



# Markham Training Course Guide 2022

All the information you need in one place to make an informed training selection.



# GE Grid Solutions | Grid Automation Learning & Development

## Markham Training Course Guide

Welcome to our integrated learning program, its aim is to provide a flexible learning methodology to learn all about our products, services and protection and control solutions offerings in creating protection and control schemes.

We cover all our protection and automation devices and protection elements including IEC 61850, HardFiber, Cyber Security and much more.

Our objective is not to simply look at specific products, but look more towards integrated systems and so while the program starts off with building product knowledge. This is only done so that we are building a knowledge foundation upon which to build out integrated systems capability.

Learning is done through a blend of e-learning modules, virtual classroom sessions and practical workshops with knowledge testing throughout.

Page numbers at right are clickable hyperlinks to take you to key pages quickly.

<a href="#">03/</a>	<a href="#">contact/resource info</a>	<a href="#">17/</a>	<a href="#">TRNG-MTR Motor Essentials Workshop</a>
<a href="#">04/</a>	<a href="#">learning made easy</a>	<a href="#">18/</a>	<a href="#">TRNG-MTR Essentials</a>
<a href="#">05/</a>	<a href="#">e-learning</a>	<a href="#">19/</a>	<a href="#">TRNG-URPL</a>
<a href="#">07/</a>	<a href="#">TRNG-UR8S UR &amp; 8 Series Essentials</a>	<a href="#">20/</a>	<a href="#">TRNG-8SPL</a>
<a href="#">10/</a>	<a href="#">TRNG-UR UR Essentials</a>	<a href="#">21/</a>	<a href="#">TRNG-FMPR</a>
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<a href="#">12/</a>	<a href="#">TRNG-8S 8 Series Essentials Workshop</a>	<a href="#">23/</a>	<a href="#">P40PL-C MiCOM P40 Platform</a>
<a href="#">13/</a>	<a href="#">TRNG-MTDT Motor &amp; Distribution Essentials</a>	<a href="#">24/</a>	<a href="#">P40AE-C P40 Agile Enhanced</a>
<a href="#">15/</a>	<a href="#">TRNG-DIST Distribution Essentials</a>		



# Welcome to Learning & Development

Lets Start With Some Useful Information

## What is being offered and when? Visit our website.

It is a useful place to find more information about our training offerings including other course guides etc. You can also download our Curriculum Guide from there.

<http://www.gegridsolutions.com/multilin/support/training/>

## Need to access free learning videos? Visit our YouTube channels.

Did you know that we have a dedicated You Tube channel where you can find e-learning training videos at no cost. Here you can find how2 videos, training webinars and training course modules for self learning.



<http://www.youtube.com/GEgridautomationLD>

## Contact Us

Need more information, have questions about our offerings, want to follow up with us on any training related issue, then contact us through our training email.

[training.multilin@ge.com](mailto:training.multilin@ge.com)

## What type of training is offered by GE?

- no cost training videos are available on our youtube channels
- standard schedule courses are available to book on the online store
- on demand courses at your place or ours, email: [training.multilin@ge.com](mailto:training.multilin@ge.com)
- try our virtual classroom sessions (remote learning)
- try one of our certification programs - visit our online store

## Where can I buy a seat? Visit our online store.

Where you can view standard course schedule and purchase a seat/s on a specific course.

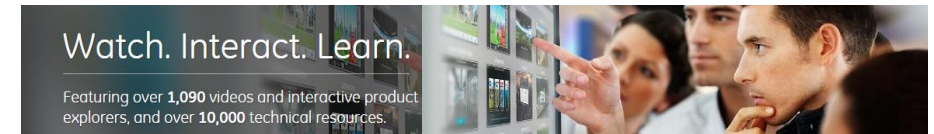
<http://store.gedigitalenergy.com/TrainingCourses.asp>

<http://store.gegridsolutions.com/Training/TrainingCourses.aspx>

## Where do I find resource info? Visit our resources page.

Did you know here you can find a multitude of useful resources to assist your learning about our products services and solutions.

<http://www.gegridsolutions.com/resources.htm>



## Certification Programs offer the greatest learning value!

Need more than a classical classroom session then try one of our programs. Programs are based upon bended learning, combining;

- e-learning modules
- virtual classroom sessions
- assessment and testing
- intense workshop hands on sessions
- programs typically incorporate over 200 hours of training

## Grid IQ Learning Center's - Discover the Difference

### Did you know?

That our Learning Centers have state of the art technology and learning material to allow the student to receive a rich learning experience, using smart boards, hands on workshop equipment, telepresence and digital device technologies.

Smart Board  
Technology



Virtual Class  
Technology



Workshop  
Technology



Our training courses are constantly evolving. The future is built around learning events with material built to suit a wide range of students and delivery methods whether they be maintenance personnel, engineers or consultants. No matter what your background or depth of understanding or need we can deliver training that works for you. You can take separate learning modules or combine them, it's your choice, or you can take one of our programs such as UR Platform and 8 Series Essentials, which combines learning modules, virtual classroom sessions and practical workshops.

## Why are we evolving, training delivery

- Training is only a vehicle to assist learning
- Training is a transactional activity, it does not create expertise alone, attendance at a class simply stimulates the desire to learn and build your expertise.
- Expertise comes through the desire to learn and the quality of the learning experience created through learning resources and delivery methods, the key being practical application of taught principles and concepts.

