framatome

IC academy
Training Solutions

IC academy

With more than 40 years of training experience, Framatome's full training portfolio includes courses on virtually every aspect of nuclear power plant construction and operation. We also design individually tailored training programs and courses to suit our customers' specific requirements. Our long-standing relationships with global experts, utilities, and institutions give us the necessary expertise to offer valuable insights into nuclear safety policy and procedures.

Our training solutions focus on:
- Certified, experienced instructors and experts in all fields of nuclear technology
- Competent advice and support regarding your intended training goals
- Practical courses with applied training on real-life systems
- Training curriculum customized to your needs
- High-quality training materials individually tailored for each course and customer

Our promise to you

Framatome offers comprehensive training solutions for the development, construction and maintenance of nuclear power plants. Our IC academy is home to world-leading experts in the industry, ready to share their know-how and experience with your operational teams. Framatome delivers the training programs you need to help you achieve your team's development goals.

Your performance
is **our** everyday **commitment**

Training Locations

Framatome offers extensive system and operations training at our modern training facilities or on-site at customer locations worldwide.

France

Framatome offers instrumentation and control training at sites like Grenoble, Lyon and Paris, as well as at NPP sites like Flamanville. Our experts combine the best of the theoretical and the practical from our comprehensive portfolio to ensure the best training for all customers.

Germany

For more than 40 years, Framatome's Training Centers in Karlstein am Main and Erlangen Germany have hosted training courses for various aspects of nuclear power plant construction and plant operation. Instrumentation and control courses are supported by comprehensive I&C training platforms and mock-ups, ensuring hands-on training in realistic environments for our customers. Our well-experienced trainers are looking forward to welcoming you in both the classroom as well as practical settings.

USA

Located in Lynchburg, Va., Framatome's Technical Training Center extends over 3.5 acres, with classrooms, offices, and technical mock-ups aimed at meeting the growing needs for nuclear site maintenance in the United States. Technicians receive hands-on training for plant-specific instrumentation and control configurations and new procedures in a safe, realistic environment that is more conducive to learning and sharing information.

China

Framatome China has developed under-construction plant simulators for better understanding of the physical phenomena, plant processes and cycle events of a PWR nuclear plant. It combines simulators and training content, and can serve to train engineers working in the nuclear industry in order to improve general knowledge of power plant design and operation.

China Slovakia

For our local customers in Asia and Eastern Europe, we can also ensure direct access to Framatomes IC trainings by offer our I&C academy portfolio in China and Slovakia. We have increased the amount languages in which our portfolio is offered in native language and we are looking forward to either welcoming you at one of our local facilities or directly training you at your place of work.

TRAINING SOLUTIONS
Table of Contents

Boremeters

Control, Calibration and Operation of Multiblock and SM4 Neutron Boremeters

DURATION	LOCATION	LANGUAGES
15 hours spread over 3 consecutive days	Framatome Grenoble	French

TARGET GROUP

Nuclear chemists at CP0, CPY, 1300 and N4 level plants likely to operate and intervene on MULTIBLOC boremeters (CPY and 1300) or SM4 (CPO and N4)

OBJECTIVES

- Explain Boremeter operation
- Explain reactivity monitoring role of Boremeter
- Define functions of equipment in process, ETS, and reactivity measurement and control
- Reference applicable steps to take in case of Boremeter unavailability
- Identify and define role and structure of equipment sub-assemblies
- Identify parameters of chemist interventions on equipment
- Define and apply troubleshooting method to ensure compliance with quality requirements (risk analysis - control - requalification - traceability)
- Carry out operational commissioning and tests
- Ensure support to service providers during calibration
- Integrate material and functional REX

CONTENT

- Boremeter operation
- Reactivity monitoring role of boremeter - Descriptions and roles of sub-assemblies: measuring device (tank and moderator, neutron sources, neutron detectors), cabinet, electronic frame, display boxes (control room box, local display)
- List of parameters related to the chemist's activities:
- System outputs (indication of the number of stroke/s, concentration, alarm), treatment in case of fault, self-control in case of anomaly detection, initialization, global test, thresholds and alarms
- List of functional tests, diagnostic help on the front panel
- Troubleshooting method to ensure compliance with quality requirements: (risk analysis, control, requalification, traceability)
- Roles and descriptions: recalibration, global test, reset calibration verification, adjustable and modifiable parameters, operating terms: HV curves, meter discriminant curve
- Material and functional REX: recalibration, low boron content, global test
- Information on the evolutions: RCV boremeter, EPR boremeter

PREREQUISITES

PCF1 training or equivalent, boremeter calibration participation, EP RGE IX boremeter performance

OTHER INFORMATION

6 people maximum
TRAINING CODE: M143

Boremeters
RPN CP0 and Boremeter SM4 recycling

DURATION	LOCATION	LANGUAGES
32 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
Automation department personnel operating digital neutron measurement equipment RPN and digital boremeter type SM4 of the CP0 level

OBJECTIVES
- Define functional roles of equipment in process, in STEs, in reactivity measurement and control
- Define roles and structure of various chains of measurement and monitoring (RPN and Boremeter)
- Carry out commissioning of equipment and confirming of correct operation (calibration of the Boremeter)
- Apply troubleshooting method leading to implementation of risk analysis approach, intervention practice reliability and quality assurance requirement adaption (control, requalification, traceability, REX)
- Integrate evolutions following material and functional REX

CONTENT
- Briefly explain function of equipment in process (applicable to RPN and Boremeter)
- Briefly reconstruct links with other systems (applicable to RPN)
- Orally formulate safety impact, in context of STEs and accidental procedures (reactivity monitoring) applicable to both systems
- Reconstruct equipment architecture in form of RPN cabinet synoptic
- Explain briefly functions of the synoptic measurement chains components
- Enter data pairs provided by chemistry section
- Drawing of curves
- Carry out troubleshooting under conditions equivalent to those encountered on wafers
- Find failure origins by best possible use of chain diagrams
- Use previously stated faults to search for hypotheses leading to a diagnosis
- Theoretically elaborate practical actions for implementation on equipment, validating hypotheses
- Describe intervention main steps, including most critical phases, risks incurred and associated countermeasures
- Prior to intervention, determine if operating modes of the automatisms and physical state of installation are compatible with planned actions
- In consultation with other group members, apply all intervention stages involving adjustment resumption, configuration modification or installation change of state
- In consultation with other group members, formulate diagnosis based on hypotheses envisaged and reports taken
- In consultation with other group members, establish conditions for defective element replacement or adjustment resumption
- After taking precautions during unpacking and assembly of spare part and possibly its power supply, replace defective element
- Implement requalification procedure adapted to defective element replacement operation
- RPN system and Boremeter feedback will be given during the course, specifically focusing on:
  - Material aspect: main failures and remedies, component problems, material evolutions, new and old part compatibility
  - Functional aspect: failures, causes (material, human), effects (safety, availability)

PREREQUISITES
Course 5644 “Study and maintenance of digital RPN equipment (CP0)”

OTHER INFORMATION
6 people Max
TRAINING CODE: M060

Boremeters
RPN CPY and Boremeter 900 MW recycling

DURATION	LOCATION	LANGUAGES
32 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
Automation services personnel called to intervene on neutron measurement equipments RPN and analog Boremeter of the CPY levels

Objectives
- Define functional role of equipment in process, in STEs, in reactivity measurement and control
- Define role and structure of various measurement and monitoring chains (RPN and Boremeter)
- Carry out commissioning of equipment and verification of correct operation (Boremeter calibration)
- Apply troubleshooting method leading to implementation of risk analysis approach, intervention reliability practices and quality assurance requirements adaption (control, requalification, traceability, REX)
- Integrate evolutions following material and functional REX

CONTENT
- Briefly explain process equipment function (applicable to RPN and Boremeter)
- Briefly reconstruct system links (applicable to RPN)
- Orally formulate safety impact, in context of STEs and accidental procedures (reactivity monitoring), applicable to both systems
- Reconstruct equipment architecture in form of an RPN cabinet synoptic
- Explain briefly synoptic measurement chain component functions
- Platform manipulation: implement calibration procedure to enter data pairs provided by the chemistry section
- Curve drawing
- Carry out troubleshooting in conditions equivalent to those met on the wafers
- Find failure origins by best possible use of chain diagrams
- Use previously stated faults to search for hypotheses leading to a diagnosis
- Elaborate practical actions to be implemented on equipment, validating hypotheses
- Describe orally intervention main steps, including most critical phases, risks incurred and associated countermeasures
- Pre-intervention, determine if automatism operating modes and physical state of installation are compatible with planned actions
- In consultation with other group members, apply all intervention stages involving adjustment resumption, configuration modification or installation change of state
- In consultation with other group members, formulate diagnosis based on hypotheses envisaged and reports taken
- In consultation with other group members, establish defective element replacement conditions or adjustments resumption
- After taking precautions during unpacking and assembly of spare part and possibly its power supply, replace defective element
- Implement requalification procedure adapted to defective element replacement operation
- RPN system and Boremeter feedback will be given during the course, specifically focusing on:
  - o Material aspect: main failures and remedies, component problems, material evolutions, new and old part compatibility
  - o Functional aspect: failures, causes (material, human), effects (safety, availability)

PREREQUISITES
A231 “Study and maintenance of RPN 900 CP1 and CP2 chains”

OTHER INFORMATION
6 people maximum
TRAINING CODE: M061

Boremeters
Study and Maintenance of Boremeter on RCV 900MW

DURATION	LOCATION	LANGUAGES
16 hours spread over 2 consecutive days	Framatome Grenoble	French

TARGET GROUP
- Automation maintenance technicians (900 MWe nuclear power plants)
- Automation services (900 MWe nuclear power plants)

OBJECTIVES
- Materially and functionally define sub-assemblies
- Carry out equipment commissioning and check for correct operation
- Carry out calibration operations on RCV Boremeter
- Define and apply methods of preventive and corrective maintenance by implementing the requirements of quality and traceability
- Define MCO contract terms and their application

CONTENT

Theoretical section:
- General presentation of equipment
- Operating principle (representation in form of synoptic diagram)
- Description of sub-assemblies
  - o Measuring device
  - o Acquisition devices
  - o Processing unit cabinets

Local human-machine interface (HMI)
- System outputs (number of strokes/ second, concentration, alarms)
- Fault treatment
- Self control in case of anomaly detection
- Initialization, global test

Thresholds and alarms
- Calibration principles
- Adjustable and modifiable parameters
- Presentation of main EPs
- Presentation of manufacturer's assistance (MCO) warranty, scope and application methods
- Presentation of the technical documentation (GEE, alarm sheets, EP ranges)

Practical execution on representative mobile training model:
- Commissioning / shutdown
- Diagnosis in case of fault, alarm, failure
- Identification of faulty element
- Realization of main EPs (in demonstrative method)
- Replacement of faulty element
- Calibration process
- Use of technical documentation

PREREQUISITES

M982 "RCV Boremeter: Functional and regulatory approach" On e-learning

OTHER INFORMATION

4 people maximum
TRAINING CODE: M983

Boremeters
Study and Maintenance of Multiblock Boremeter (CP1, CP2, 1300)

DURATION	LOCATION	LANGUAGES
24 hours spread over 4 consecutive daysa	Framatome Grenoble	French

TARGET GROUP

On-site intervention teams personnel with knowledge of Boremeter measurement principles

OBJECTIVES
- Describe Boremeter role and functionality
- Calibrate a Boremeter using data provided by the chemistry section.
- Ensure preventive and curative maintenance
- Carry out periodic control of electronic card drift
- Carry out acknowledgment of defects

CONTENT
- Modification of parameters, thresholds and alarms
- Usage of outputs, protocol and operator dialogue
- Exploitation of display boxes
- Exploitation of printer-issued information
- Practical work

PREREQUISITES

Intervention field experience, including intervention on equipment contained in this training course, and knowledge of neutron measurement principles

OTHER INFORMATION

6 people maximum
TRAINING CODE: M067

Boremeters
Study and Maintenance of the SM4 Boremeter (CP0 and N4)

DURATION	LOCATION	LANGUAGES
24 hours spread over 4 consecutive days	Framatome Grenoble	French

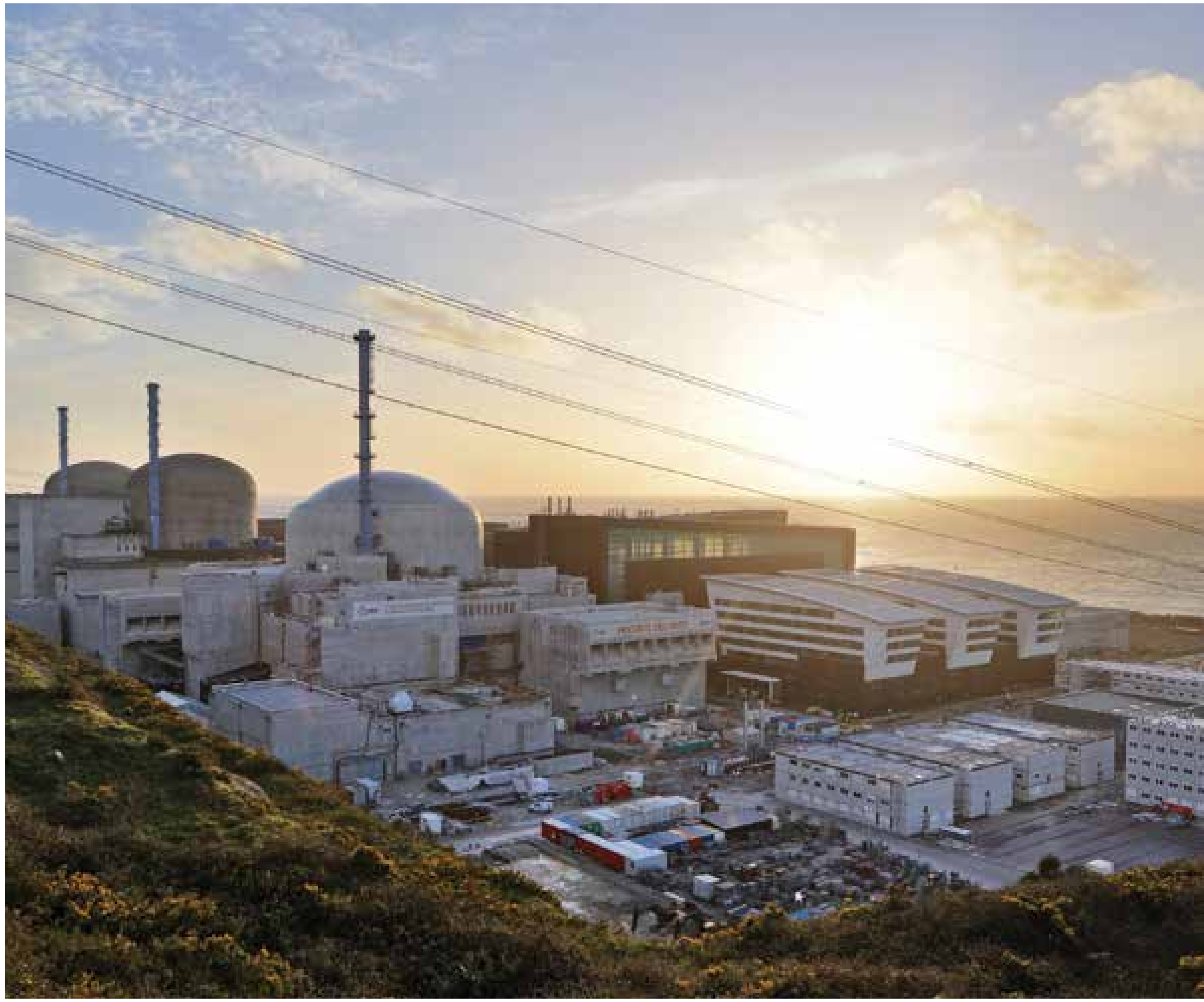
TARGET GROUP
On-site intervention team personnel with knowledge of Boremeter measurement principles

OBJECTIVES
- Describe role and functionality of the Borometer
- Calibrate Boremeter from data provided by chemistry section
- Ensure preventive and curative maintenance
- Carry out periodic control of electronic card drift
- Carry out an acknowledgment of defects

CONTENT
- Modification of parameters, thresholds and alarms
- Use of outputs, protocol and operator dialogue
- Exploitation of the display boxes
- Exploitation of printer-issued information
- Practical work

PREREQUISITES
Intervention field experience, at least one intervention on equipment contained in this training course, knowledge of neutron measurement principles

OTHER INFORMATION
6 people max
TRAINING CODE: M027



EPR Reactor
MZ3A - RIC

DURATION	LOCATION	LANGUAGES
51 hours	Flamanville	French

TARGET GROUP
EDF EPR agents

OBJECTIVES
- Define the functional role of the equipment in process, in STE
- Define materially and functionally the role of the different subassemblies of instrumentations of RIC / AMS – COT / SPND – RPVL / RPVDT
- Know how to commission equipment including critical maintenance tests and proof of operation
- Define and apply a method of repair by implementing requirements of the quality assurance (analysis of risks, control, requalification, traceability)
- Include material and functional feedback

