

SEPADUTM

TECH ACADEMY

(Institute For Professional Skill Development)

Professional Training Courses-
Corporate/Individuals/Institutes



Sepadu Academy is part of Sepadu Tech group companies involved in Plant Design & Engineering activities for Oil & Gas, Chemical & Allied industries, Water & Waste Water treatment, New energy & carbon capture, Offshore- Oil & Gas, Mechanical Product & system.

Professional skill development Training Program based on Industry requirement taught by Industry Experienced Subject matter experts

These courses are particularly designed to cater for following Industry Requirement

- Engineering Design & Consultancy,
- Contractors (EPC)
- Equipment Manufactures(OEM)
- Plant Owner/Operators of Oil & Gas, Power,Water & Waste, utilities, New Energy & Carbon Capture Industry.



Development from awareness to Expertise via Knowledge Acquisition, Hands on Skill Development & Critical Thinking.

Sophisticated Facility
Case Studies from all industry Segments
Expert Trainers.

Skill
Development

Best
Infrastructures

Course
content

Extensive
Project -
Case Studies

- Class Room Lectures
- Workshops & Brain Storming Sessions
- Assignment
- Hands on Real Projects.

- Trainings are based on extensive Project Experience from Oil & Gas, Power, Water Treatment , Chemical New Energy



- Process & Safety Engineering
- Piping Layout & 3D Material
- Piping Material Engineering
- Piping Stress Analysis
- Mechanical Static- Equipment Design

- Architectural-BIM/MEP/HVAC
- Electrical & Power System
- Instrumentation & Control
- Construction Management & Supervision
- Civil & Structural Engineering

Advanced Courses

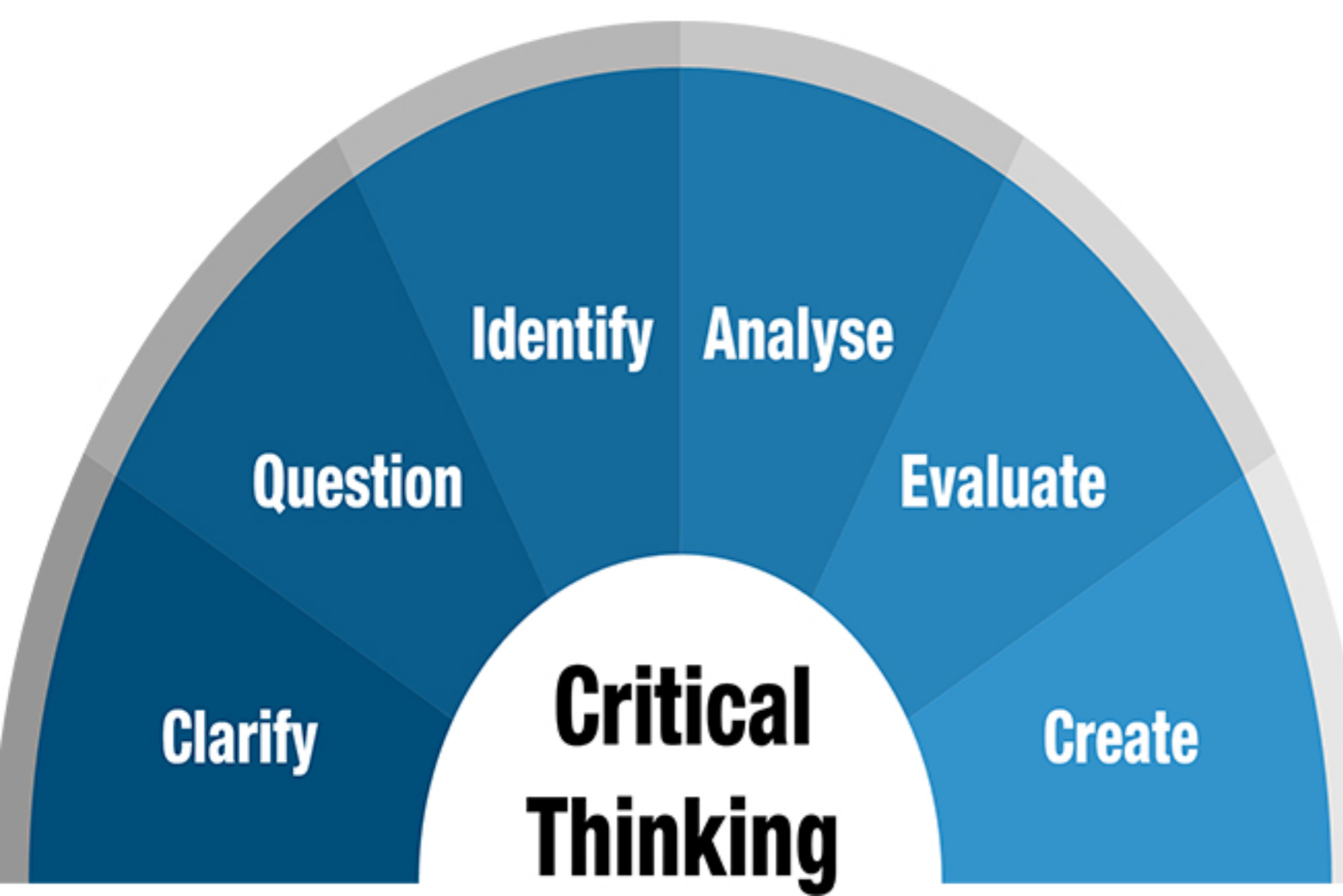
- Field Development Studies
- Offshore facility Layouts
- Offshore Structural Engineering
- Asset Integrity Management & Brownfield Engineering

