

We **IN**vest  
People

## OUR VISION



" To be recognized throughout Enppi, Egypt and the Middle East as a business profit center providing professional, supportive and pro-active Human Resources services in response to the needs of individuals, organizations and interested parties."

## OUR MISSION



" To serve our Company as well as the Egyptian & Arab Petroleum and Industrial sectors through providing professional training services focusing mainly on the development of Human Resources as means to achieve strategic objectives and explore new growth opportunities."

## WORD FROM THE GENERAL MANAGER



In today's dynamic business environment, where customers' needs move towards what is unique and innovative, Enppi is striving to reinforce its position as a prominent learning and educational figure. With this challenge comes both responsibility and opportunity. Our responsibility is to be an ethical corporate providing training services of superior quality and value to the Oil & Gas sector in the MENA Region. Our opportunity is to capture customers loyalty by offering customers satisfaction and delight.

Our competitive advantage comes from providing a variety of training opportunities that can lead to career advancement through enhancing participants knowledge and skills related to on-the-job performance in all technical fields and for all managerial levels. All our training courses have been designed and developed by experts

with accumulated experience to ensure smooth knowledge transfer.

We are proud to foster the first educational facility in the local Oil & Gas Market; Enppi Academy is dedicated exclusively to enhancing the knowledge and skills of fresh-graduate engineers through developing comprehensive training modules on both basic and detailed levels. Classroom and practical hands-on tools training is provided to bridge the gap between academic theoretical education and practical job experience.

Finally, we take pride that our value proposition is our empowered customer-oriented staff who are highly committed to the quality of service and are willing to maintain and grow strong customer relationships through creatively meeting and exceeding customers' demands.

Eng. Olfat Ezzat | 

## ABOUT US

The Center for Training and Development (CTD) was found in 1983 as one of Enppi strategic business units for providing professional training and consultancy services for enppi personnel as well as customers from the Oil & Gas Industry worldwide. Since its establishment, CTD has enlightened and encouraged the participation of an outstanding number of individuals in numerous training programs, events, seminars and workshops. The training programs range from: Technical, Management, Quality Environmental, Health & Safety to other organizational functions.

CTD provides a wide range of training services starting from public courses available as scheduled on Enppi annual training catalogue to customized and tailor-made courses in addition to affiliated/internationally accredited and certified training programs.

The adopted training methodology is a combination of formal class room lecturing and practical workshops conducted through applying the latest presentation and inter-active techniques. The applied training evaluation process measures the reaction of participants as well as the knowledge, skills and attitudes acquired through each program.

The training facilities include fully equipped training classrooms, auditorium, simulators and highly automated computer labs in addition to other relevant supplementary services.

## OUR VALUES

- Integrity & Honesty: To carry out duties and interact with Stakeholders with honesty and integrity in all business dealings.
- Commitment: To demonstrate enthusiasm in all our business relations as we set and meet challenging commitments for self and others.
- Continuous improvement: To embark on continuous improvement of our work procedures for achieving best quality services.
- Innovation: To meet today's challenges and participate in tomorrows breakthroughs via our people and processes.



# CONTENTS

**06**    **PROCESS TECHNOLOGY**

**43**    **MECHANICAL ENGINEERING**

**72**    **PIPING & PIPELINE ENGINEERING**

**85**    **INSTRUMENTATION & CONTROL**

**101**    **WIRELESS & TELECOMMUNICATION**

**110**    **CIVIL ENGINEERING**

**114**    **ELECTRICAL ENGINEERING**

**124**    **HEALTH & SAFETY**

**151**    **PRODUCTION ENGINEERING**

**PT01**

**PROCESS SIMULATION USING PRO II**

**OBJETCIVE:**

Participants will learn about the basics of process design with the aid of computerized simulation techniques. Particularly PRO II which is used for operational analysis in the chemical, petroleum and natural gas plants.

**WHO SHOULD ATTEND:**

- Chemical Engineers
- Process Engineers
- Operation Engineers

**DURTAION:**

5 days

**TOPICS:**

- General approach to process simulation
- Simulation types
- Simulation steps
- Building flow sheets using PRO II
- Chemical component library
- Thermodynamic property prediction methods
- Stream information
- Unit Operation: distillation columns, heat exchangers, compressors
- Executing the simulation
- Reviewing simulation results

**PT02** PROCESS SIMULATION USING HYSYS**OBJECTIVE:**

Participants will be introduced to the basic process of modeling tools for steady state simulation. Participants will further learn the basics of design and performance monitoring for optimization of Oil & Gas production as well as gas processing & petroleum refining industries.

**WHO SHOULD ATTEND:**

- Chemical/Process Engineers
- Operation Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to process simulation
- Process Simulation application
- Thermodynamic/equation of state & transport property methods Selection
- Definition of System components
- Flow sheets and connection of unit operations with streams
- Data supply for feed streams
- Supply of Operating conditions
- Process simulation run
- Simulation result analysis
- Generation of simulation output reports
- Application on Gas processing & refinery cases

**PT03**

**ASPEN TECH HYSYS PROCESS SIMULATOR  
(ADVANCED - DYNAMICS)**

**OBJECTIVE:**

Participants will be exposed to AspenTech Software for optimizing, rating, revamping and debottlenecking of process plants. Through Workshop application, participants would be able to simulate dynamic processes, perform equipment sizing, and build automatic control schemes.

**WHO SHOULD ATTEND:**

- Chemical/Process Engineers
- Optimization Engineers

**DURATION:**

5 days

**TOPICS:**

- Getting started in steady-state
- Transitioning from steady-state to dynamics
- Pressure-flow theory
- Column dynamics
- Basic control theory
- De-butanizer column
- Expanding the column overhead system
- Column pressure relief
- Event scheduler and spreadsheet



**PT04** INTRODUCTION TO PROCESS HYDRAULICS & P&ID's**OBJECTIVE:**

Participants will have a comprehensive overview of process hydraulics including process & Instrumentation drawings in relation to: types, scope and design guidelines.

**WHO SHOULD ATTEND:**

- Process Engineers
- Instrumentation Engineers

**DURATION:**

5 days

**TOPICS:**

- P&ID's:
  - Introduction to P&ID's
  - Scope of P&ID's with project milestones
  - P&ID's standard presentation
  - P&ID's design guidelines
- Lines & Pumps Hydraulics:
  - Fluid in Motion
  - Pressure drop in lines
  - Pump head calculations
  - Control valve pressure drop

## **PT05** FUNDAMENTALS OF OIL & GAS FACILITIES

### **OBJECTIVE:**

Participants will be introduced to the main production facilities & operation processes utilized in the Oil & Gas Industry.

### **WHO SHOULD ATTEND:**

- Operation Engineers/Supervisors

### **DURATION:**

5 days

### **TOPICS:**

- Introduction to Oil processing:
  - Crude oil feed
  - Refinery overview
  - Refinery products
  - Crude production facilities
  - Crude treatment
  - Crude distillation
  - Crude storage
- Introduction to Gas processing:
  - Natural gas processing
  - Natural gas treatment
  - Dehydration
  - Refrigeration
  - Turbo expansion
  - Fractionation

**PT06 INTRODUCTION TO OIL PROCESSING****OBJECTIVE:**

Participants will learn about the basic aspects of crude oil processing & will further gain knowledge of different oil treatment methods & processes.

**WHO SHOULD ATTEND:**

- Process/Chemical Engineers
- Operation Engineers/Supervisors
- Mechanical/Petroleum Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to crude oil
- Crude oil feed stocks
- Crude distillation curves
- Refinery products
- Typical refinery processing
- Production facilities
- Crude oil treatment methods
- Storage tanks

## **PT07** INTRODUCTION TO GAS PROCESSING

### **OBJECTIVE:**

Participants will learn about the fundamental concepts & principles on which most gas processing plants operate.

### **WHO SHOULD ATTEND:**

- Process/Chemical Engineers
- Operation Engineers/Supervisors
- Production/Petroleum Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Introduction to Egyptian Natural gas processing
- Natural gas composition
- Natural gas treatment methods:
  - Dehydration
  - Refrigerating
  - Turbo expansion
  - Fractionation
  - Hydrocarbon recovery
- LPG
- NGL
- LNG

**PT08** NATURAL GAS DEHYDRATION**OBJECTIVE:**

Participants will be introduced to the main definitions & principles of gas dehydration system & applied process technology.

**WHO SHOULD ATTEND:**

- Process/Chemical Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to natural gas properties
- Gas Dehydration principles
- Gas Dehydration process technology & design methods:
  - Gas inhibition dehydration
  - Absorption dehydration
- Dehydration Additives selection
- Process selection criteria

## **PT09** GAS DRYING & SWEETENING

### **OBJECTIVE:**

Participants will have a comprehensive overview of gas modern methods of treatment including the most widely applied drying, sweetening & processing systems.

### **WHO SHOULD ATTEND:**

- Process/Chemical Engineers
- Production Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Introduction to gas drying methods
- Gas dehydration principles
- Gas dehydration process technology & design methods:
  - Gas inhibitors dehydration
  - Absorption dehydration
- Dehydration additives selection
- Gas sweetening principles
- Process technology of gas sweetening:
  - Conventional process (Physical/Chemical process):
    - Amine process
    - MEA Process
    - DEA process
    - MDEA process
    - DGA process

**PT09** GAS DRYING & SWEETENING (Cont'd)**TOPICS (Cont'd):**

- Hybrid solvent processes
- Hot Alkaline process
- Non-conventional process:
  - Gas separation membrane
  - Molecular sieve absorption
  - Other processes
- Process design & selection criteria

## **PT10** COOLING & REFRIGERATION SYSTEM DESIGN

### **OBJECTIVE:**

Participants will gain full understanding of the cooling & refrigeration system design in relation to refrigeration stages, design considerations & refrigerant selection requirements.

### **WHO SHOULD ATTEND:**

- Process/Chemical Engineers
- Operation Engineers/Supervisors

### **DURATION:**

5 days

### **TOPICS:**

- Cooling and Refrigeration system description/usage
- Cyclic configuration (refrigeration stages):
  - One stage system
  - Two stage system
  - Refrigerant cascading
  - Mixed refrigerant
- Design Considerations
- Selection of refrigerant



**PT11** PROCESS FIRED HEATERS**OBJECTIVE:**

Participants will learn about the fired heater parts, preliminary sizing procedure, thermal efficiency calculation & control of heaters.

**WHO SHOULD ATTEND:**

- Process/Chemical Engineers
- Mechanical Engineers/Supervisors
- Petroleum Engineers

**DURATION:**

5 days

**TOPICS:**

- Fired heaters components
- Design Considerations
- Rating a fired heater
  - Radiant section rating
  - Convection section rating
  - Stack design
  - Fired Heater monitor & control
  - Furnace operation & troubleshooting
- Thermal efficiency measurement & calculation

## **PT12** SAFETY RELIEF & FLARE SYSTEM DESIGN

### **OBJECTIVE:**

Participants will learn about the basis of relief system, safety valve sizing, header sizing, knockout drum sizing and will further gain knowledge about various types of flares.

### **WHO SHOULD ATTEND:**

- Process/Chemical Engineers
- Mechanical Engineers
- Operation Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Safety relief devices
- Relief header sizing
- Knockout drum sizing
- Flaring of relieved streams
- Safety relief system consideration
- Determination of relieving rates
- Safety relief device data sheet
- Relief manifold

**PT13****HEAT EXCHANGER SELECTION, DESIGN & CONSTRUCTION****OBJECTIVE:**

Participants will learn about the basis of design and selection of all types of heat exchangers. Furthermore, participants will be exposed to a complete thermal design and application for shell and tube heat exchangers.

**WHO SHOULD ATTEND:**

- Process/Chemical Engineers
- Mechanical Engineers
- Operation Engineers/Supervisors

**DURATION:**

5 days

**TOPICS:**

- Introduction & main definitions
- Heat transfer fundamentals
- Shell & tube exchangers:
  - Heat exchanger nomenclature
  - Construction features
  - Mechanical Design
  - Shell Types
  - Thermal design & rating
  - Condensers
  - Re-boilers
- Types of heat exchangers:
  - Double pipe exchanger
  - Heating coils

**PT13**

**HEAT EXCHANGER SELECTION, DESIGN & CONSTRUCTION  
(Cont'd)**

**TOPICS (Cont'd):**

- Tank & line heaters
- Suction heaters
- Scrapped double pipe
- Electric Heaters
- Plate type heat exchanger
- Plate fin heat exchanger: application, construction & assembly
- Design & calculations:
  - Calculation data
  - Physical property conversion factors

**PT14 TOWER INTERNALS****OBJECTIVE:**

Participants will be provided with the main principles and methods of design & selection of tower internals. Participants will further be introduced to the most recently applied methods and techniques for increasing towers performance. In addition to that, participants will share through workshops how to deal with tower & internals troubleshooting.