CONTENT
1. Specificity of the platform
2. Functional Presentation of AMS System
3. Presentation of AMS equipments
4. Presentation of the applicable documentation of AMS
5. Presentation of the normal use of the equipment of AMS
6. Practical class: Procedures of normal use of the equipment of AMS
7. Maintenance presentation of AMS
8. Practical class: maintenance corrective actions of AMS
9. Functional presentation of SPND/COT system
10. Presentation of SPND/COT equipments
11. Presentation of the applicable documentation of SPND/COT
12. Presentation of the normal use of the equipment of SPND/COT
13. Practical class: Procedures of normal use of the equipment of SPND/COT
14. Maintenance presentation of SPND/COT
15. Practical class: maintenance corrective actions of SPND/COT
16. Functional Presentation of RPVL/RPVDT system
17. Presentation of RPVL/RPVDT equipment
18. Presentation of the applicable documentation of RPVL/RPVDT
19. Presentation of the normal use of the equipment of RPVL/RPVDT
20. Practical class: Procedures of normal use of the equipment of RPVL/RPVDT
21. Maintenance presentation of RPVL/RPVDT
22. Practical class: maintenance corrective actions of RPVL/RPVDT

PREREQUISITES
The trainees must have some knowledge in automatisation and control systems digital control
- The trainees also have a knowledge on the function of the process of elementary systems RIC, RPN and RGL
- The trainees have already followed the MZ00 “functional Approach of the instrumentation and control reactor of EPR FA3” training and the MZ01 “Study and Maintenance of the control of Sureté of EPR FA3 (PS, RCSL, HKS, CCAG, PIPS) training

OTHER INFORMATION
Contact: ic-academy@framatome.com
for more information

EPR Reactor
MZ3B - RPN

DURATION	LOCATION	LANGUAGES
19 hours	Flamanville	French

TARGET GROUP
EDF EPR agents

OBJECTIVES
- Define the functional role of the equipment in process, in STE
- Define materially and functionally the role of the different subassemblies of instrumentations
- Know how to commission equipment including critical maintenance tests and proof of operation
- Define and apply a method of repair by implementing requirements of the quality assurance (analysis of risks, control, requalification, traceability)
- Include material and functional feedback

CONTENT
1. Specificity of the platform
2. Functional presentation of RPN system
3. Presentation of RPN equipment
4. Presentation of the applicable documentation
5. Presentation of the normal use of the equipment of RPN system
6. Practical class: Procedures of normal use of the equipment of RPN
7. Maintenance presentation
8. Practical class: maintenance corrective actions

PREREQUISITES
The trainees must have some knowledge in automatisation and control systems digital control
- The trainees also have a knowledge on the functional of the process of elementary systems RIC, RPN and RGL
- The trainees have already followed the MZ00 “Functional Approach of the Instrumentation and Control Reactor of EPR FA3” training and the MZ01 “Study and Maintenance of the control of Sureté of EPR FA3 (PS, RCSL, HKS, CCAG, PIPS)” training

OTHER INFORMATION
Contact: ic-academy@framatome.com
for more information

EPR Reactor
MZ3C - RPI

DURATION	LOCATION	LANGUAGES
26 hours	Vitry Platform - France	French

TARGET GROUP
EDF EPR agents

OBJECTIVES
- Define the functional role of the equipment in process, in STE
- Define materially and functionally the role of the different subassemblies of instrumentations
- Know how to commission equipment including critical maintenance tests and proof of operation
- Define and apply a method of repair by implementing requirements of the quality assurance (analysis of risks, control, requalification, traceability)
- Include material and functional feedback

CONTENT
1. Specificity of the platform
2. Functional presentation of RGL/RPI-RDTME System
3. Presentation of RGL/RPI-RDTME equipment
4. Presentation of the applicable documentation
5. Presentation of the normal use of the equipment of RGL/RPI-RDTME
6. Practical class: Procedures of normal use of the equipment of RGL/RPI-RDTME
7. Maintenance presentation
8. Practical class: maintenance corrective actions

PREREQUISITES
The trainees have already participated in the MZ01 training

OTHER INFORMATION
Contact: ic-academy@framatome.com
for more information

Foxboro Control Software
Advanced FoxView Software

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP
Plant Engineers

OBJECTIVES
- Describe the purpose and function of AIM*AT software applications
- Operate the AIM*Historian application to monitor various process variables
- Configure and utilize reduction groups
- Perform AIM*Historian archiving operations
- Access real-time and historical data in table format
- Access real-time and historical data in trend format
- Set up the AIM*ODBC driver and access data with the SQL Select statement
- Access data using AIM*OPC and tools embedded in the AIM suite
- Build and view HTML reports using AIM*Inform
- Access and modify instances using AIM*Historian utilities
- Configure an instance to include both events activated by user-defined conditions and MDE values

CONTENT
This course promotes effective HMI design using advanced features in the FoxView and FoxDraw applications. These features help you build and maintain graphical displays in a Foxboro system. In this course, you use display configuration tools, substitutions, Display Manager commands (dmcmd), and various utilities. You also use FoxView displays to interact with real-time data, historical field data, and process data. The course is ideal for Process Control Engineers who build or maintain FoxDraw displays and maintain the Process Operator human interface environment.

PREREQUISITES
Course #2001v8 Foxboro Configuration Essentials

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services.

Contact: ic-academy@framatome.com
for more information

Foxboro Control Software
AIM AT Historian

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP
Plant Engineers, Process Engineers

OBJECTIVES
- Describe the purpose and function of AIM*AT software applications
- Operate the AIM Historian application to monitor various process variables
- Configure and utilize reduction groups
- Perform AIM*Historian archiving operations
- Access real-time and historical data in table format
- Access real-time and historical data in trend format
- Set up the AIM*ODBC driver and access data with the SQL Select statement
- Access data using AIM*OPC and tools embedded in the AIM suite
- Build and view HTML reports using AIM*Inform
- Access and modify instances using AIM*Historian utilities
- Configure an instance to include both events activated by user-defined conditions and MDE values
- Configure and execute reports using the I/A Series Report package

CONTENT
This course introduces you to the programming steps for accessing and engineering the AIM*AT suite of software applications.
In this course, among other tasks, you practice configuring an AIM*AT server to retrieve data and report output into a Microsoft Excel spreadsheet or web-based application.
Through hands-on lab exercises, you acquire up-to-date information on creating, managing, and querying this database. The course is ideal for plant personnel who retrieve data on process performance, plant performance, or plant operations.

PREREQUISITES
Working knowledge of Microsoft Office tools; Course #2001 Legacy I/A Configuration Essentials, Course #2001v8 Foxboro Configuration Essentials or equivalent knowledge

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services.

Contact: ic-academy@framatome.com
for more information

Foxboro Control Software
Configuration Essentials with FoxView

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP
Process Engineers, System Engineers

OBJECTIVES
- Identify hardware components of Foxboro Control Network, their functions, and the relationships between stations and modules
- Construct simple process control schemes using Control Editor
- Test control loops using default process displays
- Construct process displays that interact with live process data, using FoxView software
- Make online modifications to real-time and historical trend displays
- Interpret results and modify predefined alarm schemes
- Assign control block alarm events to Annunciator Keyboard LEDs and displays, and programs to Annunciator Keyboard pushbuttons
- Describe standard diagnostic and support tools in System Manager

CONTENT
This course allows you to work with the Foxboro system, generating Control HMI displays, building simple control loops, and responding to general diagnostic messages. In this course, you identify the major hardware and software components of Foxboro DCS. Using various configuration tools, you enable and disable process alarm reporting. Course topics use the Control Software package Control Editor (Galaxy), FoxView software, and AIM Historian. Classroom instruction and practical lab exercises lay the groundwork for more advanced Foxboro DCS courses.

PREREQUISITES
Working knowledge of plant processes; Minimum of 6 months of experience using process control computers

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services.

Contact: ic-academy@framatome.com for more information

Foxboro Control Software
Continuous Control with FoxView

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP
Process Control Engineers and Technicians

OBJECTIVES
- Construct and verify the operation of cascade, feedforward, ratio, multiple output, and discrete control schemes using control block parameters
- Create a safe control strategy for operational changes
- Enable output tracking, alarm filtering, and loop initialization using control parameters
- Configure fieldbus modules for fail-safe operation and measurement resolution
- Implement complex real-time calculations in control loops using advanced calculation blocks
- Configure and test adaptive control schemes using PIDA, FBTUNE, and other control blocks
- Use different types of control algorithms available in Foxboro DCS

CONTENT
This course helps you become familiar with the control blocks and algorithms for designing continuous control databases using Foxboro DCS Control Editor.
in this course, you focus on parameters and algorithms required for continuous control applications, such as cascade, ratio, feed-forward, and adaptive control loops. You execute complex real-time mathematical calculations at the loop level and leverage fail-safe strategies and procedures.
Course topics use Control Software packages of only Control Editor (Galaxy) and Historian with FoxView as the Human/Machine Interface (HMI). Throughout the course, extensive lab sessions help you practice and test procedures. The course is ideal for Process Control Engineers and Technicians who design, install, test, or maintain control schemes using the Control Editor.

PREREQUISITES
Course #5001FV Control Software Configuration Essentials With FoxView; Course #6211 Process Control Technology or equivalent knowledge

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services.

Contact: ic-academy@framatome.com for more information

Foxboro Control Software
Maintenance with FoxView

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP
Technicians

OBJECTIVES
- List basic hardware components, their functions, and relationships between modules and workstations
- Follow documented procedures to verify proper system installation
- Gain the knowledge to identify each module and peripheral device, trace all bus and cable connections, and demonstrate proper removal and replacement procedures
- Demonstrate knowledge of the procedures required to replace a control switch.
- Access displays, overlays, and Control Editor using FoxView HMI
- Describe how power is distributed to fieldbus modules and control processors
- Access status, configuration, and fault analysis information related to the network, individual modules, and peripheral devices using System Manager displays
- Update the firmware of control stations and modules using System Manager displays
- Resolve hardware using documentation and proper troubleshooting techniques

CONTENT
This course helps you become familiar with diagnostic and problem-solving procedures through lab exercises using Foxboro DCS hardware and software. In this course, you identify all essential hardware and software components of Foxboro DCS and verify proper installation. The course is ideal for Technicians who maintain Foxboro DCS and use the FoxView HMI.

PREREQUISITES
Working knowledge of personal computers; Prior experience with digital process control equipment

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services.

Contact: ic-academy@framatome.com for more information

Foxboro Control Software
Process Operations

DURATION	LOCATION	LANGUAGES
3 days	Customer on-site / Worldwide	English

TARGET GROUP
Operators

OBJECTIVES
- Use the devices provided by the operator’s station to access displays, overlays, and environments, and to determine variables that are operator-changeable
- Given a typical process situation, recognize the occurrence of a process alarm, determine the cause, and provide the appropriate response
- Operate the standard Foxboro faceplate displays and custom graphical displays
- Observe variations in process conditions and review historical data using real-time trends
- Demonstrate the method of access and the information presented in operational reports and in scheduled and on-demand custom process reports
- In the event of a failure, acknowledge the system alarm and identify the failed component

CONTENT
This course provides the background necessary to perform procedures normally encountered by a Process Operator in the control room. Through a series of simulated control schemes in this course, you identify the mechanics of operating the FoxView interface and interacting with typical process displays. This course is ideal for personnel who are responsible for day-to-day operations in a plant.

PREREQUISITES
Prior control room experience using pneumatic, electronic, or digital systems

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services.

Contact: ic-academy@framatome.com for more information

Foxboro Control Software
Secured System Administration

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP
Application Engineers; Control Engineers

OBJECTIVES
- Describe key enhancements in Foxboro system software, Version 8.8 and greater
- Review and use the Secured Editor System Definition package
- Perform workstation hardening on both Microsoft Windows 7 and server-class workstations
- Review Active Directory enhancements, settings, and troubleshooting techniques
- Save Active Directory settings from a Primary Domain Controller (PDC)
- Review procedures for Secured Edition installations of secured systems
- Understand new software packages released with Secured Edition, the System Assessment tool, the Control Network configuration tool, and others
- Work with functions and manipulate settings in the McAfee ePolicy console
- Deploy McAfee Agent on client stations and review all software settings
- Update a McAfee Virus Definition Update file using ePO

CONTENT
This course helps you gain experience with Foxboro Secured Edition releases. Specifically, you gain understanding of the secured setup for a Foxboro system through security management settings. Course topics address system definition, workstation hardening, all types of installation, Microsoft Active Directory modifications, and troubleshooting and recovery techniques required to meet cybersecurity standards. Course topics also address features added to the system from McAfee ePolicy Orchestrator (McAfee ePO) console, setup, and navigation.

PREREQUISITES
Course #2001v8 Foxboro Configuration Essentials or 5001 Control Software Configuration Essentials; Minimum of 1 year of experience in process control system administration

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services.

Contact: ic-academy@framatome.com for more information

Foxboro Control Software
Visualization Server

DURATION	LOCATION	LANGUAGES
3 days	Customer on-site / Worldwide	English

TARGET GROUP
Application Engineers; Control Engineers

OBJECTIVES
- Describe requirements and advantages of a virtualization server
- Describe procedures to maintain a virtualization server and virtual images for Primary Domain Controller (PDC), the Galaxy repository, Display Server, and Historian Server
- Describe network requirements and setup for connecting a virtualization server to the Control Network and engineering networks
- Describe how to manage thin-client connections
- Save and recover virtual stations using Microsoft Hyper-V tools
- Consult all available documentation to use assigned configurators, tools, and utilities to analyze and troubleshoot the virtualization server
- Understand endpoint protection and replication requirements using V91 documentation
- Administrate virtualization host servers using centralized virtualization management
- Create a replica of the virtual stations in different virtualization host servers and perform planned and unplanned failovers
- Move virtual stations from one V91 host to another V91 host using the Hyper-V Manager Live Migration feature

CONTENT
This course covers the use of the Microsoft Hyper-V server and the administration of virtual images. In this course, you back up and restore virtual images to the server to demonstrate the reliability and versatility of this platform. This course is ideal for Engineers who support virtualization servers and operator workstations using thin clients.

PREREQUISITES
Course #5012 Secured System Administration or equivalent knowledge; Minimum of 1 year of experience in process control administration

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services.

Contact: ic-academy@framatome.com for more information

I&C Concept
Operational I&C

DURATION	LOCATION	LANGUAGES
2 days	Customer on-site / Worldwide	German, English on request

TARGET GROUP
Utility employees who specialize inoperational I&C at KWU nuclear power plants.

OBJECTIVES
The participants are familiarized with the use of conventional I&C in a nuclear power plant. After the course, the participants will be able to:
- Illustrate the basic usage of the I&C systems ISKAMATIC and TELEPERM C inside the power plant
- Explain the operation and monitoring concept of ISKAMATIC and TELEPERM C

CONTENT
The course covers the following topics in detail:
- I&C concept
- Overview main condensate system
- Measured value acquisition and conditioning
- Binary signal conditioning
- Analog signal conditioning
- Open-loop control, e.g. main condensate system
  o Group control
  o Subgroup control
  o Sub-loop control
  o Individual drive control
  o Priority control
- Equipment protection, e.g. main condensate system
- Closed-loop control, e.g. main condensate system
- Alarm concept

PREREQUISITES
General knowledge about automation technology in nuclear power plants.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com
for more information

Inverter
Maintaining and Improving Operational Knowledge of Inverters 1300 MW

DURATION	LOCATION	LANGUAGES
24 hours spread over 4 days	Framatome Grenoble	French

TARGET GROUP
Technical or intervention function personnel with inverters experience

OBJECTIVES
Procedure for incidental interventions or maintenance operations on N108 inverters

CONTENT
- Theoretical module: N108 inverter architecture and functioning principles
- Practical module: preventive controls and settings

Prerequisites
- M209 Study and maintenance of the N108 inverter
- BR, B2V, H0

OTHER INFORMATION
4 people maximum
TRAINING CODE: M214

Inverter
Maintaining and Improving Operational Knowledge of Inverters 900 MW

DURATION	LOCATION	LANGUAGES
24 hours spread over 4 days	Framatome Grenoble	French

TARGET GROUP
Technical or intervention personnel with inverter experience

OBJECTIVES
Procedures for incidental interventions or maintenance operations on MG30 inverters

CONTENT
- Theoretical module: MG30 inverter architecture and functioning principles
- Practical module: preventive controls and settings
- Evaluation of the course and synthesis

PREREQUISITES
- A243 “Study and maintenance of the MG30 inverter”
- BR, B2V, H0

OTHER INFORMATION
4 people maximum
TRAINING CODE: M210

Inverter
Study and maintenance of the MG30 inverter 900 MW

DURATION	LOCATION	LANGUAGES
35 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
Technical function personnel with at least 6 months of seniority

OBJECTIVES
- Master the theoretical and practical knowledge necessary to ensure level 1 and 2 maintenance, according to the AFNOR NFX 60-010 standard, on the MG30 5 KVA and 20 KVA inverters of the 900 MW level
- Intervene on the MG30 inverters during incidents or maintenance operations
- Appreciate the limits and consequences of an intervention
- Describe the functions of the equipment and situate it in its environment
- Describe the role and structure of the different sub-assemblies of the inverters.
- Carry out the commissioning of the equipment and check its correct operation
- Define and apply a troubleshooting method by implementing quality assurance requirements. (risk analysis, control, requalification, traceability)

CONTENT
- Introduction and presentation of the course
- Theoretical module consisting of explanations on the architecture and functioning principle of an MG30 inverter
- Practical module oriented towards preventive controls and settings with the support of a handling book
- Troubleshooting methodology for breakdown scenarios
- Evaluation of the course and synthesis

PREREQUISITES
- Fundamentals of electronics
- Power electronics
- BR, B2V, H0

OTHER INFORMATION
4 people max
TRAINING CODE: A243

Inverter
Study and maintenance of N108 inverter 1300 MW

DURATION	LOCATION	LANGUAGES
35 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
Technical function personnel

