample elementary, product hardware, GE Control System Toolbox (required Windows) and UC/OC2000.

**Prerequisite:** Electrical experience/education and familiarity with Windows

**LOCATION:** Salem, VA **CLASS STARTS:** 02/09/04 04/19/04 06/14/04 08/02/04  
10/11/04 11/29/04

### EX2100™

**LENGTH:** 4 1/2 days **TUITION:** \$2700

This course is designed to provide technicians and engineers with an adequate understanding of the EX2100 excitation in order to maintain and troubleshoot the system. Topics include excitation and generator theory, power conversion, sample elementary, product hardware and GE Control System Toolbox (required Windows).

**Prerequisite:** Electrical experience/education and familiarity with Windows

**LOCATION:** Salem, VA **CLASS STARTS:** 03/01/04 05/03/04 07/12/04 10/25/04



### Advanced EX2100 Software, Troubleshooting and Maintenance

**LENGTH:** 3 days **TUITION:** \$2700

Maintenance personnel, technicians and engineers learn troubleshooting techniques including how to replace and configure processor cards online, tracing signal flow, software changes including injection of step function into AVR, trending data, capture buffer data collection, alarm troubleshooting and understanding communication. This course is great for students who have previously attended an EX2100 class and who wish to learn more about the Toolbox and the software.

**Prerequisite:** EX2100 class

<b>LOCATION:</b>	<b>CLASS STARTS:</b>
Salem, VA	07/20/04 11/02/04

### LCI Static Start for turbine/generator application

**LENGTH:** 4 days **TUITION:** \$2700

This course is designed for engineering and maintenance personnel in power generation who configure, set up, install and maintain the LCI Static Start. Topics include synchronous ac generator theory, power components (SCR, line filters and snubbers) and the water cooled system. The AFE data panel 90-30 and/or VersaMax PLC configuration is used in the lab and Innovation Series controller interfacing components will be discussed. The Hyperterminal monitor mode to set up, tune and maintain the LCI will also be presented. Laboratory assignments will include hardware identification, programming DACs and circular list.

**Prerequisite:** Electrical experience/education and familiarity with Windows

<b>LOCATION:</b>	<b>CLASS STARTS:</b>
Salem, VA	03/15/04 04/26/04 06/07/04 08/16/04 09/20/04 11/08/04

### PC-Historian/PI™

**LENGTH:** 2 1/2 days **TUITION:** \$1500

This course is designed for technicians and engineers who configure the PC-Historian/PI. Topics include functional understanding of the overall PC-Historian/PI system configuration, data flow path of the PC-Historian/PI system, PI-ProcessBook® functionality and ability to make changes and enhance your utilization of the PI system.

**Prerequisite:** Electrical experience/education and familiarity with Windows

<b>LOCATION:</b>	<b>CLASS STARTS:</b>
Salem, VA	05/25/04 11/02/04

### SPEEDTRONIC™ Mark V Advanced Maintenance

**LENGTH:** 4 1/2 days **TUITION:** \$2700

This is a good course for students wanting to learn additional troubleshooting skills and how to maximize the Mark V capabilities. Maintenance personnel and engineers learn software troubleshooting, software customization, signal generation, customizing graphical screens, counters and timers.

**Prerequisite:** Mark V Maintenance class

<b>LOCATION:</b>	<b>CLASS STARTS:</b>
Salem, VA	03/08/04 10/11/04

### SPEEDTRONIC Mark V <I> Maintenance

**LENGTH:** 9 1/2 days **TUITION:** \$4950

Maintenance personnel, experienced operators and engineers learn an overview of the Mark V system, introduction to turbine fundamentals, <I> operator interface navigation, alarm troubleshooting, communication troubleshooting, hardware troubleshooting, servo and LVDT calibration, minor software changes, trending data, data collection and an introduction to graphical displays. This course is essential for anyone having an <I> operator interface and is required to maintain and troubleshoot the Mark V control system.

**Prerequisite:** Familiarity with MS-DOS®

<b>LOCATION:</b>	<b>CLASS STARTS:</b>
Salem, VA	03/22/04 06/14/04 10/18/04

### SPEEDTRONIC Mark V <HMI> Maintenance

**LENGTH:** 9 1/2 days **TUITION:** \$4950

Maintenance personnel, experienced operators and engineers learn an overview of the Mark V system, introduction to turbine fundamentals, <HMI> operator interface navigation, alarm troubleshooting, communication troubleshooting, hardware troubleshooting, servo and LVDT calibration, minor software changes, trending data, data collection and an introduction to graphical displays. This course is essential for anyone having a Human Machine Interface (HMI) and is required to maintain and troubleshoot the Mark V control system.

