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المؤسسة العامة للتدريب التقني والمهني Technical and Vocational Training Corporation

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く Instrumentation (PCST) Short Courses



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To provide an introduction to Electronic Systems by giving a systems approach to fully operational functional requirements. System circuits to be constructed with a variety of inputs, signal processors, drivers and outputs to allow a wide range of systems to be constructed and investigated.



Who Should Attend?

Electrical, Mechanical, Instrumentation, Technicians and Operators.



Enabling Objectives:

- Investigate a simple Automatic Light Switch System and a Fire Detection/Sprinkler Operator System.
- Investigate a Buzzer, Amplifier & Loudspeaker and the opera-tion of a 7-Segment Display
- Investigate a voltage divider containing an LDR and outputs from Logic Source switches and Press Switches.

Applications of Silicon Controlled Rectifiersn

12 Minimum participants



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Course Overview

To provide an introduction to Electronic Systems by giving a systems approach to fully operational functional requirements. System circuits to be constructed with a variety of inputs, signal processors, drivers and outputs to allow a wide range of systems to be constructed and investigated..



Who Should Attend?

Electricians, Electrical, Electronics, Electrical Power, Power Electronics and Instrumentation Technicians



- Investigate the basic operation of a SCRs;
- Investigate the operation of an SCR with DC Triggering;
- Investigate the operation of an SCR with AC phase control trig-gering;
- Troubleshooting an AC phase control circuit;
- Investigate the operation of Diacs and Triacs.





Introduction to PICs and PIC BASIC using the BASIC PICShell Software and Running a PIC Program.



Who Should Attend?

Electrical, Electronic and Instrumentation Technicians.



Enabling Objectives:

- Recognize the basic steps in a PIC program;
- Be familiar with the PIC BASIC Editor;
- Identify the features of the PICShell software;
- Introduction to PIC programming.



Digital Electronic Devices

12Minimum
participants()5 days



Course Overview

To provide an overview of Digital Electronic Devices for Electricians, Electrical, Electronic, Instrumentation and Telecommunications Technicians.



Who Should Attend?

Electricians, Electrical, Electronic and Telecommunications Technicians.



- Investigate Encoders and Decoders;
- Investigate Multiplexers and De-multiplexers;
- Investigate Adders, Comparators and Buffers;
- Investigate Flip-flops;
- Investigate Shift Registers and Binary Counters.

Functional Safety Engineer





Course Overview

This course is designed to provide participants with elementary and necessary knowledge about functional safety, based on the international standards.



Who Should Attend?

nstrument engineers, application engineers, site engineers, project managers, operation engineers, maintenance engineers.



Enabling Objectives:

- Introduction to functional safety;
- International Safety Standards HAZOP, SIF & SIL;
- Safety Engineering;
- Functional Safety Management;
- Failures, Tolerance and Safety Calculations.

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Process Plant Equipment

12 Minimum participants



Course Overview

To introduce process plant equipment such as Valves, Pumps, Compressors, Heat Exchangers & Cooling Equipment.



Who Should Attend?

Electrical Maintenance, Mechanical Maintenance, Instrument Technicians and Repairmen.



- Investigate Valves;
- Investigate Pumps;
- Investigate Compressors;
- Investigate Heat Exchangers;
- Investigate Cooling Equipment.



Troubleshoot And Repair A Pneumatic Control Loop





Course Overview

To train Electricians, Electrical Technicians. Instrument Technicians on how to troubleshoot and repair and pneumatic control loop.



Who Should Attend?

Electricians, Electrical Technicians. Instrument Technicians..



Enabling Objectives:

- Maintain an Instrument Air System;
- Maintain Control Valve Actuators and Positioners;
- Maintain Control Loop Sensors;
- Maintain Control Loop Sensors and Controllers;
- Troubleshoot and Repair a Pneumatic Control Loop.



Troubleshoot And Repair Electronic Control Loops

12 Minimum participants



Course Overview

To teach and Train Electricians, Electrical Technicians. Electronic Technicians, Instrument Technicians and Process Control Technicians on how to faultfind and repair Electronic Control Loops.



Who Should Attend?

Electricians, Electrical Technicians. Electronic Technicians, Process Control Technicians, Instrumentation Technicians.



- Calibrate Electronic Control Loop Components;
- Investigate the Operation of Advanced Electronic Control Loops;
- Investigate Process Control Loops;
- Troubleshoot and Repair Electronic Control Loops.

