

MODULES	DEPARTMENT	BASE COURSE
01 TO 05	ELECTRICAL	ELECTRICAL DESIGNING
06 TO 10	MECHANICAL	HVAC DESIGNING
11 TO 15	MECHANICAL	PLUMBING DESIGNING
16 TO 20	MECHANICAL/ELECTRICAL	FIRE FIGHTING DESIGNING

MODULE 1 – FUNAMENTAL CONCEPTS OF ELECTRICAL ENGINEERING

About MEP – Roles and responsibilities of Electrical Design Engineers, Job opportunities, Growth and changes of MEP sector

Concepts in Electrical Engineering - Basic terms and Formulas, General concepts in Engineering, Fundamental of Electrical power system. Fundamental of Power generation, transmission, distribution & utilization. Basic wiring concepts and different types of loads [motors, HVAC system, starters, power electronic devices, Illuminations etc..] that consumes Electrical Energy and their impacts in supply systems including harmonics, reactive power and starting currents.

MODULE 2 - SYSTEM PLANNING & COST ESTIMATING

Basic design considerations - Planning guide for the supply and distribution system Power system modernization and evaluation studies/programs Voltage considerations. Voltage control in electric power systems Voltage selection, Voltage ratings for low-voltage utilization, equipment Voltage drop considerations in locating the low-voltage/ high-voltage. Calculation of voltage drops. Preparing the cost estimate, Classes of estimates Equipment and material costs installation costs other costs.

MODULE 3 – DESIGN OF ELECTRICAL SYSTEM BELOW 50KW AND LIGHTING DESIGN

Electrical Layout in residential building using AutoCAD - Selection of house wiring, Sizing and Selection of Conduit, Sizing and selection of Switch Socket, Calculation of load on circuit, Design of sub circuit (Lighting Circuit and Power Circuit) Distribution of Power Circuit, Calculation of fan, Calculation of Earthing for residential buildings, Sizing and selection of low voltage switchgears (MCB, MCCB, RCB, RCBO MPCB)

Lighting Design - Different entities of illuminating systems, Light sources: daylight, incandescent, electric discharge, fluorescent, arc lamp and Lasers. Luminaries, wiring, switching & control circuits. Laws of illumination; illumination from point, line and surface sources Photometry and spectrophotometry. Interior lighting – industrial, residential, office departmental stores, indoor stadium, theater and hospitals. Exterior lighting- flood, street, aviation and transport lighting, lighting for displays and signaling- neon signs, LED-LCD displays beacons and lighting for surveillance

MODULE 4 – DESIGN OF ELECTRICAL SYSTEM OF 11KV/33KV/66KV

Selection of Supply Voltage based on Load calculated. *Selection of transformers* – Winding considerations, protection devices and relays, type of cooling, tap changing methods. Different types of cables, *Selection of Cable sizing* - Current rating considerations, voltage drops, bending radius, short circuit ratings. Selection of protection devices [MCCB, ACB, SDF, VCB] and different types of Panel boards. Panel design concepts and general design criteria's to follow. Diesel generator selection and design of Generator control panel [GCP]. Interlocking methods of transformers and generator supplies in different panel boards. Fault level calculation and Earthing design. High tension side design of panels including protection devices, relays, metering devices etc...

MODULE 5 – VARIOUS PROJECT DESIGN STAGES OF ELECTRICAL DESIGN PROCEDURE

Concept design stage - Understanding the building plans, elevations & sections, Gathering specific data from the utilities (Electricity board), Understanding client's specific requirements Preparation of basis of design which should include the cost estimate.

Schematic design stage - Preparation of Load calculation to arrive maximum peak demand, Sizing of all Equipment's, cables, cable trays, Electrical design calculations, Preparation of single line schematic of electrical distribution system with metering options, Preparation of lighting, small power, earthing & miscellaneous layouts Preparation of technical specification

Detailed design stage - Preparation of detail layouts including sectional details wherever required Coordination with other services like HVAC, PHE & FF layouts Preparation of bill of quantities (BOQ) Preparation of shop drawings based on the tender drawings issued by Electrical consultants for installation as built drawings shall be prepared and handed over to client's representative

MODULE 6- FUNDAMENTALS

Present scenario in the field of HVAC, Common terms and definitions used in HVAC, Rules, Regulations and standards to follow, Thermal principles involved, Fluid mechanics and HVAC, Psychometry and process, Refrigeration and air conditioning cycles, Refrigerants and properties, Air conditioners types and applications, Parts and components of air conditioners, Multi stage systems, Ducts and associated components, Understanding building structure, Planning and development, Load calculation, HVAC designing.

MODULE 7- WORK ALLOCATION

Tender and quotation, Familiarising with manufactures GA drawings and O&M manuals, Tender drawing preparation, Professional Load calculation, Estimation and costing, Shop drawing preparation, TDS preparation, Rate analysis, Variation report, Final submission of works, hand over documentation, general documentation.

MODULE 8- DESIGNING PRACTICES

ASHRAE, ISHRAE, RHEVA, SMACNA, DW 144, ASME CODES AND COMPLIANCE, IAQ practices, Air distribution and air flow patterns, Air locks, pressure gradients, and ACH rates, Design of residential HVAC services, Design and operation of commercial HVAC services, Design and operation of data centres, Design and operation of health care facilities, Design and operation of tall, mega tall, super tall buildings, Laboratory design, Clean room design.

MODULE 9- COMPONENT SIZING AND OPTIMISATION

Coil design, Humidity control, Optimising indoor environments, Noise and vibration control system design, Insulations, Filters and controllers, Fans and blowers, Static pressure calculation, CAV and VAV systems, temperature and flow controls.

MODULE 10- HEAVY EQUIPMENTS

VRF/ VRV Systems, Air loop, Energy management, AHU and FCU services, AHU room designing, Chiller services design, Pumping and piping design, Piping network design and development, Cooling towers, Stair well pressurisation, Cold storage design, Chilled beam systems, District cooling systems, Plant room layouts, Electrical fundamentals, Controls and BMS.

MODULE 11- FUNDAMENTALS

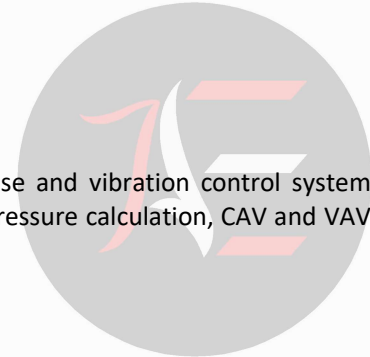
Present scenario, Common terms and definitions used in plumbing, Rules and regulations, Hydraulics and fluid dynamics, Common fixtures and services, Demand load calculation, Water quality and testing, Drawings and specifications, Pipe calculations, Pump system selection, Plumbing service designing.

MODULE 12- DESIGN PRELIMINARY

Resource management, Pipes selection, Storage system design, Pumping system design, Fixtures and arrangement, Fixture units, Water demand calculation, Plumbing service layout, Routing and sizing, Wash room designing, Kitchen layout.

MODULE 13- SUPPLY SERVICES DESIGN

Gravity feed system design, Ring main system design, Pipe sizing calculations, Water distribution system design, Geyser system, Centralised hot water generation and distribution, Pressure calculations, Hydro-pneumatic system design, Water supply layout.



MODULE 14- DRAINAGE PIPING DESIGN

Drainage fixtures, DFU determination and calculation, Drainage pipe sizing and selection, Traps and seals, Drainage pipe layout, Soil waste and water waste management, Vent pipe system, Inspection chambers, Storm water services.

MODULE 15- TERMINAL SERVICES

Septic tank designing, Soak pit designing, Water treatment system design, STP and ETP, Swimming pool recirculation system, Water fountain system, Domestic gas supply system design, Chemical disposal system design.

MODULE 16

- INTRODUCTION TO FIRE FIGHTING.
- CLASSIFICATION OF FIRE (DESCRIPTION)
- FIRE EXTINGUISHER TYPES- USING PROCEDURE AND GENERAL MAINTENANCE
- FIRE PROTECTION SYSTEMS
 1. ACTIVE
 2. PASSIVE
- REFUGE AREAS – RULES & REGULATIONS

MODULE 17

- STAIR WELL PRESSURIZATION SYSTEM
- FIRE SUPPRESSION & DETECTION SYSTEMS
- SPRINKLERS – TYPE, SELECTION & DESIGNING
- DETECTORS – TYPE, SELECTION & DETECTION (SMOKE, HEAT, BEAM & FLAME DETECTORS)

MODULE 18

- FIRE HOSE CABINET & FIRE HYDRANT SELECTION
- PIPE SELECTION & SIZING
- CONCEPT OF WET RISER & DRY RISER
- BASIC LAY OUT FOR DOWNCOMER & RAISER

MODULE 19

- DESIGN OF OVERHEAD & UNDER GROUND FIRE TANK SIZING
- FIRE PUMPS (MAIN PUMP, JOCKEY PUMP & DIESEL PUMP)
- CLASSIFICATION, TYPES & SELECTION.
- DESIGN OF FIRE PROTECTION SCHEMATIC LAYOUTS
- FM 200 SYSTEM DESIGN (WATER LESS FIRE PROTECTION SYSTEMS)

MODULE 20

- FIRE ALARM SYSTEM DESIGNING
- NFPA, NBA & FSAI CODE FOR FIRE FIGHTING SYSTEM DESIGNING
- FIRE FIGHTING HYDRAULIC CALCULATION FOR HIGH RISE BUILDINGS

Final project submission and seminar on the done projects assessed by our MEP Engineers and an external engineer from respective industry, including Industrial Interaction Programme [IIP]