## What are we doing to improve

- Continuously improve the quality of our training content and training delivery methods.
- Seek to build skills through active learning, reinforced with assessment tests as we go.
- Evolve in how we execute training, using flexible blended learning offerings as integrated training programs.
- Use all available technology to improve the learning experience.
- Leverage social media wherever possible.

“I never teach my pupils, I only attempt to provide the conditions in which they can learn”.

“everything should be made as simple as possible, but not simpler.”

Albert Einstein

Rethinking how education is delivered

## Improving the Learning Experience

### Self-Paced

Accommodates a self-study approach to training for individuals who prefer to learn at their own pace and without the presence of an instructor.



#### eLearning

Training content comprising of how2 videos, recorded webinars and training e-modules

### Instructor Led

Designed for those who prefer attending courses in a classroom or similar environment facilitated by an experienced instructor while learning amongst a group of peers who share the same goal.



#### Webinars

Designed for those who are interested in gaining further knowledge regarding our products and theory based modules, our live webinars offers students the opportunity of attending our online sessions to discuss specific topics with a live instructor.



#### Virtual Classroom

Stay seated and connect with your peers through our virtual class room sessions. These sessions are facilitated by a live instructor, allowing you the opportunity of reaching out throughout your learning.



#### Classroom

Whether you are interested in attending classes at our GE Learning Centers, or preferred location of your choice, our facilitators provide a learning experience like no other. Students are able to expand their knowledge in an environment conducive to learning.

Redefining how learning is achieved

Each **Virtual Course** uses e-learning self paced course work, virtual class sessions and on-line testing of what you have learned. These courses are prerequisites for attending any of our workshop sessions that we offer.

## Course Structure

### Virtual Classroom

- getting started and setting expectation session

### eLearning

- student complete self pace course work
- uses e-learn playlist

### Test

- course work testing of knowledge

### Virtual Classroom

- interactive learning
- walk through e-learn content
- demonstration activities
- group discussions
- practical exercises

### Test

- final program testing
- course certificate

## Course Tools

To aid learning we provide access to various tools:



Virtual Classroom



eLearning

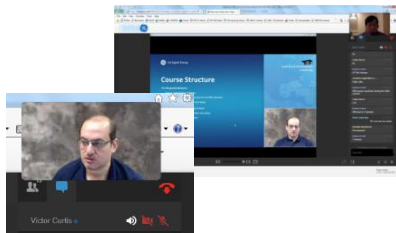


Testing



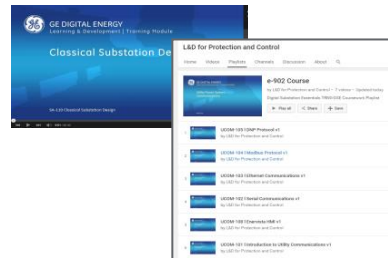
Collaboration

Classes can be run for a minimum of 8 persons and subject to content can be run for groups up to 25.



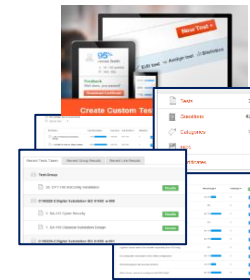
These are interactive sessions using GE video conferencing technology. All you need is a good internet connection, computer, web cam and microphone.

e-learning modules are video based learning they are compiled into playlists for courses with links provided.



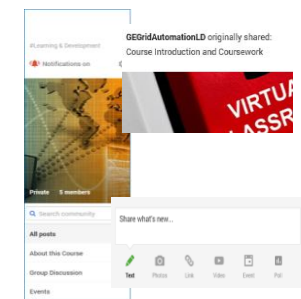
Watch and learn as we take you on a step by step journey through the subject. All that is needed is an internet connection.

All our paid courses offer student assessment and testing.



Successful completion leads to issuance of a certificate that provides course abstract, level of attainment and number of learning hours.

Enter our course collaboration tool, communicate with your instructor and your peers.

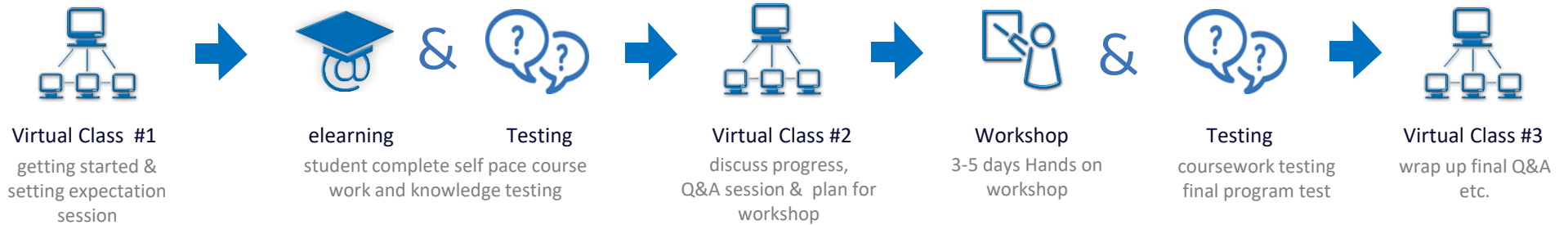


Have a question... ask!  
See a question you know the answer... share!

The goal is to learn together.

