Engineering Training Programs

Part 1

Mechanical Engineering Programs

AIR-CONDITIONING AND REFRIGRATION

COURSE OBJECTIVES:

Enables participants to acquire the knowledge and skills in handling ACProjects.

COURSE CONTENTS:

- Ventilation and Air-conditioning :
- Design parameters - Engineering calculations - Heat gain Dehumidifying - Installation.
- Heating of Buildings
- Refrigeration :
  P – h chart - cycle calculation for fern 12 - Coefficient of performance - Multistage compression - Physical properties of various refrigerants - Binary refrigeration systems - Capacity control for reciprocating compressors - Common types of refrigerants (Ammonia - Fern 12 - Fern 22 - Methyl Chloride - Carbon Dioxide.
- Cold Storage :
  Insulation - Pipe covering - Relative humidity for cold storage - Operating conditions Systems - Space required for refrigeratedgoods - Small boxes and rooms - Refrigeration accessoryequipment - Ice manufacture.
- Cooling Towers :
  Function - Design calculations - Construction - Operation - Maintenance.

TARGET PARTICIPANTS:

Mechanical and electrical engineers and senior technicians involved in the selection, installation, operation and maintenance of air conditioning and industrial applications.

LOCATION:

DURATION: One week

DATE: .....

WELDING ENGINEERING & TECHNOLOGY

COURSE OBJECTIVES:

Provides participants with knowledge related to welding engineering.
Emphasis will be made on the allied processes of surfacing and hard facing, cutting and weld testing.

COURSE CONTENTS:

- General classification and definitions of welding processes.
- Equipment and Techniques of :
  Oxyacetylene - Pressure welding - Resistance welding - Termite pressure welding.
- Nonpressure fusion welding - Gas welding - Arc welding - Atomic hydrogen welding - Inert gas - shielded arc welding - Sub merged arc welding - Termite welding.
  - Welding metallurgy.
  - Mechanical properties of fusion welds.
  - Conditions for sound welds - Soundness of fusion welds - Stresses in welds.
- Welding design: Advantages of welded construction, - Forms of welded joints
  - Welding construction codes for boilers and high- pressure vessels (ASME).
  - Facing surfacing by welding.
  - Metal cutting.
- Oxyfuel gas cutting - Arc cutting - Carbon arc cutting - Plasma arc cutting.
- Nondestructive testing :
  Radiography - Magnetic particle - Dye penetration - Ultrasonic - Welding reports.

TARGET PARTICIPANTS:

Engineers, supervisors and qualified technicians in metal industries, maintenance engineers and senior foremen in refineries, chemical, petrochemical and power plants.

LOCATION:

DURATION:

DATE:

COURSE OBJECTIVES:

Provides participants with detailed knowledge on the available types of lubricants and their additives, specifications and testing. Also, to discuss in detail the problems of lubricants application.

COURSE CONTENTS:

- Friction.
- Wear.
- Types of lubricants and their manufacture :
  Mineral oils – Animal and vegetable oils – Synthetic liquids - Miscellaneous fluids - Greases - Solid lubricants.
- Properties and specifications of lubricants :
  Viscosity - Specific gravity - Specific heat - Acidity - Saponification value - Flash - point- Water and sediment.
- Lubricating Oil Additives:
  VI improves - Antioxidants - dispersants - Detergents - Anti - wear agents
- Friction modifiers - Extreme pressure agents - PP Depressants – Antirust - agents - Antifoam agents.
  - Lubricants Applications & Problems.
  - Automotive Gasoline engine lubricants
    Gas turbine lubricants.
  - Lubrication of marine diesel propulsion engines.
  - Lubrication of automotive diesel engines.
  - Lubrication of electrical equipment.
- Lubrication of metal working equipment.
- Textile machinery.
- Lubrication in steam turbines.
- Deterioration in steam turbines.
  - Health and safety in lubricants handling and use.
  - Disposal of used oil.

TARGET PARTICIPANTS:

This course is directed to maintenance and operation engineers, supervisors and senior technicians. It will also be of benefit to laboratory chemists responsible for testing and evaluation of new oils proposed for use and giving advice on the suitability of used oil for continuous performance without change.

LOCATION:

DURATION: One week

DATE:

COURSE OBJECTIVES:

Provides participants with full appreciation of the different types of hydraulic systems and their characteristics. Also, provides participants with understanding of hydraulic system design, operation and maintenance.

COURSE CONTENTS:

- Introduction :
  Hydraulic principles and symbols.

- Pumps :
  Types of pumps.
  Pumping circuits and pump derives.
  Pump circuit design study.

- Hydraulic valves :
  Pressure - control - Flow - control valves.
  Directional control valves - Cartridge valves.
  Mobil hydraulic valves.

- Actuators :
  Hydraulic cylinders.
  Semi - rotary actuators.
  Hydraulic motors and circuits.
  Motor circuits design examples.

- Fluids for hydraulic system :
  Hydraulic fluids.
  Fluid contamination control.
  Filler construction and filtration technology.
  Leakage control.

- Control systems :
  Servo control.
  Valve and pump servo systems.
  Proportional valves.
  Proportional versus servo valves.
  Some applications of proportional control valves.

- Hydraulic system design :
  Design criteria,
  Hydraulic intensifiers.

- Hydraulic system maintenance :
  Equipment and practices.
  Trouble shooting in hydraulic systems.

TARGET PARTICIPANTS:

Engineers, supervisors, qualified technicians and foremen.

LOCATION:

DURATION: One week

DATE:

COURSE OBJECTIVES:

Provides participants with full understanding of the design features and principles of operations of pressure vessels.
Develops participant's skills to ensure correct and safe operation of different types of pressure vessels.

