Best Technology Soultions **(BTS)**

Training Program

Fundamentals Of HVAC Systems

Training Program

Introduction:

Fundamentals of HVAC Systems is a thorough introduction on how HVAC systems control temperature, air quality and air circulation in a conditioned space. Mastering fundamentals and operation principles of HVAC systems is a must for designers and operators of such systems. This course covers fundamentals of HVAC systems starting from psychometric calculations to design of air conditioning cycles. Load calculations, distribution, system selection, control, and energy conservation of HVAC systems are all covered in this course. Topics are introduced to individuals who have no or little background on the subject while also providing a valuable information resource to personnel having experience with HVAC systems. This course is ideal for recent engineering graduates working in the HVAC&R industry, experienced engineers entering HVAC&R from another engineering area, as well as architects, technicians, construction or building management professionals who need to increase their knowledge of HVAC systems. The course will feature:

- Knowledge of HVAC load estimating concepts
- The ability to relate load estimates to equipment sizing and systems design
- A practical understanding of the theory dictating the design and control of HVAC systems
- Information on the energy conservation aspects of HVAC systems

Who Should Attend?

Mechanical Engineers, General Supervisors, Consulting Engineers, Design Engineers, Foremen, Supervisors, Technicians, Maintenance Personnel, Engineers of all disciplines, Supervisors, Team Leaders and Professionals in Maintenance, Engineering and Production Managers, Maintenance Personnel, Heads of Maintenance and Operation, Chemical Engineers, Equipment Specialists, Technical Engineers, Operation Engineers, Planning Engineers, Process Engineers, Reliability Specialists, Boiler Plant Construction Managers, Consulting Engineers, Design Engineers, Insurance Company Inspectors, Operation, Maintenance, Inspection and Repair Managers, Supervisors and Engineers, Plant Engineers, Senior Boiler Plant Operators, Repairers and Installers, Project Engineers and Technologists, Facility Engineers, Consultants, Mechanical Engineers and Technologists, Maintenance and Operation Personnel and other technical personnel who need to upgrade/refresh their current knowledge of HVAC systems

Course Objectives:

By the end of this course, delegates will be able to:

- Understand key thermodynamics, fluid mechanics and heat transfer fundamentals and their practical application in the design and operation of HVAC systems
- Learn systematic procedures for cycle and load calculations
- Gain insight into determination of opportunities of energy conservation and selection of appropriate types of control for the application of interest

Course Outline:

Fundamentals of HVAC: Determination of Moist Air Properties and the Use of Psychometric Chart

- Moist air properties
- The psychometric chart
- Moist air processes

Calculations of Air Conditioning Cycles (Systems)

- Bypassed, return and outdoor air
- Capacity of refrigerating plant
- Effect of heat gains in ductwork

Determination of Space Conditions – Comfort Zone

- Comfort-physiological considerations
- Environmental comfort indices
- Comfort conditions

Cooling/Heating Load Calculations

- Design temperature differences
- Quantity of heat to be removed
- Conduction heat gains
- People load
- Loads due to lights and equipment
- Infiltration load
- Ventilation load
- Radiant and solar heat gains

Design of Air Distribution System (Duct Design)

- Total, static and velocity pressures
- Changes in pressure in a duct
- Loss in static pressure due to friction
- Fan laws and fan performance curves
- System characteristic curves
- Fan selection

- Duct design

Operation of HVAC: System Selection and Control

- System selection
- Control devices
- Types of control systems
- Basic control theory

Energy Conservation

- Determination of energy conservation opportunities (ECOs) in HVAC Systems
- Diagnostics and refining
- Implementation and maintenance
- Economic considerations