Learning programs, blend together e-learning, virtual classroom sessions and face to face workshops. All elements have on-line assessment testing. To attend you must have completed all the prerequisites needed.

## Course Structure



## Course Tools

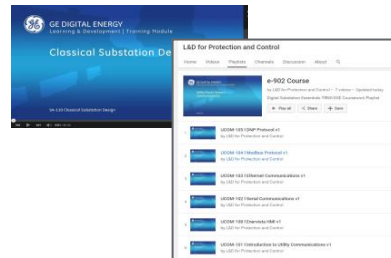
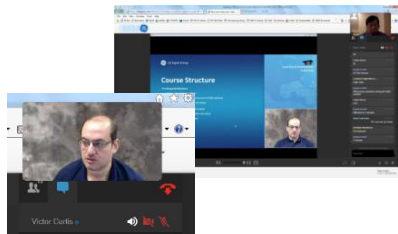
All used in virtual classroom sessions



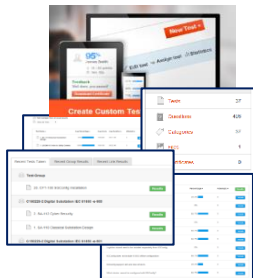
Virtual Classroom



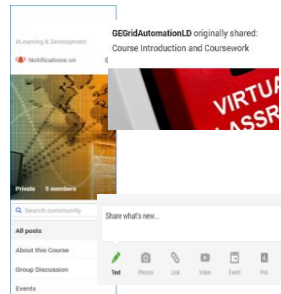
eLearning



Test



Collaboration



## Key Attributes

The UR and 8Series course programs build on the content learned in the virtual class offerings and move into system integration of GE products to create customer solution.

The students will practice the basic configurations of the relays in the first two days or four days, then in the last day will create one capstone project to use the knowledges learnt in previous exercises.

At the end of each course the student will have a greater understanding on the programming and operation of the UR and 8Series relays. Application Labs will allow the students to apply and hone their skills on these relays.

Both courses starts with e-learning coursework and testing, and then a hands-on face to face workshop.

Throughout the course students are encouraged to collaborate with the instructor and their peers through the collaboration tool.

Its all about learning, it is much more than a training course!



## Course Code | TRNG-UR8S - Universal Relay and 8 Series Essentials

**note 1:** timeline is generic may vary dependent on scheduling logistics

### who should attend

Engineering Staff within electrical utility, industrials & system integrators who need to design protection and control systems using GE products in non- 61850 and 61850 configurations.

### learning outcome

Build a knowledge and understanding of UR and 8 Series hardware, software and configuration and its application within the smart grid.

Application Labs will give the students an opportunity to apply their knowledge.

### prerequisites

TRNG-FMPRV course is highly recommended or with certain UR & 8 Series working experiences.

### workshop hardware needs

All equipment is provided as part of the workshop.

### what's covered

- Hardware
- Enervista software
- Diagnostic Tools
- I/O Configuration
- Protection Elements
- FlexLogic
- IEC61850
- Capstone project

### learning contact hours

• E-learn: (playlist e-954)	6 hours
• Workshop:	40 hours
• Testing:	2 hours
• <b>Total :</b>	<b>48 hours</b>

Learning contact hours quoted are our estimate of time to complete, actual is very much dependent on students prior knowledge.

### timeline note 1

- Registration Deadline
- 8 weeks prior to workshop**
- course notices sent out
- 7 weeks prior to workshop**
- virtual class 1
- 6 weeks prior to workshop**
- complete: e-learning
- 2 week prior to workshop**
- Virtual Class 2
- 1 week prior to workshop**
- Workshop
- week zero**
- Virtual Class 3
- 2 weeks after workshop**

## e-learning playlist | e-952 & e-953

Module	Name	Module	Name
UR-100	UR Platform Overview	8SP-100	8 Series Relay Overview
UR-101	UR Platform Hardware	8SP-101	8 Series Hardware
UR-102	UR Platform Software	8SP-102	8 Series Software Interface
UR-103	UR Platform FlexLogic	8SP-103	S Series Software Setpoints
UR-104	UR Platform Protection	8SP-104	8 Series Protections
UR-107	UR Platform IEC61850 ed2	8SP-105	8 Series Control & Monitoring
UR-110	UR Platform AC Input Configuration	8SP-106	8 Series FlexLogic
UR-118	Graphical Front Panel	8SP-107	8 Series IEC61850 Configurator
UR-140	UR7.0 Release Introduction		
UR-141	UR7.3 Release Introduction		



## Prerequisites

Students **MUST** complete all course work and successfully pass the prerequisite assessment test for each course module assigned.

## Learning Objective

On completion of the Practical Workshop students should be able to identify, assemble, integrate and operate configure UR and 8 series relays where they can then hone their skills through further applications.

In addition to the exercise each module comes with an assessment test.

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
UR-401   Initial Setup	UR-405   Protection Summary	8SP-401   Hardware Setup	8SP-405   Controls and Monitoring	<b>Capstone Project</b> Examples : Interlock Scheme Breaker Simulator with 50BF Auto Reclose Scheme Breaker Fail Transfer Trip Main Tie Main Bus Scheme
UR-402   Diagnostic Setup	UR-406   FlexLogic	8SP-402   Software Interface	8SP-406   FlexLogic	
UR-403   Inputs & Outputs	UR-408   v7.2-IEC61850 or UR-414   IEC61850 Ed 2	8SP-403   Generic Settings	8SP-407   IEC61850	
UR-404   Metering	61850-420   UR-8S GOOSE	8SP-404   Protection Functions	8SP-408   SLD Editor	

**legend**

practical exercise    classroom taught

**Course Note**

Workshop activities are a mix of video based, written and demonstration instruction, followed by student hands on activities.