**WHO SHOULD ATTEND:**

- Process/Chemical Engineers
- Mechanical Engineers
- Operation Engineers/Supervisors

**DURATION:**

5 days

**TOPICS:**

- Principles of Internals
- Types of Internals
- Internals Components & definitions
- Trayed column internals
- Types of trays
- High performance trays
- Tray construction & distributors
- Tray design considerations
- Tower sizing
- Towers & Internals Troubleshooting
- Trayed vs. packed Towers

## **PT14** TOWER INTERNALS (Cont'd)

### **TOPICS (Cont'd):**

- Packed column & types of packing
- Packed column internals details
- Samples of Enppi towers & internals data sheets
- Samples of manufactures drawings
- FRI (CD) for tower internals
- Installation industries for types of internals & tower shell

**PT15****SEPARATORS FILTRATION, SELECTION & DESIGN****OBJECTIVE:**

Participants will be fully exposed to separation theory, main principles and the most recently applied methods and techniques for gas treatment. Participants will further learn about types of separators and equipment description.

**WHO SHOULD ATTEND:**

- Process Engineers
- Chemical Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to the separation theory
- Principles of separation (factors affecting separation efficiency)
- Separation methods & techniques
- Separators types, selection & equipment description
- Separation process & design considerations

## **PT16** INDUSTRIAL WATER CONDITIONING

### **OBJECTIVE:**

Participants will learn about water conditioning techniques & treatment methods for different types of water. Due emphasis will be placed on assessing the technical and economic feasibility of applying each technique.

### **WHO SHOULD ATTEND:**

- Process Engineers
- Utility Engineers
- Water Treatment Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Introduction to industrial water
- Water composition & impurities
- Treatment and conditioning for different water uses techniques (Eg. Settling, filtration, chemical treatment,....etc.)
- Analysis: significance & interpretation
- Economic feasibility of each applied technique



**PT17** AIR COOLED EXCHANGERS**OBJECTIVE:**

Participants will learn about the main principles, components, general design and specification of air-cooled heat exchangers design and construction.

**WHO SHOULD ATTEND:**

- Process/Chemical Engineers
- Mechanical Engineers
- Operation Engineers/Supervisors

**DURATION:**

5 days

**TOPICS:**

- Introduction to exchangers
- The use of air-cooling to minimize water requirement in process plants
- Air coolers vs. heat exchangers
- Types of air coolers
- Construction features & components
- Performance control of air-side
- Optimization of thermal design
- Special application
- Noise control
- Basic data for rating air-cooled exchangers
- Quick sizing & estimating methods
- Samples of thermal design data sheets
- Review of drawing samples
- Startup procedure

## **PT18** INDUSTRIAL POLLUTION CONTROL

### **OBJECTIVE:**

Participants will be introduced to modern methods and techniques for reducing pollution with emphasis on the importance of controlling industrial pollution to meet environmental regulations.

### **WHO SHOULD ATTEND:**

- Mechanical Engineers
- Process/Chemical Engineers
- Environmental & Pollution Control Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Introduction & main definitions
- Pollution control hierarchy
- Sources of industrial pollution
- Pollution Control methodology
- Cleaner production in various industrial sectors
- New trends; cleaner technologies substitutes assessment
- Case study

**PT19 WATER DESALINATION TECHNOLOGY****OBJECTIVE:**

Participants will learn about the main principles, methods & techniques of water desalination with an emphasis on applications & limitations of each type.

**WHO SHOULD ATTEND:**

- Process/Chemical Engineers
- Water Treatment Engineers/Specialists

**DURATION:**

5 days

**TOPICS:**

- Introduction to the chemistry of seawater
- Water desalination & corrosion
- Methods of desalination
- Evaporation:
  - Multistage flash
  - Multi effect evaporation
  - Vapour compression
- Membrane Separation:
  - Reverse osmosis
  - Electro dialysis
- Deionization:
  - Chemical/Ion exchange
  - Electro deionization

## **PT20** WASTE WATER TREATMENT & RE-USE

### **OBJECTIVE:**

Participants will learn about the effective water pollution control techniques & waste water treatment methods for different types of wastes. Due emphasis will be placed on assessing the technical & economic feasibility of applying each technique.

### **WHO SHOULD ATTEND:**

- Chemical Engineers
- Environmental Engineers/Specialists
- Wastewater Treatment Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Introduction to sources & types of industrial effluent
- Pollution Effects
- Waste water collection methods
- Methods of reducing pollution:
  - Process design modification
  - Modern waste treatment systems
- Treatment Techniques:
  - Gravity separation of oil
  - Gas flotation
  - Filtration
  - Biological treatment

**PT21** LOSS PREVENTION ENGINEERING**OBJECTIVE:**

Participants will get familiar with the impact of loss during basic & detailed engineering phases.

**WHO SHOULD ATTEND:**

- Chemical Engineers
- Electrical/Instrument Engineers
- Safety Engineers
- Mechanical Engineers

**DURATION:**

5 days

**TOPICS:**

- Hazardous area classification
- Selection of fire protection system
- Assessment of fire exposed envelopes
- Site selection & equipment layout
- Hazard identification on project design

## **PT22** FIRE PROTECTION SYSTEMS (BASIC)

### **OBJECTIVE:**

Participants will be introduced to the fire protection system components/equipment list & design criteria. Participants will learn about types of fires, firefighting method and protection systems.

### **WHO SHOULD ATTEND:**

- Junior Safety Engineers
- Junior Operation Engineers

### **DURATION:**

5 days

### **TOPICS:**

- General Design Criteria
- Approved/Listed Equipment
- Fires Theory
- Fire Passive Protection System
  - Spacing & Layout
  - Electrical Area Classification
- Fire Active Protective Systems
  - Fire Water Protection System
  - Fire Foam Extinguishing
  - Gaseous Extinguishing
  - Detection & Alarm
  - Fire Extinguishers
- Historic cases & accident overview

**PT23 FIRE PROTECTION SYSTEMS (ADVANCED)****OBJECTIVE:**

Participants will gain advanced knowledge and skills of fire protection systems design and operation philosophy with emphasis on protection methods through workshop & case studies.

**WHO SHOULD ATTEND:**

- Senior Safety Engineers
- Senior Operation Engineers

**DURATION:**

5 days

**TOPICS:**

- General Design Criteria
- Approved/Listed Equipment
- Fire in Refiners
- Fire Passive Protection Systems:
  - Spacing & Layout
  - Fire proofing design
  - Containment & Drainage
  - Electrical Area Classification
  - Isolation & Depressurization
  - Ventilation/Exhaust
- Fire Active Protective Systems:
  - Water Supply
  - Water Distribution
  - Sprinklers System
  - Water Mist Systems
  - Fire Water Demand
  - Fire Water Pumps
  - Water Spray Systems

## **PT23** FIRE PROTECTION SYSTEMS (ADVANCED) (Cont'd)

### **TOPICS (Cont'd):**

- Foam Systems
- Foam-Water Deluge & Water Spray Systems
- Clean Agents
- Carbon Dioxide Systems
- Dry Chemical
- Steam Snuffing
- Portable Fire Suppression Equipment
- Detection & Alarm & Gas Sensing Detectors
- Workshop
- Historic Cases & Accident Overview



**PT24** FUNDAMENTALS OF PROCESS HAZARD ANALYSIS**OBJECTIVE:**

Participants will be introduced to the basic processes of hazard identification & analysis. Participants will further learn about hazard evaluation techniques & how to conduct an effective HAZOP Study.

**WHO SHOULD ATTEND:**

- Safety Engineers
- Chemical Engineers
- Instrument Engineers
- Project Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to process hazard analysis
- Overview of hazard evaluation techniques:
  - HAZOP
  - HAZID
  - WHAT IF list?
  - Fault tree analysis
  - Event tree analysis
  - Failure modes & effect analysis
- Human reliability analysis
- Historic cases & accident overview

## **PT25** PROCESS HAZARD ANALYSIS (ADVANCED)

### **OBJECTIVE:**

Participants will gain advanced knowledge about process hazard analysis. Participants will learn how to select & use hazard evaluation techniques.

### **WHO SHOULD ATTEND:**

- Senior Safety Engineers
- Senior Chemical Engineers
- Senior Instrument Engineers
- Senior Operation Engineers

### **Note:**

Attendees of this course shall be aware of course “Fundamentals of Process Hazard Analysis”

### **DURATION:**

5 days

### **TOPICS:**

- Overview of hazard analysis techniques
- Selecting hazard evaluation techniques
- Using hazard evaluation techniques
- Team leadership skills
- Case studies/workshops

**PT26 FIRE HAZARD ANALYSIS AND RISK ASSESSMENT (BASIC)****OBJECTIVE:**

Participants will be introduced to the basic knowledge & skills required for conducting fire HAZARD analysis and risk assessment. Emphases will be placed on types of chemical hazards, their impacts and the applied assessment methodology.

**WHO SHOULD ATTEND:**

- Safety Engineers
- Operation Engineers

**DURATION:**

5 days

**TOPICS:**

- Legalization, law & codes and standards
- Hazard management strategy (recognize what do you want to understand)
- Identification of inventories
- Define fire scenarios
- Calculate potential fire
- Fire impact to personnel, structures & equipment

**PT27**

**FIRE HAZARD ANALYSIS AND RISK ASSESSMENT  
(ADVANCED)**

**OBJECTIVE:**

Participants will gain advanced knowledge and skills of how to conduct an effective HAZARD analysis & risk assessment procedure through workshop and case studies.

**WHO SHOULD ATTEND:**

- Supervisor Safety Engineers
- Supervisor Operation Engineers

**Note:**

Attendees of this course shall be aware of course "Fire Hazard Analysis & Risk Assessment (basic)"

**DURATION:**

5 days

**TOPICS:**

- Fire risk assessment overview
- Fire risk assessment methodology
- Likelihood
- Risk assessment:
  - Determine risk
  - Assessment of the risk
- ALARP
- Workshops & examples

**PT28 FIRE & GAS DETECTION SYSTEM****OBJECTIVE:**

Participants will be introduced to the Fire & Gas detection system components & operation philosophy. Participants will also learn about other types of detectors & their interface with other systems.

**WHO SHOULD ATTEND:**

- Safety Engineers
- Operation Engineers
- Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to fire and gas detection system
- Types of fire & gas panels & operation philosophy
- Types of controllers
- Types of detectors & operation philosophy
- Fire & gas cables requirements
- Interface with other systems
- Case study

## **PT29** HAZARD AREA CLASSIFICATION

### **OBJECTIVE:**

Participants will be introduced to the definition of hazards and related principles, codes & standards applied in hazard representation, equipment enclosures, selection for hazardous areas along with applications.

### **WHO SHOULD ATTEND:**

- Chemical Engineers
- Electrical Engineers
- Maintenance Engineers
- Safety Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Introduction to hazards area classification
- Hazardous locations
- Flammable gas and liquids different classifications of hazardous areas
- Auto ignition temperature of gas mixtures
- Purposes of electrical classification
- Classifications, certifications, and codes
- Comparing North American and European Classifications
- Explosion proof electrical equipment

**PT30** PROCESS SAFETY MANAGEMENT**OBJECTIVE:**

Participants will be provided with essential knowledge regarding process safety principles and procedures. Moreover, participants will learn about the most recently applied safety programs and regulations utilizing modern hazards analysis tools and techniques.

**WHO SHOULD ATTEND:**

- Process Engineers/Technicians
- Petroleum/Operation Engineers
- Safety Engineers/Technicians

**DURATION:**

5 days

**TOPICS:**

- Introduction to process safety management
- General responsibilities of safety
- Health & safety leadership
- Process hazard analysis
- The role of risk assessment
- Health & safety program
- Bulletin board

## **PT31** MANAGEMENT OF CHANGE (MOC)

### **OBJECTIVE:**

This intensified training course is likely to provide participants with a comprehensive guideline to “Process Safety Management” with emphasis on the principles of Process Hazard Analysis (PHA) tools, methods and applied HAZOP techniques. Participants will further learn about application and best practices of effective and efficient Management of Change (MOC) methods and techniques based on International Standards.

### **WHO SHOULD ATTEND:**

- Process Engineers
- Chemical Engineers
- HSE Engineers/Inspectors

### **DURATION:**

5 days

### **TOPICS:**

- Introduction to Process Hazard Identification & HAZOP
- Overview of Process Hazard Analysis Techniques
- Selection of Process Hazard Analysis Techniques
- Application of Process Hazard Analysis Techniques
- HAZOP/HAZID Techniques & Methodology
- PHA Examples & Application
- PHA Results/Recordkeeping
- PHA Reports
- Hazard Identification for Organization & Procedure Changes
- Case Study



**new****PT32 HAZARD OPERABILITY & HAZOP****OBJECTIVE:**

Participants will understand the concept of HAZOP (Hazard Operability); the application of formal systematic critical examination to the process and engineering intentions of new or existing facilities to assess the hazard potential of mal-operation or mal-function. The course provides an opportunity for guidance in discussion leading for the purpose of coordinating the hazard identification contributions of all members of a typical study team, representing such functions as process design, construction, maintenance, control engineering, chemists and start-up/shut-down routines.