Digital Communication



12

Minimum

5 davs

participants



Course Overview

To introduction Pulse Amplitude Modulation (PAM) and Pulse Coded Modulation (PCM) and the Time Division Multiplexing (TDM) of PAM and PCM signals for Technicians and Engineers who use Digital Communication Techniques in their workplace.



Who Should Attend?

Electrical, Electronics and Telecommunications Technicians and Engineers.



Enabling Objectives:

- Investigate PAM and its effect on signals;
- TDM of PAM signals;
- Investigate PCM signal and demodulation;
- TDM of PCM signals;
- Practical implementation of PCM.

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Fiber-Optic Communications

Course Overview

To create an awareness in Electricians, Electrical & Telecommunications Technicians as well Electrical, Electronic and Telecommunications Engineers on the workings of Fiber-Optic Communications.



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Who Should Attend?

Electricians, Electrical, Electronic and Telecommunications Technicians and Electrical, Electronic and Telecommunications Engineers.



- Demonstrate a simple fiber-optic communication system;
- Investigate analog optical communication systems;
- Investigate digital optical communication systems;
- Demonstrate PWM and PPM transmission methods;
- Troubleshoot a Fiber-optic system.

Centum VP Operation & Monitoring - Yokogawa DCS System

12 Minimum participants



Course Overview

This course is designed to give participants the fundamental knowledge on operation and functions of the Centum VP system on the Yokogawa DCS. Participants should have some basic knowledge on process measurement and control and a fundamental working knowledge of MS-Windows System.



Who Should Attend?

For operators, plant operation specialists and engineers who need to operate the CENTUM VP system on the Yokogawa DCS System.



Enabling Objectives:

- Centum VP System Overview; Centum VP Hardware Description;
- Browser Bar and Container Window;
- Regulatory & Sequential Control Function;
- System Status Display.

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Centum VP Operation Yokogawa DCS System

12 Minimum participants

5 days

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Course Overview

This 5-day course is designed to give participants the fundamental knowledge on operation and functions of the Centum VP system on the YOKO-GAWA DCS System.



Who Should Attend?

For operators, plant operation specialists and engineers who need to operate the CENTUM VP system on the YOKOGAWA DCS. Participants should have some basic knowledge on process measurement and control or can take the Industrial Process Measurement and Control Course (5 days) above as a prerequisite.



- Introduction to System Architecture;
- Operational Windows and layout of HIS and Navigation;
- System Monitoring and Window Displays & Operations key-board;
- Sequence Control Displays, Alarms and Messages;
- HIS setup.

Pro-safe RS Engineering & Maintenance - Yokogawa DCS System





Course Overview

This 5-day course is designed to give participants the fundamental knowledge on operation and functions of the Centum VP system on the YOKO-GAWA DCS System.s.



Who Should Attend?

For Participants who will operate, maintain and modify the Yokogawa DC system. Fundamental knowledge of computers and a working knowledge of MS- Windows is required.



Enabling Objectives:

- Introduction to Prosafe-RS and its configuration;
- Introduction to Engineering projects;
- Centum integration;
- Inter SCS Safety Communication;
- Operating Mode and maintenance of Prosafe-RS Hardware.

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Centum VP Engineering Yokogawa DCS System

12 Minimum participants



Course Overview

This 5-day course is designed to provide users the ability to perform software engineering in their plant while in operation. Participants must first attend Centum VP Operation and Monitoring Course as a prerequisite, or must have sufficient experience operating the Centum VP Opera-tor Station (HIS).



Who Should Attend?

For plant engineers or specialists who are involved in the modification of the CentumVP System after project handover.



- Centum VP System Specification/Overview;
- FCS & Software Configuration;
- Regulatory & Sequence Control Function;
- Inter FCS & HIS Configuration;
- Graphic generation & Project Downloading.



PLC Applications and Programming (FAM3) Yokogawa DCS System



Minimum

5 days

participants

12



Course Overview

This course is designed to enable participants to have basic understanding hardware structure, software programming and applications of PLC. Attendees will learn about PLCs and related devices and peripherals, Ladder Logic and the use of Programming Software Tools as well as gaining insight to various applications in Process Automation and Factory Automation.



Who Should Attend?

For Engineers involved in software generation, modification and maintenance of a PLC system.

Enabling Objectives:

- Introduction to PLC Hardware & Software;
- Introduction to Ladder Logic and PLC programming;
- Case Study on Yokogawa's PLC FAM3 Series;
- Introduction to FAM3 Programming Tool Software Widefield 3;
- Programming I/O Modules Communication & Interfacing.