OBJECTIVES
- Procedures for incidental interventions or maintenance operations on N108 inverters
- Intervention limits and consequences

CONTENT
- Theoretical module: explanations of N108 inverter architecture and functioning principles
- Practical module: preventive controls and settings, troubleshooting methodology in real-world scenarios
- Evaluation of the course and synthesis

PREREQUISITES
- Fundamentals of electronics
- Power electronics
- BR, B2V, H0

OTHER INFORMATION
4 people maximum
CODE TRAINNING: M209

N4
Functional Systems Approach CO3/CS3/SCAP of level N4

DURATION	LOCATION	LANGUAGES
35 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
Technical function personnel

OBJECTIVES
- Locate the functional role of the CO3, CS3 and SCAP in the N4 control architecture
- Identify basic hardware technology and software organization
- Identify the physical architecture of the CO3, CS3, SCAP by integrating the functionalities of each equipment
- Explain the simplified functioning of the equipment and situate it in its environment

For Automation department personnel:
- Master the theoretical and practical knowledge necessary to carry out the study and maintenance of CO3, CS3 and SCAP systems

For Conducting, Testing, Safety and Engineering department personnel:
- Master the basic theoretical knowledge on the functioning of the CO3, CS3 and SCAP systems and identify their interactions with the conducting means

CONTENT
- Design principles
- Functional architecture
- Technology and software generalities
- CO3 architecture
- RPN, RGL, SPIN study
- Principle of periodic tests
- Related functions of the UTC
- Study of RGL, RPN, UTD, CS3, SCAP
- Functional synthesis

PREREQUISITES
Knowledge of installations; fundamentals of electronics and microprocessors

OTHER INFORMATION
6 people max
TRAINING CODE: 5547

N4
Recycling Maintenance of equipment CO3/CS3/SCAP of level N4

DURATION	LOCATION	LANGUAGES
35 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
Technical function personnel

OBJECTIVES
- Define and apply a troubleshooting method that implements quality assurance requirements. (risk analysis, control, requalification, traceability)
- Carry out interventions on CO3/CS3/SCAP equipment during incidental interventions or preventive maintenance operations
- Take into account feedback concerning the interventions on the CO3, CS3, SCAP equipment of the N4 level, their hardware and functional evolutions

CONTENT
- The different aspects of an intervention
- Preparation and risk analysis
- Intervention methodology
- Equipment replacement and requalification
- Implementation of periodic tests and analysis of test results
- The selection and use of documentation associated with the equipment
- Theoretical reminders are given on an ad hoc basis if necessary

PREREQUISITES
5547 “Functional Systems Approach CO3/CS3/SCAP of level N4”

AND

5555 “Study and Maintenance of CS3-SCAP Systems”

OTHER INFORMATION
6 people max
TRAINING CODE: 5550

N4
Study and Maintenance of CO3 Systems

DURATION	LOCATION	LANGUAGES
140 hours or 4 weeks. - 10 consecutive days - 15-day minimum break - 10 consecutive days	Framatome Grenoble	French

TARGET GROUP
Technical personnel operating CS3-SCAP system equipment of the N4 level

OBJECTIVES
- Carry out interventions on CO3/CS3/SCAP equipment during incidental interventions or preventive maintenance operations
- Take into account feedback concerning the interventions on the CO3, CS3, SCAP equipment of the N4 level, their hardware and functional evolutions

CONTENT
- Reminders and complements to the course 5547 “Functional Approach”
- Human machine interface
- UD, TdP: offered functionalities
- UTC, SPIN, UATP, UTD,
- SPIN UT1, UT2, UD, UI, RPR interface
- Interface level 1 and 2
- UTC
- Periodic tests (UTLPS, UTLS)
- Parameter management: programming and remote operation
- RPN protection
- Detectors
- Instrumentations
- RGL protection
- Sensors
- RGL, EEC, UP, US, RPN, US, RPN 1
- Interface RPN0 levels 1-2 CO3
- Synthesis handling, fault finding on all equipment

PREREQUISITES
5547 “Functional Systems Approach CO3/CS3/SCAP of level N4”

OTHER INFORMATION
6 people max
TRAINING CODE: 5560

N4
Study and Maintenance of CS3-SCAP Systems

DURATION	LOCATION	LANGUAGES
35 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
Technical personnel operating CS3-SCAP system equipment of the N4 level

OBJECTIVES
- Carry out the commissioning of the equipment and verify its functioning
- Define and apply a troubleshooting method by implementing quality assurance requirements (risk analysis, control, requalification, traceability)

CONTENT
- Reminders
- CS3 and SCAP environment
- NERVIA Network
- CS3 System: study and practical work
- SCAP system: study, handling, troubleshooting
- Periodic tests: principle, implementation
- Parameter management: handling, troubleshooting

PREREQUISITES
5547 “Functional Systems Approach CO3/CS3/SCAP of level N4”

OTHER INFORMATION
6 people max
TRAINING CODE: 5555

Preservation of Skill and Competencies
1300MWe Power Plant

DURATION	LOCATION	LANGUAGES
21 hours	Framatome Lyon	French

TARGET GROUP
EDF's automatisation and test agents for 1300MWe plants.

OBJECTIVES
At the end of the training, trainees will be able to:
1. Explain the role of in-core measurement
2. Put into practice processes of mechanical setting and electrical respecting the safety rules
3. Formulate diagnoses from information found on diagrams, and outcomes of signaling statements
4. Apply the repair process most adapted to realized diagnosis
5. Material feedback

CONTENT
Explain roles and operations of RIC system including:

Situation scenarios:
- Mechanical settings
- Propulsion: chain of guidance, drive wires of probe of flow, torque limiter, propulsion engine braking
- Probe path: entered / taken out UC, take-up reel, encoders
- Switching: selectors, cams, tubing, motor-operated valves

Electrical settings:
- Microphone switches of signaling and of positioning of electromechanism (on cams and input-output selectors, on unit of propulsion, in lead cask)
- Intensity take-up reel, power supplies, coding, system of detection of blockage of propulsion, cards amplification flow signal

Mechanical repairs:
- Propulsion: chain of guidance / drive wires of probe of flow, torque limiter, propulsion engine braking
- Probe path: entered / taken out UC, take-up reel, encoders
- Switching: selectors, cams, tubing, motor-operated valves

Electrical repairs:
- Microphone switches of signaling and of positioning of “Electromechanisms (on cams and input-output selectors, on unit of propulsion, in lead cask)
- Intensity take-up reel, coding, system of detection of blockage of propulsion
- Electronic cards, cards amplification signal of flows, power supplies

PREREQUISITES
Basic knowledge on REP functionality
- M018 training
- Basic knowledge in electronics and mechanics.

OTHER INFORMATION
Contact: ic-academy@framatome.com for more information

Preservation of Skill and Competencies
1450MWe Power Plant

DURATION	LOCATION	LANGUAGES
21 hours	Framatome Lyon	French

TARGET GROUP
EDF's automatisation and test agents for 1450MWe plants.

OBJECTIVES
At the end of the training, trainees will be able to:
1. Explain the role of in-core measurement
2. Put into practice processes of mechanical setting and electrical respecting the safety rules
3. Formulate diagnoses from information found on diagrams, and outcomes of signaling statements
4. Apply the repair process most adapted to realized diagnosis
5. Material feedback

CONTENT
Explain roles and operations of RIC system including:

Situation scenarios:
- Mechanical settings
- Propulsion: chain of guidance, drive wires of probe of flow, torque limiter, propulsion engine braking
- Probe path: entered / taken out UC, take-up reel, encoders
- Switching: selectors, cams, tubing, motor-operated valves

Electrical settings:
- Microphone switches of signaling and of positioning of electromechanism (on cams and input-output selectors, on unit of propulsion, in lead cask)
- Intensity take-up reel, power supplies, coding, system of detection of blockage of propulsion, cards amplification flow signal

Mechanical repairs:
- Propulsion: chain of guidance / drive wires of probe of flow, torque limiter, propulsion engine braking
- Probe path: entered / taken out UC, take-up reel, encoders
- Switching: selectors, cams, tubbings, motor-operated valves

Electrical repairs:
- Microphone switches of signaling and of positioning of electromechanisms (on cams and input-output selectors, on unit of propulsion, in lead cask)
- Intensity take-up reel, coding, system of detection of blockage of propulsion
- Electronic cards, cards amplification signal of flows, power supplies

PREREQUISITES
Basic knowledge on REP functionality
- M018 training
- Basic knowledge in electronics and mechanics.

OTHER INFORMATION
Contact: ic-academy@framatome.com for more information

Process Control System
ISKAMATIC B

DURATION	LOCATION	LANGUAGES
5 days	Framatome Karlstein	German, English on request

TARGET GROUP
Utility employees from engineering, operation and maintenance departments, and employees of licensing authorities.

OBJECTIVES
The participants are familiarized with the ISKAMATIC B control system and its applications. After the course, the participants will be able to:
- Perform engineering
- Operate ISKAMATIC B
- Interpret signal patterns
- Detect malfunctions
- Work with the documentation

CONTENT
Overview of the ISKAMATIC B process control system
- System data and design
- Logic symbols
- Design of the standard cabinet (ISKAMATIC E)
- Documentation (function diagrams and circuit diagrams)
- Alarm annunciation concept
- Binary signal conditioning and limit signal generation
- Control interface
- Undervoltage monitoring
- Fault isolation and priority control
- Sub-loop control
- Subgroup control
- Group control
- Protective logics
- Practical exercises on modules

PREREQUISITES
General basic knowledge of signal conditioning, control technology and logic functions.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com for more information

RIC Training
900MWe Plant Series

DURATION	LOCATION	LANGUAGES
32 hours	Framatome Lyon	French

TARGET GROUP
EDF's automatisation and test agents for 900MWe plants

OBJECTIVES
At the end of the training, the trainees will be able to:
1. Define the functional role of the equipment in process and identify the impact on STE
2. Define materially and functionally the role of the different subassemblies of the core instrumentation
3. Realize equipment commissioning and check its operating condition
4. Define and apply a repair method by implementing quality assurance requirements (risk analysis, control, requalification, traceability)
5. Material feedback

CONTENT
1.1 Describe the roles of core temperature measures in shaded and accidental, normal situation
1.2 Describe the roles of flow measures in normal situation
2.1 Identify each part of the subassembly of the core instrumentation (measure of flow, electromechanism, cabinet of distribution, control cabinet)
2.2 Describe the operation of core measure temperature (qualified thermocouple and line and not qualified, function core cooling monitor)
2.3 Describe the operation of flow measure (sequence of a path, types of flux maps, ways of functioning)
3.1 Lead one flux map in normal mode
3.2 Manage a shaded operation
3.3 Identify the parameters of basic settings of every piece of equipment for correct operation of system
3.4 Identify key steps and interfaces for a system in unit outage
3.5 List the preventive maintenance operations realised in unit outage
4.1 Analyse a dysfunction of the system flow measurement
4.2 Prepare the repair operation to premier level by taking technical aspect into account, safety and security
4.3 Realise the operation and notice possible deviations
4.4 Execute the system requalification such as planned in preparation

PREREQUISITES
Attended training courses on the operation of a REP power plant
- Participation in test performance periodicals
- Knowledge in electronics and mechanics

OTHER INFORMATION
Contact: ic-academy@framatome.com for more information

RIC Training
1300MWe Plant Series

DURATION	LOCATION	LANGUAGES
32 hours	Framatome Lyon	French

TARGET GROUP
EDF's automatisation and test agents for 1300MWe plants

OBJECTIVES
At the end of the training, the agents will be able to:
1. Define the functional role of the equipment in process and identify the impact on STE
2. Define materially and functionally the role of the different subassemblies of the core instrumentation
3. Realize equipment commissioning and check its operating condition
4. Define and apply a repair method by implementing quality assurance requirements (analysis of risks, control, requalification, traceability)
5. Material feedback

CONTENT
1.1 Describe the roles of temperature measures core in shaded and accidental, normal situation
1.2 Describe the roles of flow measures in normal situation
2.1 Identify each part of the subassembly of the core instrumentation (measure of flow, électromhecanism, cabinet of distribution, control cabinet)
2.2 Describe the operation of core measure temperature (qualified thermocouple and line and not qualified, function (office) core cooling monitor)
2.3 Describe the operation of flow measure (sequence of a path, types of flux maps, ways of functioning)
3.1 Lead one flux map in normal mode
3.2 Manage a shaded operation
3.3 Identify the parameters of basic settings of every piece equipment for a correct operation of system
3.4 Identify key steps and interfaces for a system in unit outage
3.5 List the preventive maintenance operations realised in unit outage
4.1 Analyse a dysfunction of the system flow measurement
4.2 Prepare the repair operation to premier level by taking technical aspect into account, safety and security
4.3 Realise the operation and notice possible deviations
4.4 Execute the system requalification such as planned in preparation

PREREQUISITES
Attended training courses on the operation of a REP power plant
- Participation in test performance periodicals.
- Knowledge in electronics and mechanics

OTHER INFORMATION
Contact: ic-academy@framatome.com for more information

RIC Training
1450MWe Plant Series

DURATION	LOCATION	LANGUAGES
32 hours	Framatome Lyon	French

TARGET GROUP
EDF's automatisation and test agents for 1450MWe plants

OBJECTIVES
At the end of the training, the agents will be able to:
1. Define the functional role of the equipment in process and identify the impact on STE
2. Define materially and functionally the role of the different subassemblies of the core instrumentation
3. Realize equipment commissioning and check its operating condition
4. Define and apply a repair method by implementing quality assurance requirements (analysis of risks, control, requalification, traceability)
5. Material feedback

CONTENT
1.1 Describe the roles of temperature measures core in shaded and accidental, normal situation
1.2 Describe the roles of flow measures in normal situation
2.1 Identify each part of the subassembly of the core instrumentation (measure of flow, électromechanism, cabinet of distribution, control cabinet)
2.2 Describe the operation of core measure temperature (qualified thermocouple and line and not qualified, function (office) core cooling monitor)
2.3 Describe the operation of flow measure (sequence of a path, types of flux maps, ways of functioning)
3.1 Lead one flux map in normal mode
3.2 Manage a shaded operation
3.3 Identify the parameters of basic settings of every piece equipment for a correct operation of system
3.4 Identify key steps and interfaces for a system in unit outage
3.5 List the preventive maintenance operations realised in unit outage
4.1 Analyse a dysfunction of the system flow measurement
4.2 Prepare the repair operation to prenier level by taking technical aspect into account, safety and security
4.3 Realise the operation and notice possible deviations
4.4 Execute the system requalification such as planned in preparation

PREREQUISITES
Attended training courses on the operation of a REP power plant
- Participation in test performance periodicals
- Knowledge in electronics and mechanics

OTHER INFORMATION
Contact: ic-academy@framatome.com for more information

RIC Training
Realization of flow cards (RIC 900) Renovated Command Control (VD3 900)

DURATION	LOCATION	LANGUAGES
21 hours spread over 4 consecutive days	Framatome Grenoble	French

TARGET GROUP
Technical function personnel with basic knowledge of electronics/electrical engineering

OBJECTIVES
- Define the functional role of the equipment in the process, in the STEs
- Define materially and functionally the role of the renovated RIC001 AR cabinet's different sub-assemblies for the flow domain
- Utilize information delivered by the HMI to implement various modes of operation using available commands
- Integrate operating feedback

CONTENT
- Describe roles of flow measurements in normal situations.
- Identify each of the flow measurement subassemblies in the RIC001AR cabinet:
  - o Leak detection automatons
  - o Flow measurement automaton and associated gateway
  - o Analog cabinets
  - o Position coding cabinets
  - o Auxiliary cabinets
  - o Human Machine Interface (HMI), software (supervisor/mobile device), and hardware
- Implement the HMI:
  - o Available commands
  - o Drop-down menus
  - o Logbook edition
  - o Alarm and error reporting messages
- Modify operating parameters in normal operation
- Implement specific flow measurement sequences
- Communicate RIC and KIT
- Stop and restart flow card sequence
- Execute probe plateau phase in both auto and manual mode
- Verify proper operation using test
- Implement RIC in degraded mode
- Throughout course, integrate material and functional REX of the RIC system, taking into account failures, causes (material or human) and effects (safety and availability) on the flow cards

PREREQUISITES
Familiarity with performance of RIC functions: acquisition, processing and flow card operation

OTHER INFORMATION
6 people Max
TRAINING CODE: M046

RIC Training

Study and maintenance of core instrumentation (RIC 900) and renovated control command (VD3 900)

DURATION	LOCATION	LANGUAGES
28 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP

Personnel familiar with RIC functions: acquisition, processing and operation of flow cards

OBJECTIVES

- Define the functional role of the equipment in the process, in the STEs
- Define materially and functionally the role of the core instrumentation's different sub-assemblies
- Carry out commissioning of equipment and verification of function
- Define and apply troubleshooting method leading to implementation and adaptation of quality assurance requirements (risk analysis, control, requalification, traceability)
- Integrate material and functional REX

CONTENT

- Identify each flow measurement sub-assembly of RIC001AR cabinet:
  o Automatic leak detection systems
  o Automatic flow measurement systems,
  o Analog cabinets
  o Position coding cabinets
  o Leakage acquisition sub-assembly
  o Analog cabinets
  o Position encoding cabinets
  o HMI hardware and software
- Operate the human-machine interface (commands available, edition of logs, reporting messages, alarms, errors ...)
- Modify the operating parameters that can be modified by the personnel in normal operation
- Implement flow measurement sequences and specific sequences
- Communicate the RIC and the KIT
- Stop and restart a flow card sequence,
- Management of degraded modes
- Execute a probe plateau phase, in auto and manual mode
- Verify proper operation using tests
- Interpret the origin of the failure indicated by the computer, locate a defective sub-assembly of the control command part (RIC001AR)
- Interpret the origin of the failure indicated by the ECU, locate a defective sub-assembly of the electromechanical part:
  o Selectors
  o Control units
  o Motorized valves
- Putting the installation back into service
- Use the manufacturer's documentation (Operation and Maintenance Guide - OMG - user's manual, drawings and diagrams) during troubleshooting operations from the diagnostic phase to repair
- Information on the feedback from the operation of the RIC will be given throughout the course at appropriate times. It will focus in particular on:
  o Material aspect: effects of and remedies for main failures, module repair, failure rates, possible component problems
  o Functional aspect: failures, material and human causes, effects (safety, availability).