**WHO SHOULD ATTEND:**

- Engineering Team Leaders
- Environmental, Health and Safety Professionals & Supervisors
- Engineers and other expected to lead or participate in HAZOP studies

**DURATION:**

5 days

**TOPICS:**

- Types of hazards:
  - Chemical exposure
  - Explosion & fire
  - Electricity
  - Oxygen
- Confined space hazards, property damage and environmental impacts.
- Examples of hazardous substances information form and potentially incompatible wastes

## **PT32** HAZARD OPERABILITY & HAZOP (Cont'd)

### **TOPICS (Cont'd):**

- Permissible exposure limit (PEL)
- Immediately dangerous to life and health (IDLH) concentration.
- Potential skin absorption and irritation and eye irritation.
- Risk assessment methodology.
- Chemical facility assessment
- Assessment flow chart
- The basic concept of HAZOP examination and its objectives
- The procedures for a HAZOP study
- Preparative work, Examination in practice as well as follow up and recording
- Early checking for major hazards
- How to start hazard and operability studies
- The formalization of hazard and operability studies
- Proposed corrective action to protect plant from the identified hazard

**ME01 PUMPS TECHNOLOGY****OBJECTIVE:**

Participants will learn about pumps & their specific applications in refineries & chemical plants. Due emphasis will be placed on the application of fluid mechanics concepts for the selection or purchase of different types of pumps.

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to fluid mechanics
- Types of pumps
- Pump selection criteria
- Centrifugal pumps (characteristics of curves, capacity head power, NPSH & efficiency):
  - Hydraulic & motor power evaluation
  - Centrifugal pumps construction features (casing, impellers, shaft, wear rings, bearing, seals, ...etc)
  - Pump series & parallel operation
  - Pump material selection
  - Pump seal selection
  - Pump viscous liquid & change of pump calculations
  - Pump testing & inspection
  - Pump maintenance & troubleshooting
- Positive displacement pumps
- Reciprocating pumps
- Case study

## ME02

### ADVANCED APPLICATIONS & TECHNOLOGIES OF API PUMPS

**OBJECTIVE:**

Participants will be introduced to API pumps and their seal system including seal-less technology. Participants will further learn how to calculate the acceleration head for various types of pumps.

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Overview of pumps technology
- Overview of API 682 pumps seal systems
- Overview of API 685 seal-less pumps technology
- Acceleration head calculations for reciprocating & dosing pumps
- Pulsation study for reciprocating pumps
- Case study

**ME03 DIESEL ENGINE****OBJECTIVE:**

Participants will be introduced to the main components of Diesel Engine and the four-stroke cycle. Participants will also learn about diesel engine fuel, cooling, air and electrical systems. Due emphasis will be placed on spare parts selection and troubleshooting.

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to the diesel engine components
- The four-stroke cycle
- The fuel system
- The cooling system
- The air system
- Engine electrical systems
- Spares & tool requirements
- Important services or maintenance
- Troubleshooting

## **ME04** CENTRIFUGAL COMPRESSORS

### **OBJECTIVE:**

Participants will learn about centrifugal compressors and their performance characteristics. Process control and instrumentation for compressors will also be discussed with emphasis on safe and economic operational modes.

### **WHO SHOULD ATTEND:**

- Mechanical Engineers
- Maintenance Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Introduction to centrifugal compressors:
  - Compressor methods
  - Compressor selection
  - Compressors types & application ranges
- Performance considerations
- Compressor performance maps
- Quick methods for centrifugal compressor power estimate
- Surge & shock
- Mechanical considerations, accessories, auxiliary system
- Factors affecting compressor heat, power & inlet volume flow
- Construction features ( casing, impeller, shaft, rotor, balance drum, bearings, shaft seal & diaphragms)
- Compressor control (capacity control, surge control & equipment protection)
- Divers selection

**ME05** RECIPROCATING COMPRESSORS**OBJECTIVE:**

Participants will learn about reciprocating compressors and their performance characteristics. Process control and instrumentation for compressors will also be discussed with emphasis on safe and economic operational modes.

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Chemical Engineers
- Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction :
  - Compression methods
  - Compression selection
  - Compressors types & application ranges
- Reciprocating compressor:
  - Performance characteristics
  - Basic design, accessories & auxiliary system
  - Construction features (cylinder, piston, piston rods, piston rings, crank shaft connecting rods, bearings, crossheads, valve unloaders, distance pieces & packing)
  - Lubrication system
  - Compressor cylinder cooling system
  - Pulsation & vibration control

## **ME05** RECIPROCATING COMPRESSORS (Cont'd)

### **TOPICS: (Cont'd)**

- Compressor analogue study
- Compressor control
- Operation, maintenance & troubleshooting



**ME06 VIBRATION ANALYSIS****OBJECTIVE:**

Participants will learn about vibration and will be introduced to the latest methods & techniques for vibration analysis.

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to vibration
- Laws governing mechanical vibration
- Simple harmonic motion
- One degree of freedom system
- Two degree of freedom system
- Multi-degree of freedom system
- Spectrum analysis
- Vibration measurement
- Establishing vibration severity criteria
- Types of maintenance
- Balancing
- Alignment
- Procedures for analysis of vibration & troubleshooting

## ME07 BOILER DESIGN & STEAM RAISING

### OBJECTIVE:

Participants will be introduced to the up to date knowledge of boiler construction, operation & control techniques. Safety considerations of high-pressure/high temperature boilers will be also covered, along with maintenance & energy saving applications.

### WHO SHOULD ATTEND:

- Mechanical Engineers
- Instrumentation Engineers
- Maintenance Engineers

### DURATION:

5 days

### TOPICS:

- Introduction to boiler & steam separation
- Fundamentals of steam generation & use
- Mechanical aspects of boilers & auxiliary equipment
- Modes of heat transfer
- Principles of combustion & calculation
- Operation of steam generation equipment:
  - Design considerations & requirements
  - Fuel-ash effects on design & requirement
  - Boiler maintenance inspection shutdown & efficiency –monitoring techniques
- Start-up & shutdown operation philosophy

**ME08 BOILER EFFICIENCY IMPROVEMENT****OBJECTIVE:**

Participants will be introduced to the state-of-the art technology utilized in boiler efficiency improvement with a brief review on the boiler package components.

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Chemical Engineers
- Operation Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to boilers: boilers & combustion
- How to increase boiler's efficiency
- Test methods & boiler operation diagnosis
- Fuels & fuel treatment
- Applied statistics & errors in control and measurement
- Engineering calculations
- Boiler efficiency test form
- Scheduled maintenance requirements on boilers
- ASTM fuel tests

**ME09**

**BOILER SELECTION, OPERATION & MAINTENANCE –  
FUNDAMENTALS**

**OBJECTIVE:**

Participants will have a comprehensive overview of boiler types, selection, and design codes, along with main components construction, usage, and advantages. Participants will be also introduced to boiler operation and control techniques, boiler maintenance & energy saving applications.

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Instrumentation Engineers
- Process Engineers
- Operation Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to boilers & boilers types
- Fundamentals of steam generation
- Steam specification & usage
- Modes of heat transfer
- Principles of combustion & control
- Fuel types & preparation
- Design requirement for heavy oil fuel
- Boiler inspection & maintenance
- Start-up, operation & shutdown philosophy
- Boiler selection rules & applications

**ME10** PRESSURE VESSELS DESIGN, INSPECTION & REPAIR**OBJECTIVE:**

Participants will be introduced to methods of mechanical design & inspection of pressure vessels according to ASME code requirements.

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Pressure vessels technical terminology
- Design of pressure vessels:
  - Codes & standards
  - Basic principles
  - Design procedures
  - Design of vertical vessels
  - Design of horizontal vessels
  - Standards specifications
- Inspection & repair of pressure vessels:
  - Pressure vessels repair codes
  - Flaws types, detection & classification
  - Introduction to flaws assessment
  - Repair & alterations
  - Welded repairs
  - Mechanical repairs
  - Repair techniques versus flaw type

**ME11** HEAT EXCHANGERS MECHANICAL DESIGN & MAINTENANCE

**OBJECTIVE:**

Participants will learn about the design and maintenance of different types of shell & tube heat exchangers

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to the design & selection of heat exchangers
- Applied codes & standards
- Heat exchangers main components
- Mechanical design requirements
- Fabrication requirements
- Maintenance & testing

**ME12 TANKS DESIGN & MAINTENANCE****OBJECTIVE:**

Participants will learn about the methods of design and maintenance of different types of storage tanks according to API 650 & API 620 codes and standards.

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to tanks design & terminology
- Applied codes & standards
- Types of storage tanks
- Design of tanks components
- Inspection, repair & maintenance of tanks
- Storage tanks selection & sizing

## **ME13** GAS TURBINE DESIGN & SELECTION

### **OBJECTIVE:**

Participants will have a comprehensive overview of gas turbines: types, main components, applied codes & standards and design principles. Participants will further learn about thermodynamics such as reversible cycles, combustion process & gas turbine performance calculation. The program will also tackle gas turbine construction including selection of the system parts.

### **WHO SHOULD ATTEND:**

- Process Engineers
- Mechanical Engineers/Supervisors

### **DURATION:**

5 days

### **TOPICS:**

- Introduction to gas turbines types, main components, features & functions
- Gas turbine cycles
- Methods of improving gas turbine engines performance
- Combustion section
- Cooling & turbine blades
- Turbine auxiliaries & starting devices
- Compressed air systems
- Fuel Systems
- Gas Turbine start up
- On-load operation & shutdown
- Automatic startup & operation



**ME14 CATHODIC PROTECTION (CP)****OBJECTIVE:**

Participants will be introduced to the principles of cathodic protection in terms of: design basis, operation & maintenance and applied techniques for marine and onshore installations such as underground piping, storage tanks and process equipment.

**WHO SHOULD ATTEND:**

- Design Engineers
- Inspection Engineers
- Corrosion Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to corrosion
- Thermodynamics of corrosion
- Forms of corrosion
- Cost of corrosion
- Rates of corrosion
- Corrosion management
- Corrosion control techniques:
  - Material selection for proper design
  - Chemical treatment
  - Painting & coating

## **ME14** CATHODIC PROTECTION (CP) (Cont'd)

### **TOPICS: (Cont'd)**

- Cathodic protection:
  - Theory of cathodic protection
  - Types of cathodic protection systems
  - Sacrificial anodes system
  - Impressed current system
  - Practical applications of cathodic protection
- Cathodic protection design, calculations & troubleshooting
- Case study

**ME15 PAINTING & COATING TECHNOLOGY****OBJECTIVE:**

Participants will learn about the proper selection, application and inspection of coating as one of the most effective corrosion control methods and techniques.

**WHO SHOULD ATTEND:**

- Chemical Engineers
- Mechanical Engineers
- Inspection Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to corrosion control techniques
- International material standard specification
- Structure of Nace International and technical practice committee
- NACE corrosion rates
- Corrosion forms
- The history of corrosion protection
- Paints and coating:
  - Introduction to paints & coating
  - Design of corrosion coating
  - Standards of surface preparation
  - Outline of paint
  - Painting control
  - Causes & prevention of paint failure

## **ME15** PAINTING & COATING TECHNOLOGY (Cont'd)

### **TOPICS: (Cont'd)**

- Paint types
- R.A.L. color code
- Industrial corrosion protection applications
- Offshore platforms paint applications
- Surface preparation
- Coatings application & Inspection

**ME16 CORROSION INHIBITORS****OBJECTIVE:**

Participants will learn about the basics of corrosion theory and control. Emphasis will be placed on the methodology, composition and application of corrosion inhibitors and performance.

**WHO SHOULD ATTEND:**

- Chemical Engineers
- Mechanical Engineers
- Corrosion Engineers

**DURATION:**

3 days

**TOPICS:**

- Introduction to corrosion
- Thermodynamics of corrosion
- Forms of corrosion
- Nace rates of corrosion
- Overview corrosion control techniques:
  - Material selection for proper design
  - Chemical treatment
  - Painting & coating
  - Cathodic protection

## **ME16** CORROSION INHIBITORS (Cont'd)

### **TOPICS: (Cont'd)**

- Chemical Treatment:
  - Removal of gases
  - PH control
  - Corrosion inhibitors
  - Biocides
- Classification of corrosion inhibitors:
  - Inhibitors for acid media
  - Inhibitors for near-normal media
- Mechanism of corrosion inhibitors
- Corrosion inhibitors efficiency
- Corrosion monitoring techniques
- Case study

**ME17****MATERIAL SELECTION IN PETROLEUM INDUSTRY****OBJECTIVE:**

Participants will learn about the main principles of materials selection for refineries & chemical process plants. Participants will further gain understanding of the selection criteria and performance of materials in different environments.

**WHO SHOULD ATTEND:**

- Process Engineers
- Inspection Engineers
- Corrosion Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to corrosion
- Review of corrosion control techniques :
  - Application of paints & coating
  - Application of cathodic protection
  - Application of corrosion inhibitors
- Classification of engineering materials (metallic, non-metallic, ferrous, nonferrous)
- Factors affecting material selection
- Corrosion allowance calculation & material selection
- Life time of equipment (corrosion rate, corrosion allowance, etc...)
- Environmental process control (sour & sweet crude oils & gases, hydrocarbon & wet natural gases, effect of impurities in process steams, upset conditions, etc...)
- Performance of material in different services

## **ME17** MATERIAL SELECTION IN PETROLEUM INDUSTRY (Cont'd)

### **TOPICS: (Cont'd)**

- Degradable materials
- Corrosion resistant alloys:
  - Stainless steels
  - Nickel alloys
  - Copper alloys
  - Titanium alloys
- Most common corrosion mechanisms in refineries & process industry
- Case study



**ME18 CORROSION CONTROL TECHNIQUES****OBJECTIVE:**

Participants will be introduced to corrosion forms and mechanisms as well as the latest applied methods and techniques for corrosion control such as material selection, cathodic protection & coatings. Emphasis will be placed on corrosion problems in the Oil & Gas industry and based on the latest Nace recommendations.