The detailed content of each module is introduced on page 24-26.

Learning content is provided on a digital device.



# Protection & Control

## Course Code | TRNG-UR - Universal Relay Essentials

**note 1:** timeline is generic may vary dependent on scheduling logistics

### who should attend

Engineering Staff within electrical utility, industrials & system integrators who need to design protection and control systems using GE products in non- 61850 and 61850 configurations.

### learning outcome

Build a knowledge and understanding of the UR hardware, software and configuration and its application within the smart grid.

Application Labs will give the students an opportunity to apply their knowledge.

### prerequisites

TRNG-FMPRV virtual course is highly recommended or with certain UR working experiences.

### workshop hardware needs

All equipment is provided as part of the workshop.

### what's covered

- Diagnostic Tools
- I/O Configuration
- Protection Elements
- FlexLogic
- IEC61850
- Application design
- Integration

### learning contact hours

- E-learn: (playlist e-952) 6 hours
- Workshop: 24 hours
- Testing: 2 hours
- **Total :** 32 hours

Learning contact hours quoted are our estimate of time to complete, actual is very much dependent on students prior knowledge.

### timeline note 1

Registration Deadline

8 weeks prior to workshop

course notices sent out

7 weeks prior to workshop

virtual class 1

6 weeks prior to workshop

complete: e-learning

2 week prior to workshop

Virtual Class 2

1 week prior to workshop

Workshop

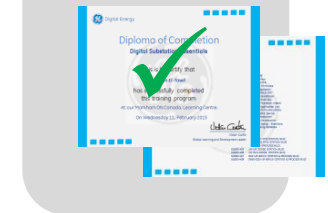
week zero

Virtual Class 3

2 weeks after workshop

## e-learning playlist | e-952

Module	Name
UR-100	UR Platform Overview
UR-101	UR Platform Hardware
UR-102	UR Platform Software
UR-103	UR Platform FlexLogic
UR-104	UR Platform Protection
UR-107	UR Platform IEC61850 ed2
UR-110	UR Platform AC Input Configuration
UR-118	Graphical Front Panel
UR-140	UR7.0 Release Introduction
UR-141	UR7.3 Release Introduction



## Prerequisites

Students **MUST** complete all course work and successfully pass the prerequisite assessment test for each course module assigned.

## Learning Objective

On completion of the Practical Workshop students should be able to identify, assemble, integrate and operate configure UR relays where they can then hone their skills through further applications.

In addition to the exercise each module comes with an assessment test and final exam on the last day.

MONDAY	TUESDAY	WEDNESDAY
UR-401   Initial Setup	UR-405   Protection Summary	Capstone Project Examples : Interlock Scheme Breaker Simulator with 50BF Auto Reclose Scheme Breaker Fail Transfer Trip
UR-402   Diagnostic Setup	UR-406   FlexLogic	
UR-403   Inputs & Outputs	UR-408   v7.2-IEC61850 or UR-414   IEC61850 Ed 2	
UR-404   Metering		

## Legend

practical exercise

classroom taught

## Course Note

Workshop activities are a mix of video based, written and demonstration instruction, followed by student hands on activities.

The detailed content of each module is introduced on page 24.

Learning content is provided on a digital device.

# Protection & Control

Course Code | TRNG-8S - 8 Series Essentials

**note 1:** timeline is generic may vary dependent on scheduling logistics

### who should attend

Engineering Staff within electrical utility, industrials & system integrators who need to design protection and control systems using GE products in non- 61850 and 61850 configurations.

### learning outcome

Build a knowledge and understanding of the product hardware, software and configuration and its application within the smart grid.

Application Labs will give the students an opportunity to apply their knowledge.

### prerequisites

TRNG-FMPRV virtual course is highly recommended or with certain 8 Series relay working experiences.

### workshop hardware needs

All equipment is provided as part of the workshop.

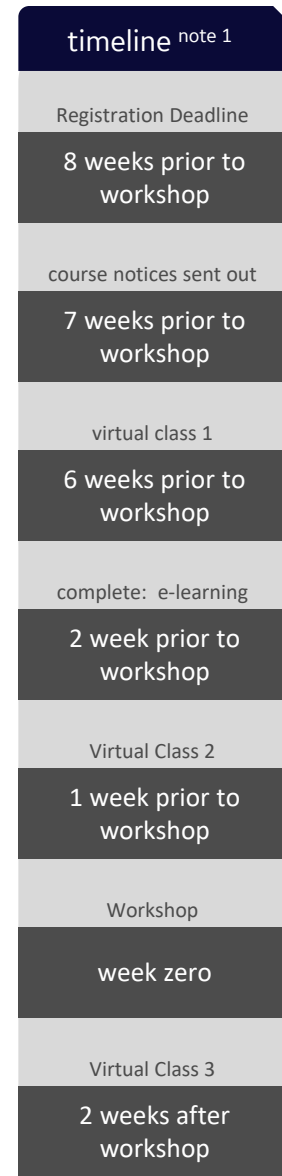
### what's covered

- Diagnostic Tools
- I/O Configuration
- Protection Elements
- FlexLogic
- IEC61850
- Application design
- Integration

### learning contact hours

- E-learn: (playlist e-953) 6 hours
- Workshop: 24 hours
- Testing: 2 hours
- Total: 32 hours**

Learning contact hours quoted are our estimate of time to complete, actual is very much dependent on students prior knowledge.