Centum VP Maintenance Yokogawa DCS System



Course Overview

To teach and Train Electrical Technicians. Electrical Engineers on how to trace the electrical diagrams of motor operated valve and how to set and configure its operating parameters.



Who Should Attend?

Electricians, Electrical Technicians and Electrical Engineers.



- Understand Schematic /Wiring Diagrams
- Trace the wiring Connections
- Describe the operating principle of the MOV actuator
- Troubleshoot the inserted faults in safe and logical Sequence





To Train Electricians, Electrical, Electronic and Telecommunications Technicians in the fundamentals of Digital Electronics..



Who Should Attend?

Electricians, Electrical, Electronics, Instrumentation and Telecommunication Technicians.



Enabling Objectives:

- Introduction to Digital Systems;
- Combinational Logic Circuits;
- Sequential Logic Circuits;
- Boolean Algebra and Karnaugh Maps;
- Minimization Techniques.



Operational Amplifiers





Course Overview

To introduce operational amplifiers to Electricians, Electrical, Electronic, Instrumentation and Telecommunication Technicians.



Who Should Attend?

Electricians, Electrical, Electronic, Instrumentation Technicians.



- Investigate the basic operation and parameters of an Op-Amp;
- Investigate an Inverting and Non-inverting Amplifier;
- Investigate a Unity Gain Amplifier;
- Investigate a Summing Amplifier;
- Troubleshooting Op-Amps.



Minimum participants

5 days

12



Course Overview

To train Electricians, Electrical Technicians. Mechanical Technicians, Instrumentation Technicians about basic process diagrams (PFDs and P&IDs) and control loops.



Who Should Attend?

Electricians, Electrical Technicians. Mechanical Technicians Instrumentation Technicians, Operators, Process Control Technicians.



Enabling Objectives:

- Process Variables and Process Flow;
- Process Flow Diagrams (PFDs);
- Piping & Instrumentation Diagrams (P&IDs);
- Tracing Process Flow and Process Control;
- Control Loops.



Test and Repair Vibration Monitoring Devices

Course Overview

To train Electricians, Electrical Technicians. Electronic Technicians, Instrument Technicians and Process Control Technicians on how to test and repair Rotating Equipment Vibration Monitoring Devices.



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Who Should Attend?

Electricians, Electrical Technicians. Electronic Technicians, Process Control Technicians, Instrumentation Technicians.



- Investigate the Operation of Rotating Equipment Monitoring Devices;
- Test Rotating Equipment Field Devices;
- Repair Rotating Equipment Field Devices.

Process Measurement, Instrumentation & Process Control





Course Overview

This program introduces the measurement and control of processes used in the process industry to monitor and conduct control of the process variables – flow, level, pressure and temperature.



Who Should Attend?

Instrument Technicians or Electrical Technicians. Electrical Engineers, Instrumentation and control engineers and all field operators.



Enabling Objectives:

- Describe the operation of a range of sensors and transducers.
- Design, build and test a sensor with signal conditioning circuits.
- To be familiar with a range of measurement techniques.
- Introduction to Process Control and process variable measurements.
- PID control and tune a process control system using PID control.
- Troubleshooting in Process Control.



Safety Instrumentation &12Minimum
participantsEmergency Shut-down Systems(i) 5 days

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Course Overview

This program covers the safe operation of equipment and the safety of personnel which is of paramount importance in Instrumentation. The international standards are introduced along with SISD and SIL models. Finally safe Emergency Shutdown and Manage of Change is covered.



Who Should Attend?

Instrument Technicians or Electrical Technicians. Electrical Engineers, Instrumentation and control engineers and all field operators.



- Introduce the international standards IEC 61598 and IEC 61511
- Apply the IEC 61508 SISD 'Safety Life Cycle' model
- Use risk assessment to determine the Safety Integrity Level (SIL)
- Be aware of emergency shutdown protection requirements.
- Investigate sensor, programmable logic controller and valves.
- Follow MOC procedures for control of future SIS changes.



Data Communication & Fieldbus System





Course Overview

This program introduces Data communications & Fieldbus Systems and covers cabling, communication protocols as well as the physical communication standards. The OSI model which is the ISO system for all Data communications is presented along with its architecture.



Who Should Attend?

Instrument Technicians or Electrical Technicians. Electrical Engineers, Instrumentation and control engineers and all field operators.