PREREQUISITES

The agents of the Automation departments of the CNPE 900MW nuclear power plants called to intervene on the core instrumentation equipment (RIC 900) benefiting from the renovated command control

OTHER INFORMATION

6 people Max
TRAINING CODE: M047

RIC Training

REP 900 MW PWR clusters Renovated Command Control (VD3 900) study, maintenance and adaptation training

DURATION	LOCATION	LANGUAGES
35 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
Automation department personnel at CNPE 900MW power plants called to intervene on RGL clusters position control equipment

OBJECTIVES
- Define materially and functionally the control system renovation's different sub-assemblies
- Define and apply a troubleshooting method that leads to the implementation and adaptation of quality assurance requirements (risk analysis, control, requalification, traceability) for software maintenance
- Implement adjustments identical to those of an equipment overhaul during a unit outage, in accordance with the requirements of the basic preventive maintenance program
- Integrate material and functional failure modes

CONTENT
- Integrate the evolutions due to the refurbishment of the RGL with existing installation
- Describe the architecture of the refurbished equipment
- Explain the role of the sub-assemblies:
  o Control Logic
  o Processing Logic
  o The Static Power Units, cycler part
  o The Accelerated Maneuverability Device (DMA) consisting of the Position Setpoint Logic (LCP) and the Control Monitoring Logic (LSP)
  o The Human Machine Interface (HMI), software (supervisor/mobile device), and hardware (internal to the renovated cabinets)
- Explain the operation of the sub-assemblies:
  o Control Logic:
  o Individual operation
  o Overlapping operation
  o Operating modes (Auto; Manu; Reset)
- DMA:
  o Position Control Logic (LCP)
  o Drive Monitoring Logic (LSP)
- Static Power Assemblies (ESP)
  o Control trays
  o Cycling Logic
  o Processing Logic
- Describe the hardware and software used in the renovated equipment (Schneider Premium and Quantum automatons and graphical interfaces of ARC informatique's PCVue software)
- Implement the "centralized" HMI (RGL supervisor):
  o Commands at your disposal
  o Edition of logbooks
  o Alarm and error reporting messages
- Implementing the Mobile Maintenance Device:
  o Features
  o Use
  o Available screens
- Identify and interpret faults on the cycler, LC, DMA, LT or network using the HMI as an aid to troubleshooting these subassemblies
- Employ the appropriate method for the required overhaul
- Identify risks and constraints to maintain equipment availability during troubleshooting
- Locate and replace a defective component
- Implement a procedure to requalify the equipment after intervention
- Estimate the influence of the settings of the analog cards on the system response (only for the CP 0)
- Carry out the parameter setting of the sub-assemblies using the HMI
- Apply a procedure for restarting the installation
- Implement the restart of the equipment
- An information will be given on the evolutions of the PBMP, following the renovation
- Carry out the replacement of a component of the renovated Command Control in complete safety for the personnel and the equipment
  o Cycler module
  o SCHNEIDER PLCs
    (Premium and Quantum)
  o Network elements, HMI
    (server / client PC)
- Use the manufacturer's documentation
- Use the mobile diagnostic and troubleshooting device (portable PC)
- Carry out an application program change
- Manage the different software versions

PREREQUISITES
Familiar with functions of the RIC: acquisition, processing and operation of flow cards.

OTHER INFORMATION
6 people Max
TRAINING CODE: M048

RIC Training
Support training in the operation of the RIC computer - 1300MWe Plant Series

DURATION	LOCATION	LANGUAGES
14 hours	Framatome Lyon	French

TARGET GROUP
EDF's test agents for 1300MWe plants

OBJECTIVES
At the end of training, the trainees will be able to:
1. Use man/machine interface
2. Navigate in interface and identify the different windows
3. Run the logbook
4. Run the tabled alarms
5. Run the contractual documents (GEE, user guide)
6. Use the online help available on the interface

CONTENT
1.1 Switch on
1.2 Login with password
2.1 Make up sequences
2.2 Change modifiable operation parameters by the staff in normal operation
2.3 Implement the sequences of flow measure and the specific sequences
2.4 Stop, relaunch a flux map sequence
2.5 Execute a phase probe tray in subscriber trunk dialling or in textbook
2.6 Return equipment in states of secure fold.
3.1 Describe the structure of the logbook
3.2 Locate logbooks in IT environment
3.3 Print logbooks
3.4 Secure logbooks on peripherals available.
3.5 Extract logbooks for a subsequent operation by software office automation
4.1 Edit the alarms tables
4.2 Edit the alarms' history

PREREQUISITES
Know the basic principles of human/machine interface
- In-core instrumentation
- Basic principles in electronics

OTHER INFORMATION
Contact: ic-academy@framatome.com
for more information

Rod control
Recycling RGL 900 renovated

DURATION	LOCATION	LANGUAGES
28 hours spread over 4 consecutive days	Framatome Grenoble	French

TARGET GROUP
Automation department personnel at renovated 900 level nuclear sites

OBJECTIVES
- Define and apply troubleshooting method that leads to the implementation of quality assurance requirements (risk analysis, control, requalification, traceability)
- Intervene on equipment in context of incidental interventions, preventive maintenance operations or periodic tests, using associated human-machine interface (HMI)
- Take into account the feedback and the evolutions concerning the interventions on the equipments

CONTENT
- Diagnosis of defects based on structured analysis
- Equipment safety quality requirements
- Identify risks to equipment in functional environment
- Understand intervention limits and consequences, incidental or programmed
- Failure analysis and countermeasure implementation with respect to safety and technical operating specifications
- Redeployment and requalification of equipment
- Interventions without unit degradation
- Signal interpretation
- Post-fault equipment reconfiguration to maintain unit availability
- Identificaton of faults using appropriate logic (procedures, diagrams, measuring equipment, etc.)
- Perform faulty sub-assembly troubleshooting
- Record quality intervention conclusions for 2nd level analysis and subsequent report
- RGL 900 system operation feedback will focus specifically on:
  - Material aspect: Main failures and remedies, module repair, failure rate monitoring, component problems
  - Functional aspect: failures, causes (material, human), effects (safety, availability)

PREREQUISITES
M051 "Study and Maintenance of the Renovated Cluster Control," field experience, periodic testing experience

OTHER INFORMATION
6 people maximum
TRAINING CODE: M098

Rod control

Recycling RGL 900 renovated Maintenance of Capabilities RGL 900 CPY renovated VD3/VD4

DURATION	LOCATION	LANGUAGES
28 hours spread over 4 consecutive days	Framatome Grenoble	French

TARGET GROUP

Automation services personnel of 900 VD3/VD4 level nuclear sites

OBJECTIVES

- Define and apply a troubleshooting method that leads to the implementation of quality assurance requirements (risk analysis, control, requalification, traceability).
- Define the material and functional role of the human-machine interface (HMI)
- Implement and control the information given by the HMI
- Carry out the functional analysis related to the realization of the EP(s)
- Carry out EP(s) and explain their meaning
- Analyze causes of EP failure and produce a remedy
- Propose a troubleshooting methodology taking into account security, safety and availability aspects
- Analyze different type of defects (e.g.; LC, LT, power tanks, cycler, power supply, com, etc.)

CONTENT

- Diagnose defects based on structured analysis
- Apply safety quality requirements during equipment interventions:
  - o Identify risks due to functional environment of equipment
  - o Appreciate limits and consequences of interventions, whether incidental or programmed
  - o Analyze failure with respect to safety and technical operating specifications and set up countermeasures
  - o Redeploy and requalify equipment
- Intervene without degrading the wafer availability
- Interpret available signals
- Configure equipment to maintain wafer availability despite faults
- Identify failure using appropriate logistics (procedures, diagrams, measuring devices)
- Perform troubleshooting by standard exchange of defective sub-assembly
- Report intervention conclusions for 2nd level analysis
- RGL 900 operational feedback will specifically focus on:
  - o Material aspect: main failures and their remedies, repair of modules, follow-up by failure rates, component problems
  - o Functional aspect: failures, causes (material, human), effects (safety, availability)
- Based on actual interventions, the training allows for a real-world approach to the following topics:
  - o The different aspects of incidental or planned interventions
  - o Preparation and risk analysis
  - o Intervention methodology
  - o Replacement of defective equipment and appropriate requalification
  - o The realization of periodic tests and the analysis of the results
  - o The choice and use of documents associated with the intervention on the equipment

PREREQUISITES

PPAUTMA510 “Study and Maintenance of the renovated Command Control of the REP 900MW VD3/VD4 clusters.”

- or -

PPAUTM0510 “Study and Maintenance of the renovated Command Control (VD3) of the REP 900M W clusters.”

APIIMM3150 Maintenance of Industrial Programmable Logic Controllers course is recommended

RGL renovated VD4 900 tutorial is recommended

Intervention field experience and realized periodic tests or troubleshooting on related equipment

OTHER INFORMATION

6 people maximum
TRAINING CODE: MA98

Rod control
Renovation RGL power VD4 900 Connection

DURATION	LOCATION	LANGUAGES
7 hours spread over 2 consecutive days	Framatome Grenoble	French

TARGET GROUP
Automation and Engineering Services Personnel operating Long Cluster Regulation (RGL) equipment of the 900 MW levels (CP1/CP2)

OBJECTIVES
- Define the material and functional role of the modification
- Carry out a fault diagnosis
- Implement the knowledge and skils necessary to execute card adjustments
- Implement the knowledge and skills required to put the equipment back into service and carry out requalifications
- Implement a troubleshooting method
- Integrate the material and functional REX

CONTENT
- Presentation of the replacement of the control trays in the ESP cabinets with a redesignated phase shifter and relaying board
- Presentation of the new RCTI cards (with the correction of the thyristor firing faults)
- Presentation of the DDR (Quick Disconnect Device) card, its purpose and functionality
- Presentation of the material removed in the maintenance cabinet (MAFELEC switches and inoperative material)
- Presentation of the Cycleur Software modification (FGPA) with the residual consequences:
  - o Ensure inhibition of double hold command following AAR
  - o Remove possibility of GM dual hold command forced on several units simultaneously
- Presentation of protections provided on bare live parts

PREREQUISITES
- Completed M051 training course “Study and Maintenance of Renewed Control Command of REP 900MW Clusters
- Participated in equipment maintenance operations

OTHER INFORMATION
6 people Max
TRAINING CODE: M050

Rod control
Study and maintenance of RGL VD4 cluster control (initial)

DURATION	LOCATION	LANGUAGES
96 hours or 3 weeks - 64 hours spread over 2 weeks - 2 weeks minimum break - 32 hours spread over 1 week	Framatome Grenoble	French

TARGET GROUP
Technical function personnel with basic knowledge of electronics/electrical engineering

OBJECTIVES
- Define functional role of equipment in process, specifically reactivity control
- Physically and functionally define control system sub-assemblies
- Implement adjustments and parameter changes equivalent to those of an equipment overhaul during a unit shutdown, in accordance with basic maintenance system or periodic testing requirements
- Use human-machine interface (HMI) to implement STE-provided periodic tests
- Adopt troubleshooting method implementing quality assurance requirements (risk analysis, control, requalification, traceability)
- Following training, identify expolitable material and functional feedback elements

CONTENT
1st week:
- Role and place of the RGL in the control command
- Study of ESP, structure of equipment
- Study of cycler
- Study of power bridges
- Study of control loop
- Regulation tank setting with HMI and DMM.

2nd week:
- Presentation of automatons
- Study of control logic
- Study of DMA
- LC/DMA operation
- Manipulation and simulation exercise
- EP RGL103
- MCP10/MCP21 adjustment
- Test of the different operating modes
- Basic troubleshooting

PREREQUISITES
- Minimum H0/B2/M0 (mandatory)
- Basic knowledge of electronics
- Regular use of computer tools

OTHER INFORMATION
6 people maximum
TRAINING CODE: MA51

Rod control
Study and maintenance of the RGL 900 MW

DURATION	LOCATION	LANGUAGES
96 hours or 3 weeks - 64 hours spread over 2 weeks - 2 weeks minimum break - 32 hours spread over 1 week	Framatome Grenoble	French

TARGET GROUP
technical function personnel with basic knowledge of electronics/electrical engineering

OBJECTIVES
- Define the functional role of the equipment in the process; specifically in reactivity control
- Define physically and functionally different sub-assemblies of the control system
- Implement adjustments and parameter changes equivalent to those of an equipment overhaul during a unit shutdown, in accordance with requirements of basic preventive maintenance or periodic test program
- Implement periodic tests provided by the STEs from the human-machine interface (HMI)
- Implement troubleshooting method incorporating quality assurance requirements (risk analysis, control, requalification, traceability)
- Identify material and functional feedback elements to be exploited following training

CONTENT
1st week:
- Role and place of the RGL in the control command
- Study of ESP, structure of equipment
- Study of cycler
- Study of power bridges
- Study of control loop
- Regulation tank setting with HMI and DMM

2nd week:
- Presentation of automatons
- Study of control logic
- Study of DMA
- LC/DMA operation
- Manipulation and simulation exercise.
- EP RGL103
- MCP10/MCP21 adjustment
- Test of different operating modes
- Basic troubleshooting

PREREQUISITES
- General knowledge of electronics
- Regular use of computer tools

OTHER INFORMATION
6 people Max
TRAINING CODE: M051

RPN
Study and maintenance of digital RPN equipment (CP0)

DURATION	LOCATION	LANGUAGES
70 hours spread over 10 consecutive days	Framatome Grenoble	French

TARGET GROUP
technical function personnel

OBJECTIVES
- Define the function of the equipment in the process and in STEs
- Define materially and functionally the different sub-assemblies
- Carry out the commissioning of the equipment and verify its correct operation
- Define and apply a troubleshooting method by implementing the requirements of quality assurance (risk analysis, control, requalification, traceability)

CONTENT
1st week
- General information
- General presentation of the renovated system
- Presentation of the platform
- Presentation of the SPINLINE3 technology
- Presentation of the sensors: technology and characteristics
- Linking of sensors
- Manipulations on the platform
- Presentation of the CNS, CNS, CNP protection chains processes

2nd week
- Reminder of 1st week's lessons
- Mechanisms of safe and inhibition positioning
- Presentation of periodic test principles
- Presentation of equipment parameterization
- Detailed description of periodic tests
- Description of periodic test management
- Detailed description of testing parameter management
- Description of other testing functions
- General presentation of control unit system aspects
- Detailed description of human-machine interface
- General presentation of control unit functional aspects
- Interface for chain and unit inhibition and safe positioning
- Manipulations on the platform
- Functional synthesis

PREREQUISITES
General knowledge of electronics and microprocessors

OTHER INFORMATION
6 people max
TRAINING CODE: 5644

RPN
Study and maintenance of the RPN 900 MW

DURATION	LOCATION	LANGUAGES
35 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
technical function personnel with at least 6 months of seniority

OBJECTIVES
- Define equipment function in process, in measurement and control of reactivity, for 900 level
- Define the role and structure of different measurement and monitoring chains
- Carry out commissioning of equipment and verify correct operation
- Define and apply troubleshooting method leading to implementation and adaptation of quality assurance requirements
- Integrate the hardware and functional REX

CONTENT
- Introduction and presentation of the course
- The system in its environment and functional and material breakdown
- Sensors and links
- Degraded operation
- Source and intermediate chains 900
- Power chains 900
- Comparison chassis
- Distribution chassis
- Evaluation of the course and synthesis

PREREQUISITES
General knowledge of electronics

OTHER INFORMATION
6 people max
TRAINING CODE: A231

RPN
Training on aging analysis and RPN sensor replacement

DURATION	LOCATION	LANGUAGES
35 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
On-site intervention team or technical services personnel managing this type of material

OBJECTIVES
- Explain operation and technological characteristics of RPN sensors
- Give physical value characteristics of both a new RPN sensor as well as one in aging and/or degradation phase
- Justify maintenance actions undertaken following the maintenance doctrine surveys or associated amendment sheets
- Implement diagnostic tools neccesary to undertake maintenance actions
- Describe organization needed to replace an RPN sensor
- Implement RPN chamber replacement operations in procedure-specified chronological order
- Integrate material and functional REX

CONTENT
- RPN in command control roles and structure
- Sensor operation and characteristics
- Analysis and characteristics of real curves
- Theoretical and practical presentations of insulation, reflectometry and Sycode measurements
- Presentation of contractual and intervention documents
- Correction of risk analysis and dosimetric forecast
- Installation troubleshooting
- Use of POLAIR (Level 1300/N4)

PREREQUISITES
Initial RPN training

OTHER INFORMATION
6 people maximum
TRAINING CODE: M058

Safety Control Equipment
Equipment 1300 VD2/VD3: RGL - RPN - RPR. Presentation of the materials in the process

DURATION	LOCATION	LANGUAGES
21 hours spread over 3 consecutive days	Framatome Grenoble	French

TARGET GROUP
Senior staff and conducting department personnel, safety engineers, senior staff, engineers and automation department recruits

OBJECTIVES
- Make link between functional and material
- Describe material and functional structure of RGL, RPN and RPR systems
- Evaluate consequences of equipment failure and degraded functioning

CONTENT
Presentation of the RGL
- Functional and material breakdown
- Functional description of each sub-assembly

Presentation of the RPN
- Principles of neutron measurement chains
- Functional presentation of detectors, instruments and control cabinets
- The RPN seen from the control room

Presentation of the RPR
- Role and structure of the protection
- Functional and material breakdown of each sub-assembly
- Periodic tests of the protection

PREREQUISITES
To achieve the objectives of the training, trainees have a general knowledge of the basics of plant operation.

