

## Institute of Piping Engineering & Building Services

P. G. DIPLOMA CERTIFICATE - ONLINE TRAINING COURSE



### PLUMBING & FIRE FIGHTING DESIGN & CONSTRUCTION -IPC & NFPA

#### Course Co-Ordinator:

Mr. Mohammed Kaleemullah

MEP Head

International Course Speaker

IPEBS

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## ABOUT IPEBS

**IPEBS** was established with a vision to offer proactive training & consulting services for design, construction, Inspection, Operation & Maintenance of Process Plants & Building Services including

- a) Process Plant Engineering: Plant 3d-Modelling, Process Equipment, Piping Engineering, Pipeline Engineering, Valves, Rotating Equipment's, Piping QA/QC & Inspection.
- b) Electro-Mechanical Building Services (MEP 3d Modeling, HVAC, Plumbing, Fire Protection & Electrical Systems)

## IPEBS - CONSULTING

**IPEBS** team comprises of engineers and designers having extensive real time experience in the design, construction, inspection, Operation & Maintenance of Process Plant Engineering and Building Services.

## IPEBS - TRAINING

Thousands of Engineers, Designers, Draftsman and Technicians have attended **IPEBS** training programs. On a national basis, **IPEBS** is now unquestionably the number one professional Plant Engineering, Piping Engineering & MEP course provider.

## ABOUT TRAINING PROGRAM

This course provides basic design criteria pertinent to the design of Plumbing, Sanitary & Water Based Fire Fighting systems. This course identifies and outlines the types of drainage systems (sanitary and storm water) supply water distribution systems, hot water systems, sprinkler systems, standpipe systems and private hydrant systems, appropriate for your needs, together with the wise system design & energy conservation.

Gain an understanding of the basic principles and code requirements of typical plumbing systems and the ability to design and review plumbing systems. Know how to use calculations in the selection of piping materials and the methods of construction, sizing of piping and equipment, and plumbing fixture selection. Be well prepared to meet the design challenges of the varying types of commercial and institutional projects anticipated in the next decade.

## PROGRAM FEATURES

- ✓ In-depth course content for easy understanding.
- ✓ Blended Learning: Online contact with faculty.
- ✓ Accessibility to Course Faculty & Counseling Services.
- ✓ Job oriented training program.
- ✓ Student will be job ready, after the course.
- ✓ Student will acquire skills and knowledge similar to working professional.

## **WHO SHOULD ATTEND**

- Graduating College Students in the following disciplines**

- ✓ Mechanical Engineers
- ✓ Electrical Engineers
- ✓ Civil Engineers
- ✓ Production Engineers
- ✓ Diploma / ITI

- Working Professionals**

- ✓ Fire Fighting Engineers
- ✓ Plumbing Systems Design Engineers
- ✓ Fire Protection Engineers
- ✓ MEP Engineers
- ✓ MEP Co-Ordinator
- ✓ Design & Project Engineers
- ✓ HVAC Engineers
- ✓ HVAC Site Engineers
- ✓ HVAC QA / QC Engineers
- ✓ HVAC Draftsman
- ✓ MEP Draftsman
- ✓ Plumbing Technicians

- Corporate / Organizations**

- ✓ Fire Protection Consulting Companies
- ✓ Fire Fighting Designing Consultancies
- ✓ Fire Fighting Contracting Companies
- ✓ MEP Consultants
- ✓ MEP Contracting Companies
- ✓ HVAC Consulting Companies
- ✓ HVAC Contracting Companies

## **COURSE MODULES:**

### **I) Plumbing Systems**

- ✓ **Introduction**
- ✓ **Piping Systems**
- ✓ **Water Supply – Cold & Potable Water Systems**
- ✓ **Hot Water Supply System**
- ✓ **Hydraulics and Pumping Systems**
- ✓ **Sanitary Drainage System**
- ✓ **Storm Water Management**

### **II) Water Based Fire Fighting Systems**

- ✓ **Introduction**
- ✓ **Fire Dynamics**
- ✓ **Fire Sprinkler Systems - NFPA 13**
- ✓ **Design & Layout**
- ✓ **Fire Sprinkler Hydraulics-NFPA 20**
- ✓ **Standpipe Systems-NFPA 14**
- ✓ **Private Hydrant and Hose Systems- NFPA 14**