## e-learning playlist | e-953

Module	Name
8SP-100	8 Series Relay Overview
8SP-101	8 Series Hardware
8SP-102	8 Series Software Interface
8SP-103	S Series Software Setpoints
8SP-104	8 Series Protections
8SP-105	8 Series Control & Monitoring
8SP-106	8 Series FlexLogic
8SP-107	8 Series IEC61850 Configurator



## Prerequisites

Students **MUST** complete all course work and successfully pass the prerequisite assessment test for each course module assigned.

## Learning Objective

On completion of the Practical Workshop students should be able to identify, assemble, integrate and operate configure 8 series relays where they can then hone their skills through further applications.

In addition to the exercise each module comes with an assessment test and final exam on the last day.

MONDAY	TUESDAY	WEDNESDAY
8SP-401   Hardware Setup	8SP-405   Controls and Monitoring	Capstone Project Examples : Interlock Scheme Breaker Simulator with 50BF Auto Reclose Scheme Breaker Fail Transfer Trip Main Tie Main Bus Scheme
8SP-402   Software Interface	8SP-406   FlexLogic	
8SP-403   Generic Settings	8SP-407   IEC61850	
8SP-404   Protection Functions	8SP-408   SLD Editor	

## Legend

- practical exercise
- classroom taught

## Course Note

Workshop activities are a mix of video based, written and demonstration instruction, followed by student hands on activities.

The detailed content of each module is introduced on page 26.

Learning content is provided on a digital device.

# Protection & Control

## Course Delivery Offerings | Workshop

Course Code | TRNG-MTDT - Motors and Distribution Essentials

**note 1:** timeline is generic may vary dependent on scheduling logistics

### who should attend

Engineering Staff within electrical utility, industrials & system integrators who need to design protection and control systems using GE products in non- 61850 and 61850 configurations.

### learning outcome

Build a knowledge and understanding of the product hardware, software and configuration and its application within the smart grid.  
Application Labs will give the students an opportunity to apply their knowledge.

### prerequisites

TRNG-FMPRV is highly recommended to attend.

### workshop hardware needs

All equipment is provided as part of the workshop.

### what's covered

- ANSI Device Elements for:
- Transformer Protection
  - Generator Protection
  - Motor Protection
  - Feeder protection
  - Busbar Protection

### learning contact hours

- Virtual class 1: 1 hour (intro session)
- E-learn: 10 hours (playlist e-957)
- Virtual class 2: 2 hours
- Workshop: 40 hours
- Testing: 2 hours
- Virtual class 3: 2 hours
- **Total :** **57 hours**

E- Learning hours depends on the selection of the videos, it maybe longer or shorter than 10 hours.

### timeline <sup>note 1</sup>

Registration Deadline

8 weeks prior to workshop

course notices sent out

7 weeks prior to workshop

virtual class 1

6 weeks prior to workshop

complete: e-learning

2 week prior to workshop

Virtual Class 2

1 week prior to workshop

Workshop

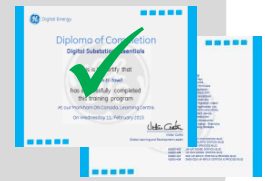
week zero

Virtual Class 3

2 weeks after workshop

e-learning playlist | e-954 and/or 952/953/960 depends on the relay selected

Module	Name	Module	Name
SR-103	369 Motor Protection Hardware	3SP-100	3 Series Relay Overview
SR-104	369 Motor Protection Software	3SP-101	3 Series Hardware
SR-105	469 Motor Protection Hardware	3SP-102	3 Series Relay Software
SR-106	469 Motor Protection Software	3SP-103	3 Series Platform Elements
SR-107	750 Feeder Protection Hardware	3SP-104	350 Feeder Protection
SR-108	750 Feeder Protection Software	3SP-105	339 Motor Protection
SR-109	745 Transformer Protection Hardware	3SP-106	345 Transformer Protection
SR-110	745 Transformer Protection Software	3SP-107	3 Series IEC 61850
SR-111	489 Hardware		
SR-112	489 Software		



## Prerequisites

Students **MUST** complete all course work and successfully pass the prerequisite assessment test for each course module assigned.

## Learning Objective

On completion of the Practical Workshop students should be able to identify, assemble, integrate and operate small scale substation solutions from where they can then hone their skills through further application.

In addition to the exercise each module comes with an assessment test and final exam on the last day.

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

This course is a free form style: after complying with the prerequisites and completing the course work students come to the workshop and complete 6-8 out of 22 relay modules and at least 1 integration exercise for successful course completion.