- Process Risk & Safety
- New Technology & TRL assessment
- Front End design & Value Engineering Project Management
- Product Design-CAD/FEA & CFD

Software Training

- Primavera/Ms Office
- HYSYS/PIPENET/HTRI/SPPID
- SP3D,PDMS/E3D,AUTOCADPLANT3D
- STADPRO,Tekla,BOCAD,Advanced Steel

- SPI, Instrucalc
- SPEL,ETAP
- ANSYS-FEA/CFD
- BIM-REVIT/Bentley building



Module 01- Industry Overview

- Oil & Gas - Upstream, Midstream, Downstream
- Chemical Plants/Power Plant & FGD
- New Energy- Green hydrogen, Methanol & ammonia
- Chemical Plants
- Desalination, Water & Waste water treatment
- Understanding Project lifecycle & Role of Process Engineer Concept Identification, Conceptual Engineering, FEED, Detailed Engineering, Procurement Support, Construction, Testing, Startup & Commissioning, Operation
- Softskills : Communication, attire, Critical thinking, SMART Objectives, Aptitude Test.

Module 02- Process Design Philosophies, Calculations & Deliverables

- Philosophies- Process, Utilities, Safety System, Sparring, Isolation, Control etc.
- Process Calculations- Upstream Oil, Gas & LNG/Power Plant, Green Hydrogen
- Hydraulics - line sizing, Pump selection, Steady state & transient flow analysis
- Heat transfer- Heat exchanger Sizing & calculation
- Equipment/Packages-Selection & sizing
- Instrumentation & control - Flow element, Control valve, Control system

Deliverables - PFD, P&ID, Datasheets, Line List, Equipment List, load List, Operation Philosophy

Module 03- Process safety & Risk

- Hazardous area classification
- Process Risk assessment-HAZOP & HAZID
- Pressure Protection System- Blowdown, vent & flaring
- Fire Protection System - Fire water & Foam System