**Prerequisite:** Familiarity with Windows

<b>LOCATION:</b>	<b>CLASS STARTS:</b>
Salem, VA	02/23/04 05/10/04 08/02/04 09/27/04 11/29/04

### SPEEDTRONIC Mark V <HMI> Upgrade

**LENGTH:** 4 1/2 days **TUITION:** \$2700

This course is designed for maintenance and engineering personnel proficient with Mark V and the MS-DOS based <I> operator interface who are upgrading to the Windows-based HMI. This course covers Mark V HMI software tools, CIMPPLICITY display modification, system administration and networking.

**Prerequisite:** Familiarity with Windows

<b>LOCATION:</b>	<b>CLASS STARTS:</b>
Salem, VA	01/19/04 04/19/04 08/23/04 11/15/04

### SPEEDTRONIC Mark V LM Maintenance

**LENGTH:** 9 1/2 days **TUITION:** \$4950

This course is designed to train maintenance personnel how to maintain and troubleshoot the Mark V LM and operator interface. This course covers Mark V LM panel hardware, signal flow and communications, Mark V LM documentation, <HMI> Windows-based operator interface, modifying control software and I/O, operator interface display generation, data gathering tools and troubleshooting panel hardware and software.

**Prerequisite:** Familiarity with Windows

<b>LOCATION:</b>	<b>CLASS STARTS:</b>
Salem, VA	07/12/04

### NEW SPEEDTRONIC Mark V LM Advanced Maintenance

**LENGTH:** 4 1/2 days **TUITION:** \$2700

This course is designed for students wanting to learn additional troubleshooting skills and how to maximize the Mark V LM capabilities. Maintenance personnel and engineers learn software troubleshooting, software customizing, signal generation, counters and timers.

**Prerequisite:** Mark V LM maintenance class

<b>LOCATION:</b>	<b>CLASS STARTS:</b>
Salem, VA	07/26/04

### SPEEDTRONIC Mark V Refresher (Troubleshooting)

**LENGTH:** 4 1/2 days **TUITION:** \$2700

Maintenance personnel, technicians, experienced operators and engineers learn extensive troubleshooting techniques including how to identify hardware failures, replace cards and monitor I/O status, servo and LVDT calibration, tracing signal flow, understanding communication, advanced alarm troubleshooting and data collection. This course is good for students who have previously attended Mark V overview or introductory courses and wish to learn how to troubleshoot the Mark V system. This course is also well suited for students who have previously attended a Mark V maintenance course and need a troubleshooting refresher course.

**Prerequisite:** Mark V Maintenance

<b>LOCATION:</b>	<b>CLASS STARTS:</b>
Salem, VA	02/09/04 06/07/04 09/13/04

### SPEEDTRONIC Mark VI Advanced Maintenance

LENGTH: 4 1/2 days TUITION: \$2700

This is a good course for students wanting to learn additional troubleshooting skills and how to maximize the Mark VI capabilities. Maintenance personnel and engineers learn software troubleshooting, software customizing, signal generation, counters and timers.

**Prerequisite:** Mark VI maintenance class

LOCATION: CLASS STARTS:  
Salem, VA 06/21/04 10/11/04

### SPEEDTRONIC Mark VI Maintenance

LENGTH: 9 1/2 days TUITION: \$4950

Maintenance personnel, experienced operators and engineers learn an overview of the Mark VI system, introduction to turbine fundamentals, operator interface navigation, alarm troubleshooting, communication troubleshooting, hardware troubleshooting, servo and LVDT calibration, minor software changes, trending data, data collection and an introduction to graphical displays. This course is essential for anyone required to maintain and troubleshoot the Mark VI control system.

**Prerequisite:** Familiarity with Windows

LOCATION: CLASS STARTS:  
Salem, VA 02/16/04 04/12/04 06/07/04 08/02/04  
09/27/04 11/29/04

### SPEEDTRONIC Mark VI Refresher (Troubleshooting)

LENGTH: 4 1/2 days TUITION: \$2700

Maintenance personnel, technicians, experienced operators and engineers learn extensive troubleshooting techniques including how to identify hardware failures, replace cards and monitor I/O status, Servo and LVDT calibration, tracing signal flow, understanding communication, advanced alarm troubleshooting and data collection. This course is good for students who have previously attended Mark VI overview or introductory courses and wish to learn how to troubleshoot the Mark VI system. This course is also well suited for students who have previously attended a Mark VI maintenance course and need a troubleshooting refresher course.