### Distribution

### Motors

### Integration

489/889/G60  
Generator Protection

D60/L90  
Line Protection

3SR-404 | 339  
Motor Protection

SR-403 | SR369  
Motor Protection

Non 61850 Application  
Scheme Integration

UR-420 | B30  
Bus Protection

350 /750/850/F60/P14D  
Feeder Protection

SR-405 | SR469  
Motor Protection

UR-425 | M60  
Motor Protection

61850 Application Scheme  
Integration

345/745/845/T60  
Transformer Protection

F650  
Bay Controller

8SP-421 | 869  
Motor Protection

MM-401 | MM series  
Motor Protection

3 phase motor protection  
and control

## Legend

practical  
exercise

classroom  
taught

## Course Note

Workshop activities are a mix of video based, written and instructor demonstrated. followed by student hands on activities.

Learning content is provided on a digital device.

\* Students need to decide their workshop relay types when register this course.

Course Code | TRNG-DIST - Distribution Essentials

**note 1:** timeline is generic may vary dependent on scheduling logistics

### who should attend

Engineering Staff within electrical utility, industrials & system integrators who need to design protection and control systems using GE products in non- 61850 and 61850 configurations.

### learning outcome

Build a knowledge and understanding of the product hardware, software and configuration and its application within the smart grid.

Application Labs will give the students an opportunity to apply their knowledge.

### prerequisites

TRNG-FMPRV is highly recommended to attend.

### workshop hardware needs

All equipment is provided as part of the workshop.

### what's covered

ANSI Device Elements for:

- Transformer Protection
- Generator Protection
- Line Protection
- Busbar Protection

Integration Applications:

- IEC61850

### learning contact hours

• E-learn: (playlist e-958)	6 hours
• Workshop:	24 hours
• Testing:	2 hours
• <b>Total :</b>	<b>32 hours</b>

eLearning hours depends on the selection of the videos, it maybe longer or shorter than 6 hours.

### timeline note 1

- Registration Deadline
- 8 weeks prior to workshop**
- course notices sent out
- 7 weeks prior to workshop**
- virtual class 1
- 6 weeks prior to workshop**
- complete: e-learning
- 2 week prior to workshop**
- Virtual Class 2
- 1 week prior to workshop**
- Workshop
- week zero**
- Virtual Class 3
- 2 weeks after workshop**

e-learning playlist | e-954 and/or 952/953/960 depends on the relay selected

Module	Name	Module	Name
SR-103	369 Motor Protection Hardware	3SP-100	3 Series Relay Overview
SR-104	369 Motor Protection Software	3SP-101	3 Series Hardware
SR-105	469 Motor Protection Hardware	3SP-102	3 Series Relay Software
SR-106	469 Motor Protection Software	3SP-103	3 Series Platform Elements
SR-107	750 Feeder Protection Hardware	3SP-104	350 Feeder Protection
SR-108	750 Feeder Protection Software	3SP-105	339 Motor Protection
SR-109	745 Transformer Protection Hardware	3SP-106	345 Transformer Protection
SR-110	745 Transformer Protection Software	3SP-107	3 Series IEC 61850
SR-111	489 Hardware		
SR-112	489 Software		





**Prerequisites**

Students **MUST** complete all course work and successfully pass the prerequisite assessment test for each course module assigned.

**Learning Objective**

On completion of the Practical Workshop students should be able to identify, assemble, integrate and operate small scale substation solutions from where they can then hone their skills through further application.

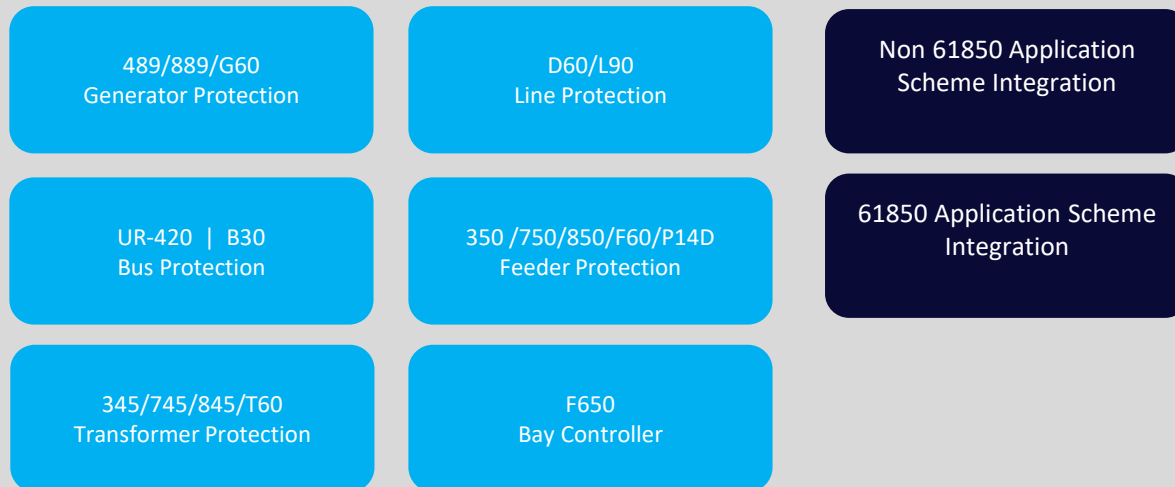
In addition to the exercise each module comes with an assessment test and final exam on the last day.



This course is a free form style: after complying with the prerequisites and completing the course work students come to the workshop and complete 2-4 out of 16 relay modules and at least 1 integration exercise for successful course completion.

**Distribution**

**Integration**



**Legend**

practical exercise

classroom taught

**Course Note**

Workshop activities are a mix of video based, written and instructor demonstrated. followed by student hands on activities.