**WHO SHOULD ATTEND:**

- Mechanical Engineers
- Pipeline Engineers
- Corrosion Engineers
- Operations/Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to corrosion engineering
- Corrosion forms
- Material selection:
  - Ferrous & nonferrous alloys
  - Corrosion allowance
  - Calculation of corrosion allowance in the Oil & Gas/process industry
- Corrosion Protection (CP)
  - Impressed current CP system
  - Sacrificial mode CP system
- Improved design

## **ME18** CORROSION CONTROL TECHNIQUES (Cont'd)

### **TOPICS: (Cont'd)**

- Corrosion inhibitors and chemical treatment
- Painting and coatings:
  - Selection of protective coating
  - Surface preparation specifications
  - Effect of coatings & corrosion allowance allocation
- Cathodic protection
- Case study

**ME19****FUNDAMENTALS OF LOW TEMPERATURE & CRYOGENIC TANKS****OBJECTIVE:**

Participants will gain knowledge of the primary aspects of the design and construction of cryogenic & low temperature tanks.

**WHO SHOULD ATTEND:**

- Construction Engineers
- Mechanical Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to cryogenic tanks
- Storage philosophies
- Tank Design & Selection
- Types of low temperature & cryogenic tanks using API 620 & BS EN14620 codes
- Tank manufacturing & construction
- Tank inspection & testing
- Applications & case studies

**ME20**

**DESIGN, FABRICATION & INSPECTION OF PRESSURE VESSELS ACCORDING TO ASME VIII DIV 1**

**OBJECTIVE:**

Participants will learn about the basic requirements & methods of design, fabrication and inspection of pressure vessels according to ASME VIII DIV 1.

**WHO SHOULD ATTEND:**

- Design/Stress Analysis Engineers
- Inspectors/Fabrication Engineers

**DURATION:**

5 days

**TOPICS:**

- Code rules, scope & jurisdiction
- General requirements related to materials & testing
- Design requirements:
  - Design criteria & strength theory for division 1
  - Design loadings & allowable stresses
  - Design for internal pressure & tensile loading
  - Design for external pressure & compressive loads
- Openings & reinforcement
- Low temperature operation
- Welding requirements:
  - Joint categories & joint efficiencies
  - Post weld heat treatment
- General requirements related to fabrication
- General requirements related to inspection & testing
- General requirements related to stamping & reports

**ME21****PRESSURE VESSELS & TANKS FITNESS-FOR-SERVICE ASSESSMENT (API 579-1 / ASME FFS-1)****OBJECTIVE:**

Participants will be introduced to the “FITNESS-FOR-SERVICE ASSESSMENT” as an engineering approach used for determining equipment fitness to continue operation for future period. Participants will learn how to analyze, evaluate, and monitor pressure vessels, piping & tanks against flaws or caused by continued operation.

**WHO SHOULD ATTEND:**

- Mechanical/Stress Analysis Engineers
- Inspection Engineers
- Materials Engineers

**DURATION:**

5 Days

**TOPICS:**

- Overview of flaw & damage assessment procedures
- Assessment of equipment for brittle fracture
- Assessment of general metal loss
- Assessment of local metal loss
- Assessment of pitting corrosion
- Assessment of blisters & laminations
- Assessment of welding misalignment & shell distortions
- Level 1 assessment of crack-like flaws
- Assessment of components operating in the creep regime
- Assessment of fire damage

## **ME22** HVAC SYSTEM DESIGN



### **OBJECTIVE:**

Participants will learn about HVAC system selection and design criteria. The course is designed to include practical hands-on-training to provide participants with full image of HVAC in industrial & commercial applications.

### **WHO SHOULD ATTEND:**

- Mechanical Engineers
- Civil Engineers
- Electrical Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Introduction & theoretical background
- Load estimation
- System selection:
  - All air system
  - Air water system
  - DX system
- HVAC Equipment:
  - Electrical chillers
  - Absorption chillers
  - Condensing units
  - Air handling units
  - Fan coil units

**ME22****HVAC SYSTEM DESIGN (Cont'd)****TOPICS: (Cont'd)**

- Pumps
- Cooling towers
- Boilers
- Air separators
- Expansion tanks
- Water treatment package
- Refrigerators
- Duct design & duct accessories
- Piping design & piping accessories
- Motor control center & control systems
- District cooling

## **PE01** SPECIFICATION FOR PIPING COMPONENTS

### **OBJECTIVE:**

Participants will learn about the specifications for piping components such as: valves, codes, types and selection criteria for effective application. Participants will wind up with practical recommendations.

### **WHO SHOULD ATTEND:**

- Piping Design Engineers/Technicians
- Maintenance Engineers
- Field Inspectors

### **DURATION:**

5 days

### **TOPICS:**

- Piping elements:
  - Definitions
  - Types & classification
  - Coding
- Wall thickness calculations for pipes:
  - Materials
  - Design codes
  - Examples with design considerations



**PE01** SPECIFICATION FOR PIPING COMPONENTS (Cont'd)**TOPICS: (Cont'd)**

- Valves:
  - Types
  - Specification
  - Advantages & disadvantages of each type
- Terminology of valve industry:
  - Definition of terms of valves
  - Types & components

## **PE02** PIPING DESIGN & FABRICATION

### **OBJECTIVE:**

Participants will gain understanding of physical aspects affecting the design of piping, (pressures, temperatures & services) and the selection of the suitable piping components, in addition to recommendation for fabrication procedures and drawings issued by piping designers.

### **WHO SHOULD ATTEND:**

- Piping Design Engineers/Technicians
- Mechanical Engineers
- Engineers & Technicians

### **DURATION:**

5 days

### **TOPICS:**

- Overview of piping terminology
- Piping design criteria:
  - Pressure/temperature rating
  - Process piping design (design pressure/temperature, wall thickness calculations)
  - Equipment piping design
  - Pumps associated piping
- Piping fabrication:
  - Fabrication concepts
  - Drawings & documents
  - Fabrication aspects

## **PE03** BASICS OF PIPING STRESS ANALYSIS

### **OBJECTIVE:**

Participants will learn about the definitions of different piping systems and loading conditions, and will also understand and become able to apply the relevant codes, rules and differentiate between types of pipe supports.

### **WHO SHOULD ATTEND:**

- Mechanical Design Engineers
- Fabrication/Maintenance Piping Technicians

### **DURATION:**

5 days

### **TOPICS:**

- Pipe stress analysis fundamentals:
  - General introduction to piping stress analysis
  - Theoretical background & piping failure theories
  - Compliance with codes & standards
  - Piping stress analysis & supporting
  - Piping expansion & flexibility
  - Manual stress analysis calculations
  - Computer aided piping stress analysis calculations
- Pipe supports:
  - Types of pipe supports
  - Standard pipe support drawings
  - Special Pipe support layouts

## PE04 PIPING DYNAMIC ANALYSIS

### OBJECTIVE:

Participants will learn about different types of dynamic loading to which piping systems may be subjected during normal and abnormal plant operations. They will be exposed to learn about the mechanical behavior of piping systems when subjected to such types of loading and the necessary precautions to be considered during a piping system design, operation, maintenance, and/or revamping to cope with different types of dynamic loading without affecting its integrity or the integrity of connected equipment.

### WHO SHOULD ATTEND:

- Piping Stress Analysis Engineers
- Piping Design Engineers
- Operations & Process Engineers
- Maintenance Engineers
- Project Engineers

### DURATION:

5 days

### TOPICS:

- Fundamentals of mechanical vibrations
- Piping systems subjected to harmonic loads
- Piping systems subjected to impact loads
- Random dynamic loading
- Loading considerations on piping system
  - During design phase
  - During operation & maintenance phase
  - During revamping

**PE05**

**FUNDAMENTALS OF UNDERGROUND PIPING  
ENGINEERING**

**OBJECTIVE:**

Participants will be introduced to the main concepts and definitions of underground engineering including main systems such as: sewer system, portable system and fire/ water system.

**WHO SHOULD ATTEND:**

- Piping Engineers
- Process Engineers
- Maintenance Engineers
- Operation Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to underground engineering terms & definitions
- Sewer system
- Potable water system
- Fire/water system
- Others (Rain water, plumbing, ...etc)

## **PE06** VALVES TECHNOLOGY (BASIC)

### **OBJECTIVE:**

Participants will be introduced to various types of valves and will further learn about the principles & criteria on which they should be selected for different locations and service areas. Participants will gain understanding of valves design and specification, and construction according to international standards.

### **WHO SHOULD ATTEND:**

- Piping & Design Engineers
- Project Engineers
- Maintenance Engineers

### **DURATION:**

5 Days

### **TOPICS:**

- Valves types and classifications
- Valve materials and components
- Valves codes of design and rating criteria
- Valves selection and application
- Pressure temperature rating
- Valves ordering
- Case study

**PE07 VALVES TECHNOLOGY (ADVANCED)****OBJECTIVE:**

Participants will have a broad understanding of valves classification and material, and will be able to select valves based on function and economic value. Participants will further gain advanced knowledge and skills on the wide variety of valves in service, their distinct characteristics and the operating functions. They will also be exposed to the main principles for valves testing and inspection.

**WHO SHOULD ATTEND:**

- Senior Piping and Design Engineers
- Senior Project Engineers
- Senior Maintenance Engineers

**DURATION:**

5 Days

**TOPICS:**

- Overview of valves
- Selection based on function and economics
- Valves selection and specification for special process
- Valve materials for various environments and fluids
- Valves design according to international standards
- Valves testing and inspection for new and repaired valves
- Valves trims and materials
- Valves rating for process plants and well-heads
- Valves packing and seals
- Valves for cryogenic service
- Valves Pressure and temperature rating
- Specifying for hazardous areas

## **PE08** FUNDAMENTALS OF PIPING DESIGN

### **OBJECTIVE:**

Participants will have a brief understanding of the fundamentals and basic features used in the design of both process and utility piping systems for petroleum refineries; chemical, pharmaceutical, textile, paper, semiconductor, and cryogenics plants; and related processing plants and terminals at both offshore and onshore locations covered by different piping codes as ASME B31.3 (Process Piping, ASME Code for Pressure Piping).

### **WHO SHOULD ATTEND:**

- Junior Piping Engineers
- Design Engineers

### **DURATION:**

5 Days

### **TOPICS:**

- Introduction to piping design
- Piping codes, standards and specifications
- Piping components
- Project types and phases
- Plant equipment
- Flow diagrams
- Specific plant systems



## **PE09** ADVANCED PIPING DESIGN

### **OBJECTIVE:**

Participants will be able to perform equipment orientations and related piping layouts for basic equipment: pumps, heat exchangers, tanks....etc. according to applicable international codes.

### **WHO SHOULD ATTEND:**

- Piping and Design Engineers/Technicians

### **DURATION:**

5 Days

### **TOPICS:**

- Introduction to detailed piping design
- Piping layouts for basics equipment
  - Pumps
  - Exchangers
  - Tanks
  - Vessels
    - Horizontal vessel
    - Vertical vessel
- Pipe Ways
- Practical application

## **PE10** SUBSEA PIPELINE DESIGN

### **OBJECTIVE:**

Participants will be introduced to the engineering process of subsea pipeline and will learn about the main topics related to subsea design and installation.

### **WHO SHOULD ATTEND:**

- Offshore Pipe lay Field Engineers
- Offshore Pipeline Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Pipeline routing
- Beach pulling & Pre-trench
- Post Trenching
- Design Code
- Wall Thickness Design
- Pipeline Stability
- Free Span
- Riser/Spool-piece design
- Pipeline Installation :
  - Installation methods overview
  - Design code requirements
  - Installation phases (beach-pull, normal lay, lay start/lay down)
  - Essential Lay Barge Data
- Global Buckling Analysis:
  - Upheaval Buckling
  - Lateral Buckling
- Pipe-lay vessels
- Dynamic analysis

PE11

**GAS TRANSMISSION & DISTRIBUTION ACCORDING TO ASME B31.8****OBJECTIVE:**

Throughout this training program, Participants will be introduced to gas transmission & distribution process according to ASME B31.8. Participants will further learn about utilized material & equipment, welding & inspection, piping system.

**WHO SHOULD ATTEND:**

- Pipeline/Piping Engineers
- Operation Engineers/Supervisors
- Petroleum Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to codes, contents & requirements
- Materials & Equipment (material qualification, transportation & pipe reuse
- Welding:
  - Qualification of welding procedures & welders
  - Preheating & Stress Relieving
  - Inspection of Welds & NDT
- Piping system components & fabrication
- Design, installation & testing
- Operating & maintenance
- External & Internal Corrosion Control
- Sour Gas Service

## **PE12** ONSHORE PIPELINE DESIGN

### **OBJECTIVE:**

Participants will be introduced to the engineering process of onshore pipeline and will learn about the main topics related to onshore pipeline design and construction.