**Prerequisite:** Mark VI Maintenance

LOCATION: CLASS STARTS:  
Salem, VA 03/29/04 07/12/04 09/13/04 11/15/04

### SPEEDTRONIC Mark VI Millennium Panel

LENGTH: 4 1/2 days TUITION: \$2700

This course is designed to train maintenance personnel how to maintain and troubleshoot the Mark VI fuel and airflow controller used in the LM6000<sup>®</sup>PC Millennium panels. This course covers Mark VI hardware, signal flow and communications, Mark VI documentation, Mark VI software tools, inputs and outputs from the fuel and airflow controller to the other Millennium panel components and troubleshooting panel hardware and software. Other Millennium panel components such as the 90-70 PLC sequencer will not be covered.

**Prerequisite:** Familiarity with Windows

LOCATION: CLASS STARTS:  
Salem, VA 03/01/04 11/08/04

## POWER EQUIPMENT AND POWER MANAGEMENT

### NEW Industrial Power Systems Engineering and Device Coordination

LENGTH: 4 days TUITION: \$2000

This course is designed for electrical engineers responsible for industrial or commercial power systems planning, designs for reliability and overall system performance. Course includes short-circuit currents, over-voltages, power systems planning, protective relaying, voltage control, equipment and system grounding, power factor improvement, switchgear selection, protective device coordination and workshop exercises.

**Prerequisite:** Electrical engineering experience/education recommended

LOCATION: CLASS STARTS:  
Salem, VA 03/8/04 05/17/04 11/01/04

### NEW Motors, Power Converters and Drives

LENGTH: 4 1/2 days TUITION: \$2250

This course is designed for engineers and technicians responsible for drive systems. It includes detailed operational information on standard ac and dc motors, semiconductor operation (diodes, SCR's, GTO's, IGCT's, IGBT's, and IEGT's), applications, dc converters and PWM / SCR / GTO inverters. The course includes an introduction to the principles of operation and the laws of physics that apply to fans, pumps and compressors.

**Prerequisite:** None

LOCATION: CLASS STARTS:  
Salem, VA 04/12/04

### NEW Power Transformers, Power Converters and System Harmonics

LENGTH: 4 days TUITION: \$2000

This course is designed for engineers and technicians responsible for overall power system performance. Transformer topics include theory, types, accessories, maintenance and testing. Semiconductor topics include operation and application of diodes, SCR's, GTO's, IGCT's, IGBT's and IEGT's, half and full wave rectifiers, dc converters and PWM / SCR / GTO inverters. A review of electrical system components that generate harmonics leads into other harmonic topics such as the effect of harmonics on system components, recommendations for reducing system harmonics, harmonic analysis tools, harmonic measurements and an introduction to harmonic filters.

**Prerequisite:** None

LOCATION: CLASS STARTS:  
Salem, VA 04/26/04

### Closed Loop Regulator Theory

LENGTH: 4 days TUITION: \$2000

This course is designed for personnel involved in designing or troubleshooting closed loop regulating systems. Topics include transfer functions, control block diagrams, regulator control strategy and PID regulators. Drive regulator control is discussed including Volts/Hz and Flux Vector ac drive control. Bode stability analysis is used to calculate crossover frequency and compensation in many classroom exercises. Hands-on laboratory exercises using analog simulators that contain operational amplifiers are used to demonstrate the principles from the lecture.

**Prerequisite:** Electrical engineering experience/education recommended

LOCATION: CLASS STARTS:  
Salem, VA 05/10/04

### Substation Power Equipment

LENGTH: 4 days TUITION: \$2000

This course is directed at new and experienced electricians. It features procedures for maintenance and testing of equipment found in a typical substation, such as lightning arresters, oil circuit breakers, fuses, protective relays and transformers.