Learning content is provided on a digital device.

\* Students need to decide their workshop relay types when register this course.

# Protection & Control

## Course Delivery Offerings | Workshop

Course Code | TRNG-MTR - Motors Essentials

**note 1:** timeline is generic may vary dependent on scheduling logistics

### who should attend

Engineering Staff within electrical utility, industrials & system integrators who need to design protection and control systems using GE products in non- 61850 and 61850 configurations.

### learning outcome

Build a knowledge and understanding of the product hardware, software and configuration and its application within the smart grid.

Application Labs will give the students an opportunity to apply their knowledge.

### prerequisites

TRNG-FMPRV is highly recommended to attend.

### workshop hardware needs

All equipment is provided as part of the workshop.

### what's covered

Configuration and Motor Protection Elements from a selection of GE Multilin Motor Protection Relays.

Integration Applications:

- IEC61850

### learning contact hours

- E-learn: 6 hours (playlist e-959)
- Workshop: 24 hours
- Testing: 2 hours
- **Total: 32 hours**

E- Learning hours depends on the selection of the videos, it maybe longer or shorter than 6 hours.

### timeline <sup>note 1</sup>

- Registration Deadline
- 8 weeks prior to workshop
- course notices sent out
- 7 weeks prior to workshop
- virtual class 1
- 6 weeks prior to workshop
- complete: e-learning
- 2 week prior to workshop
- Virtual Class 2
- 1 week prior to workshop
- Workshop
- week zero
- Virtual Class 3
- 2 weeks after workshop

### e-learning playlist | e-959

Module	Name
SR-103	369 Motor Protection Hardware
SR-104	369 Motor Protection Software
SR-105	469 Motor Protection Hardware
SR-106	469 Motor Protection Software
8SP-121	869 Motor Relay
3SP-105	339 Motor Protection
FMPR-109-1	Motors Protection part 1
FMPR-109-2	Motors Protection part 2
FMPR-109-3	Motors Protection part 3
FMPR-2002	Technical Webinar Motor Protection



## Prerequisites

Students **MUST** complete all course work and successfully pass the prerequisite assessment test for each course module assigned.

## Learning Objective

On completion of the Practical Workshop students should be able to identify, assemble, integrate and operate small scale substation solutions from where they can then hone their skills through further application.

In addition to the exercise each module comes with an assessment test and final exam on the last day.

MONDAY

TUESDAY

WEDNESDAY

This course is a free form style: after complying with the prerequisites and completing the course work students come to the workshop and complete 2-4 out of 6 relay modules, on the last day, the student need to use pickup one of the motor relay and configured to control and protect one GE 1 horsepower 3 phase motor.

### Motors

3SR-404 | 339  
Motor Protection

SR-403 | SR369  
Motor Protection

SR-405 | SR469  
Motor Protection

UR-425 | M60  
Motor Protection

8SP-421 | 869  
Motor Protection

MM-401 | MM series  
Motor Protection

### Integration

3 phase motor protection  
and control

## Legend

practical  
exercise

classroom  
taught

## Course Note

Workshop activities are a mix of video based, written and instructor demonstrated. followed by student hands on activities.

Learning content is provided on a digital device.

\* Students need to decide their workshop relay types when register this course.

Course Code | TRNG-URPL - UR Platform

**who should attend**

Technician and electrician within electrical utility, industrials & system integrators who need to learn the UR hardware, software interface, the setting files download & upload, how to retrieve the events and waveform records, the basic protection elements.

**learning outcome**

Build a knowledge and understanding of the UR hardware, software and configuration and its application within the smart grid.

Application Labs will give the students an opportunity to apply their knowledge.

**prerequisites**

- Fundamentals of Modern Protective Relaying is highly recommended
- No E-learning are required for this course.

**workshop hardware needs**


All equipment is provided as part of the workshop.

**what's covered**

- Hardware & Software
- Actual Values & Settings
- I/O Configuration
- Protection & Control
- FlexLogic
- IEC61850 or specific UR application

**learning contact hours**


- 32 hours over 4 days



## COURSE CONTENT & TIMING

MONDAY	TUESDAY	WEDNESDAY	THURSDAY
UR Hardware Overview and Exercises	Protections and Exercises	FlexLogic and Exercises	IEC 61850 Overview UR application
EnerVista Software and Exercises	Control and Exercises	Breaker Simulator Exercise and AR test	IEC 61850 Exercises ANSI Device Test


Course Code | TRNG-8SPL - 8 Series Platform

<p><b>who should attend</b></p> <p>Technician and electrician within electrical utility, industrials &amp; system integrators who need to learn the 8 Series hardware, software interface, the setting files download &amp; upload, how to retrieve the events and waveform records, the basic protection elements.</p>	<p><b>learning outcome</b></p> <p>Build a knowledge and understanding of the 8 Series hardware, software and configuration and its application within the smart grid.</p> <p>Application Labs will give the students an opportunity to apply their knowledge.</p>	<p><b>prerequisites</b></p> <ul style="list-style-type: none"> <li>• Fundamentals of Modern Protective Relaying is highly recommended</li> <li>• No E-learning are required for this course.</li> </ul>
<p><b>workshop hardware needs</b></p> <p>All equipment is provided as part of the workshop.</p>	<p><b>what's covered</b></p> <ul style="list-style-type: none"> <li>• Hardware &amp; Software</li> <li>• Actual Values &amp; Settings</li> <li>• I/O Configuration</li> <li>• Protection &amp; Control</li> <li>• FlexLogic</li> <li>• IEC61850 or 8 Series Application</li> </ul>	<p><b>learning contact hours</b></p> <ul style="list-style-type: none"> <li>• 32 hours over 4 days</li> </ul> 