OTHER INFORMATION
8 people (10 max.)
TRAINING CODE: M029

Safety Control Equipment

Equipment 1300 VD2/VD3: RGL - RPN - RPR. Presentation of the materials in the process (without direct experience of equipment)

DURATION	LOCATION	LANGUAGES
14 hours spread over 2 consecutive days	Framatome Grenoble	French

TARGET GROUP
Senior staff and conducting department personnel, safety engineers, senior staff, engineers and automation department recruits

OBJECTIVES
- Make link between functional and material
- Describe material and functional structure of RGL, RPN and SPIN systems
- Evaluate consequences of equipment failure and degraded functioning

CONTENT
Presentation of the RGL
- Functional and material breakdown
- Functional description of each sub-assembly

Presentation of the RPN
- Principles of neutron measurement chains
- Functional presentation of sensors, instruments and control cabinets
- The RPN seen from the control room

Presentation of the SPIN
- Role and structure of the protection
- Functional and material breakdown of each sub-assembly
- Periodic tests of the protection

PREREQUISITES
General knowledge of plant operation basics

OTHER INFORMATION
8 people (10 max.)
TRAINING CODE: M028

Safety Control Equipment

Materials 900: RGL - RPN - IPB - DMA. Presentation of the materials in the process

DURATION	LOCATION	LANGUAGES
14 hours spread over 2 consecutive days	Framatome Grenoble	French

TARGET GROUP
Operators, conducting technical managers, safety engineers, senior staff, engineers and automation department recruits of nuclear power plants 900

OBJECTIVES
- Locate various materials in the control command
- Make link between functional and material
- Describe material and functional structure of each piece of equipment
- Know consequences of a unit operational failure and degraded functions
- Locate fault and make initial diagnosis
- Note and describe fault to facilitate intervention of automation engineer

CONTENT
General, Environment and Signage
Presentation of the RGL
- Functional and material breakdown
- Functional description of each sub-assembly
- Different operating modes: auto, manual, reset
- Degraded functions

Presentation of the RPN
- Neutron measurement chain principles
- Functional presentation of sensors, instrumentation and control cabinets
- RPN as seen from the control room
- Degraded functions

Presentation of the DMA
- Functional description of the LCS and LSP cabinets
- Degraded functions

Presentation of the IPB
- Functional and material breakdown of the position measurement
- Role and principle of processing logic
- Degraded functions

PREREQUISITES
General knowledge of plant operation basics

OTHER INFORMATION
8 people (10 max.)
TRAINING CODE: M030

Safety Control Equipment
Overview of Framatome-GRENOBLE safety control equipment

DURATION	LOCATION	LANGUAGES
2 days	Framatome Grenoble	French

TARGET GROUP
All personnel with at least 6 months of seniority

OBJECTIVES
- Name the Framatome-GRENOBLE equipment involved in the control-command of PWR nuclear power plants
- Define the roles of equipment and situate it in its environment
- Briefly describe the functional and material structure of equipment

CONTENT
- Introduction and presentation of the course
- Knowledge of the operating principle of a nuclear power plant
  - o Notions of nuclear physics
  - o Different nuclear technologies
  - o Operating principle of a PWR power plant
  - o Reactor control / piloting modes
- Overview of the equipment in its environment
  - o Main elementary systems of the control system
  - o Materials in the control system
- Functional and material description of the main equipment
  - o RPN (All levels)
  - o RGL (All levels)
  - o RPR (All levels)
  - o Boremeter (All levels)
  - o Inverters (900 and 1300)
  - o Transmitter and probes (All levels)
- Evaluation of the course and synthesis

PREREQUISITES
Minimum 6 months of seniority

OTHER INFORMATION
8 people (10 max.)
TRAINING CODE: I_PANO

Safety Control Equipment
R level 900 systems equipment training for automation engineers

DURATION	LOCATION	LANGUAGES
35 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
Conducting department senior staff and personnel, automation department senior staff, engineers and recruits, safety engineers

OBJECTIVES
- Physically identify RGL, RPN, RPR materials
- Define basic functions of equipment used
- Identify equipment functions in wafer 900 control system
- Describe the architecture of different systems with their interactions

CONTENT
Presentation of the RGL
- General Structure
  - o System structure
  - o Functional breakdown
  - o Control and monitoring principles
  - o Measurement architecture (short)
  - o Material and technological breakdown
- Static Power Unit
  - o Role of the ESP
  - o Description of the mechanisms (short)
  - o Function of an ESP
  - o Architecture of power part
  - o Control and monitoring loops
  - o Logic part
- Control logic
  - o Synoptic of the control logic (LC)
  - o Piloting of the LC
  - o Individual and overlapping logic (treat DMA function integrated in the LC)
  - o LC operating mode (Manual / Auto / Reset)
- Increased maneuverability device
  - o Study of the DMA
  - o Concept of turbine control (load following, remote control, operating modes, general principle of control, control synoptic)
- Position measurement
  - o Study of the position measurement (sensor and electronics)
  - o Position measurement equipment
  - o Position monitoring (operating principle of the sensor, interconnection of secondary coils)
  - o Processing logic (role, principle of acquisition of the measured position, principle of misalignment, IPB synoptic)
  - o Summary of the links between LC, LT and DMA
  - o Training available in the control room (requested and measured position)
- Renovated RGL
  - o Presentation of the renovated RGL
  - o Perimeter
  - o Architecture
  - o Mobile maintenance device
  - o Use of the local human-machine interface (HMI) board (supervision, screens and applications)

Presentation of the RPN
- Architecture of the RPN
- Principle of chain detection and their technology (short)
- Characteristic curves of the sensors
- Processing performed by the electronics of the CNS, CNI, CNP, comparison chassis
- Distribution chassis, Votan
- Distribution of SIN material
- Operating limits in relation to the control mode
- SIP and RPR interface

Presentation of the RPR
- Reactor protections
  - o RPR in the process
  - o System limits
  - o Defense in depth design
  - o Lines of defense
- Reactor safety system
  - o Threshold relays
  - o 2/3 and 2/4 logic and safety / availability concept
  - o Protection chain links
  - o Matrices
  - o Principle of the protection system
  - o AAR switch tables
  - o Permissives and interlocks
- Periodic tests
  - o Periodic tests (self-checking, inhibition, simulation, tester blocking)
  - o Role of the tester
  - o The watch dog
  - o Principle of operation of the automaton
  - o Automatic tests
  - o Principle of a test sequence
  - o Decoupling cabinet

PREREQUISITES
The trainees have followed the Young Maintenance Executive Course

OTHER INFORMATION
8 people maximum
TRAINING CODE: M089

Simulator
THOR Advanced Thermal Hydraulics Models

DURATION	LOCATION	LANGUAGES
2 days	Customer on-site / Worldwide	English

TARGET GROUP
Process Control/Simulation Engineers

OBJECTIVES
Simulation tools and Software for Operations Training Simulator. To develop an understanding of the THOR model configuration, modification, tuning, and debugging techniques. The class is intended to help simulator engineers maintain the complex THOR models in-house.

CONTENT
Introduction to THOR, Numerical Solution to Ordinary Differential Equations, Volumetric Flow, THOR source code, Developer Tools Overview, THOR3G Model Builder, Data Processing, Database Maintenance, and Tuning Exercises

PREREQUISITES
Process Control and Simulation Science

OTHER INFORMATION
This course is delivered by CORYS. Computers and training materials will be provided

Contact: ic-academy@framatome.com
for more information

Spinline
Adaptation Maintenance RGL RPN RPR renovated (M2C VD3 1300)

DURATION	LOCATION	LANGUAGES
70 hours spread over 10 consecutive days	Framatome Grenoble	French

TARGET GROUP
Automation and Industrial IT department technicians responsible for level 1 and 2 maintenance of control equipment

OBJECTIVES
- Describe functional changes and hardware renovations to RPN, RGL and RPR systems and principle of networks within each system
- Describe technological characteristics of renovated parts in RPN, RGL and RPR systems
- Locate the sub-assemblies materially and functionally
- Interpret cabinet wiring diagrams
- Use available diagnostic and maintenance tools to check proper functioning and modify certain operating parameters

CONTENT
- Components, interactions and links between systems, ommunication networks used, role of KCF system in relation to systems maintenance and operation
- Modifications and evolutions made to the 3 systems (RPN, RGL and RPR)
- Describe maintenance and operation modes and technological characteristics of proposed equipment
- Characteristics of the NERVIA network (determinism, content, operating principle, data exchange)
- RODLINE technology
- SPINLINE 3 technology (panorama of the cards, chassis, cabinets and connectors)
- Use of OVI in maintenance (communication with UC card via LSA; visualization, downloading and modification of parameters)
- Use of human-machine interface for centralized maintenance functions (FMC of KCF)
- Reading of functional schematics and troubleshooting diagrams
- Tester modification
- Situational scenarios

PREREQUISITES
- Basic knowledge of level 1300 wafer operation
- M310 “Basics of Industrial Local Area Networks”
- M964 “FMC FCC of KCF”

OTHER INFORMATION
6 people maximum
TRAINING CODE: M977

Spinline
Maintenance Practice RGL RPN RPR renovated (M2C VD3 1300)

DURATION	LOCATION	LANGUAGES
35 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
Automation and Industrial IT department technicians responsible for level 1 and 2 maintenance of control equipment

OBJECTIVES
- Identify faulty equipment
- Interpret alarms on faulty equipment
- Carry out risk analysis adapted to defect or breakdown
- Analyze defect or breakdown consequences on equipment availability
- Describe implemented repair solutions
- Carry out periodic parameter setting on control command equipment
- Replacement of elements in CO4 principal equipment breakdown
- Write short requalification report

CONTENT
- Periodic testing
  - o RPN tester
  - o Performance of EPs (CNS, CNI and CNP)
  - o RPR tester
  - o Realization of the EPs (T0, T1, T2)
  - o Follow-up of the EPs from the human-machine interfaces (HMIs)
  - o RGL
  - o Realization of the EPs
  - o Follow-up of the EPs from the HMIs
- RGL/RPN/RPR:
  - o Modification of parameter values
  - o Downloading with HMI
  - o Use of OVI tool for maintenance in case of local HMI unavailability
- RGL:
  - o Realization of diagnostics from HMI cycler
  - o Intervention on coil power frames
- RPN:
  - o Calibration of the power chains
  - o Realization of the plateau curves (CNS, CNI and CNP), of discrimination (CNS)
  - o Resumption of the KH/KB parameters of the CNPs
- UATP:
  - o Resume parameters UF6/UF7 or other UF
- RGL/RPN/RPR:
  - o Troubleshooting or intervention situations in context of hardware or software defect
- KCF:
  - o consequences of network link loss (RIE2 or other) on maintenance HMI

PREREQUISITES
M977 “Adaptation Maintenance RGL RPN RPR renovated (M2C VD3 1300)”

OTHER INFORMATION
6 people maximum
TRAINING CODE: M978

Spinline
RGL RPN RPR renovated VD3 1300 engineering training

DURATION	LOCATION	LANGUAGES
32 hours spread over 5 consecutive days	Framatome Grenoble	French

TARGET GROUP
- Automation and reliability department personnel deploying VD3
- SP automation specialists integrating VD3 1300 modifications
- PCC/UFPI personnel integrating VD3 1300
- GMAP engineers in charge of C05
- Others interfacing with VD3 1300 structure

OBJECTIVES
- Describe material structure of equipment
- Describe equipment technological characteristics and maintenance methods
- Use characteristics and maintenance modes to identify necessary adaptations to existing or developing maintenance documents
- Use human-machine interface (HMI) to understand troubleshooting and operation
- Identify and interpret equipment fault signals
- Estimate consequences of failure and degraded functioning on process
- Evaluate equipment reactions during intervention

CONTENT
- Components, interactions and links between systems, communication networks used, role of KCF system in relation to maintenance and operations
- Evolutions resulting from modifications made to systems (RPN, RGL and RPR)
- Describe proposed equipment’s maintenance modes, operation modes and technological characteristics
- Characteristics of NERVIA network (determinism, content, operating principle, data exchange)
- RODLINE technology
- SPINLINE 3 technology (panorama of the cards, chassis, cabinets and connectors)
- Use of OVI in maintenance (communication with UC card via LSA; visualization, downloading and modification of parameters)
- Use of HMI for centralized maintenance functions (FMC of KCF)
- Reading of functional schematics and troubleshooting diagrams
- Situational scenarios

PREREQUISITES
- A203 “RGL RPN RPR 1300 Equipment Engineering training”
- M310 “Basics of industrial local area networks”

OTHER INFORMATION
10 people maximum
TRAINING CODE: M966

Spinline
Study and Maintenance of RGL (M2C VD3 1300)

DURATION	LOCATION	LANGUAGES
70 hours spread over 10 consecutive days	Framatome Grenoble	French

TARGET GROUP
Automation and Industrial IT department technicians responsible for level 1 and 2 maintenance of control equipment

OBJECTIVES
- Define functional role of equipment in process, STEs and reactivity control
- Define functional structure and material breakdown of sub-assemblies
- Describe RGL system (SPIN LINE, ROD LINE and IPG cabinets) technology characteristics
- Materially and functionally locate sub-assemblies
- Interpret cabinet wiring diagrams
- Use available diagnostic and maintenance tools to check proper functioning and modify certain operating parameters
- Apply a troubleshooting method leading to implementation of centralized maintenance functions from centralized and local human-machine interfaces (HMI) (Monitoring functions, trouble-shooting assistance, parameterization, configuration, periodic tests)

CONTENT
- Equipment function
- Equipment links
- Justification of architecture with respect to safety and availability
- Safety impact of equipment (STE unavailability, AAR risk and accidental procedures)
- Architecture
- Hardware breakdown
- Functional structure
- Control system operating modes
- SPINLINE
- Presentation of SPINLINE technology
- Functional
- SPINLINE basic functions
- Safety aspect
- Usability aspect
- SPINLINE basic components
- NERVIA safety network
- Rodline EEC cabinets
- Functional breakdown of EECs
- Presentation of cycler cards
- Post power-up function check
- Modification of parameter values
- Trainee scenarios
- Simulations using diagnostic, parameterization and requalification tools (KCF maintenance HMI, OVI for SPINLINE, cycler HMI for RODLINE)

PREREQUISITES
- 1300 level wafer operational knowledge
- M310 “Basics of industrial local area networks”

OTHER INFORMATION
6 people maximum
TRAINING CODE: M962

Spinline
Study and Maintenance of RPN, RPR renovated (M2C VD3 1300)

DURATION	LOCATION	LANGUAGES
102 hours or 15 days - 10 consecutive days - Minimum 15 day break - 5 days	Framatome Grenoble	French

TARGET GROUP
Automation and Industrial IT department technicians responsible for level 1 and 2 maintenance of control equipment

OBJECTIVES
- Define functional role of equipment in process, STEs
- Define functional structure and material breakdown of sub-assemblies
- Describe characteristics of RPN and RPR system technologies
- Use material and function to locate different sub-assemblies
- Interpret cabinet wiring diagrams
- Use available diagnostic and maintenance tools to check proper functioning and modify certain operating parameters
- Apply a troubleshooting method leading to implementation of centralized maintenance functions from centralized and local human-machine interfaces (Monitoring functions, troubleshooting assistance, parameterization, configuration, periodic tests)

CONTENT
SPIN / RPN
- Architecture
- SPIN:
  - o UATP
  - o ULS
  - o Tester
  - o Power supplies
- RPN :
  - o Types of sensors, principles, technology, ranges
  - o Protection cabinets
  - o Control cabinet
  - o Tester
  - o Power supplies
- ESDP :
  - o Software and hardware generalities
  - o Calculation algorithms
  - o Normal operation
  - o Degraded operation
  - o Hardware presentation (briefly, as hardware and troubleshooting are covered in APTORM9640 training)

Constitutive technologies of RPN and RPR systems
- The SPINLINE:
- Presentation of the SPINLINE technology
  - o The functional
  - o Basic functions of the SPINLINE system
  - o Safety aspect
  - o Usability aspect
  - o The basic components of the SPINLINE technology
  - o NERVIA safety network
- UATP:
  - o Presentation of the terminal wired logic
- ULS:
  - o Presentation of the cabinets
- RPR tester:
  - o Principle of connection to UATP and ULS (functions, SCOP, GLOB, VERF, ATVE).
- RPN:
  - o Presentation of the sensors, from the connections to the cabinets
  - o Presentation of the control tools of the sensors and the measuring lines

PREREQUISITES
- Basic knowledge of 1300 level wafer operation
- M310 “Basics of industrial local area networks”

OTHER INFORMATION
6 people maximum
TRAINING CODE: M961

SVDU Training
Graphics Building and Application

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP
SVDU Application Engineers

OBJECTIVES
To provide practical knowledge and experience with SVDU graphics application development using the ACCIS Display Builder Tool:
- Setup and Installation of the Display Builder Tool
- System Administrative Tasks
- Use of Graphical Objects, Widgets, and Templates
- Applying Connections
- Understanding the Eclipse Platform
- Performing Resource Editing
- Creating a New Display Project
- Testing the Display Project

CONTENT
The 5-day course progresses through SVDU overview; display building essentials; navigation; including the Eclipse platform; the HSI Display Builder application; menu and toolbar items; resource editing; creating a new display project with templates; widgets; and connection statements; and testing the application. Advanced topics include editing XML and runtime examples. The class concludes with operational topics, runtime modifications, and permissions-based display access.