### **WHO SHOULD ATTEND:**

- Onshore Pipeline Engineers
- Onshore Pipeline Field (Construction) Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Pipeline Route Selection
  - Aboveground Pipelines
  - Buried Pipelines
- Pipeline Trenching
- Pipeline Crossings
- Pipeline Bending
- Design Codes
- Pipeline Block Valve Stations
- Pipeline Stress Analysis
- Pipeline Buoyancy Control
- Pipeline Elastic Bend
- Pipeline Piggability
- Pipeline Construction
- Pipeline Testing

## IC01

**INSTRUMENT PRE-INSTALLATION & INSTALLATION GUIDELINES****OBJECTIVE:**

Participants will learn about the fundamental techniques and theoretical aspects of installation and commissioning of instrumentation control systems.

**WHO SHOULD ATTEND:**

- Instrumentation Engineers
- Construction/Instrumentation Engineers & Technicians

**DURATION:**

5 days

**TOPICS:**

- Introduction to instrument installation
- Installation activity cycle:
  - Organization
  - Planning
  - Communication
  - Cost control
- Equipment & tools
- Documentation and forms issuance
- Loop checks, commissioning & startup phases

## IC02

### INSTRUMENTATION IN HAZARDOUS LOCATIONS

#### OBJECTIVE:

Participants will learn about the requirements of designing a safe application for instrumentation in hazardous locations.

#### WHO SHOULD ATTEND:

- Instrumentation Engineers (With a minimum of 2 Years experience)

#### DURATION:

3 days

#### TOPICS:

- Classification of hazardous locations & apparatus
- Overview of protection methods:
  - Explosion proof & flame proof
  - Encapsulation
  - Powder Filling
  - Increased safety
  - Non-incentive
  - Purging (or pressurization)
  - Oil Immersion
  - Sealing, Limited-breathing & dust proofing
  - Intrinsic safety
- Special protection method
- Mixed protection method
- Comparison between the widely used protection methods
- Certifications, labels, marks & ratings
- Standards & practices
- Agencies & testing facilities

## IC03

## BASICS OF INSTRUMENTATION &amp; CONTROL

**OBJECTIVE:**

The basic principles and applied techniques for various process measurements and controls.

**WHO SHOULD ATTEND:**

- Junior Instrumentation Engineers

**DURATION:**

5 days

**TOPICS:**

- Basic principle of process measurements:
  - Flow measurements
  - Pressure measurements
  - Temperature measurements
  - Level measurements
- Basic principles of process controls:
  - On/off control
  - Modulating control
  - Open loop control
  - Ratio control
  - Closed loop control

## IC04 PROCESS MEASUREMENTS

### OBJECTIVE:

Participants will be provided with the basic knowledge and skills utilized in process plants measurements of the big-four variables: pressure, flow rate, level & temperature. Selection and application guides will also be tackled.

### WHO SHOULD ATTEND:

- Instrumentation Engineers
- Operation Engineers

### DURATION:

5 days

### TOPICS:

- Process measurements & means for plant productivity, product quality & cost optimization
- Applied terminology
- The big process measurements:
  - Pressure measurement
  - Flow measurement
  - Level measurement
  - Temperature measurement



**IC05 FLOW MEASUREMENTS (BASIC)****OBJECTIVE:**

Participants will be introduced to the main principles and techniques practically applied in process plants flow rate measurements. Participants will also be introduced to the theoretical basics, practical sizing equations, selection criteria and application guidelines.

**WHO SHOULD ATTEND:**

- Instrumentation Engineers
- Operation Engineers

**DURATION:**

5 days

**TOPICS:**

- Volumetric and mass flow units & conversion factors
- Pressure, temperature & viscosity corrections of volumetric flow rate
- Differential pressure methods
- Orifice plates
- Venturi tubes
- Flow nozzles
- Pitot tubes
- Differential pressure flow transmitters
- Vortex type flow element
- Target flowmeter
- Magnetic flowmeter
- Turbine flowmeter
- Positive displacement flowmeters
- Ultrasonic flowmeters
- Mass flowmeters (coriolis)

**IC06 FLOW MEASUREMENTS (ADVANCED)****OBJECTIVE:**

Throughout this training program, Participants will be provided with the in-depth knowledge of the process plants measurement tools and techniques. Participants will also learn about the concepts of the most commonly used systems in various flow measuring techniques. Participants will also gain understanding of the classification and the characterization of the approaches, classes, types and the actual devices used in flow measurements.

**WHO SHOULD ATTEND**

- Senior Instrumentation Engineers
- Senior Operation Engineers

**DURATION:**

5 days

**TOPICS:**

- Course overview and introduction
- Classification of flowmeters
- General flow-measurement terminology
- Theory of differential pressure flow metering devices
- Head-producing flowmeters I (conventional)
- Head-producing flowmeters II (special)
- Head-producing flowmeters III (open channel)
- Pulse producing flowmeters
- Special techniques
- Flowmeter selection
- Powered flowmeters
- Mass flow measurement

## IC07 BOILER CONTROL

### OBJECTIVE:

Participants will learn about the main Principles and methods of design & operation for boilers control.

### WHO SHOULD ATTEND:

- Instrumentation Engineers
- Operation Engineers

### DURATION:

5 days

### TOPICS:

- Introduction to boilers (an overview):
  - Principles of steam production
  - Functions of boiler systems
- Boiler Feed water & steam:
  - Corrosion scale on boiler components
  - Boiler response to steam demand
  - Three basic approaches to feed water control
- Boiler controls:
  - Boiler startup procedure
  - Boiler operators responsibilities
  - Boiler shut down procedure
  - Abnormal & emergency condition
- Boiler design & construction:
  - Basic types of boilers
  - Functions of water tube boiler components
- Boiler fuel & air (controlling for safety & efficiency):
  - Three types of boiler fuels
  - Factors needed to control combustion
  - Combustion control systems

## IC08 CONTROL VALVE ENGINEERING

### OBJECTIVE:

Participants will be provided with the essential knowledge and skills required for sizing, selection, installation and testing practices of control valves used in process industries.

### WHO SHOULD ATTEND:

- Instrumentation Engineers
- Piping Engineers

### DURATION:

5 days

### TOPICS:

- Control valve as a control loop element
- Control valve as a part of a piping system
- Control valve terminology
- Control valve components
- Control valve body: types & styles
- Control valve trim: types & styles
- Inherent & installed valve characteristics
- Body & trim materials selection guide lines
- Valve actuator types & selection guide lines
- Factors to consider in valve selection
- Sizing data, equations & application
- Flashing, cavitations & noise
- Control valve installation & commissioning
- Sizing & selection examples

**IC09** PROCESS CONTROL (BASIC)**OBJECTIVE:**

Participants will learn about the basics of process control theory and practice in the field of Oil & Gas.

**WHO SHOULD ATTEND:**

- Instrumentation Engineers
- Operation Engineers
- Process Engineers

**DURATION:**

5 days

**TOPICS:**

- Terminology of process control
- Review of basic feedback control schemes
- Review of PID control algorithms & application criteria
- Cascade control
- Ratio control
- Split range control
- Override control
- Feed-forward control
- The dead time problem & how to deal with it
- Controller tuning & calculation of tuning parameters
- Application examples
- Open discussion on process control

**IC10** PROGRAMMABLE LOGIC CONTROLLERS (PLC)**OBJECTIVE:**

Participants will be introduced to the main concepts, components, architecture practices and guidelines of Programmable Logic Controllers (PLC) Systems.

**WHO SHOULD ATTEND:**

- Instrumentation/Electrical Engineers (minimum 2 years experience in process plants)

**DURATION:**

5 days

**TOPICS:**

- Conceptual review:
  - Sequence Control
  - Process Shutdown Requirements
  - The need for event monitoring & recording
  - Process & Equipment Alarms & Alarm Levels
  - Emergency Shutdown Requirements
- Basic components & functions of PLC's
- Triple Modular Redundant PLC's (TMR)
- Logic diagrams/overview:
  - Cause & effect diagrams
  - Ladder logic
  - Functional logic
  - Ladder logic functional diagrams
- Programming languages
- Review of IEC 1131-3 as a standard programming resource
- PLC's & hybrid control (PID's & logic control)
- FAT & SAT guidelines
- Preventive maintenance guidelines
- Corrective maintenance & spare parts management
- Design basis & selection guidelines
- PLC installation guidelines

IC11

## SUPERVISORY CONTROL & DATA ACQUISITION SYSTEM (SCADA)

### OBJECTIVE:

Participants will learn about the main concepts, components and architecture practices and guidelines of Supervisory Control & Data Acquisition System (SCADA)

### WHO SHOULD ATTEND:

- Instrumentation Engineers
- Electrical Engineers  
(Familiar with the concepts associated with microprocessors & digital systems)

### DURATION:

5 days

### TOPICS:

- Basic Concepts & Features
- Basic architecture of a SCADA system
- Basic hardware components
- Communications systems overview
- Transmission media
- Remote Terminal Unit (R.T.U)
- Master Terminal Unit (M.T.U)
- Operator interface
- System security requirements and concepts
- Selection of a SCADA system
- Pre-installation site planning
- Installation requirements and considerations
- Preventive maintenance guidelines

**IC11**

**SUPERVISORY CONTROL & DATA ACQUISITION SYSTEM  
(SCADA) (Cont'd)**

**TOPICS: (Cont'd)**

- Corrective maintenance & spare parts management
- Software upgrades & support
- Training considerations
- FAT & SAT guidelines



**IC12****DISTRIBUTED CONTROL SYSTEMS (DCS)****OBJECTIVE:**

Participants will learn about the basic concepts, components & architecture practices & guidelines for the Distributed Control System (DCS).

**WHO SHOULD ATTEND:**

- Instrumentation Engineers
- Process Engineers (Five years experience in process plants)

**DURATION:**

5 days

**TOPICS:**

- Introduction & historical background
- Basic architecture of DCS
- Basic hardware components
- Communications systems overview
- System security requirements & concepts
- Implementation of project-specific applications
- DCS graphics & displays philosophy & guide lines
- Windows-based displays & operator interactions
- What does “open architecture” mean?
- Pre-installation site planning
- Preventive maintenance guidelines
- Corrective maintenance & spare parts management
- Software upgrades & support
- Training considerations
- FAT & SAT guidelines

**IC13** FIELD BUS FOUNDATION**OBJECTIVE:**

This course aims at providing participants with a comprehensive overview of Emerson data communicator's fundamental, operation principles and guidelines. Participants will have a comprehensive hands-on training on field bus foundation, maintenance and troubleshooting.

**WHO SHOULD ATTEND:**

- Instrumentation Engineers/Technicians
- Operators & Maintenance Staff

**DURATION:**

5 days

**TOPICS:**

- Introduction to foundation field bus (FF) benefits, components & terminology
- FF technology (hardware & software)
- Overview of field bus communications fundamentals
- Field bus blocks
- Field bus engineering
- Segment design
- Field bus interoperability
- Reliability & redundancy
- Field bus intrinsically safe
- Field bus commissioning
- Field bus diagnostic
- Installation, operation, maintenance & troubleshooting

**IC14 ON-LINE ANALYZERS****OBJECTIVE:**

Participants will gain knowledge of modern applied techniques for online measurement of chemical composition and properties of liquid and gas streams. Participants will also be introduced to vibration measurement modern techniques and applications.

**WHO SHOULD ATTEND:**

- Instrumentation Engineers
- Operation/Mechanical Engineers

**DURATION:**

5 days

**TOPICS:**

- On-line analysis
- Infrared absorption
- Thermal conductivity
- O<sub>2</sub> analysis
- Chromatography
- Dew point analysis
- Density meters
- Reid vapor pressure analyzer

**IC15****SAFETY INSTRUMENTED SYSTEMS (SIS)  
FOR THE PROCESS INDUSTRY****OBJECTIVE:**

Participants will be provided with an understanding of the principles of SIL Determination and Verification of Safety Instrumented Systems (SIS) in the process industry by applying the Techniques and Measures described in IEC 61511

**WHO SHOULD ATTEND:**

- Instrumentation Engineers
- Process Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction to Functional Safety
- Design Lifecycle
- Process Control vs. Safety Control
- Protection Layers
- Developing the Safety Requirement Specifications (SRS)
- Determining the Safety Integrity Level (SIL)
- Choosing a Technology
- Initial System Evaluation
- Selection of field Devices

**new****TL01****INTRODUCTION TO TELECOMMUNICATION AND WIRELESS SYSTEMS****OBJECTIVE:**

Participants will have an overview of the various telecommunication systems and the wireless systems applicable in the Oil & Gas industry along with their main functions.