COURSE CONTENT & TIMING

MONDAY	TUESDAY	WEDNESDAY	THURSDAY
8 Series Hardware Overview and Exercises	Protections and Exercises	FlexLogic and Exercises	IEC 61850 Overview
EnerVista Software and Exercises	Control and Exercises	Breaker Simulator Exercise and AR test	IEC 61850 Exercises

Course Code | TRNG-FMPR - Fundamentals of Modern Protective Relaying

<p><b>who should attend</b></p> <p>Managers, Consultants, Engineers and System Integrators responsible for power delivery in either utility or industrial sectors..</p>	<p><b>learning outcome</b></p> <p>Students acquire basic knowledge on the fundamentals of today’s technology in various applications. The objective is to ensure that Students have the basic knowledge to make future GE courses attendance effective.</p>	<p><b>prerequisites</b></p> <p>Basic electrical knowledge, there are no GE course prerequisites.</p>
<p><b>workshop hardware needs</b></p> <p>None</p>	<p><b>what’s covered</b></p> <ul style="list-style-type: none"> <li>• Power System Overview</li> <li>• Generator Protection</li> <li>• Transmission Line Protection</li> <li>• Busbar Protection</li> <li>• Distribution Protection</li> <li>• Transformer Protection</li> <li>• Motor Protection</li> </ul>	<p><b>learning contact hours</b></p> <ul style="list-style-type: none"> <li>• 32 hours over 4 days</li> </ul> 

COURSE CONTENT & TIMING

MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Power Systems Overview	Generator Protection	Transformer Protection	Feeder Protection
Power System Protection	Busbar Protection	Transmission Line Protection	Motor Protection

Course Code | TRNG-61850 - IEC 61850 Fundamentals

**who should attend**

Managers, Consultants, Engineers and System Integrators responsible for power delivery in either utility or industrial sectors..

**learning outcome**

Students acquire basic knowledge on the fundamentals of today’s technology in various applications.  
The objective is to ensure that Students have the basic knowledge to make future GE courses attendance effective.

**prerequisites**

Basic electrical knowledge, there are no GE course prerequisites.

**workshop hardware needs**


None

**what’s covered**

- Network Protocols
- SV Messages
- GOOSE Messages
- MMS Messages
- SCL, CID, ICD, IID Configuration
- Applications

**learning contact hours**

- 40 hours over 5 days



## COURSE CONTENT & TIMING

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Network Protocols	GOOSE	SCL	Applications	Capstone Projects
SV Messages & Merging Units	IED Configuration	MMS & Gateway	Digital Substation Simulation	



Course Code | P40PL-C MiCOM P40 Platform

## who should attend

Engineering Staff within electrical utility, industrials & system integrators who need to design protection and control systems using MiCOM P40

## learning outcome

At the end of this course you will have the essentials of the MiCOM P40 platform hardware software and configuration, using the P14x relay. To be able to program feeder protection and operate with auto-reclose.

## prerequisites

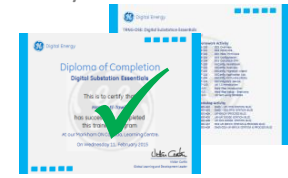
Fundamentals of Modern Protective Relaying is highly recommended

## what's covered

- Overview of the of MiCOM P40 relays and applications,
- Hardware, front panel navigation of P14x relay, communication setup with MiCOM P40 software, Settings creation, upload, download, event extraction, interrogation, disturbance record extraction and interrogation.
- PSL (Programmable scheme logic) file creation and upload/download.
- Hands on tests of overcurrent and various functions with RTT test set.

## learning contact hours

28 hours over 4 days



## COURSE CONTENT & TIMING

MONDAY

Overview of MiCOM P40 relay family and hardware.

TUESDAY

MiCOM P40 Software interface operation.

WEDNESDAY

P14x Feeder relay hands on workshop and test.

Thursday

IEC61850

Course Code | P40AE-C P40 Agile Enhanced

## who should attend

Engineering Staff within electrical utility, industrials & system integrators who need to design protection and control systems using P40AE

## learning outcome

At the end of this course you will have the essentials of the P40AE platform hardware software and configuration. To be able to program feeder protection and operate with auto-reclose.

## prerequisites

Fundamentals of Modern Protective Relaying is highly recommended

## what's covered

- Overview of the of P40AE relay and applications,
- Hardware, front panel navigation of P40AE relay, communication setup with EnerVista Flex software, Settings creation, upload, download, event extraction, interrogation, disturbance record extraction and interrogation.
- PSL (Programmable scheme logic) file creation and upload/download.
- Hands on tests of overcurrent and various functions with RTT test set.

## learning contact hours

28 hours over 4 days



## COURSE CONTENT & TIMING

MONDAY

P40AE Hardware and EV Flex Software

TUESDAY

P40AE Protection & Controls

WEDNESDAY

PSL & IEC 61850

# Legal

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