PREREQUISITES
Knowledge of Process and Flow Control, Tricon, QNX, SVDU (Safety Video Display Unit)

OTHER INFORMATION
This course requires the SVDU unit(s) and Tricon configuration for hands-on experience and skills development; 2 students per lab setup. Alternatively, a PC and Virtual Machine configurations.

Contact: ic-academy@framatome.com
for more information

SVDU Maintenance

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP
SVDU Maintenance Engineers

OBJECTIVES
To provide practical knowledge and experience with maintaining an SVDU installation, including:
- Setup, Connecting, Installing, Upgrading and Replacing SVDUs
- System Administrative Tasks
- Predictive and Preventive Maintenance Functions
- Troubleshooting and Reporting-Hardware, Software, Graphics
- Determining Normal vs. Abnormal Operation
- System Health Monitoring – Hardware, Software
- System Safety and Security

CONTENT
The 5-day course progresses through the ACCIS overview, 1E SVDU platform and architecture, QNX OS, laptop utilities, software installation, and touchscreen calibration. The runtime applications, annunciation databases, alarm event data flows, SVDU startup, Tricon I/O Driver, System Health Monitoring, HSI Display Builder tool and template verification tool, verification of runtime operation. Hardware/software troubleshooting, and system maintenance, system security.

Hands-on: Set up Laptops - Wireless and Tools, Lab Setup, QNX OS-Commands and Utilities, QNX Photon, Networks, Full Software Installation, Touchscreen Calibration, Filesystems, ACCIS Commands and Utilities, Online Database Utilities, QNX and ACCIS Startup, System Health Monitoring, Add a point to Tricon and SVDU display, Verify Configuration, Install Updated Data, Diagnosing system issues, Copying System Logs and Archives, Debugging Graphics, Add, Remove, Replace SVDU Nodes, Time synchronization, Process and Disk Auditor, QNX root password, ACCIS user accounts, HSI User Login.

PREREQUISITES
Knowledge of Process and Flow Control, Tricon, QNX, SVDU (Safety Video Display Unit)

OTHER INFORMATION
This course requires the SVDU unit(s) and Tricon configuration for hands-on experience and skills development; 2 students per lab setup.

Contact: ic-academy@framatome.com
for more information

System Training
Nuclear Instrumentation (NI)

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP

I&C Systems Engineers and Technicians, who are responsible for the System Adherence, Maintenance and Troubleshooting of the Nuclear Instrumentation (NI) System. This course is also applicable to Operations Management, ROs, SROs, STAs, I&C Test Engineers and Commissioning Personnel who require a detailed understanding of the operation of the NI System.

OBJECTIVES

Upon successful completion of this course, the student will be able to:

1. Explain the functions for each channel of the NI System
2. Explain the operation for each channel of the NI System
3. Identify the components and sub-systems which make up the NI System
4. Explain the detailed function of each component the A/C and D/C Power Systems and Interfaces
5. Correctly Power Up and Power Down the NI System
6. Utilize tools on the Maintenance Engineering Workstation (ME-WS) to determine system status and diagnose faults/failures within the system
7. Explain in detail the functions of the various NI interfaces to the Plant
8. Explain in detail the various Faults, Trips, Interlocks, Permissives, and Alarms associated with the NI System
9. Solve specific hardware problems using the various diagnostic features of the NI System
10. Use the ME-WS Operator Interfaces to change setpoints, load and run the application software and obtain selected data or status from the NI System
11. Utilize tools on the ME-WS to perform calibration and normalization of the NI detectors, as well as determine HV outputs
12. Understand annunciators and operator interfaces of system indications within the control room

CONTENT

Day 1 of the course covers the overall function and operation of the NI System. Each major subsystem is detailed, in relation to the total system, supplemented with hands-on demonstrations in a simulated environment. Students are exposed to all of the various hardware and software components of the NI System, and receive a basic understanding of how they interact. Students will also be exposed to the operational similarities and differences of the new NI System compared to the present system.

Day 2 of the course will cover the Wide Range subsystem of the NI System. Students will be exposed to the detailed functional and logic operations of the subsystem, including its interaction with other plant equipment, other subsystems, and the data network. Maintenance operations, troubleshooting, and hardware replacements will also be covered as part of this session. Students will also learn the Wide Range subsystem's function as part of the Post-Accident Monitoring System as part of this section.

Day 3 of the course will cover the Source Range subsystem of the NI System. Students will be exposed to the detailed functional and logic operations of the subsystem, including its interaction with other plant equipment and the data network. Maintenance operations, troubleshooting, and hardware replacements will also be covered as part of this session.

Day 4 of the course will cover the Intermediate Range subsystem of the NI System. Students will be exposed to the detailed functional operations and logic operations of the subsystem, including its interaction with other plant equipment and the data network. Maintenance operations, troubleshooting, and hardware replacements will also be covered as part of this session.

Day 5 of the course will cover the Power Range subsystem of the NI System. Students will be exposed to the detailed functional operations and logic operations of the subsystem, including its interaction with other plant equipment and the data network. Maintenance operations, trouble-shooting, and hardware replacements will also be covered as part of this session.

Topics - NI per channel Functions; NI per channel Operation; Tricon Digital Interfaces; External I/O with other Systems; Power Electronics (High-Voltage Outputs); AC and DC Power Systems; Maintenance Engineering Workstation; Operator HMI; Faults, Trips; and Bypasses; Interlocks and Permissives; Plant Physical Interfaces; Hardware Replacement; MCR Indications/ Annunciators; Cabinet Indications/ Annunciators; Troubleshooting/Diagnostics; Per Channel Periodic Maintenance' Calibration/Normalization; and System Alarms

OTHER INFORMATION

Training can either be provided at the Framatome Lynchburg facility prior to equipment delivery, or at site following equipment delivery

Seating/desk space for 10 students
Laptop computer interface for presentation
NI System Drawings and Instruction Manual (1 set for every 2–3 students)
Access to the NI System before or after delivery.

Contact: ic-academy@framatome.com for more information

System Training
Rod Control

DURATION	LOCATION	LANGUAGES
4 days	Customer on-site / Worldwide	English

TARGET GROUP
I&C Systems Engineers and Technicians, who are responsible for the System Adherence, Maintenance and Troubleshooting of the Rod Control System. This course is also applicable to Operations Management, ROs, SROs, STAs, I&C Test Engineers and Commissioning Personnel who require a detailed understanding of the operation of the Rod Control System.

OBJECTIVES
Upon successful completion of this course, the student will be able to:

1. Explain the functions of the Rod Control System
2. Explain the operation of the Rod Control System
3. Identify the components and sub-systems which make up the Rod Control System
4. Explain the detailed function of each component and the A/C and D/C Power Systems and A/C Power Interface
5. Correctly Power Up and Power Down the Rod Control System
6. Identify the various Hardware and Software components of the TMR Control System and describe each of their functions
7. Utilize tools on the EWS to determine system status and diagnose faults/failures within the system
8. Collect and analyze coil current traces from the Rod Control System
9. Explain in detail the functions of the various Rod Control interfaces to the Plant
10. Explain in detail the various Faults, Trips and Alarms associated with the Rod Control System
11. Solve specific hardware problems using the various diagnostic features of the Rod Control System
12. Use the Engineering Workstation to change setpoints, load and run the application software and obtain selected data or status from the Rod Control System

CONTENT
Day 1 of the course covers the overall function and operation of the Rod Control System. Each major subsystem is detailed, in relation to total system, supplemented with hands-on demonstrations in a simulated environment. Students are exposed to all of the various hardware and software components of the Rod Control System, and receive a basic understanding of how they interact.

Day 2 of the course covers the detailed operation of the Rod Control System, with emphasis on its operational similarities and differences, compared to the present system. The control system HMI is presented in detail and discussed in relation to the total system. Hands-on exercises, in a simulated environment, are provided.

Days 3 and 4 of the course detail the functions of each of the components, which compose the DCRDCS. The interaction of both the hardware and software functions is emphasized. Maintenance and Diagnostic features of the System are explained and supplemented with hands-on exercises in a simulated environment.

Topics – Rod Control Functions; Rod Control Operation; Power Electronics; AC and DC Power Systems; Hardware Replacement; Coil Testing; Maintenance and Engineering Workstation; Operator HMI; Faults; Trips; and Bypasses; Plant System Interfaces; Troubleshooting; Detailed Design Drawings; Diagnostic Capabilities; Maintenance Features; Redundancy; and Alarm Management Diagnostics

PREREQUISITES
General knowledge of Nuclear Plant operation and the basic role of associated control systems

OTHER INFORMATION
Seating/desk space for 10 students
Overhead projector for interface with Laptop computer (for ppt presentation)
Rod Control System Drawings and Instruction Manual (1 set for every 2–3 students)
Access to the Rod Control System with classroom network connection capability

Contact: ic-academy@framatome.com
for more information

System Training
Rod Position Indication (RPI)

DURATION	LOCATION	LANGUAGES
2.5 days	Customer on-site / Worldwide	English

TARGET GROUP
I&C Systems Engineers and Technicians, who are responsible for the System Adherence, Maintenance and Troubleshooting of the Rod Position Indication (RPI) System. This course is also applicable to Operations Management, ROs, SROs, STAs, I&C Test Engineers and Commissioning Personnel who require a detailed understanding of the operation of the RPI System.

OBJECTIVES
Upon successful completion of this course, the student will be able to:
1. Explain the functions of the RPI System
2. Explain the operation of the RPI System
3. Identify the components and sub-systems which make up the RPI System
4. Correctly Power Up and Power Down the RPI System
5. Utilize tools on the ME-WS to determine system status and diagnose faults/failures within the system
6. Explain in detail the various Alarms associated with the RPI System
7. Solve specific hardware problems using the various diagnostic features of the RPI System
8. Use the ME-WS to change setpoints, load and run the application software and obtain selected data or status from the RPI System
9. Use the RDTC to perform rod drop testing on the RPI System

CONTENT
Day 1 of the course covers the overall function and operation of the RPI System. Each major subsystem is detailed, in relation to total system, supplemented with hands-on demonstrations in a simulated environment. Students are exposed to all of the various hardware and software components of the RPI System, and receive a basic understanding of how they interact. Day 1 will also have an emphasis on the operational similarities and differences of the NI System compared to the present system.

Days 2 and 3 of the course detail the functions of each of the components, which compose the RPI System. The interaction of both the hardware and software functions is emphasized. Maintenance and Diagnostic features of the System are explained and supplemented with hands-on exercises in a simulated environment. This includes the use of the Maintenance Engineering Workstations (ME-WS) and the Rod Drop Testing Computer (RDTC).

Topics - RPI Functions, RPI Operation, AC and DC Power Systems, Hardware Replacement, External I/O with other systems, Maintenance and Engineering Workstation, MCR Indication and Local Displays, Data Network Interfaces, Plant Physical Interfaces, Signal Processing / Calculations, Detailed Design Drawings, Periodic Maintenance/Calibration, Rod Drop Testing Computer (RDTC), System Alarms

PREREQUISITES
General knowledge of Nuclear Plant operation and the basic role of associated control systems

OTHER INFORMATION
Seating/desk space for 10 students
Laptop computer interface for presentation
RPI System Drawings and Instruction Manual (1 set for every 2–3 students)
Access to the RPI System before or after delivery

Contact: ic-academy@framatome.com for more information

TELEPERM XS
DIMAS Fundamentals

DURATION	LOCATION	LANGUAGES
3 days	Framatome Karlstein	German / English

TARGET GROUP
This course is intended for I&C engineering, V&V, commissioning and maintenance personnel

OBJECTIVES
Upon successful completion of this course, participants will be able to:
- Explain the interaction between DIMAS and the online system
- Explain the basic functionalities of a Service Unit and CPU operating modes
- Perform parameter changes
- Explain DIMAS clients and their functionalities
- Develop DIMAS scripts using DIMAS Client API
- Implement Graphical Service Interfaces with the aid of dimasQt

CONTENT
This course covers DIMAS functionality, version 3.6.x. The functionality and the possible applications of the Service Unit and DIMAS (including clients) are explained and consolidated on with the aid of practical exercises. The Python programming interface is explained on the basis of the DIMAS Client API with reference to practical examples. The programming skills acquired are used to perform the first steps in the development of a Graphical Service Interface.
The course covers the following topics in detail:
- Introduction to the Service Unit and DIMAS
- Principle of the TELEPERM XS service concept
- Functionality of DIMAS clients (TXSStatus, FDView, EventLog, DIMAS-Shell)
- Introduction to the DIMAS client API (dimasUtil)
- Introduction to operating modes and parameterization
- Development of scripts and Graphical Service Interfaces
- Practical exercises

PREREQUISITES
Knowledge of Python is mandatory.
Basic knowledge of I&C and experience in digital automation systems, as well as basic TELEPERM XS knowledge, are advantageous but not essential. General IT skills and Linux knowledge are necessary.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com
for more information

TELEPERM XS
Engineering Detailed Design

DURATION	LOCATION	LANGUAGES
5 days	Framatome Karlstein	German / English

TARGET GROUP
This course is intended for external/internal engineers (I&C, IT, QM) and training personnel, qualification personnel

OBJECTIVES
Upon successful completion of this course, participants will be able to:
- Name the basic properties of TELEPERM XS I&C systems with respect to system design, hardware and software
- Explain the most important steps and tools of the engineering process
- State the tools required for engineering of TELEPERM XS I&C systems
- List the tasks and contents of I&C requirement and system specification
- Use the engineering tools for code generation, verification and validation, testing and documentation of TELEPERM XS application software

CONTENT
In addition to a short introduction to TELEPERM XS basics, the course covers the most important elements of the TXS engineering process. It gives an overview of how to generate an I&C system specification and detailed engineering of software coding, as well as the verification and validation of the individual process steps using the associated engineering tools (SPACE). The validation tool SIVAT is also examined closely. The theoretical knowledge is consolidated in practical exercises.

The course covers the following topics in detail:
- TELEPERM XS basics
- TELEPERM XS engineering process (overview)
- Overview of I&C requirement and system specification (levels 1-4)
- SPACE function diagram editor (FDE) in detail
- SPACE database design (identification coding concept, tips and rules)
- Generation of an I&C system specification (hardware, software)
- Application software coding using all SPACE tools
- Validation of the application software using SIVAT

PREREQUISITES
Basic knowledge of I&C and experience in digital automation systems, and basic knowledge of TELEPERM XS (such as the prior attendance of a TELEPERM XS basic course). General IT skills are desirable.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com
for more information

TELEPERM XS
Engineering Detailed Design - Compact

DURATION	LOCATION	LANGUAGES
3 days	Framatome Karlstein	German / English

TARGET GROUP
I&C engineering personnel, as well as I&C test and commissioning personnel who have already taken part in an engineering course

OBJECTIVES
Upon successful completion of this course, participants will be able to:
- Recall the basic knowledge of TELEPERM XS I&C systems with regard to system architecture, hardware and software
- Revise important steps and content of engineering processes
- Explain the tools which are necessary for engineering of TELEPERM XS I&C systems
- Use the engineering tools for creation, verification and validation and documentation of TELEPERM XS software independently

CONTENT
This course is a refresher course for all persons who have previously participated in an engineering course. The most important features and topics of TELEPERM XS engineering are revised in a compact manner. This course is based on the TELEPERM XS Engineering Detailed Design engineering course. The participants perform practical exercises to expand and consolidate their knowledge.
The following topics are covered in detail:
- TELEPERM XS basics (function computer, system architectures and properties)
- TELEPERM XS engineering process (concept)
- SPACE function diagram editor (FDE)
- Create an I&C system specification (hardware and software)
- User software coding using all SPACE tools
- Practical exercises

PREREQUISITES
TELEPERM XS system knowledge with regard to architecture, hardware and software.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com
for more information

TELEPERM XS
Fundamentals Compact

DURATION	LOCATION	LANGUAGES
3 days	Framatome Karlstein	German / English

TARGET GROUP
Personnel involved in I&C project processing, including management staff and personnel in sales/marketing of I&C equipment and licensing authorities.

OBJECTIVES
Upon successful completion of this course, course participants will be able to:
- Explain the architecture, function computers, TELEPERM XS hardware modules, as well as the system properties of a TELEPERM XS system
- State the TELEPERM XS engineering process
- Design part of a database
- Perform some tasks with TELEPERM XS SPACE tools
- Identify and explain maintenance and diagnostic possibilities

CONTENT
This course essentially covers the same topics as course TELEPERM XS Fundamentals including practicals, but in a condensed form. Course participants receive an overview of TELEPERM XS products, the engineering process and the process of operation and maintenance. They learn about selected hard- and software components, as well as system properties. Safety I&C architectures and maintenance/diagnostic applications are presented.