**WHO SHOULD ATTEND:**

- Junior Engineers (maximum 3 years' experience)

**DURATION:**

3 days

**TOPICS:**

- Internetwork Packet Exchange (IPX)
- Public Address and General Alarm (PAGA)
- Integrated Security Systems
- Integrated Multimedia systems
  - Wired Systems
    - Fiber Optic System
    - Power Line Carrier (PLC )
    - Leased Telephone Line
    - Structured Cabling System
  - Wireless Systems
    - Microwave System
    - VHF/UHF System
    - VSAT System

## TL02 INTERNETWORK PACKET EXCHANGE (IPX)

### OBJECTIVE:

Participants will be introduced to the IPX as a networking protocol from Novell that interconnects networks. Further participants will learn about the IPX details in terms of system components, features, tools and applications

### WHO SHOULD ATTEND:

- Junior Telecommunication Engineers (maximum 3 years' experience).

### DURATION:

3 days

### TOPICS:

- Introduction & Historical Data
- Background Information
- IPX system components and its parameters
- IPX main features
- IPX versus EPABX
- IP Telephone sets
- Types of used cables
- Telephone Cables Terminations
- IPX system special tools
- Case Study

**new****TL03 INTEGRATED MULTIMEDIA & SOUND SYSTEMS****OBJECTIVE:**

Participants will learn about the modern techniques and tools for sound system design and optimization in the Oil & Gas industry. The course focuses mainly on PAGA and Page and Party systems.

**WHO SHOULD ATTEND:**

- Junior Telecommunication Engineers (maximum 3 years' experience)

**DURATION:**

3 days

**TOPICS:**

- Introduction and Background Information
- Different Sound Systems:
  - Public Address and General Alarm (PAGA) System
    - System Purpose
    - System Components
    - Design Criteria
    - Case Study
  - Page and Party System
    - System Purpose
    - System Components
    - Design Criteria
    - Case Study

## TL04 INTEGRATED SECURITY SYSTEM

### OBJECTIVE:

Participants will be introduced to the latest security system design and application for the Oil & Gas industry. Participants will learn about the CCTU system design, criteria, main components, major parameters, functions and applications.

### WHO SHOULD ATTEND:

- Junior Telecommunication Engineers (maximum 3 years' experience)

### DURATION:

5 days

### TOPICS:

- Introduction
- CCTV system design criteria.
- CCTV system components and its major parameters
  - Cameras' types (Fixed, PTZ, Day/Night, Dome...etc)
  - Motion detection feature and application.
  - Network Video Recorder, Digital Video Recorder.
  - CCTV System Manager
  - Monitors' type, size and quantity (No. of monitors relevant to No. of cameras)
  - Telemetry unit
  - Multiviewer
  - Video Decoder
  - Control Keyboard
- IP CCTV system and its components
- Recording methods and resolution levels.
- Types of used cables



**new****TL04 INTEGRATED SECURITY SYSTEM (Cont'd)****TOPICS: (Cont'd)**

- Access Control System design criteria
- Access Control System components and parameters
- Intrusion System Design Criteria
- Intrusion System Components and design parameters
- Interfacing Access Control/Intrusion System to the CCTV system
- CCTV system special tools
- Case Study

**TL05 FIBER OPTIC SYSTEM****OBJECTIVE:**

Participants will be introduced to the evolving technology of fiber optic system design starting from system advantages/disadvantages, optical sources, transmission, components and tool on to system operation and application.

**WHO SHOULD ATTEND:**

- Junior Telecommunication Engineers (maximum 3 years' experience)

**DURATION:**

3 days

**TOPICS:**

- Introduction & Historical Data
- Background Information
  - Communication Transmission Systems Basics
  - Different Transmission Medium
- Fiber optic transmission advantage & disadvantage
- Fiber optic generation and transmission
- Basics of the fiber optic system design
- Fiber optic transmission system network topologies
- Fiber optic system power budget calculation
- Difference between SDH and PDH
- SDH system basics
- Fiber optic system components
  - Fiber optic Modem
  - Fiber optic Multiplexer
  - Fiber optic Patch Panel, patch cords, pigtailed, connectors

**new****TL05 FIBER OPTIC SYSTEM (Cont'd)****TOPICS: (Cont'd)**

- Multiplexer units
  - Controller Unit
  - Power unit
  - Ethernet Unit
- Fiber optic Network Management System Features
- Fiber optic system special tools
- Case Study

## TL06 WIRELESS COMMUNICATION

### OBJECTIVE:

Participants will be introduced to the revolutionary paradigm shift in the wireless communication technology. Participants will learn about the various transmission systems including microwaves, VHF/UHF, VSAT and INMARSAT. Each system system's main function, tools, features and application will be discussed in details.

### WHO SHOULD ATTEND:

- Junior Telecommunication Engineers (maximum 3 years' experience)

### DURATION:

5 days

### TOPICS:

- Microwave System (Point to Point and Point to Multipoint)
  - Introduction & Historical Data
  - Background Information
  - Microwave link design
  - Information on frequency spectrum, policies and licensing in Egypt
  - Microwave Antenna
  - Attenuation factors
- Free space loss                      • Fading
- Diversity
  - Microwave system radio components
  - Microwave Management System
  - Microwave System special Tools
  - Microwave system radio Test
  - Case Study

**TL06 WIRELESS COMMUNICATION (Cont'd)****TOPICS: (Cont'd)**

- VHF/UHF
  - Introduction & Historical Data
  - Background Information
  - Link design
  - Information on frequency spectrum, policies and licensing in Egypt
  - Antenna
  - Radio Components
  - Management System
  - Special Tools
  - Radio Test
  - Case Study
- VSAT & INMARSAT Communication
  - Introduction & Historical Data
  - Background Information
  - VSAT & INMARSAT systems' bands of operation
  - VSAT & INMARSAT systems' components and parameters
  - VSAT & INMARSAT systems' applications
  - Practical impairments of deployed VSAT/INMARSAT system
  - Available transmission capacity for VSAT/INMARSAT system
  - Typical figures for the running Costs of VSAT/INMARSAT system versus bandwidth of operation
  - VSAT & INMARSAT Management System
  - Case Study

## **CE01** REPAIR & STRENGTHENING OF CONCRETE STRUCTURE

### **OBJECTIVE:**

Participants will learn about the main causes of defects in structures and how to evaluate and avoid them each type with suggested remedies.

### **WHO SHOULD ATTEND:**

- Structural Engineers
- Civil Engineers

### **DURATION:**

3 days

### **TOPICS:**

- Reasons of defects
- Types of cracks
- Corrosion cause and effect
- Evaluation of defects
- Testing methods
- Methods of repairing and strengthening
- Repair of cracks
- Provision to protect/repair for corrosion
- Materials used for repair
- Repair and strengthening of columns, beams, slabs and footings

**CE02****STRUCTURAL DESIGN OF PIPE RACK****OBJECTIVE:**

Participants will learn about the structural design of the pipe rack with emphases on stress analysis

**WHO SHOULD ATTEND**

- Structural Engineers aware of stress analysis and design of structures.

**DURATION:**

3 days

**TOPICS:**

- Stress analysis basis:
  - Structural systems
  - Loads
  - Used codes limitations (Egyptian & American Codes)
- Design basis:
  - Types of structural steel
  - Allowable working stresses
  - Stability, slenderness ratios and allowable deflection
  - Codes recommendations
  - Computer programs
  - Connection design
  - Pipe rack foundation

## **CE03** CIVIL SOFTWARE APPLICATION (SAP, SAFE & STAAD)

### **OBJECTIVE:**

Participants will learn about types of structures, finite elements information, unit system, load cases and analysis.

### **WHO SHOULD ATTEND:**

- Structural Engineers aware of stress analysis and design of structures
- Civil Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Types of structures
- Finite elements information
- Unit system
- Structural geometry and coordinate system
- Material properties
- Joint and degree of freedom and constrain
- Frame element
- Shell element
- Lad cases
- Analysis cases
- Response spectrum analysis



**CE04** EQUIPMENT FOUNDATION DESIGN**OBJECTIVE:**

Participants will learn about the minimum requirements for the analysis and design of Equipment Foundation in Oil & Gas plants. Participants will be exposed to various equipment design bases such as: Heat Exchangers, Horizontal Vessels, Vertical Vessels and Storage Tanks.

**WHO SHOULD ATTEND:**

- Structural Engineers

**DURATION:**

5 days

**TOPICS:**

- Design Considerations
- Loads
- Load Combinations
- Anchor Bolts
- Foundation Design for equipment

## EL01 ELECTRICAL HAZARDOUS AREA CLASSIFICATION

### OBJECTIVE:

Participants will be introduced to the definition of hazards and related principles, codes and standards applied in hazard representation, equipment enclosures and selection for hazardous areas and applications.

### WHO SHOULD ATTEND:

- Chemical Engineers
- Electrical Engineers
- Maintenance Engineers
- Safety Engineers

### DURATION:

5 days

### TOPICS:

- Purpose of electrical classification
- Flammable gases & liquids
- Different classifications of hazardous areas
- Auto ignition temperature for gas mixture
- Explosion proof electrical equipment

**EL02 POWER PROTECTION SYSTEMS****OBJECTIVE:**

Participants will get familiar with the art of protection schemes, fault level calculations, instrument transformers (CT's & PT's), and relay device functions, electrical network components, protection schemes and selectivity principles.

**WHO SHOULD ATTEND:**

- Electrical Engineers
- Maintenance Engineers
- Operation Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction and main definition
- Network calculations
- System protection
- Automatic transfer
- Protection coordination
- Case study

## ELO3 ELECTRICAL ENGINEERING & INSTALLATION

### OBJECTIVE:

Participants will learn about the electrical data required for drawings applied in construction and installation project phases.

### WHO SHOULD ATTEND:

- Electrical Engineers
- Maintenance Engineers

### DURATION:

5 days

### TOPICS:

- Introduction and main definitions
- Electrical calculations
- Electrical equipment operation & control
- Introduction to electrical power generation
- Hazardous area classification
- Electrical cabling system
- Electrical requirements for buildings

**EL04 ELECTRICAL PRE-INSTALLATION & INSTALLATION GUIDELINES****OBJECTIVE:**

Participants will be introduced to the main principles, theoretical aspects and applied techniques in the field of installation and commissioning of electrical works.

**WHO SHOULD ATTEND:**

- Staff Responsible for Electrical Installation
- Electrical Engineers and Technicians

**DURATION:**

5 days

**TOPICS:**

- Introduction and main definitions
- Pre-installation guidelines
- Cable routing and cable laying
- Termination and cable joint
- Installation of equipment
- Earthing and lightning protection system
- Lighting system
- Inspection and testing

## EL05 ELECTRICAL CABLING SYSTEM

### OBJECTIVE:

Participants will have a comprehensive preview of electrical cabling system including: cable route, cable section, cable schedule, cable M.T.O and cable M.R.Q along with associated accessories.

### WHO SHOULD ATTEND:

- Electrical Engineers
- Maintenance Engineers

### DURATION:

5 days

### TOPICS:

- Introduction & main definition
- Electrical layouts
  - Cable route
  - Cable sections
  - Cable schedule
  - Cable M.T.O/M.R.Q
  - Case study

**EL06** EARTHING SYSTEMS & LIGHTNING PROTECTION**OBJECTIVE:**

Participants will have a comprehensive preview of electrical earthing system along with necessary precautions and protection methods against lightning.

**WHO SHOULD ATTEND:**

- Electrical Engineers
- Maintenance Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction & main definitions
- Earthing system and layouts
- Requirements of existing plants
- Nature and definition of lightning
- Forms of lightning discharges
- Lightning protection systems

**EL07 UPS & BATTERY SYSTEMS****OBJECTIVE:**

Participants will be provided with essential knowledge and skills required for UPS & Battery system components and applications.

**WHO SHOULD ATTEND:**

- Electrical Engineers
- Maintenance Engineers/Technicians

**DURATION:**

5 days

**TOPICS:**

- Batteries:
  - Charging & discharging batteries
  - Different types of batteries & performance comparison
  - Battery selection, sizing and selection charts
- Battery charges DC power units:
  - DC supply systems, configurations & construction
  - Types of charging & applications
  - Control, alarms, indication & operation modes, and measurements
  - DC power supply unit rating
  - Other DC sources
  - Battery charging



**EL07** UPS & BATTERY SYSTEMS (Cont'd)**TOPICS: (Cont'd)**

- Battery supported AC systems uninterruptible power supplies UPS:
  - Power semiconductor devices
  - Uncontrolled & controlled rectifiers
  - Inverters
  - Static switches
  - UPS system configuration, calculation, operation and construction
  - By-Pass circuit
  - Control, alarms, indication & measurements

## EL08 FUNDAMENTALS OF POWER SYSTEM & GENERATION

### OBJECTIVE:

Participants will gain knowledge of power system and generation units with an introduction to the AC theory, operation principles, generators loading, stability and protection. Participants will further learn about the power distribution system.

### WHO SHOULD ATTEND:

- Engineers/Technicians responsible for maintaining, and testing of protection relays at power plants.

### DURATION:

5 days

### TOPICS:

- AC theory review
- Fundamentals of generators operation system
- Generators synchronization
- Generators loading
- Generator governor & AVR control
- Stability
- Generator protection methods
- Parallel operation and load sharing
- Load shedding
- Power distribution fundamentals
- Principle segments of a power distribution system
- Voltage level used
- Distribution system levels

**EL09 LIGHTING SYSTEM DESIGN****OBJECTIVE:**

Participants will be introduced to the basic principles and techniques for lighting system design, calculations and layouts. Emphasis will be placed on the issuance of MTO's and MRQ's with practical application.