## **Course Content:**

### **I) Plumbing Systems Design**

#### **Introduction**

- Introduction, History, Scope, Objective, Building Services
- Plumbing Codes & Standards -UPC, SPC, NPC, BOCA & IPC
- Plumbing Scope in a building
- Role of Plumbing Practitioners
- Plumbing Fixtures & Appliances – Definitions, Symbols, Supply
- Installation & Fixture Clearances
- Water Closet, Lavatory, Bath Tub, Shower Head, Bidet, Urinal
- Floor Drain, Kitchen Sink, Dish Washer, Waste Food Grinder
- Drinking Fountain, Laundry Tray, Hose Bib
- Flushing Systems
- Water Consumption

#### **Piping Systems**

- Fundamentals-Pipe, Tube
- Pipe Designators – NPS, IPS, NB
- Pipe Wall Thickness, Schedule, Pipe Weight, Lengths, Grades, Ends
- Connections in Piping System
- Pipe Joining Methods (Threaded, Socket-Weld, Butt-Weld, Flanged)
- Pipe Fittings – Elbows (90° - Long Radius, Short Radius, 45° Bends, Reducing, Mitre)
- Tee – Equal, Reducing
- Fabricated – Stub-In, Stub-On
- Reducers – Concentric, Eccentric, FOT, FOB

- Couplings, Unions, Plug, Swage
- Flanges, Configurations, Types
- Valves – Introduction, Functions, Components, Locations
- Gate, Globe, Butterfly, Ball, Angle, Check, PRV, Drain, Air Vent, Control Valves
- Valve Operators, Valve Layout Considerations

#### **Water Supply – Cold & Potable Water Systems**

- Introduction, Water, Sources of Water Supply, Requirements
- Estimating the Total Demand for Water Supply System
- Water Meter, Types, Sizing, Pressure Drop
- Water Supply Systems in Buildings – Direct, Over-Head Tank
- Underground-Overhead, Direct Pumping Systems
- Water Distribution System in Building-Up-Feed, Down-Feed
- Types, Sizing Underground & Overhead Tank
- Booster Pump Requirement
- Estimation of Number of Plumbing Fixtures
- Fixture Units/Demand Units/Loading Units
- Estimation of Fixture Units, Simultaneous Demand
- Hunter Curves, Max. Probable Flow
- Sizing Water Supply Piping - Pressure Drop & Velocity Limitation
- Pressure Needed in Different Fixtures
- Excessive Water Pressure, Water Hammer

#### **Hot Water Supply System**

- Introduction, Hot Water Requirement
- Hot Water Temperature for Various Services
- Components of Hot Water Supply System
- Water Heaters, Types, Storage Tanks

- Hot Water Distribution Piping System
- Individual Geysers
- Centralized Hot-Water Systems
- Hot Water Circulation Systems – Up-Feed, Down-Feed, Combined, Inverted
- Design – Average Hot Water Demand
- Water Heater Coil Capacity, Storage Tank Capacity

### **Hydraulics and Pumping Systems**

- Introduction, Density, Viscosity
- Pressure-Vapor, Atmospheric, Absolute and Gauge
- Static Head, Dynamic Head
- Flow under Gravity Conditions – Pipes
- Open Channels, Flow under Pressure
- Coefficient of Roughness, Frictional Loss, Nomo graph
- Need for Pumping
- Pump Types – Centrifugal, Rotary, Positive Reciprocating
- Pump Application – Booster, Circulation, Submersible, Sewage and Sump Pump
- Pumping Systems – Direct Boosting, Break-Pressure Tank, Hydro-Pneumatic
- Pump Characteristics – Capacity, Total Dynamic Head, Efficiency, Power Required
- Suction, Cavitation, Net Positive Suction Head

### **Sanitary Drainage System**

- Introduction, Waste Water-Black Water, Gray Water
- Planning Layouts, Pipes, Fittings
- Grouping of Drainage System-Above Ground, Basement, In Ground
- Parts -Traps, Vents, Drainage Pipe, Building Drain Pipe, Sewer