**Prerequisite:** None

LOCATION: CLASS STARTS:  
Salem, VA 09/27/04

### Motor Controller Maintenance and Troubleshooting

LENGTH: 4 1/2 days TUITION: \$2250

This course is designed for personnel involved in the operation and maintenance of motors and motor control circuitry. It covers detailed information on operation of standard ac and dc motors. Topics include controls fundamentals, development of circuits, control components, hands-on troubleshooting with simulator panel, maintenance and motor control circuit diagrams

**Prerequisite:** None

LOCATION: CLASS STARTS:  
Salem, VA 11/15/04

### Power System Protective Relays

**LENGTH:** 3 days **TUITION:** \$1500

This course is designed for new technicians, or is a good review for experienced engineers. It includes hands-on maintenance, troubleshooting and testing on protective relays. Topics include types and functions of protective relays, power transformer and bus protective relays.

**Prerequisite:** None

**LOCATION:** Salem, VA **CLASS STARTS:** 05/25/04

### High Voltage Cable Splicing and Terminating

**LENGTH:** 4 1/2 days **TUITION:** \$2250

This course is a hands-on practical course on installation and maintenance of shielded, solid dielectric power cable. It teaches proven techniques in splicing and terminating this type of cable. Topics include cable construction, cable preparation, tee splices, cable failures, splicing techniques, workshop sessions, taping fundamentals and terminating techniques.

**Prerequisite:** None

**LOCATION:** Salem, VA **CLASS STARTS:** 06/07/04

### Low Voltage Switchgear, AKD 5, 6, 8 and 10

**LENGTH:** 4 days **TUITION:** \$2000

This course is designed for personnel responsible for maintenance, testing and troubleshooting power circuit breakers, protective relays, breaker trip devices and switchgear panels. Topics include switchgear construction, switchgear diagrams, trip devices, low voltage power circuit breakers, testing, maintenance and hands-on laboratory sessions. Students split and restore breaker frames, perform adjustments and lubrication on varied available breakers.

**Prerequisite:** None

**LOCATION:** Salem, VA **CLASS STARTS:** 02/09/04 10/18/04

### Medium Voltage Switchgear, Magne Blast™

**LENGTH:** 3 days **TUITION:** \$1500

This is a practical maintenance and troubleshooting course which highlights the breaker, cubicle and its control circuitry. A typical 15KV Magne-Blast breaker is used for demonstration and hands-on work in the laboratory. The course covers switchgear diagrams, protective relays, control and relay circuitry, switchgear enclosure, laboratory sessions and inspection-testing maintenance

**Prerequisite:** None

**LOCATION:** Salem, VA **CLASS STARTS:** 02/24/04

### Medium Voltage Switchgear, Power-Vac

**LENGTH:** 3 days **TUITION:** \$1500

The course presents maintenance and troubleshooting procedures using actual Power-Vac equipment including vacuum interrupter, cable terminations, control and relay circuitry, breaker mechanisms, switchgear enclosures, inspection-testing maintenance, switchgear diagrams, protective relaying, ML-17 and ML-18 mechanisms.

**Prerequisite:** None

**LOCATION:** Salem, VA **CLASS STARTS:** 07/13/04

### Limitamp® Motor Starters

**LENGTH:** 3 days **TUITION:** \$1500

The course covers basic operation, maintenance and troubleshooting of medium voltage induction and synchronous motor starters. Topics include air and vacuum contactors, and full/reduced voltage motor starters.

**Prerequisite:** None

**LOCATION:** Salem, VA **CLASS STARTS:** 11/09/04

### Medium Voltage Switchgear, Magne Blast and Power-Vac

**LENGTH:** 4 days **TUITION:** \$2000

Maintenance and troubleshooting course for personnel who maintain 5KV & 15KV metal-clad switchgear. The course covers both Magne-Blast and Power-Vac circuit breakers, including their respective cubicles. A typical selection of Power-Vac equipment and 15KV Magne-Blast breaker are available for hands-on lab sessions and demonstrations. Topics include switchgear diagrams, breaker control and relaying circuitry, switchgear enclosures, protective relays and maintenance.

**Prerequisite:** None

**LOCATION:** Salem, VA **CLASS STARTS:** 06/28/04

### NEW Medium Voltage Circuit Breakers and Contactors

**LENGTH:** 4 1/2 days **TUITION:** \$2250

This course is designed for personnel responsible for maintenance, testing and troubleshooting power circuit breakers, contactors, protective relays, trip devices and switchgear panels. Primary equipment covered are Power-Vac breakers, Magne-Blast breakers and Limitamp contactors including both air and vacuum type contactors. Each piece of equipment will have one half day of lecture followed by a full day of hands-on laboratory exercises. Lecture topics include switchgear diagrams, breaker control, switchgear enclosures, protective relays, testing, maintenance and operation of medium voltage induction and synchronous motor starters.

