

# Piping Design Engineering



## What You Will Learn...

- ▶ Introduction to Industry.
- ▶ Role of a Piping Engineer in various fields of industry.
- ▶ Overview of International codes and standards.
- ▶ Fundamentals of Pipe, Pipe Fittings and Piping System Components.
- ▶ Overview of Pipe Hangers and Supports.
- ▶ Pipe Hydraulics & Line Sizing.
- ▶ Overview of Equipments Used in Process Plants.
- ▶ Overview of Codes & Standards, Piping Materials & Specifications.
- ▶ Basics of PFD, P&ID and Plot plan development.
- ▶ Development of Equipments & Piping layouts.
- ▶ Guidelines to preparation of as built drawings.
- ▶ Preparation of Isometric drawings and Bill of Materials.
- ▶ Piping System Studies: Drum Piping, Pump Piping, Compressor Piping, Heat Exchanger Piping etc.
- ▶ Plant Design Management System (PDMS): Overview of PDMS Software.
- ▶ Equipments Modeling on PDMS
- ▶ Piping Modeling on PDMS
- ▶ Structure Modeling on PDMS
- ▶ Draft Module of PDMS
- ▶ ISO Draft Module of PDMS

**SmartBrains** Oil and Energy Institute provides premium training courses for energy industry executives and fresh engineering graduates. Our success and distinguished reputation is thanks to our commitment to provide first-class programmes to our clients. Combining leading professionals from across the industry as lecturers and an interactive, practical format, the lessons learnt in a SmartBrains for Energy course are directly transferable back to the work place.

## Our Strategic Objectives

To be recognized by industry and employers as a highly reputable training organization. Provide dynamic leadership, sound management and excellence in training. Continue to improve our services through quality management processes. Invest in and value our people through professional development activities. Grow our business through innovation and to continue to be financially secure. Be influential in the economic development of the industries we serve nation wise

## Our Mission

“To provide quality training and assessment services and to prepare our students for a fulfilling professional career in their chosen industry. We are committed to upholding our values of providing excellence in training”

# Course STRUCTURE



“Smartbrains given me a good base on Detail/Design for Piping. After first placement in Shavini Engineering I got the chance to work with Tehcnip”

**Sanjeev Kumar**  
Technip, Noida

## Fundamentals of Piping Engineering

### Introduction to Chemical Processing Methods

- Unit operations and unit processes
- Process flow diagrams (PFDs)
- Piping & Instrument Diagrams (P&IDs)

### Pipe Hydraulics & Line Sizing

- Flow rate, velocity, pipe sizing calculations
- Reynolds number- laminar/turbulent flow
- Darcy weisbach & hazen William equations
- Pressure drop calculations, NPSH calculations

### Overview of Equipments Used in Process Plants

- Process equipment
  - Reactors - Towers
  - Exchangers - Furnaces
  - Vessels - columns
- Mechanical equipment
  - Pumps - Compressors - storage tanks
  - Typical equipment specifications

## Fundamentals of Pipe, Pipe Fittings and Piping Components

### Fundamentals of Pipe and Pipe Fittings

- Pipe dimensions and pipe representation
- Use of pipe data tables
- Pipe joining methods
- Pipe fittings
  - Elbows
  - Tees
  - Reducers
  - End caps
- 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

## Piping Codes & Standards, Piping Material Specifications

### ASME Codes & Standards

- Introduction to B31.3 process piping codes
- ASME standards for Common Piping Elements
- Piping specifications
- Material selection

### Piping Materials and Material Specifications

- Material properties
- Classification of materials
- Material specifications (ASTM)
- Common piping materials

## Process Plant Layout Engineering

### 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

### Plant Layout and Piping Layouts

- Equipment lists
- Piping line lists
- Piping Plan Development
- Preparing Piping Layout Drawings by placing instruments, valves etc
- Rack Piping
- Pipe Rack Spacing, Drawing pipe in the rack etc

### Equipment Layouts

- Equipment data sheets
- Equipment foundations and supports
- Equipment sketches
- Equipment drawings
- Equipment nozzle specifications
- Equipment foundation drawings

### Piping Isometrics

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

## Pipe Hangers and Supports

### Pipe Hangers & Supports

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

## Piping System Studies

Drum Piping, Pump Piping, Compressor Piping, Heat Exchanger Piping, Column Piping, Tank Farm Piping, Underground Piping, Pipe Rack Piping

## Plant Design Management System (PDMS)

### Equipment Modeling

- Creating Equipment by using primitives
- Creating Equipments by using PDMS standards catalogue.
- Creating Obstructions
- Manipulation of primitives & equipments
- Nozzles placements & manipulations
- Understanding parameters & attributes
- DB Utility

### Pipe Design

- Pipe & Branch creations
- Pipe Routing & Slope piping
- Manipulating Piping components & Assemblies
- Checking Data consistency
- Checking & rectifying classes
- Locating Supports & deciding Supports span
- Generating text reports like Line & Supports Lists

### Draft

- Preparing Layouts by using Draft modules
- Creating Views
- Annotation & Dimensioning

### ISO Draft

- Extracting Isometrics
- Preparing Isometrics for Fabrication & Erection

# Why

## SmartBrains?

SmartBrains is the ultimate choice for all the working & non working engineer's in energy Sector training requirements. Our extensive portfolio of energy training courses are:

- ▶ 100% focused on the Oil and energy industry.
- ▶ Guided by the industry's renowned professionals with unprecedented knowledge of the Oil and energy industry.
- ▶ Highly interactive program with practical and relevant case studies.
- ▶ Training by extensively researched self developed cutting edge techniques.
- ▶ Skill development techniques with comprehensive set of documentation, practical skills and tools used in the Industry.

- ▶ The perfect opportunity to develop network and experiences with knowledge sharing.
- ▶ Internationally acclaimed engineering qualification.
- ▶ Designed for both Fresh engineers and working professionals to attain growth in oil and energy industry.
- ▶ One of the finest international faculty.
- ▶ Interactive, interesting and motivational training sessions.
- ▶ Access to enormous reference books and research materials.

## Admission

### Requirements

- ▶ Duly Filled Application Form
- ▶ 2 Photographs
- ▶ Photo State of Qualifying Examination
- ▶ Address Proof
- ▶ I.D. Proof
- ▶ Latest Resume

## Declaration

- ▶ This training program is on AUTONOMOUS basis conducted by SmartBrains.
- ▶ SmartBrains has right to expel any student at any time for misbehavior, poor attendance without refunding the fees.
- ▶ Certification will be issued only after completion of course, submission of all assignments and passing all the examinations.
- ▶ SmartBrains has its own rules and regulations about conducting examinations and assessment of examinations



Oil & Energy

### Noida Office:

H-86, Sector-63, Noida-201301  
Land Mark: Behind Haldiram  
Email : [info@smartbrains.in](mailto:info@smartbrains.in)  
Phone: +91-120-4104991-94  
+91-989 110 8700  
Website: [www.smartbrains.in](http://www.smartbrains.in)

### Hyderabad Office:

6-3- 680/403, 4 floor,  
Regency House, Somajiguda,  
Hyderabad - 500 082  
Email : [info@smartbrains.in](mailto:info@smartbrains.in)  
Phone : +91-9703751174  
+91-9703132211

### Vadodara Office:

9, Helix,Complex, Opp. Hotel Surya,  
Sayajigunj, Vadodara - 390020  
Email : [info@smartbrains.in](mailto:info@smartbrains.in)  
Phone : +91-265-6595620/21  
+91-9033033791/92