COURSE CONTENTS:

- Separators
- Separation fundamentals : Principle of separation - System problems - Basic considerations - Factors affecting separation - Stream characteristics.
- Separator description : Vessel types - Flow patterns - Separators Internal - Material of construction.
- Separator sizing (Design) :Definitions - Sizing knockout drum - Sizing accumulation - Sizing vapor liquid separation
- Separator application.
- Separator operation:
- Control - Start - up and Shut - down - Routine operation - Trouble shooting.
- Reactors:
- Hydrocarbon conversion processes : Function - Principle types of reactor - Reactor application - Reactor design.
- Catalysts : Function - The nature of the catalytic process - Reaction mechanism - Catalyst types.
- Handling and using catalyst in the plan : Catalyst storage - Drum handling - Intermediate bulk containers - Sieving catalyst - Catalyst charging - Catalyst discharge - Re-use of discharged catalyst - Disposal of used catalyst - Safety precaution.
- Operation : Catalyst regeneration - Catalyst reduction - Catalyst sulfuring.

PRESSURE VESSELS

TARGET PARTICIPANTS:

Newly graduated engineers, technicians, foremen and qualified operators.

LOCATION:

DURATION: One week

DATE:

COURSE OBJECTIVES:

Provides participants with full appreciation of the types of ventilation and their properties.
Enhances participants' skills, to select the proper ventilation and base them properly.

COURSE CONTENTS:

- The motive force.
- Inductive action of the wind.
- Induced draft.
- Combine forces of wind effect and thermal effect.
- Mechanical ventilation.
- Air ventilation requirements.
- Roof ventilators.
- Capacity of ventilators.
- Design and placements.
- Fresh air requirements.
- Ventilators bases : Angle rings - Stiffener angles - Prefabricated roof curbs - Ventilator dampers - Meted calculating numbers and size of ventilators required.
- Air flow in ducts.
- Duct system design.
- High velocity system design.
- Determining required air volume.

- Volume and heat capacity ducts.
- Relation of air characteristics and temperature.
- Sizing exhaust mains at branch junctions.
- Testing exhaust ventilation systems.
- Air cleaners.
- Graphical selector for air cleaners.
- Fan, derive and inlet box arrangements.
- Fan and blowers.
- Threshold limit values of air contaminates.
- Dust collection.
- Ventilators calculation examples.
- Air leakage.
- Garage ventilation.
- General ventilation rules.

TARGET PARTICIPANTS:

Engineer supervisors and technicians whose work involve improving ventilation in industrial plants and workshops.

LOCATION:

DURATION: One week

DATE:

FIRED HEATERS

COURSE OBJECTIVES:

Provides participants with understanding and skills of fired heaters specification, design and energy conservation

COURSE CONTENTS:

- Introduction.
- Heat transfer: conduction - convection - radiation.
- Heat exchangers types
- Special heat exchanger
- Finding the basic design according to application.
- Construction materials, mechanical features a performance monitoring.
- Combustion conditions and its influence on design and operation, case study.
- Energy conservation on the design and operation.
- Dry - out procedure.
- Start up procedure.
- Shut down procedure.

TARGET PARTICIPANTS:

Engineers, technicians and foremen.

LOCATION:

DURATION: One week

DATE:

AIR COOLERS AND COOLING TOWERS

COURSE OBJECTIVES:

This course aims at providing participants with full understanding and appreciation of air coolers and cooling towers, regarding their types specifications and design considerations. It develops participants' skills to operate and carry maintenance required efficiently

COURSE CONTENTS:

- Cooling Towers:
    1. Cooling water system.
    2. Cooling tower elements.
    3. Cooling tower operation (Start - up & Start -down).
    4. Cooling tower troubleshooting.
    5. Cooling tower maintenance.
    6. Design consideration and case study.
- Air Coolers:
    1. Cooling, medium (water or air) .
    2. Air cooler location.
    3. Air-cooled heat exchanger.
- Types, elements & controlling systems.
- Air coolers operation and maintenance.
- Air coolers troubleshooting.
- Design consideration and case study.

TARGET PARTICIPANTS:

Fresh graduated engineers, technicians and qualified operators in industrial installations and workshops.

LOCATION:

DURATION: One week

DATE:

APPLIED COMBUSTION TECHNOLOGY

COURSE OBJECTIVES:

Provide participants with the skills and knowledge of heating process in industry. Emphasis will be made on combustion chemistry of all types of fuels, heat balance, design and operation of furnaces and burners in different industrial applications.

COURSE CONTENTS:

- Combustion chemistry : Types of fuels: gaseous - liquid - solids.
- Chemical and physical properties of fuels: Composition - Density - Flashpoint - Ignition temperature - Vapor point - Viscosity - Impurities.
- Combustion: Equations and balance - Incomplete combustion - Products of combustion - Heat generated and calculations - Latent heat and Sensible heat - Net heat value and gross heat value.
- Furnaces : Classification according to : Use - Material L shape - Movement - full saving .
- Distribution of heat.
- Operation: Start - up, shut down procedures - Monitoring performance Inspection and maintenance.
- Burners: Gas burners - Inspiration gas burners - Luminous - Flame burner - high pressure oil burners - Low burner, dual gas/oil burners - Flame and temperature control - Cleaning and maintenance - Isolation techniques.
- Typical applications : Iron and steel industry - Cement industry - Steam reforming of hydrocarbons - Crude oil heating - Gas turbines - Metal forming Boiler operations.

TARGET PARTICIPANTS:

Process, operation, inspection and maintenance engineers, Supervisors and senior operators whose work involve handling combustion industrial applications in different industrial installations, refineries and petrochemical plants.

LOCATION:

DURATION: One week

DATE: