COURSES MODULE

For

PIPING PLANT DESIGN & DETAILED ENGINEERING

Course Outline

- International codes & Standards using for piping system & its components.
- Plant layouts and work flow procedures
- Terminology and symbols used in plant layout
- Plot plans, Equipment Layouts, elevations and 3-D models
- Principles of chemical process technology
- Process flow diagrams (PFDs)
- Equipment used in process plants
- Instrument symbols and abbreviations
- Piping and instrumentation diagrams (P&IDs)
- Piping design and engineering principles
- Terminology, symbols and abbreviations used in piping design
- Piping materials
- Piping specifications and piping codes
- Components of piping systems - fittings, flanges and valves
- Piping isometrics and bill of materials

CERTIFICATION & PG DIPLOMA COURSES FOR Oil & Gas / Chemicals/ Energy & Power industries.
# Piping Plant Design & Detail Engineering

## Introduction to Process Plant Layout and Piping Design
- Plant layout fundamentals
- Procedures and workflow

## Introduction to Chemical Processing Methods
- Unit operations and unit processes
- Process flow diagrams (PFDs) & Piping & Inst. Diagrams (P&IDs) Typical equipment specifications

## Fundamentals of Pipe and Pipe Fittings
- Pipe dimensions and pipe representation
- Use of pipe data tables
- Material Specification
- Pipe joining methods
- Pipe fittings
- Fitting dimensions and tables

## Piping System Components
- Basics of flanges
- Flange ratings and flange types
- Flange data tables and their use
- Different types of valves and their applications
- Valve data tables
- Piping restraints
- Supports, anchors and guides

## ASME/ANSI Codes & Standards
- Introduction to B31.3 process piping codes ASME standards for Common Piping Elements. Piping specifications & Material selection

## Pipe Hydraulics & Sizing
- Flow rate, velocity, pipe sizing calculations Reynolds number- laminar/turbulent flow
- Darcy Weisbach & Hazen William equations pressure drop calculations, NPSH calculations

## Plant Layout and Plot Plans
- Plant layout specifications
- Codes and safety considerations
- Development of plot plans
- Plot plan use by disciplines
- Sample plot plans and equipment arrangement drawings Layout case studies

## Equipments Used in Process Plants
- Process equipment: Reactor Tower, Exchanger Furnace, Vessel, Column
- Mechanical equipment: Pumps, Compressors, Storage tanks Equipment foundations and supports Equipment data sheets, Equipment sketches & Equipment drawings Equipment nozzle specifications

## Insulation & Heat Tracing
- Insulation & Preparing an Insulation Specification
- Data required to prepare Insulation Specification
- Heat Tracing

## Piping Isometrics
- Piping Isometrics Drawings
- Isometric Dimensions, Notes & Callouts
- Isometric Offsets & Print
- Reading Exercises
- Exercises on creation of Isometrics from plans and Sections

## Pipe Supports
- Classification of Supports & Pipe Arrangements Anchors, Pipe Guides, Limit Stops, Pipe Shoe Dummy Leg, Trunion Field Support, Base Support
- Rigid Hanger, Rod & Clevis, Flexible Hangers, Variable & Constant Pipe Rack Design Types, Height & Width Calculations

## Piping Materials and Material Specifications
- Material properties & Classification of materials Material specifications (as per ASTM)
- Common piping materials & Piping specifications Material selection, Material testing, inspection and QA

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