**Prerequisite:** None

**LOCATION:** Salem, VA **CLASS STARTS:** 06/21/04

### NEW Power Systems Overview Seminar (PSO)-ANALYSIS OF FACTORS CONTRIBUTING TO BLACKOUTS

**LENGTH:** 4 1/2 days **TUITION:** \$1950

This course is designed to give students a better understanding of the conditions that caused the recent blackout. Engineering and managerial personnel in the electric power and allied industries, as well as, government personnel on state, county and municipal levels will acquire conceptual knowledge of various aspects of the electrical power spectrum. The emphasis will be placed on how human and component failure or malfunctions contribute to system failure. Remedies will be discussed.

**Prerequisite:** None

**LOCATION:** Salem, VA **CLASS STARTS:** 07/19/04 10/18/04

## GE FANUC CUSTOMER TRAINING

For more information on course dates, locations and content, visit our web site at [www.gefanuc.com/ttc](http://www.gefanuc.com/ttc)  
Phone: 1-800-433-2682

### Open Enrollment CNC Classes

LENGTH: 2 – 4 1/2 days TUITION: \$800 - \$2750

Classes are designed as hands-on, practical training for maintenance, operation and engineering personnel. Classes range from basic CNC introduction to maintenance to advanced programming with every option available.

The following CNC classes are offered:

- CNC Basics
- Series 0 Maintenance
- Series 15B Maintenance
- Series 15i Maintenance
- Series 16/18/21 Maintenance
- Power Mate D
- Power Mate H
- Mantenimiento de las Series 16/18/21 (Español)
- Series C1500, C2000, C3000, C600 Laser Maintenance
- Alpha Servo Maintenance
- Digital Servo Maintenance
- CNC Servo/Spindle Maintenance
- Ladder Interface Programming
- Macro B Programming
- Mill G Programming
- Turn G Programming

### Open Enrollment PLC Classes

LENGTH: 2 – 4 1/2 days RANGE: \$800 - \$1890

Classes are all designed as hands-on, practical courses for maintenance, operation and engineering personnel to introduce and define all aspects of the GE Fanuc programmable logic controllers' full line of products. Classes range from basic PLC introduction to control maintenance to advanced programming with the most complex options available.

The following classes are offered:

- CIMPLICITY Machine Edition LD PLC
- Series 90-30 with Logicmaster Pts 1/2
- CIMPLICITY Machine Edition LD PLC Français
- Series 90-30 with VersaPro Parts 1 and 2
- Introduction to CIMPLICITY ME Control and View
- Series 90-70 with Logicmaster 90 Parts 1/2
- Introduction à CME View Niveau 1 (Français)
- Series 90™ Genius I/O System and Communications
- PLC Maintenance w/ CIMPLICITY ME
- Series 90 Serial Communications
- S2K Motion Controllers
- Series 90 PLC LAN

### Open Enrollment Software Classes

LENGTH: 2 - 4 days TUITION: \$800 - \$2250

Classes range from beginning level courses to advanced application component courses. Valuable hands-on, performance-based objective exercises are provided in each course.

The following classes are offered:

- CIMPLICITY HMI Plant Edition Intro
- Introduction à CIMPLICITY Plant Edition (Français)
- CIMPLICITY HMI Plant Ed Advanced
- CIMPLICITY Tracker
- CIMPLICITY HMI Open Process
- CIMPLICITY Dataviews/Windows
- CimWorks®, VSPC
- FIX32 Fundamentals
- Advanced FIX32
- FIX32 to iFIX Migration
- iFIX Fundamentals
- Advanced iFIX
- Using VBA with iFIX
- iFIX Advanced Info & Troubleshooting
- infoAgent Development
- iVisualize Appl. Development
- iBatch Development
- iDownTime Development
- iHistorian Development

### On-line Learning University

TUITION: \$100 - \$995

Please visit our web site at [www.gefanuc.com/ttc](http://www.gefanuc.com/ttc)

GE Fanuc now has an e-Learning program to better meet customers' training requirements, reducing travel costs and providing flexible instructional time.