**WHO SHOULD ATTEND:**

- Electrical Engineers

**DURATION:**

5 days

**TOPICS:**

- Introduction & main definitions
- Electrical lighting calculations
- Lighting layouts
- Lighting material MTO/MRO
- Case study

## **HS01** OFFSHORE SAFETY

### **OBJECTIVE:**

Participants will be introduced to the generic hazards which are specific to offshore oil & gas installations, potential risks associated with those hazards, and how controls are put in place to eliminate or reduce risks. In addition to that, participants will be effectively able to use basic firefighting equipment, and safe using for self-rescue techniques in case of emergency.

### **WHO SHOULD ATTEND:**

- Offshore staff (maintenance/operation/Production)
- HSE Engineers
- Managers

### **DURATION:**

5 Days

### **TOPICS:**

- Introduction to Hazard Classification & effects
- Risk assessment process
- Offshore related standards
- Offshore accidents
- Travelling to /from offshore
- Hazards from helicopter/Helicopter safety
- Disembarking and embarking at a barge
- Cranes and personnel basket
- Mandatory instructions upon arrival on platform
- Offshore cranes/helidecks

**HS01 OFFSHORE SAFETY (Cont'd)****TOPICS: (Cont'd)**

- Firefighting system and equipment
- Escape and evacuation equipment
- Lock out and tag out procedure
- Fire triangle/explosion mixture diagram
- Material Safety Data sheet (MSDS)
- Respiratory Protective Equipment
- Properties & Physiological effect of Hydrogen Sulphide
- Radiation hazards
- Radar Video Surveillance (RVS)
- Hazards of pressure testing

## **HS02** RISK ANALYSIS



### **OBJECTIVE:**

Participants will be identified to the risk analysis techniques, all hazards associated with activities, preparing checklists required for risk analysis techniques implementation & the methodology of implementation for each techniques.

### **WHO SHOULD ATTEND:**

- Operation and Maintenance Engineers
- Construction Engineers
- HSE Engineers/Safety Inspectors
- Production Engineers

### **DURATION:**

5 Days

### **TOPICS:**

- Introduction to Hazards classifications
- Task based Risk Assessment Methodology
  - Identify the task
  - Breakdown tasks to steps
  - Identify hazards for each step
  - Assess the risk (risk ranking (QRA)
  - Control measures /hierarchy of risk control
- Job safety analysis process (JSA)/Job hazard analysis process (JHA)
  - Benefits of JSA
  - Stages of JSA/JHA/HIP
  - Methodology of doing JSA

## HS02 RISK ANALYSIS (Cont'd)

### TOPICS: (Cont'd)

- Hazard identification (HAZID)
  - HAZID Methodology
  - Breakdown tasks to steps
  - Identify hazards for each step
- SIMOPS (Simultaneous Operation)
- HAZOP (Hazard Operability)
- ENVID (Environmental Identification Hazards)

**HS03****INCIDENT/ACCIDENT INVESTIGATION & ROOT CAUSE ANALYSIS****OBJECTIVE:**

The overall course objective is to stress on the importance of accident/incident investigation as an effective informatory tool to support risk management and reduce future accident potential. Throughout the course, participants will be introduced to the types of hazards associated with site activities and their classification. They will practically learn about assessment methods and reporting techniques and also learn how to prepare a formal investigation report.

**WHO SHOULD ATTEND:**

- All persons with direct responsibilities for incident investigating and reporting
- HSE Engineers
- Project and Construction Managers

**DURATION:**

5 Days

**TOPICS:**

- Hazard Classification
- Hazard pyramid and iceberg theory
- Hazards effect on Health
- Risk assessment process
- Accident /incident categories
- Why we need investigation?
- The Domino theory



**HS03****INCIDENT/ACCIDENT INVESTIGATION & ROOT CAUSE ANALYSIS (Cont'd)****TOPICS: (Cont'd)**

- Incidents Investigation Scope/types
- Accident/Incident Investigation Process
- Root Cause analysis:
  - Fault tree analysis
  - Fishbone analysis
- Accident costs
- Incident formal Investigation Report
- Incidents Recording and Rates

## **HS04** INDUSTRIAL SAFETY



### **OBJECTIVE:**

Participants will be introduced to the HSE guidance about safe procedures for all construction and operational activities during all project phases (Engineering, Construction, pre-commissioning , Commissioning and Start-up )

### **WHO SHOULD ATTEND:**

- HSE Engineers
- Construction team
- Operation teams

### **DURATION:**

5 Days

### **TOPICS:**

- Introduction to construction hazards
- Engineering protection
- Site access & Security control
- Site HSE Induction & training
- Site HSE meetings & Inspections
- Personnel protective equipment
- Site medical & welfare facilities
- Excavation
- Working at height
- Electrical safety
- Energy Isolation
- Confined space entry

## **HS04** INDUSTRIAL SAFETY (Cont'd)

### **TOPICS: (Cont'd)**

- Safety in welding and cutting operation
- Radiography operation
- Working inside live plant
- Pre-commissioning, commissioning and START-UP operations
- Site waste management
- Emergency preparedness and emergency response plan
- Material safety data sheet (MSDS)
- Medical & Personnel protection

**HS05 H<sub>2</sub>S & USING BREATHING APPARATUS****OBJECTIVE:**

Participants will be introduced to the properties of H<sub>2</sub>S and workplace environments where H<sub>2</sub>S may be found. Moreover, they will be exposed to examples of engineering controls, administrative controls, and PPE that can be used to protect workers from H<sub>2</sub>S exposure.

**WHO SHOULD ATTEND:**

- Operation and Maintenance Staff
- HSE Engineers

**DURATION:**

5 Days

**TOPICS:**

- Hydrogen sulphide characteristics
- Material Safety Data sheet (MSDS)
- Physiological effect of hydrogen sulphide
- Properties of hydrogen sulphide:
- How might I be exposed to hydrogen sulphide?
- Is there a medical test to determine whether I have been exposed to hydrogen sulphide?
- What is the health effect of hydrogen sulphide?
  - Respiratory effect
  - Neurological effect
- Detection and alarm system

**HS05** H<sub>2</sub>S & USING BREATHING APPARATUS (Cont'd)**TOPICS: (Cont'd)**

- Emergency procedures
- Hydrogen sulphide rescue
- First Aid for H<sub>2</sub>S poisoning
- Respiratory protection equipment
- Types of respirators
- Rescue and first aid

## **HS06** HANDLING OF HAZARDOUS CHEMICALS AND HYDROGEN SULPHIDE

### **OBJECTIVE:**

Participants will be introduced to different types of hazards/hazards effects & the health effects raised by exposure for different types of chemicals. Moreover, they will understand that exposure to high concentrations can lead to unconsciousness and death within minutes, or even seconds.

### **WHO SHOULD ATTEND:**

- Operation and Maintenance Staff
- HSE Engineers/safety specialist
- Painting and coating Engineers
- Mechanical Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Hazard classification/Effect
- Route of entry in to the human body
- Hazard communication
  - How can workplace hazard to be minimized?
  - Why a written hazard communication program is necessary?
  - What is Material Safety Data Sheet and it is Needed?
- COSHH (Control of Substances Hazardous to Health)
- MSDS content
  - Chemical composition and information ingredients
  - Hazards identification

**new**

## **HS06** HANDLING OF HAZARDOUS CHEMICALS AND HYDROGEN SULPHIDE (Cont'd)

### **TOPICS: (Cont'd)**

- First aid
- Firefighting measures
- Accidental release measures
- Physical and chemical properties
- Disposal
- Hydrogen sulphide
  - Physiological effect of hydrogen sulphide
  - Properties of Hydrogen Sulphide:
  - Health effect of hydrogen sulphide?
  - Emergency procedures
  - Hydrogen sulphide rescue
  - First Aid for H<sub>2</sub>S Poisoning
- Respiratory protection equipment

## **HS07** FIRST AID

### **OBJECTIVE:**

Participants will be introduced to the best and most commonly applied practices of first aid in case of casualties or in case of emergency at work.

### **WHO SHOULD ATTEND:**

- HSE Engineer
- All Site Construction Engineers
- Operation and maintenance Engineers

### **DURATION:**

5 days

### **TOPICS**

- First aid definition
- First aider properties
- Primary assessment for the casualties
- Triage for accidents injuries
- Cardiopulmonary resuscitation (CPR)
- Sudden blockage of airway
- Heart attack
- Burns first aid
- First aid for cuts and wounds
- First aid for bleeding
- Bone and muscles injuries/fractures
- Splints
- Head and spinal injuries
- Chest injuries



**HS08 DEFENSIVE DRIVING****OBJECTIVE:**

Participants will be introduced to the skills and knowledge needed to be a defensive driver. In addition to that, they will be exposed to common hazards in the driving environment and react to prevent collisions.

**WHO SHOULD ATTEND:**

- Drivers
- Site Construction Engineers
- All employees

**DURATION:**

5 days

**TOPICS:**

- Objectives
  - Pre-Test “how do you drive?”
  - DDC Collision Prevention Formula (RUA)
  - What is a defensive driving?
- Ready to the road
  - Physical conditions affect driver driving
  - Vehicle/weather/road conditions
- Types of driving/symptoms/control measures
- Success on the road/six most unsafe driving behaviors
- Collision proofing
  - Review DCC collision prevention Formula
  - Types of collision

## **HS08** DEFENSIVE DRIVING (Cont'd)

### **TOPICS: (Cont'd)**

- Driving for life
  - List ten habits of defensive driving
  - Identify personal behavior's and decision you will make to avoid collision or violations
  - Successfully complete the course exam

**HS09 CONTROL OF WORK (COW) PROGRAM****OBJECTIVE:**

This course will give general knowledge about permit to work and risk assessment techniques & the Effective control of the worksite and communication with work parties. Moreover, the course will discuss the Methodology related to preparation, organizing and control of work concerning different activities.

**WHO SHOULD ATTEND:**

- HSE Engineers
- All staff related to work at Oil and Gas field

**DURATION:**

5 days

**TOPICS:**

- Why we need permit to work (PTW) at our work? (Purpose of PTW system)
- Common PTW problems
- What is Cow
- The Cow Standard – 12 Elements
- Types of work activities
- Risk assessment-JSA
  - Risk assessment methodology/process
    - Identify the Hazard Effects
    - Existing Control Measures
    - Evaluate the Initial Risk (with Existing Control)
    - Determine the Additional Controls Required
- Pre job tool box talk

## **HS09** CONTROL OF WORK (COW) PROGRAM (Cont'd)

### **TOPICS: (Cont'd)**

- Isolation-Lock Out & Tag-Out
- Isolation Methods & Techniques
- Lockout & tag-out devices
- Isolation procedure
- SIMOPS
- Work permits types

**HS10** BASIC FIRE FIGHTING TECHNIQUES**OBJECTIVE:**

Participants will be introduced to General awareness on the responsibilities of individuals in the firefighting crew & on the theory of fire. Moreover, they will be exposed to the Methodology of evacuation procedures, drills and use of the appropriate firefighting equipment to deal with an undeveloped fire

**WHO SHOULD ATTEND:**

- HSE Engineer/Safety Specialist
- Operation staff
- Construction staff
- Maintenance staff

**DURATION:**

3 days

**TOPICS:**

- Fire protection and extinguishing theories
- Fire classification
- Controls Over Flammable Materials
- Fire prevention methods
- Fire extinguishing agents
- Portable firefighting equipment
- Fire detection system
- Fire accidents reasons and analysis

## **HS11** RIGGING SAFETY & LIFTING OPERATIONS



### **OBJECTIVE:**

The course will cover all the safety precaution which required for safe lifting operation (Manual and Mechanical). Furthermore, the course will include the identification of the main hazard associated with lifting operation & main causes of lifting accident.

### **WHO SHOULD ATTEND:**

- HSE Engineers
- Heavy equipment operators
- Supervisors
- Construction team
- Operation staff

### **DURATION:**

3 days

### **TOPICS:**

- Introduction
- Crane inspection
  - Overview and objectives
  - Workshop: Why inspect Mobile cranes
  - Levels of Inspection
  - Inspector qualification and competency
  - Frequency of inspections, record-keeping and rules
  - Crane types and components
  - Aspects of inspection and senses used in inspection
- Rigging Safety and Inspection

**HS11****RIGGING SAFETY & LIFTING OPERATIONS (Cont'd)****TOPICS: (Cont'd)**

- Overview and objectives
- Why train riggers and rigging inspectors
- Types and use of rigging gear
- Rigging survey
- Rigger and inspector qualifications
- Inspection requirements and recordkeeping
- Aspects of inspection
- Wire rope and rigging workshop
- Aspects of rigging
- Rigging problems
- Rigging inspection lab
- Crane Accidents: Causes and Results

## **HS12** HSE LEADERSHIP

### **OBJECTIVE:**

The course will Identify the Roles and Responsibilities for HSE Leadership & the properties for Excellent HSE Leadership & how to Gain the Supervisor Skills.