Module 04- Process Simulation Software - HYSIS or Equivalent

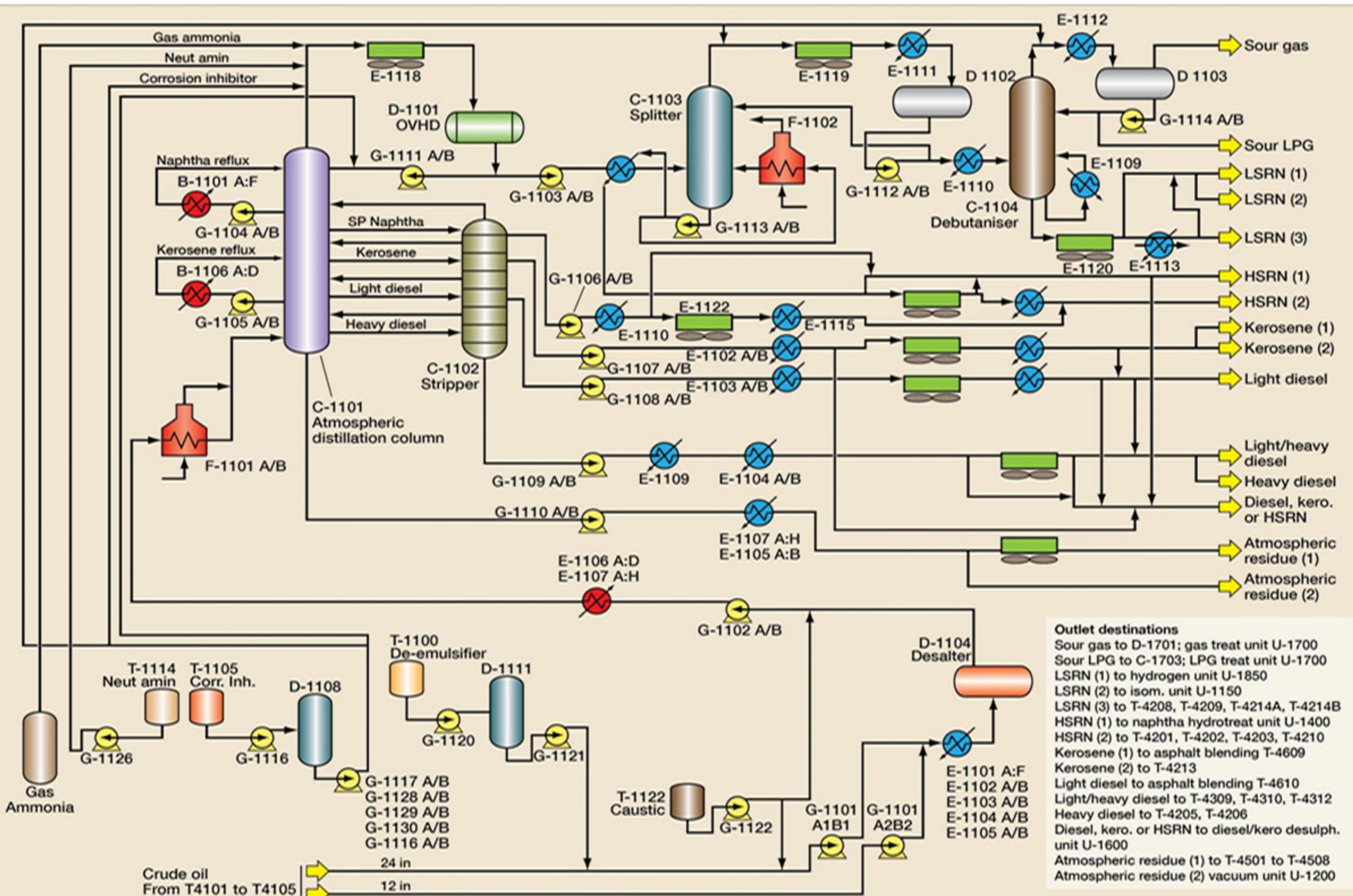
Module 05- Steady state & transient flow analysis-Pipenet or Equivalent

Module 06- SP PID

Module 07- HTRI-Heat transfer Exchanger Design n Sizing (TEMA)

Advanced Topics -Sessions for Experienced candidates by Industry Expert

- Process De-bottleneck studies & Brownfield Engineering
- Process Intensification
- Value Engineering- Project Cost Optimisation
- Introduction Material Selection & Corrosion
- Process Technology licensing - Process Development, Pilot Plant- Trails Scale-Up & Technology transfer/ Deployment, Technology Readiness assessment (TRL)
- Fire & Explosion studies, Dispersion study, Flare radiation, QRA
- Startup readiness & Commissioning



Module 01- Introduction & Industry Overview

- Industry Overview- Oil & Gas - Upstream, Midstream, Downstream, New Energy- Green hydrogen, Methanol & ammonia , Chemical Plants, Water Treatment, Power & FGD
- Understanding Project lifecycle & Role of Piping Engineer - Concept identification, Conceptual Engineering, FEED, Detailed Engineering, Procurement Support, Construction- Shop/Field Mechanical Completion, Startup & Commissioning, Operation
- Soft skills- Communication, attitude, Critical thinking, SMART Objectives , Aptitude Test.

Module 02- Plant & Piping Layouts

- Introduction to Piping components, Codes & Standard & Piping Material class.
- Plot Plan Development
- Equipment Layout development
- Piping layout & Study Piping
- Guidelines & typical installation details for valves, Flow elements, Control station, manifolds, headers, trench Piping, Utility stations, Piping Special items Strainers, Steam trap, Sight glass, stand Pipe, Instrument Hookup, DBB valves,
- Piping routing- Sleepers, Rack, trench, Buried, Culverts, Road crossing
- Pipe Supporting- Span, Support type, Typical details, Selection philosophy for Stress critical & non-Critical lines, Supporting concentrated loads.
- Pump & Piping
- Compressors Skid layout consideration & Piping
- Deliverables -GAD, Piping isometrics with BOM, Pipe Support details, MTO
- Tank farm Facilities & Piping
- Vertical/Horizontal tank, Heat exchanger layout consideration & Piping.
- Tall Tower/Absorber/Stripper/ Distillation column Piping
- Skid/Package Interface, Layout & Piping
- Fired Heaters & boiler Piping
- Introduction to 3D Modelling - Workflow- 30%/60%/90% Review

Module 03 3D Modelling- AUTOCAD Plant 3D/PDMS/E3D

Module 04 3D Modelling- AUTOCAD Plant 3D/SP3D

Module 05 - Piping Material Engineer.