The following class is offered:

- CIMPLICITY Plant Edition HMI Introduction

### At-your-site and Custom Classes

GE Fanuc Automation Training Services offers courses at-your-site and custom training courses configured to meet the needs of the personnel who use GE Fanuc PLC, CNC and software products and systems in your plant. The custom courses are developed after in-depth communication between your company and a GE Fanuc training specialist. Objectives for each course are based on your GE Fanuc equipment and software and your specific personnel needs.

Benefits for custom and/or at-your-site classes:

- Custom training can be developed to cater to specific needs of individual students
- Consensus on common plant processes as students and management discuss best methods
- Custom training geared to user needs, which condenses time needed for training
- Focused training based on specific end-user processes



## GE MULTILIN TRAINING CENTER

Website: [www.GEindustrial.com/multilin/training](http://www.GEindustrial.com/multilin/training)

Email: [training.Multilin@ge.com](mailto:training.Multilin@ge.com)

Phone: 1-800-547-8629 ext. 2152 (North America) or 905-201-2152

GE Multilin offers courses that cover theory and practical application of protective relaying. Our hands-on courses teach concepts and practical applications tailored to engineers, technicians and maintenance personnel. Courses are offered both at-your-site and at the GE Multilin Training Facility. Please contact us for further details.

## Fundamentals Courses

### Fundamentals of Modern Protective Relaying

Duration: 3 days Tuition: \$1,800 US

This course provides a comprehensive understanding of the principles of digital power system relaying and their associated applications. Topics covered include power system faults, protection schemes and an overview of transformer, feeder, motor, distribution and bus applications.

### Introduction to Electromechanical Relays

Duration: 3 days Tuition: \$1,800 US

This course provides the student with a solid understanding of the operation, application, practical testing and maintenance techniques used with GE Multilin electromechanical relays. Through practical lab exercises, students will learn how to calibrate, monitor and troubleshoot various devices.

## Product Application Courses

### Distribution Management Relay Courses

Duration: 3 – 5 days Tuition: \$1,800 - \$3,600 US

These courses provide a thorough understanding of GE Multilin feeder and transformer protective relay installation, operation and troubleshooting procedures. Product courses include the following: SR 745, SR 750/760, F650, UR F60/F35, UR B30/B90, and UR T60/T35.

### Generator Relay Courses

Duration: 3 – 5 days Tuition: \$1,800 - \$3,600 US

These courses include an overview of basic generator theory and associated protection requirements. Through a combination of lectures and practical lab exercises, the class will learn how to correctly monitor and test the operation of Generation relays. Product courses include the following: SR 489, DGP, UR G60.

## Meter Relay Courses

Duration: 1 day Tuition: \$600 US

This course provides a thorough understanding of the PQM and PQMII's installation, configuration, operation and troubleshooting procedures. The class will also cover PQM and PQMII's configuration through both the product keypad and PC-based software. Practical lab exercises include the use of configuration and diagnostic tools such as waveform capture utility. Product courses include the following: PQM and PQMII

## Motor Relay Courses

Duration: 1 - 3 days Tuition: \$600 - \$1,800 US

These courses address the training requirements of electrical maintenance staff responsible for motor management relays. Through a combination of lectures and practical lab exercises, the class will learn how to correctly configure, monitor and troubleshoot these GE Multilin motor protection relays. Product courses include the following: 239, 269, 369, 469, SPM and UR M60.

## Other Instructor-Led Courses

Duration: 2 - 5 days Tuition: \$1,200 - \$3,600 US

Additional courses include UR Platform, UR Maintenance, UR Data Communications, UR Advanced Applications and JungleMUX SONET Multiplexer Training.

## Interactive Training CDs

Interactive Learning CDs provide a content-rich, cost-effective way to learn about GE Multilin products. The CDs use cutting edge multimedia, graphics and animation to bring training course material to life. Topics include: Fundamentals of Modern Protective Relaying, Introduction to the Universal Relay, Motor Protection with the 469, Motor Protection with the 269, Feeder Protection with the 750/760.