Enabling Objectives:

- Cabling in Data communications and fieldbus systems
- Gain an understanding of industrial protocols
- Identify physical communication standards (232, 423, 422, 485)
- Examine the various aspects of the OSI model
- Recognize network architecture and hardware



Control Valves & Actuators





Course Overview

This program outlines the typical Valves and Actuators that are commonly used in the Process Industry and introduces the criteria used in the application of specific Valves and their operation.



Who Should Attend?

Instrument Technicians, Electrical Technicians. Electrical Engineers, Instrumentation and control engineers and all field operators.



- Introduction to commonly used Valves
- Specific applications of Valves
- Determine the most cost-effective valve size
- The operation Valves
- Optimal use of Control Valves in the field

DCS Training program





Course Overview

The program introduces Distributed Control System with a review of the technology, its organization and operation covering its salient fea-tures. Troubleshooting and maintenance is also highlighted with an introduction to Advanced Process Controllers and a presentation of the latest trends.



Who Should Attend?

Instrument Technicians, Electrical Technicians. Electrical Engineers, Instrumentation and control engineers and all field operators.



Enabling Objectives:

- Review sensors, instrumentation, and process control
- Outline DCS Organization and operation
- Cover Networking, HMI, and Alarm features of DCS systems
- Highlight Maintenance and Troubleshooting procedures
- Introduce Advanced Process Controllers in DCS systems
- Present the latest trends in DCS systems



SCADA Training

12 Minimum participants



Course Overview

The principles of a Supervisory Control and Data Acquisition with its devices and features is covered along with an introduction to the Citect Software. How to setup projects with the associated hardware and then using the software features to create graphics, pages and databases. An introduction to the Cicode and generating forms is provided as well as the various alarms, security measures and trends in a typical sys-tems.



Who Should Attend?

Instrument Technicians, Electrical Technicians. Electrical Engineers, Instrumentation and control engineers and all field operators.

- Principles of SCADA, devices and features of the Citect Software
- Setup of Projects, Communications, Clusters, Networks & Servers
- Using Graphics, Mimic Pages and Variable Tag Databases
- Function of Alarms, Accumulators, Events, Security and Trends
- Genies & Super Genies and writing Custom Genie Forms
- Introduction to Cicode





An introduction to the principles of Calibration is conducted and then performance activities on a range of sensors, actuators and transducers is carried out in terms of their calibration that covers the 4 variable processes in flow, level, pressure and temperature.



Who Should Attend?

Instrument Technicians, Electrical Technicians. Electrical Engineers, Instrumentation and control engineers and all field operators.



Enabling Objectives:

- Introduction to Calibration Principles
- Perform Pressure/Differential Pressure Instruments Calibration
- Perform Temperature Instruments Calibration
- Perform Flow Instruments Calibration.
- Perform Level Instruments Calibration



Basic of P&ID Drawing





Course Overview

Piping & Instrumentation Diagrams are introduced and a breakdown is given down to component level. The attendees are then trained on how to read these process drawings and follow the process in terms of sequence of operation by tracing the flow and identifying the equipment in the process. The control and safety systems are then covered and finally detailed engineering drawings for Construction and Operation are covered.



Who Should Attend?

Instrument Technicians, Electrical Technicians. Electrical Engineers, Instrumentation and control engineers and all field operators.

- Define Preliminary Engineering Drawings
- Understand Piping and Instrumentation Diagrams
- Interpreting P&IDs Valves & Equipment
- Interpreting P&IDs Control and Safety Systems
- Engineering Drawings for Construction and Operation

Introduction to Condition Monitoring Course



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Course Overview

The course introduces the principles of Vibration Monitoring in Rotating Field Devices on the Bentley-Nevada system. Vibration measurement considerations and performance is conducted and a basic understanding of the Data Acquisition, Spectral Analysis and Signal Processing is carried out. Attendees then cover basic troubleshooting on typical machine problems and Rolling Bearing Faults.



Who Should Attend?

Instrument Technicians, Electrical Technicians. Mechanical Technicians Electrical Engineers, Instrumentation and control engineers Mechanical Engineer and all field operators.

- Understand the Principles of Vibration
- Considerations in Vibration Measurement
- Perform Vibration Measurement
- Understand Data Acquisition & Spectral Analysis
- Conduct Vibration Signal Processing.
- Identify Typical Machine Problems & Rolling Bearing Faults