The course covers the following topics in detail:
- Basics of the TELEPERM XS system (function computer with architecture, hardware and software with system properties)
- Engineering process (incl. V&V and function specifications)
- Important function specifications as part of a database (network plan)
- SPACE tools, which are a part of the engineering process
- Introduction to maintenance and the necessary tools
- Simple demonstrations and exercises are included

PREREQUISITES
General knowledge of automation technology for safety systems in nuclear power plants.

OTHER INFORMATION
This course will be the basis for the following courses: TELEPERM XS-Maint, TXS-QDS, TXS-HW2G, TXS SIVAT, TXS-ADMIN
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com
for more information

TELEPERM XS
Fundamentals including Practicals

DURATION	LOCATION	LANGUAGES
5 days	Framatome Karlstein	German / English

TARGET GROUP
Personnel involved in I&C project processing, including management staff and personnel in sales/marketing of I&C equipment and licensing authorities.

OBJECTIVES
Upon successful completion of this course, course participants will be able to:
- Explain the architecture and function computers of a TELEPERM XS I&C system
- State the basic functions of the hardware modules
- Explain TELEPERM XS system properties and fault detection
- State the TELEPERM XS engineering process in detail
- Design simple databases
- Work with the TELEPERM XS SPACE tools
- Interpret the diagnostic possibilities

CONTENT
This course covers the overall concept of the safety I&C system platform TELEPERM XS (TXS). It gives an overview of TELEPERM XS products, the engineering process (including V&V and SPACE tools) and operation (handling, maintenance). The most important TELEPERM XS hardware and software components, as well as their system properties, are presented. TELEPERM XS safety architecture and maintenance/diagnostic applications are explained.

The following topics are covered in detail and their practical applications are stated:
- Basics of the TELEPERM XS system (architecture, function computers, Hardware 2nd generation and system properties)
- Engineering process, including function specifications and V&V management
- Specification of a database with hardware and software plans (detailed engineering)
- Engineering tools (SPACE)
- Introduction to diagnostics and any tools required
- Overview of the Test Bay and ERBUS
- Practical exercises, demonstrations and seminar tasks

PREREQUISITES
General knowledge of automation technology for safety systems in nuclear power plants. General IT skills and knowledge of Linux required.

OTHER INFORMATION
This course will be the basis for the following courses: TELEPERM XS-Maint, TXS-QDS, TXS-HW2G, TXS SIVAT, TXS-ADMIN
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com
for more information

TELEPERM XS
Fundamentals Overview

DURATION	LOCATION	LANGUAGES
2 days	Framatome Karlstein Framatome Beijing	German / English / Chinese

TARGET GROUP
Personnel involved in I&C project processing, including management staff and personnel in sales/marketing of I&C equipment and licensing authorities.

OBJECTIVES
Upon successful completion of this course, course participants will be able to:
- Explain the basic concepts of the TELEPERM XS system platform
- Identify the relevant hardware modules of the system platform
- State the system properties of the digital I&C system and the possibilities for fault detection
- Explain the basic principles of engineering and maintenance

CONTENT
This course gives a condensed overview of TELEPERM XS products. The participants learn about individual components of the TELEPERM XS system. This includes hardware and software components, and an initial insight into the system properties, the engineering process and maintenance.
The course covers the following topics in detail:
- Basics of the TELEPERM XS system
- TELEPERM XS function computer and system architectures
- Overview of the most important hardware/software modules and TELEPERM XS system properties
- Overview of the engineering process
- Introduction to maintenance
- Presentation of additional demonstrations

PREREQUISITES
General knowledge of automation technology for safety systems in nuclear power plants.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com for more information

TELEPERM XS
Hardware 2nd Generation

DURATION	LOCATION	LANGUAGES
3 days	Framatome Karlstein	German / English

TARGET GROUP
This course is intended for I&C engineering personnel, technical project managers, I&C testing, commissioning and maintenance personnel

OBJECTIVES
Upon successful completion of this course, participants will be able to:
- State the basics of TELEPERM XS Hardware 2nd generation
- Explain the connection between the mechanical structure of a cabinet and the conceptual requirements regarding the assembly of a TXS cabinet
- Explain the structure and the operating principle of cabinet modules and cabinet connection techniques
- Plan the hardware in the engineering process (e.g. cabinet arrangement diagram)

CONTENT
The course begins with an introduction and an overview of TELEPERM XS Hardware 2nd generation. The actual properties of the TELEPERM XS Hardware 2nd generation are presented, including the new range of TELEPERM XS modules. The course provides information on purpose, structure and function of the modules, including cabinet power supply, circuit breaker and monitoring. A cabinet arrangement diagram will be designed. Thereby, the relationship between engineering specification and the functionality of the cabinet modules are mediated. This includes coding concept, standards, cabinet structure, mechanics, etc.

The course covers the following topics in detail:
- Basics of TELEPERM XS hardware components
- Purpose, structure and operating principle of modules
- Non-code-relevant analog and binary modules
- Code-relevant modules (computer, communication, input and output modules)
- Creation of a cabinet arrangement diagram using VISIO
- Consolidation of instruction material in theoretical and practical exercises

PREREQUISITES
Basic knowledge of I&C and digital automation systems, basic knowledge of TELEPERM XS (introductory course). Generic IT skills (VISIO) are advantageous.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com
for more information

TELEPERM XS
Maintenance HW2G/DIMAS

DURATION	LOCATION	LANGUAGES
10 days	Framatome Karlstein	German / English

TARGET GROUP
This course is intended for I&C maintenance personnel and I&C testing and commissioning personnel

OBJECTIVES
Upon successful completion of this course, participants will be able to:
- Explain TELEPERM XS basics, architecture and system properties
- Explain concept and mechanisms of TELEPERM XS maintenance
- Independently diagnose and troubleshoot the TELEPERM XS system (HW faults/SW errors) with aid of the TXS Service Unit and rectify the faults/errors
- Identify hardware faults, replace faulty modules, change parameters, save changes and load software
- Document the troubleshooting

CONTENT
The course covers all aspects of TELEPERM XS maintenance for carrying out independent diagnosis, troubleshooting, parameterization, module replacement and commissioning of a real system. The theoretical knowledge is consolidated in practical exercises. The course covers the following topics in detail:
- Basics of the TELEPERM XS system (system architecture, HW2G, system properties, engineering, coding concept)
- Diagnosis using the TELEPERM XS Service Unit (monitoring and annunciation concept, SU, DIMAS and DIMAS clients, introduction, operating modes and parameterization)
- Diagnosis and maintenance at the training cabinet (independent diagnostic analysis with the Service Unit and the training cabinet, module replacement, commissioning of the system in accordance with the actual TXS documentation)
- Technical documentation of faulty modules in accordance with the return procedure

PREREQUISITES
Basic knowledge of I&C and experience in digital automation systems. TELEPERM XS basic knowledge (e.g. attendance of TXS basics or engineering). Knowledge of Python is required. Generic IT skills and Linux knowledge are necessary.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com
for more information

TELEPERM XS
Maintenance HW2G/DIMAS

DURATION	LOCATION	LANGUAGES
5 days	Framatome Karlstein	German / English

TARGET GROUP
I&C maintenance personnel, including I&C testing and commissioning personnel

OBJECTIVES
Upon successful completion of this course, course participants will be able to:
- Explain the TELEPERM XS basics, architecture and system properties
- Explain the concept and mechanism of TELEPERM XS maintenance
- Use the different DIMAS clients on the Service Unit (SU) for TELEPERM XS diagnosis and maintenance
- Monitor the TELEPERM XS system, modify parameters and verify parameter changes
- Explain module exchange procedure and module settings

CONTENT
The course is based on TELEPERM XS Hardware 2nd generation and the 2nd generation of TELEPERM XS core software version ≥ 3.6.x with DIMAS clients.
The course starts with a short introduction to TELEPERM XS basics and their plant-specific applications. The main focus is on function, application and handling of the TELEPERM XS Service Unit as a tool for diagnosis and troubleshooting in TELEPERM XS systems. Further topics are diagnosis at the cabinet and methods and handling for module replacement.

The course covers the following topics in detail:
- TELEPERM XS basics (system architecture and system properties; HW2G; SPACE function diagram editor FDE)
- Basics of TELEPERM XS maintenance with the Service Unit (DIMAS introduction, DIMAS clients, operating modes and parameterization)
- TELEPERM XS diagnostics at the cabinet (identification/repair of errors at the cabinet; replace or set modules)
- Practical exercises

PREREQUISITES
General IT skills and basic I&C knowledge as well as knowledge of digital automation systems. Basic knowledge of TELEPERM XS (e.g. previous attendance of TELEPERM XS basics or engineering course) is desirable.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com
for more information

TELEPERM XS
Maintenance HW2G/SMS

DURATION	LOCATION	LANGUAGES
5 days	Framatome Karlstein	German / English

TARGET GROUP
I&C maintenance personnel and I&C testing and commissioning personnel

OBJECTIVES
Upon successful completion of this course, course participants will be able to:
- State basics of the TELEPERM XS system (e.g. architecture, hardware and system properties)
- Explain the concept and mechanism of TELEPERM XS maintenance and its use in the context of maintenance service
- Carry out the following activities independently: system error analysis, diagnosis, troubleshooting and recovering

CONTENT
The course is based on TELEPERM XS Hardware 2nd generation and the core software version 3.3 x with SMS and GSM as diagnostic tools. After a short introduction to the basics and their plant-specific application, the course focuses on the functionality, application and use of the Service Unit, which is the main tool for fault detection and diagnosis. The theoretical knowledge is consolidated in practical exercises.

The essential elements of the course are:
- System Basics (function computer and system architectures, Hardware 2nd generation and system properties)
- The basics of maintenance
- Fault analysis and diagnosis using the Service Unit and the TELEPERM XS cabinet
- Procedure and handling of module replacement
- Loading software and verify loaded software and parameter settings

PREREQUISITES
Basic knowledge of control and digital automation systems, basic knowledge of TELEPERM XS by preference. Previous attendance of a TELEPERM XS basics or engineering course is desirable but not essential.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com
for more information

TELEPERM XS
QDS (Qualified Display System) Applications

DURATION	LOCATION	LANGUAGES
2 days	Framatome Karlstein	German / English

TARGET GROUP
This course is intended for I&C personnel, electrical, simulator training instructors and power plant operators

OBJECTIVES
Upon successful completion of this course, course participants will be able to:
- Explain the concept and mechanisms of QDS
- Use QDS, including connection to a TELEPERM XS system
- Use engineering tools such as Qt Designer, QDS_Gen, QDS_HMI and QDS_SU
- Monitor the connected TELEPERM XS system
- Modify settings
- Download application to QDS hardware

CONTENT
The course provides an overview of the concept and function of the TELEPERM XS QDS (Qualified Display System). The participants learn how a QDS system is integrated into TELEPERM XS and design a QDS application using the QDS tools QDS_Gen, Qt Designer, QDS_HMI and QDS_SU. At the end of the training course, they are able to download their applications onto the QDS hardware, which is connected to a TELEPERM XS training cabinet

The course covers the following topics in detail:
- Hardware architecture
- Software architecture
- QDS in SPACE
- Engineering tools
- Designing displays
- Connection of signals and HMI
- QDS Service Unit
- Practical exercises

PREREQUISITES
Basic TELEPERM XS knowledge (e.g. previous attendance of a TELEPERM XS fundamentals course or TELEPERM XS engineering course) is desirable. IT skills and Linux knowledge are necessary.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com for more information

TELEPERM XS
SIVAT - V1.8 Verification and Validation

DURATION	LOCATION	LANGUAGES
2 days	Framatome Karlstein	German / English

TARGET GROUP
This course is intended for I&C engineering personnel and personnel who want to acquire comprehensive knowledge in this field

OBJECTIVES
Upon successful completion of this course, course participants will be able to:
- Explain the field of application SIVAT in the engineering process and the concept and function of SIVAT (1.8)
- Generate a simulation code by using SIVAT (1.8)
- Create simulation scripts
- Test and validate I&C functions

CONTENT
This course covers the function of SIVAT (SImulation based VAlidation Tool V1.8) and the generation of SIVAT code. In addition, the course participants will learn how to work with SIVAT. They will learn to test and validate the engineered I&C functions in the software environment of SIVAT by using scripts.

The course covers the following topics in detail:
- The purpose, principle and requirements of the SIVAT simulation
- Generation of simulation code for an exemplary project of simulator structure
- Graphical user interface of SIVAT
- Work with simulation scripts
- Signal manipulations and simulation of malfunctions
- Practical exercises

PREREQUISITES
A basic background in I&C and in electrical engineering. Experience with digital automation systems is desirable. TXS basic knowledge (such as participation in a TELEPERM XS fundamentals course) is mandatory, prior attendance of a TXS engineering course desirable.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com for more information

TELEPERM XS
SIVAT - V3.6 Verification and Validation

DURATION	LOCATION	LANGUAGES
3 days	Framatome Karlstein	German / English

TARGET GROUP
This course is intended for I&C engineering personnel and personnel who want to acquire comprehensive knowledge in this field

OBJECTIVES
Upon successful completion of this course, participants will be able to:
- Explain the purpose, principles and requirements of a SIVAT simulation
- Use the SIVAT user interface (3.6.x)
- Explain and use the SIVAT Client API (3.6.x)
- Explain the interaction between DIMAS and SIVAT objects
- Specify and explain SIVAT test cases and their functions
- Create SIVAT test scripts using Python

CONTENT
This course covers the function of SIVAT (SImulation based VAlidation Tool) version 3.6.x. Course participants learn about the functions of SIVAT and how it is used in the engineering process. Subsequently, the SIVAT programming interface available in Python is explained using practical examples. Based on this, the participants validate an I&C function using the SIVAT code by developing their own SIVAT/Python test script. The course covers the following topics in detail, both theoretically and practically:
- Scope of SIVAT applications during the engineering process
- The concept and functionality of SIVAT
- Script design with help of SIVAT Client API
- Interaction between SIVAT and DIMAS
- Simulation of malfunctions
- Automation of test cases
- Integration of external models

PREREQUISITES
Knowledge of Python is mandatory. Attendance of DIMAS course L540.1 is also recommended. Basic knowledge of I&C and experience in digital automation systems are desirable. IT and Linux knowledge is necessary.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com for more information

TELEPERM XS
Special Basic/Eng/Maint/Operation

DURATION	LOCATION	LANGUAGES
2x 5 days	Framatome Karlstein	German / English

TARGET GROUP
Customers and staff members with an interest in acquiring comprehensive knowledge of the TELEPERM XS safety I&C system in a very short time

OBJECTIVES
Upon successful completion of this course, course participants will be able to:
- State the basic properties of TELEPERM XS I&C systems with respect to system design, hardware and software
- Explain the most important system architectures of the safety I&C
- Describe fundamental features of the TELEPERM XS Hardware 2nd generation and understand the engineering process
- Work with the SPACE engineering tools, carry out system diagnostics and know and understand the features of the Test Bay

CONTENT
The course provides a detailed insight into all engineering activities for the TELEPERM XS system platform. The participants consolidate their knowledge in practical exercises.

Part 1:
- TELEPERM XS basics (function computer, TELEPERM XS engineering process, system architecture, Hardware 2nd generation, system properties)
- Introduction to I&C function specifications (levels 1-4)
- SPACE function diagram editor (FDE), design rules, and practical applications of SPACE tools
- Exercises relating to hardware and software specification and application code generation

Part 2:
- TELEPERM XS maintenance (monitoring concept, diagnosis at the cabinet, introduction and diagnosis using Service Unit and DIMAS, module replacement and settings, loading and verifying software, and practical exercises concerning troubleshooting)
- SIVAT introduction
- TELEPERM XS Test Bay (introduction, Test Bay structure, test program, procedure and performance)

PREREQUISITES
Basic knowledge of I&C and of digital automation systems and generic IT skills are desirable.

OTHER INFORMATION
This is a two-part course, each part lasting 5 days. Participants: 6 to 8 persons

Contact: ic-academy@framatome.com for more information

TELEPERM XS
SYSADMIN-Linux Fundamentals

DURATION	LOCATION	LANGUAGES
2 days	Framatome Karlstein	German / English

TARGET GROUP
This course is intended for technicians responsible for the administration of a TELEPERM XS system

OBJECTIVES
Upon successful completion of this course, participants will be able to:
- State the basic functions of the TELEPERM XS Service Unit (SU)
- Configure TELEPERM XS hardware and software for a SU
- Install and test TELEPERM XS Core Software
- Perform basic administrative tasks on a TELEPERM XS Service Unit

CONTENT
The course is based on the Linux operating system and TELEPERM XS software version higher than 3.3. using the TELEPERM XS Service Unit. The participants learn how to set up and administrate users, groups and printers. Furthermore, they learn how to install TELEPERM XS software packages. YaST system administration is also dealt with. Handling of the KDE desktop environment will be consolidated. The participants consolidate the acquired knowledge in practical exercises.

The course covers the following topics in detail:
- Overview of TELEPERM XS and Linux
- Installation of SUSE Linux Enterprise Server
- KDE and Linux concepts
- Creation of TELEPERM XS users and groups
- Installation of TELEPERM XS software packages
- Configuration and administration of TELEPERM XS
- YaST Control Center
- Practical exercises, including testing of the installation

PREREQUISITES
Basic knowledge of I&C and computer technology, and of the Linux operating system, are mandatory. Experience with digital automation systems is desirable. Basic knowledge of TELEPERM XS is mandatory.