### GE Multilin Inc.

215 Anderson Avenue

Markham, Ontario, Canada L6E 1B3

## GENERAL INFORMATION

### CLASSROOM TRAINING

- We offer a broad selection of electrical training seminars for industrial, utility and commercial operations.
- Our courses are unique in that they are designed and taught by GE's practicing field engineers. Our instructors have vast experience installing and maintaining the types of electrical equipment and systems that are the subjects of these courses.
- As a student, you receive insightful, practical knowledge that you can readily relate to and apply.
- Our facilities provide you with an opportunity to learn about our products in a relaxed classroom and lab setting. Our classes are hands-on oriented with a goal of 50% lecture and 50% hands-on labs.
- Courses are offered in drives and controls products, turbine controls, PLCs and controllers, power equipment and management and electrical systems courses such as motor maintenance, appraisal testing and many more. Additional classes may be added upon request.
- Each training seminar includes text material, classroom refreshments and a diploma.
- Dress is casual.
- Classes begin at 8:30 a.m. and end at 4:30 p.m.

### AT-YOUR-SITE TRAINING

- Training at your facility is available. This is an economical approach to training since seminars held at your facility will save you transportation and living expenses.
- Standard course offerings can be provided and are structured to balance theory, hands-on application and engineering concepts for maintenance and operation personnel.
- A custom course can be designed to meet your specific needs.

### VISIT OUR WEB SITE

- For the most up-to-date training information, visit our training web site: [www.GEindustrial.com](http://www.GEindustrial.com). Select "Services" then "Training" to find course schedules and descriptions.

## HOW TO REGISTER

- Register on-line at [www.GEindustrial.com](http://www.GEindustrial.com). Your registration request is automatically e-mailed to the training registrar.
- After registration is received, a confirmation letter is e-mailed to you.

### GE training courses are subject to the following terms and conditions:

- Tuition must be paid to **General Electric Company** at least three weeks prior to the start of class. The preferred method of payment is VISA®, MasterCard® or American Express®; however, a check or purchase order is also accepted. Due to anti-money laundering policies, travelers' checks, cash, cashier checks, bank drafts and money orders **are not** accepted.
- Confirmed students who wish to cancel their registration must contact the registrar no later than 14 days prior to the course start date. Failure to do so will lead to cancellation charges as follows: 25% of course tuition for cancellations received less than 14 days before the course start date; 50% of course tuition for cancellations received less than seven days before the course start date.
- Confirmed students who do not cancel prior to class start date and fail to attend will be responsible for the full tuition amount.
- The schedule, locations, tuition and course details are subject to change.
- Courses have a minimum enrollment requirement and are subject to cancellation due to low enrollment. A cancellation notification will be sent three weeks prior to the course start date. One may consider classes to be on schedule unless a written cancellation notice is sent stating otherwise. GE is not responsible for any expenses related to non-refundable airline tickets or hotel accommodations.
- Recording devices are not allowed. The contents of our classes are fully copyrighted and cannot be recorded or duplicated without our permission.

## REGISTRATION FORM

Name of Student: \_\_\_\_\_

Country of Citizenship: \_\_\_\_\_

Company Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Phone, Fax, & E-mail: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Course Title: \_\_\_\_\_

Course Start Date: \_\_\_\_\_ Course Location: \_\_\_\_\_

Preferred Method of Payment:  VISA  MasterCard  American Express

Credit Card #: \_\_\_\_\_ Exp. Date: \_\_\_\_\_

Signature: \_\_\_\_\_

**Alternative Methods:**

Check \_\_\_\_\_

***Make check payable to "General Electric Company" and mail to address below.***

Purchase Order Number \_\_\_\_\_

***For purchase orders, remit to "General Electric Company" and use address below.***

For GE employees only: Dept. Code (BUC No.): \_\_\_\_\_ ADN#: \_\_\_\_\_

### GE TO SEND CONFIRMATION OF ENROLLMENT TO:

\_\_\_\_\_  
Name Company Name

\_\_\_\_\_  
Street Address City State Zip Code

\_\_\_\_\_  
Phone Number Fax Number E-mail Address

**PREFERRED METHOD OF REGISTRATION: ON-LINE REGISTRATION AT [www.GEindustrial.com](http://www.GEindustrial.com)**

**See General Information page under "Visit Our Web Site."**

### IF YOU DO NOT HAVE INTERNET ACCESS, YOU MAY FAX OR E-MAIL YOUR REGISTRATION FORM TO:

Barbara Cupp, GE Training Center, 1501 Roanoke Blvd., Room 530, Salem, VA 24153

Phone: 1-888-434-7378 Option 6 – Press 1 • Fax: 540-387-8159 • Email: [Salem.Training@ge.com](mailto:Salem.Training@ge.com)

imagination at work