### **WHO SHOULD ATTEND:**

- HSE Managers/leaders
- Maintenance and Operation Mangers
- Construction Managers

### **DURATION:**

5 days

### **TOPICS:**

- Introduction
- Leadership roles & responsibilities for HSE excellence
- Understanding behavioral styles to enhance supervisory relationships
- Organizational behavior and the manager
- Leadership
- Supervisory
- Safety systems steering committee
- Self-directed work teams



**HS13** **CONFINED SPACE ENTRY****OBJECTIVE:**

Participants will learn and understand all the features of the confined space entry safety rules and regulations. They will also be aware by Confined space entry different hazards.

**WHO SHOULD ATTEND:**

- Practical users who need to enter confined spaces
- Managers, Supervisors, engineers (who may have need to control work in these locations)
- Operation staff with relation to confined space entry activity/maintenance

**DURATION:**

3 days

**TOPICS:**

- What is a Confined Space?
- Examples of Confined Spaces.
- Why entry to confined spaces considered a critical one?
- Different types of hazards/hazards effects.
- Potential Hazards in Confined Spaces.
  - Atmospheric
  - Physical
  - Electrical
  - Mechanical
- Responsibilities
- Managing for confined space entry permits
- Control measures for safe entry to confined space

**HS14 CONSTRUCTION SAFETY MANAGEMENT****OBJECTIVE:**

Participants will be introduced to Health and safety responsibilities for different involved key parties (Employee, Employer,....etc). Moreover, they will be Identified to the roles and responsibilities for each party during all phases. Furthermore, they will be exposed to all HSE requirements , plans and procedures which shall be in place before commencing site activities.

**WHO SHOULD ATTEND:**

- Proposal and contracts Engineers/Specialist
- HSE Engineers
- Operation & Construction Managers
- Project Managers

**DURATION:**

5 days

**TOPICS:**

- Planning stage
- Pre-qualification stage
- Selection stage
- Pre-Mobilization stage
- Mobilization stage
- Execution/Construction Activities stage
- De-Mobilization stage
- Close Out

**HS15 WORKING AT HEIGHTS & SCAFFOLDING****OBJECTIVE:**

This course is designed to provide participants with the knowledge and skills required to identify the hazards associated with working at height and all control measures for mitigating the risks.

**WHO SHOULD ATTEND:**

- Employees who are working at height
- Scaffolding staff
- Safety Engineers/Inspectors
- Operation staff
- Construction staff

**DURATION:**

4 days

**TOPICS:**

- Identifying and evaluating fall hazards
- What Is A Scaffold?
- Scaffolding hazards
- Scaffolding Types
- HSE requirements for scaffolding
- Scaffolding design
- Scaffolding securing
- Scaffolding inspection
- Fall Protection Standard
- Fall Protection system

**HS16 ELECTRICAL SAFETY****OBJECTIVE:**

Participants will be able to identify the general requirements for electrical safety design & define proper wiring design and methods. Furthermore, participants will be identified to the definition of the proper installation and protection of electrical equipment and components.

**WHO SHOULD ATTEND:**

- Electrical Engineers/Technicians
- Safety Engineers/Inspectors
- Operation & maintenance staff
- Construction staff

**DURATION:**

4 days

**TOPICS:**

- What is the electricity?
- How does electricity work?
- Kinds of electricity
- Electrical hazards
  - Electrical Shock
  - Electrical burns
  - Arc-flash burns
  - Arc blast
  - Falls/ fire/ explosion
- Preventing electrical accidents
  - Insulation
  - Electrical protective devices
  - Guarding
  - Grounding
  - PPE
  - Safe work practices
  - Lockout & tag out

**new**

## **HS17** EXCAVATIONS & TRENCHING SAFETY

### **OBJECTIVE:**

Participants will be able to identify the minimum standard, requirements and procedures for safe excavation and trenching.

### **WHO SHOULD ATTEND:**

- Civil Engineers/Technicians
- Safety Engineers/Inspectors
- Operation & maintenance staff
- Construction staff

### **DURATION:**

2 days

### **TOPICS:**

- Definitions
- Excavation Hazards
  - Surface encumbrances
  - Access/Egress
  - Falling loads
  - Hazardous atmospheres
  - Adjacent structures
  - Loose rock or soil "According to soil investigation type"
  - Falls
  - Cave-in
- Excavation Inspection
- Soil Classification
- Protective Systems
- Underground Utilities
- Vehicle traffic
- Mobile equipment
- Water accumulation

## **HS18** WELDING & CUTTING OPERATION

### **OBJECTIVE:**

Participants will be able to Identify the types of welding and cutting operation techniques & identify HSE requirements and procedures for safe operation.

### **WHO SHOULD ATTEND:**

- Mechanical Engineers/Technicians
- Safety Engineers/Inspectors
- Operation & maintenance staff
- Construction staff

### **DURATION:**

2 days

### **TOPICS:**

- Welding and cutting operation types
  - Gas welding
  - Arc welding
  - Oxygen and arc cutting
- Welding and cutting operation hazards
- General HSE requirements
- Risk control methodology
  - Administrative control
  - Engineering
  - Personnel protective equipment
- Compressed gas cylinders

**PR01** PRODUCTION OPTIMIZATION USING NODAL ANALYSIS**OBJECTIVE:**

Participants will learn about the complicated effect of parameters on producing wells performance. Participants will further be provided with recommendations for optimizing well performance & troubleshooting production flow problems.

**WHO SHOULD ATTEND:**

- Petroleum Engineers (involved in analyzing & monitoring the performance of natural flow & artificially lifted wells).

**DURATION:**

5 days

**TOPICS:**

- Introduction to oil & gas production systems
- Inflow performance
- Vertical lift performance
- Choke & flow line performance
- Overall production system performance
- Nodal system analysis
- Nodal analysis in artificial lift
- Practical Computer Applications

## PRO2 PRODUCTION SYSTEMS SIMULATION

### OBJECTIVE:

Participants will learn about different elements involved in the simulation of the entire production system from well bores to separators. Participants will also be introduced to theoretical & practical simulation background of each element.

### WHO SHOULD ATTEND:

- Process/Petroleum Engineers (involved in the operation & design of production systems from the down-hole to the separator)

### DURATION:

5 days

### TOPICS:

- Components of a production system
- Inflow Performance of Oil & Gas wells
- Multi-phase flow theory, flow patterns & maps
- Vertical lift, performance, correlations & matching
- Overall Production System Performance
- Choke performance
- Horizontal flow performance in pipelines
- Flowing well performance & artificial lift
- Fluid properties modeling, black oil & compositional
- Reservoir modeling interface tables
- Well evaluation operations
- Nodal & system analysis
- Computer software applications:
  - Pipesim suite
  - Pipesoft suite



**PRO3** GAS LIFT OPTIMIZATION & TROUBLESHOOTING**OBJECTIVE:**

Participants will gain necessary experience required for proper design & operation of gas lifted wells. Participants will also learn about troubleshooting of problems associated with gas lift operation.

**WHO SHOULD ATTEND:**

- Petroleum Industry Engineers (involved in artificial lifting & gas lift operations)
- Production Engineers

**DURATION:**

5 days

**TOPICS:**

- Gas lift equipment
- Equipment operation
- Reservoir deliverability
- Multi-phase pressure gradients
- Well deliverability
- Gas lift valve spacing & pressure setting
- Troubleshooting

## PRO4 WELL TEST ANALYSIS

### OBJECTIVE:

Participants will gain knowledge of the well testing & analysis technology for proper reservoir monitoring & production optimization.

### WHO SHOULD ATTEND:

- Production Engineers
- Reservoir Engineers

### DURATION:

5 days

### TOPICS:

- Radical diffusivity equation
- Conventional well test analysis
- Pressure build up test
- Estimation of the distance to a no-flow boundary
- Pressure drawdown test & analysis
- Open-hole testing
- Cased hole testing
- Kinds of pressure gauges & their accuracy
- Measuring techniques
- Surface read-out techniques
- Drill steam testing
- Special well testing
- Layered reservoir testing
- Multiple well testing
- Principles of transient testing
- Modern well test interpretation
- Calculation of permeability & skin factor
- Pressure measurement
- Sampling & pressure control

**PRO5** SUCKER ROD PUMPING**OBJECTIVE:**

Participants will gain necessary experience required for proper selection, operation & troubleshooting of sucker rod pumped wells.

**WHO SHOULD ATTEND:**

- Petroleum Engineers
- Mechanical Engineers

**DURATION:**

5 days

**TOPICS:**

- Surface equipment
- Sucker rod string
- Subsurface equipment
- Volumetric efficiency & Gas interference
- Well analysis made easy
- Dynamometer & its application
- Troubleshooting common pump problems
- Reports

## **PR06** GAS RESERVOIR ENGINEERING

### **OBJECTIVE:**

Participants will gain knowledge of gas reservoir engineering parameters & applications necessary for reservoir monitoring & production optimization.

### **WHO SHOULD ATTEND:**

- Production Engineers
- Reservoir Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Gas reservoir types & phase diagram
- Properties of natural gases
- Gas reservoir performance
- Gas condensate reservoirs
- Deliverability testing of gas wells
- Transient testing of gas wells
- Separation, transport & measurement of gases

**PR07** APPLIED OIL RESEVOIR ENGINEERING**OBJECTIVE:**

Participants will gain knowledge of oil reservoir engineering parameters & applications necessary for reservoir monitoring & production optimization.

**WHO SHOULD ATTEND:**

- Production Engineers
- Reservoir Engineers

**DURATION:**

5 days

**TOPICS:**

- Reservoir fluids properties
- Reservoir rock properties
- Hydrocarbon reservoir-volumetric method
- Material balance
- Reservoir drive mechanisms
- Fluid flow
- Well testing

## **PR08** WATER INJECTION DESIGN & APPLICATION

### **OBJECTIVE:**

Participants will gain necessary experience required for evaluating well problems using open hole & production logging techniques.

### **WHO SHOULD ATTEND:**

- Production Engineers
- Reservoir Engineers (involved in reservoir pressure maintenance by water injection)

### **DURATION:**

5 days

### **TOPICS:**

- Reservoir performance analysis forecast
- Reservoir rock properties affecting displacement efficiency
- Secondary recovery process
- Displacement theory
- Vertical sweep efficiency
- Patterns and pattern effects
- Surface injection systems design
- Water-flood monitoring & management

**PR09** CASED HOLE LOGGING**OBJECTIVE:**

Participants will gain required knowledge & skills for evaluating well problems using open hole & production logging techniques.

**WHO SHOULD ATTEND:**

- Petroleum Engineers
- Production Engineers
- Reservoir Engineers

**DURATION:**

5 days

**TOPICS:**

- Cased hole logging overview
- Production logging tools
- Interpretation
- Evaluation of the information through gasing
- Cased hole logging applications
- Qualitative evaluation of flow behind pipe

**PR10**

## ENHANCED OIL RECOVERY TECHNIQUES & SCREENING (EOR)

### OBJECTIVE:

Participants will gain necessary experience required for planning & evaluating the application of the enhanced oil recovery methods.

### WHO SHOULD ATTEND:

- Petroleum Engineers
- Production Engineers
- Reservoir Engineers

### DURATION:

5 days

### TOPICS:

- Hydrocarbons & reserves
- Factors affecting EOR methods
- Petro-physics & petrochemistry
- Polymer flooding
- Miscible drive
- Gas recycling
- Carbon dioxide flooding
- Insitu combustion
- Steam injection



**PR11****BASICS OF DRILLING TECHNOLOGY****OBJECTIVE:**

Participants will be introduced to basic drilling activities including main definitions & techniques. Throughout the course, participants will gain knowledge of drilling apparatus, drilling rigs, holes types, casing & cementing techniques. The course concludes with post-drilling activities & well problems.

**WHO SHOULD ATTEND:**

- Production Engineers/Technicians

**DURATION:**

5 days

**TOPICS:**

- Pre-Drilling Activities
- Drilling Apparatus
- General Systems on Drilling Rig
- Drilling Straight Holes
- Drilling deviated Hole
- Casing & Cementing
- Wire line Logging & LWD
- Coring Operations
- Post-Drilling Activities
- Problem Wells

## **PR12** WELL COMPLETION

### **OBJECTIVE:**

Participants will learn about methods & techniques of well design & gain necessary experience required for well completion.

### **WHO SHOULD ATTEND:**

- Petroleum Production Engineers
- Reservoir Engineers

### **DURATION:**

5 days

### **TOPICS:**

- Introductions to tubing, casing, flow couplings, nipples
- Sub-surface safety valve nipples
- Circulating devices, sliding sleeves
- Types of well completions
- Open hole & liner completions
- Perforated liner/casing completions
- Conventional completions, single, multiple
- Production packer applications
- Case study

**NOTES:**

Handwriting practice area with 20 horizontal dotted lines.

**NOTES:**

Handwriting practice area with 20 horizontal dotted lines.

**NOTES:**

Handwriting practice area with 20 horizontal dotted lines.

**NOTES:**

A series of horizontal dotted lines for writing notes, contained within a rounded rectangular frame with a dashed orange border.

**NOTES:**

A series of horizontal dotted lines for writing notes, contained within a rounded rectangular frame with a dashed orange border.

We **IN**vest  
People