- System Types – One-pipe, Two-pipe, Single Stack, Soil Stack, Waste Stack
- Drainage Fixture Units, Estimation
- Sizing-Horizontal Fixture Branches, Stacks
- Branch Intervals, Maximum Capacities, Grading(sloping) of Horizontal Pipes
- Vent System, Role of Atmospheric Pressure
- Types – Wet, Waste Stack, Back-Back, Circuit, Loop, Individual Vent
- Sizing and Length
- Sewage Basin, Sewage Pump
- Types-Submersible, Vertical Lift, Self Priming, Simplex, Duplex
- Drawdown Capacity, Circular Basin Capacity, Basin Sizing
- Sewage Pump Head Calculations

### **Storm Water Management**

- Introduction, Collection, Catchment Areas
- Design Considerations- Rain Water Area, Amount of Rainfall
- Type of Roof System- Flat Roofs, Sloped Roofs
- Catchment Area, Roof Drains
- Screening, Gutters, Leader, Horizontal Storm Drain
- Sizing, Sloping, Connections

## **II) Water Based Fire Fighting Systems**

### **Introduction**

- Requirement, Absolute Safety
- Classification of Fire Safety Systems
- Passive Fire Safety, Active Fire Safety
- Fire Detection & Alarm System
- Fire Suppression System
- Foam, Chemical, Gaseous Systems
- Water-Based Systems
- Codes & Standards, Organizations
- Design and steps for protection

### **Fire Dynamics**

- Fire Dynamics, Fire Tetrahedron
- Fire Extinguishing Methods, Fire Extinguishing Agents
- Fire Classes, Comparison of Classes
- Fire Class & Extinguishing Agent
- Types of Extinguishing Agents

### **Fire Sprinkler Systems - NFPA 13**

- Introduction
- Water Based Fire Suppression Systems
- Fire Extinguishing Properties, Disadvantages
- Building Occupancy Classification
- NFPA Standards Related to Fire
- Sprinkler Head Construction, Temperature Ratings, Configurations, Types
- Sprinkler System Description, Types, Components

### **Design & Layout**

- Description, Riser, Feed Main, Cross Main, Branch Line
- Typical Piping Layouts – Grid, Loop, Tree
- Hazard Classification- Light, Ordinary, Extra, Special
- Floor Area Limitation
- Protection Area of Sprinkler
- Spacing, Location
- Sprinkler Pipe Sizing – Pipe Schedule Method

### **Fire Sprinkler Hydraulics-NFPA 20**

- Sprinkler Piping pressure, Material, Piping Joints, Wall thickness
- Sprinkler Head K-Factor
- Basic Design Circuit
- Sprinkler Density Requirement
- Hydraulic Analysis, Design Density
- Area/Density Curves, Flow Adjustments
- Riser Detail
- Hazen-Williams Formula for Friction Loss
- Sprinkler System Water Supplies

### **Standpipe Systems-NFPA 14**

- Introduction- Hose Connection, Valve, Nozzle
- Hose Storage Devices, Hose Station
- Combined Standpipe and Sprinkler System
- Standpipe Classes – Class I, Class II, Class III
- Fire Department Connection
- Standpipe Classification – Automatic, Semi-Automatic, Manual
- Standpipe Types – Dry, Wet
- Requirements, System Zoning, System Demand

- System Design – Location, Number, Interconnection, Minimum Size
- Pressure Limitation, Supply and Flow Rates
- Fire Tank Sizing
- Hydraulic Calculation Procedure
- Drains and Test Riser

#### **Private Hydrant and Hose Systems-NFPA 14**

- Introduction
- Types – Wall, Wet Barrel, Frost-proof, Monitor Nozzle Hydrant
- System Design - Number, Size, Arrangement, Location
- Flow Indicators, Body Color

#### **Course Fee Details:**

Course Title	Fee for Indian Participants	Fee for International Participants
<b>Plumbing &amp; Fire Fighting Design &amp; Drafting – IPC &amp; NFPA – Online Training Course</b>	<b>INR 15,000/- (Spl Offer: INR 14000/-)</b>	<b>USD 400/- (Spl Offer: USD 350/-)</b>

For making e – payment for the course fee please find **IPEBS** Bank account details below.