OTHER INFORMATION
Participants: 6 to 8 persons

Contact: ic-academy@framatome.com for more information

TELEPERM XS
TELEPERM XS Compact Overview

DURATION	LOCATION	LANGUAGES
1 day	Framatome Karlstein or Erlangen (Germany) / Virtual Classroom	German / English

TARGET GROUP
I&C project processing personnel, including management staff, and licensing authorities

OBJECTIVES
Upon successful completion of this course, course participants will be able to:
- explain structure and functions of TELEPERM XS Compact
- describe main components of TELEPERM XS Compact
- name application possibilities of TELEPERM XS Compact
- describe main features of engineering tool
- describe service concept and service tools

CONTENT
The course provides an overview of the structure, main components and engineering and service tools of TELEPERM XS Compact.

The course covers the following topics:
- General overview of TELEPERM XS Compact
- Structure of TELEPERM XS Compact-based I&C System
- TELEPERM XS Compact components
- Operation of TELEPERM XS Compact I&C System
- Concept of self-diagnostic and periodic testing
- Service concept
- Main features of the engineering and service tools

PREREQUISITES
General knowledge of automation technology in nuclear power plants

OTHER INFORMATION
Participants: 6 to 10 persons
- Contact: ic-academy@framatome.com for more information

TELEPERM XS
I&C TXS Engineering Training - Learning by Doing - Safety I&C

DURATION	LOCATION	LANGUAGES
6 weeks - 240 hours	Framatome Lyon	English/French

TARGET GROUP
EPR Projects - Safety I&C Engineering teams

OBJECTIVES
- Get to know TXS platform and associated systems
- Understand Framatome Engineering processes
- Have the opportunity to practice: "Learning by Doing" concept

CONTENT
1. Framatome proposes to customers project teams to attend a specific engineering training session, that will help teams get an accelerated understanding of their project engineering environment and documentation process, thus saving time and money:
   - Unique programme based on Framatome experience
   - Session instructed by Framatome experts
   - A dedicated training platform to "Learn by Doing" thanks to a V-cycle mini-project

2. The "Learning by Doing" spirit is kept, with balanced split between theory and practice parts, focusing on:
   - TXS technology
   - V-cycle engineering process
   - Mini project: Get familiar with the practices by doing, failing, analyzing, implementing, testing

3. Theory: 2 weeks:
   - Introduction, background
   - TXS fundamentals
   - Hardware design, SU, QDS
   - The V-cycle engineering of Safety control systems, Control in TXS technology

4. Practice: 4 weeks:
   - Mini-project: perform a V-cycle on a limited perimeter with testing on the TXS platform

PREREQUISITES
General knowledge of automation technology for safety systems in nuclear power plants

OTHER INFORMATION
- Participants: 6 to 8 persons
- Contact: ic-academy@framatome.com for more information

Tricon
Safety Considerations

DURATION	LOCATION	LANGUAGES
3 days	Customer on-site / Worldwide	English

TARGET GROUP
Plant Engineers, Supervisory Staff, Technicians

OBJECTIVES
- Describe the safety concepts of protection layers, Safety Instrumented System (SIS), and Safety Integrity Level (SIL)
- Describe application guidelines for TÜV certification, general considerations, and Tricon controllers
- Perform fault management with system architecture, system diagnostics, and external and internal fault types
- Develop a safety application
- Work through appendices on peer-to-peer and safety shutdown function blocks

CONTENT
The primary objective of this course is the effective development and maintenance of safety-critical systems in a live plant environment. The course emphasizes both real-world applications and academic theory. The course also covers industry standard guidelines for safety applications, thereby improving knowledge of plant availability and utilization. Using TriStation 1131 Developer's Workbench, you build a project, test and debug logic, download a safety application to a Tricon controller, perform online safety application maintenance, and implement shutdown logic. Each module includes an overview from the Instructor, lab exercises, and validation of classroom participation through evaluations. Lab exercises address project development, safety download procedures, online safety application maintenance, and the implementation of shutdown logic.

PREREQUISITES
Working knowledge of Programmable Logic Controllers (PLCs) or Distributed Control Systems (DCSs); Familiarity with basic electronics and maintenance procedures; Course Tricon System and TriStation 1131 Configuration and Implementation and TriStation 1131 Standard Programming

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services.

Contact: ic-academy@framatome.com for more information

Tricon
Tricon Basic Maintenance

DURATION	LOCATION	LANGUAGES
2 days	Customer on-site / Worldwide	English

TARGET GROUP
Engineers

OBJECTIVES
- Describe TMR and Tricon Programmable Logic Controller (PLC) operations
- Identify the components of the Tricon controller
- Replace modules online in the Tricon system
- Identify and respond to alarms in the Tricon system
- Use Enhanced Diagnostic Monitor to:
  o Connect to the Tricon controller
  o Monitor system status and troubleshoot the system. Identify, report, and clear faults. Collect events

CONTENT
This course provides an overview of the Tricon system, with a primary focus on maintenance and troubleshooting.
In this course, you identify the basic principles of Triple Modular Redundancy (TMR) architecture and system configuration, including field wiring, power distribution, and module capabilities. You gain practical experience with continuity checks, loop testing, and general field maintenance.
Using Tricon Enhanced Diagnostic Monitor, you troubleshoot the system, respond to alarms, replace modules, and clear faults.
Lab exercises and written evaluations validate classroom participation.
This course is ideal for Engineers and Maintenance personnel who maintain an online safety-critical application.

PREREQUISITES
Working knowledge of PLCs in a safety environment; Knowledge of PLCs or Distributed Control Systems (DCSs); Familiarity with basic electronics and maintenance procedures

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services

Contact: ic-academy@framatome.com
for more information

Tricon
Tricon System Advanced Maintenance

DURATION	LOCATION	LANGUAGES
2 days	Customer on-site / Worldwide	English

TARGET GROUP
Engineers, Plant Engineers, Supervisory Staff, Technicians

OBJECTIVES
- Describe the basic theory of Triple Modular Redundancy (TMR) and fault tolerance.
- Recognize and respond to internal, external, and system faults.
- Disable and force points during system maintenance.
- Connect to and navigate Tricon Enhanced Diagnostic Monitor.
- Display firmware status.
- Collect system events.
- Troubleshoot with Enhanced Diagnostic Monitor.
- Use advanced maintenance techniques to troubleshoot a Tricon system.

CONTENT
This intensive course offers advanced maintenance and troubleshooting techniques for the Tricon system. The course emphasizes real-world applications as well as theory. Specifically, you identify and respond to internal, external, and system faults.

PREREQUISITES
Familiarity with basic Programmable Logic Controller (PLC) programming principles; Working knowledge of PLCs or Distributed Control Systems (DCSs); Course Tricon Basic Maintenance

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services.

Contact: ic-academy@framatome.com
for more information

Tricon
TriStation 1131 Standard Programming

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP
Engineers

OBJECTIVES
- Describe operational concepts and basic features of TriStation 1131 software
- Write program logic using TriStation 1131 FBD Editor
- Perform diagnostics using Tricon Enhanced Diagnostic Monitor
- Use the system administration features of TriStation 1131 software
- Access TriStation 1131 documentation and the variable annotation features
- Write comment macros and cross-reference program variables
- Perform download procedures to the Tricon controller
- Test and debug program logic

CONTENT
This intermediate-level programming course covers advanced techniques for writing program logic from a flow chart using the Function Block Diagram (FBD) language. The course also covers writing customer function blocks using both FBD and Structured Text (ST) languages. Using IEC 61131-3 compliant TriStation 1131 Developer's Workbench, you acquire skills for effective project development and logic segmentation commonly used in safety and process control applications. Specifically, you develop a project, write and test program logic, partition logic, allocate memory, and download a control program. Real-time lab exercises involve a written design statement, logic segmentation, and program testing. This course is ideal for Engineers who program or maintain a Tricon, Trident, or Tricon CX system.

PREREQUISITES
Working knowledge of Programmable Logic Controllers (PLCs) or Distributed Control Systems (DCSs); Familiarity with basic electronics and maintenance procedures; Course Tricon System and TriStation 1131 Configuration and Implementation

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services

Contact: ic-academy@framatome.com
for more information

Tricon
Tricon System and TriStation 1131 Configuration and Implementation

DURATION	LOCATION	LANGUAGES
5 days	Customer on-site / Worldwide	English

TARGET GROUP
Plant Engineers, Supervisory Staff, Technicians

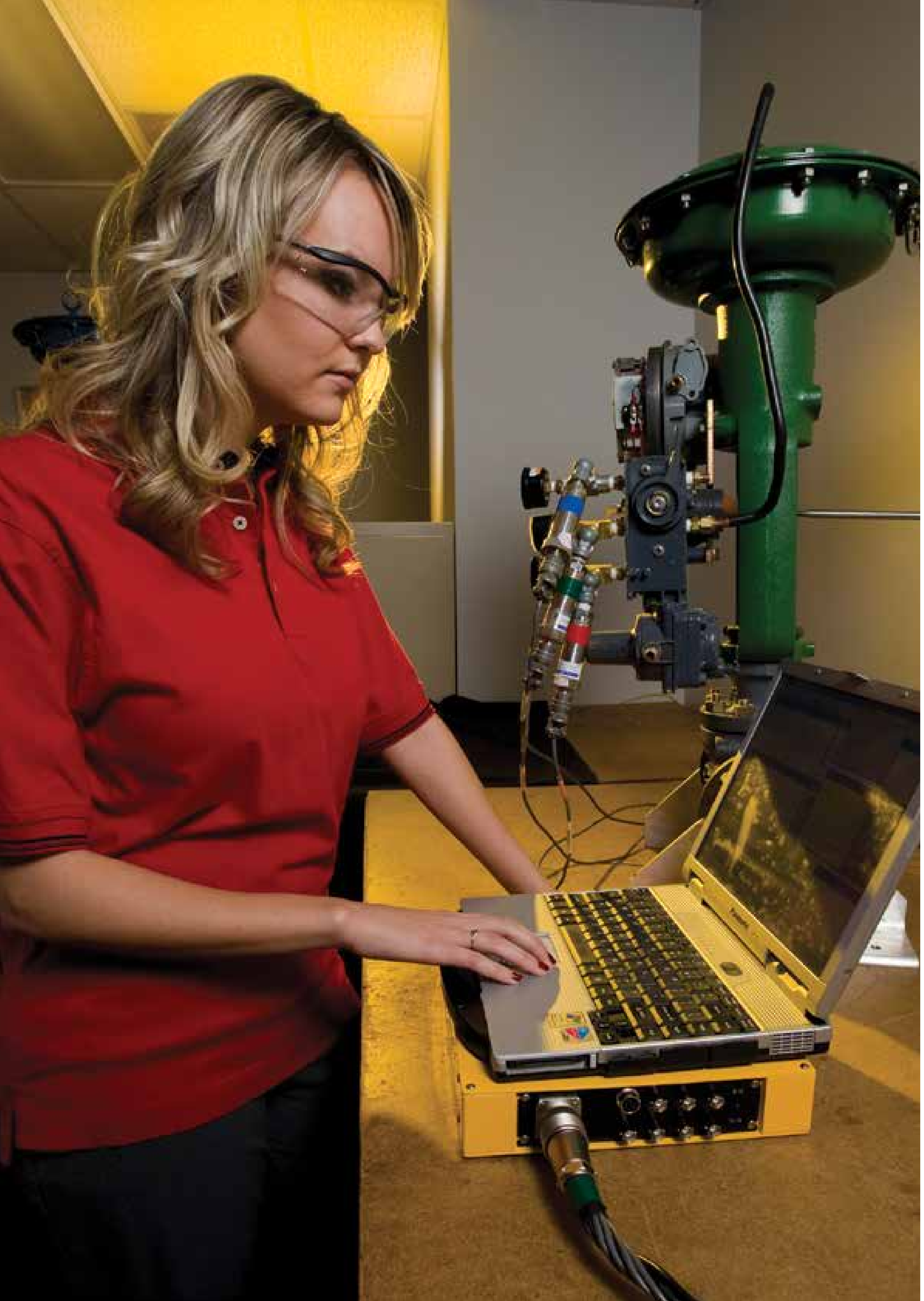
OBJECTIVES
- Describe the basic theory of operation of Triple Modular Redundancy (TMR) architecture in a Tricon system
- Navigate and use the key features of IEC 61131-3 compliant TriStation 1131 software, including programs, function blocks, and functions
- Write a safety application using the Functional Block Diagram (FBD) and Structured Text (ST) languages
- Test and debug the safety application
- Configure a Tricon system and database
- Perform download procedures to the Tricon controller, including forcing points and downloading changes
- Troubleshoot, respond to alarms, and maintain a Tricon system
- Perform system administration tasks related to project security, documentation generation, and reporting

CONTENT
This course focuses on Tricon system configuration and implementation. Using Microsoft Windows-based TriStation 1131 Developer's Workbench, you perform basic navigation techniques. You configure, program, test, and download a TriStation 1131 project with digital and analog I/O to a Tricon system. You learn to generate documentation automatically using the features of TriStation 1131 software. Classroom-based training simulators help you perform maintenance, make online changes, and force points in a simulated field environment. Lab exercises and written evaluations validate classroom participation.

PREREQUISITES
Working knowledge of Programmable Logic Controllers (PLCs) or Distributed Control Systems (DCSs); Familiarity with basic electronics and maintenance procedures; Course Tricon Basic Maintenance and Tricon System Advanced Maintenance

OTHER INFORMATION
This course is delivered by Schneider Electric Process Automation Learning Services

Contact: ic-academy@framatome.com
for more information



General
UltraCheck or EMPATH Diagnostics Training

DURATION	LOCATION	LANGUAGES
1-5 days (varies by solution)	Customer on-site / Worldwide	English

TARGET GROUP
Engineers, Plant Engineers, Supervisory Staff, Technicians

OBJECTIVES
Defined per customer request

CONTENT
Custom development and delivery of customer-specified topics for project-related deliverables

UltraCheck
(Valve diagnostics and testing platform):
a. UltraCheck-A (air-operated valve diagnostics)
b. UltraCheck-C (check valve diagnostics)
c. UltraCheck-L (thru-seat leakage detection)
d. UltraCheck-M (motor-operated valve diagnostics)
e. UltraCheck-R (Relief / safety / safety relief valve diagnostics)
f. UltraCheck-SPT (MOV spring pack tester)

EMPATH
(Electric motor / generator diagnostics platform)
a. ECMS / ECMS-1: EMPATH continuous monitoring system
b. E-plug: MCC mod. for safe data acquisition

PREREQUISITES
Varies per solution requested

OTHER INFORMATION
Contact: ic-academy@framatome.com
for more information

General
I&C Engineering and NI Manufacturing Training

DURATION	LOCATION	LANGUAGES
1-5 days (varies by solution)	Customer on-site / Worldwide	English

TARGET GROUP
Engineers, Plant Engineers, Supervisory Staff, Technicians

OBJECTIVES
Defined per customer request

CONTENT
Custom development and delivery of customer-specified topics for project-related deliverables

- RMAS
  (Reactivity Measurement and Analysis System)
- RMAD
  (Reactivity Measurement and Analysis Device)
- LPMS
  (Loose Parts Monitoring System)
- eDCU
  (Enhanced Drive Control Units)
- RDMI
  (Rod Drop Measurement Instrumentation)
- DCRDCS
  (Digital Control Rod Drive Control System)
- FMS
  (Flux-Mapping System)
- AFIS
  (Auxillary Feedwater Isolation System)
- ESFAS
  (Engineered Safety Features Actuation System)
- Control Star
  (Non-safety Digital I&C module)

Product Lines:
- Spec200 (Analog Control Modules)
- Bailey modules
- SAFETY STAR (1E Digital I&C Platform)

PREREQUISITES
Varies per solution requested

OTHER INFORMATION
Contact: ic-academy@framatome.com
for more information

General
Foxboro and Tricon Product/Application Training

DURATION	LOCATION	LANGUAGES
1-5 days (varies by solution)	Customer on-site / Worldwide	English

TARGET GROUP
Engineers, Plant Engineers, Supervisory Staff, Technicians

OBJECTIVES
Defined per customer request

CONTENT
Custom development and delivery of customer specified topics for project-related deliverables

Foxboro DCS
Tricon

PREREQUISITES
Varies per solution requested

OTHER INFORMATION
Contact: ic-academy@framatome.com
for more information

IC academy
Organization and information

SPECIFIC TRAINING REQUIREMENTS
Do you have specific requirements for a training course? We can put together a tailor made course. Please contact us and we will be happy to advise you.

Please email us at:
ic-academy@framatome.com

Our promise to you

Framatome offers comprehensive training solutions for the development, construction and maintenance of nuclear power plants. Our IC academy is home to world-leading experts in the industry, ready to share their know-how and experience with your operational teams. Framatome delivers the training programs you need to help you achieve your team's development goals.

Your performance
is **our** everyday **commitment**

Framatome is an international leader in nuclear energy recognized for its innovative, digital and value added solutions for the global nuclear fleet. With worldwide expertise and a proven track record for reliability and performance, the company designs, services and installs components, fuel, and instrumentation and control systems for nuclear power plants. Its more than 16,000 employees work every day to help Framatome's customers supply ever cleaner, safer and more economical low-carbon energy.

Visit us at www.framatome.com, and follow us on Twitter and LinkedIn.

Framatome is owned by the EDF Group (75.5%), Mitsubishi Heavy Industries (MHI – 19.5%) and Assystem (5%).

Scan the QR code to browse our solutions by market area.

Framatome
Tour AREVA. 1 Place Jean Millier
92400 Courbevoie, France

ic-academy@framatome.com
ic@framatome.com
www.framatome.com