Account Name	IPEBS
Account Number	03182020005287
Bank Name	HDFC
Branch	ABIDS
RTGS / NEFT / IFSC Code	HDFC0004125
SWIFT Code	HDFCINBB

**IPEBS Corporate Training Clients:**

<b>Company Name</b>	<b>Location</b>	<b>Company Name</b>	<b>Location</b>
Intergraph Consultants	India	CFPE Technology Solutions	Malaysia
Port of Sohar	Oman	Qatar Petroleum Technical Center	Qatar
Uhambiso Consultant	South Africa	Petro Vietnam Marine Shipyard	Vietnam
Newtech Consulting Group	Sudan	Locus Technologies	India
Yashada Consultant	India	RasGas	Qatar
Telstar Life Science Pvt Ltd	India	ICB Technimont	India & Italy
BHEL	India	LG-Digitech	Sudan
IDC Training House SDN BHD	Malaysia	Infotech Enterprises	India
Sakhlain Energy	Russia	Petroleum Operating Company	Sudan
Aveon Offshore	Nigeria	Dr. Reddy's Labs	India
BPCL	Bhutan	Vasavi Power Services	India
Saitech Engineers	India	Siddhi Consulting	India
Riyan Architects	Maldives	Qatar Petroleum	Qatar
Oryx GTL	Qatar	Centroid Technical Services	Sudan
WNPOC	Sudan	MG – Vowgas Group	Nigeria
GNPOC	Sudan	DAL Group	Sudan
Fleming gulf	UAE		

**Terms & conditions:**

**CANCELLATIONS: IPEBS** does not provide refunds for cancellations done after registration & fee payment. However, credit maybe granted to a later program. This credit will be available for up to one year from the date of issuance.

**COURSE MATERIAL AGREEMENT:** It is the intention of **IPEBS** that the course text and materials supplied to participants at **IPEBS** courses are prepared and issued for the participants' sole use. Codes and standards constantly change and interpretations are issued by the publishing societies. Information contained in **IPEBS** course materials is based on the best available data obtained by **IPEBS** at the time of publication. **IPEBS** is in no way responsible for subsequent use regardless of intention.

**PROGRAM CHANGE POLICY:** Please note that instructors and topics were confirmed at the time of publishing this document; however, circumstances beyond the control of the training organizers may necessitate substitutions, alterations or cancellations of the instructors and/or topics. As such, **IPEBS**

reserves the right to alter or modify the instructors and/or topics if necessary. Any substitutions or alterations will be updated on our web site.

**COURSE CANCELLATION BY IPEBS: IPEBS** reserves the right to cancel any course due to circumstances beyond our control. All tuition fees will be refunded in the event of cancellation. **IPEBS** liability is limited to only those tuition fees paid in advance.

**FORCE MAJEURE:** Except for the obligations to make money payments as outlined hereunder, neither party shall be responsible to the other for delay or failure to perform any of the terms and conditions, or other activities, of this agreement if such delay or failure is caused by strike, war, act of God, or force majeure.

## **Frequently Asked Questions – FAQ's**

### **Duration of the course?**

**Ans:** Course Duration is 01 month.

### **Daily Class Duration?**

**Ans:** Daily class will be for up to 02 Hours.

### **Requirement for the course?**

**Ans:** Computer / Laptop with good internet connection, Camera and Mic.

### **Support from IPEBS?**

**Ans:** Faculty assigned to all registered participant of the course. Faculty not only helps to clear the participant's queries while doing the course but also monitors the progress of the participant to help in successful completion of the course.

### **Mode of Payment?**

**Ans:** You can make the payment through electronic transfer or at IPEBS office.

### **Issue of Certificate?**

E - Certificate will be issued by **IPEBS** only on successful completion of the course & will be sent via email to the participant.

## **Training Methodology?**

**Ans:** Online Streaming of lectures, contact with faculty by email or chat groups.

### **Training Material?**

**Ans:** Printed Material – Course / Class handouts will be provided in printed format and shipped (within India) to the participants.

Soft Copy Material - Data tables, charts, nomographs, drawings, concept theory, design calculations and practice exercise's will be provided in soft copy.

Demonstration software's and excel spread sheets will be provided.

\*\* International Shipping charges of printed material - course / class handouts to be borne by participants.