- Introduction to metallurgy & Corrosion/ Material Selection for typical oil & gas facilities
- Codes & standard -Understanding Requirement, ASME/ASTM Specification & materials covered in ASME 31.1/31.3/31.12 & P/S numbers, Limiting temperature & Applicable notes, PT rating, CRA, PREN number, NACE/ISO, IBR requirement, Clad, Liners
- Selection of Pipe, Fittings- Elbow, reducer, branch connection, Flanges, gaskets, Spacers/binds, end cap, Pipe wall thickness calculations, Mitre bend calculations & Reinforcement pad calculations.
- Valves Introduction - Types, Selection of valves, design & construction feature, Parts Materials, Trim Materials, Fire safe design & certification., Datasheet.
- Type acceptance Testing (TAT/Prototype testing Requirement), Fugitive emission testing Requirement, Thermal cyclic testing, Cryogenic testing, Isobaric chamber testing for Subsea valves.
- Inspection Testing Plan- Production Testing - PMI, Hydro/Pneumatic Testing QA/QC, HIC, NDT Testing, Material Test Certification- EN 10204-certificate types 2.1, 2.2, 2.3, 3.1A, 3.1B, 3.1C, and 3.2
- Technical Bid Evaluations- Inquiry Specifications, TQ, Bid Tabulation, Purchase Specification.
- VDRL- GA drawing approval, ITP approval, Alternative Materials, seal seat trim materials- acceptance & Evaluation
- Piping Special Item Datasheet- Strainers, Steam trap, Flame arrester, Sample cooler, Injection & sampling Quill, corrosion Coupon & probe etc
- Introduction to CLAD Piping, Lined Piping, Non-metallic piping, Elastomeric Piping, RTP Piping Systems, High Pressure & High temp Piping for higher than 2500# rating, API 6A Piping for Wellhead Applications.

Module 06- Piping Flexibility Analysis.

- Understanding material Behaviour - Strain/ Stress, Modulus of Elasticity, Poissons ratio, Isotropic /Orthotropic materials, Thermal Expansion.
- Failure types & Theories
- Stress critical line selection Criteria
- Understanding Code Requirement- Stress /loads, Load case Combinations- Sustained, Operating, Occasional loads- Wind/ Seismic/ Surge
- Introduction to dynamic Stress analysis.
 - Modal, Time history analysis, Harmonic analysis. Pseudo static analysis approach with DLF, Cyclic loading & fatigue
- Allowable stress & Displacement criteria- sagging/hogging, axial displacement
- Equipment nozzle loads, Flange check/ PSV reaction Forces.
- Computer Program based analysis Hand on practice
- Stress analysis Report Preparation
- Support Type, Support Loads & Support details

Module 07- Shop & Field Construction, Brownfield Engineering, Piping Integrity Management0

- Shop & Field Fabrication- Spool Drawings,, Welding, WPS, PQR, Cold /Hot Bending. Spool Transportation, Installation, redline markup, Hydro & Pneumatic Test Work Pack.
- Brownfield & Asset Integrity - Construction & Demolition Work Pack, Hookup, Pre-Investment, Shutdown & Maintenance Management, Piping Integrity for Safety Critical element, Risk based Inspection, Life Remain calculation, CUI, Repair & replacement, Plant Relocation, Hot tapping.

Module 08- Offshore facility layouts & Piping Engineering

- Introduction to offshore Drilling, production & subsea system.
- Introduction to Field development studies & facility selection for Drilling & production.
- Facility layout development for Topsides of Fixed Platform
- Facility layout development for Topsides of FPSO/FLNG facility
- Modular Construction, Material handling Safety consideration

1. Piping layout Engineer- Module 1 +2 + 3 or 4
2. Piping Material Engineer - Module 1+5
3. Piping Stress Engineer - Module 1+6

Fresher or Experienced Professional Willing upgrade Skillsets & interested additional modules. Cost for each module is added to total module selected.



Module 01- Introduction & Industry Overview

Industry Overview- Oil & Gas - Upstream, Midstream, Downstream, Power & FGD, Chemical Plants, New Energy- Green hydrogen, Methanol & ammonia

Understanding Project lifecycle & Role of Mechanical Engineer-Static Engineer. Concept identification, Conceptual Engineering, FEED, Detailed Engineering, Procurement Support, Construction- Shop/Field Mechanical Completion, Startup & Commissioning, Operation

Soft skills- Communication, attitude, Critical thinking, SMART Objectives , Aptitude Test.

Module 02- Process Equipment Design

- Understand Materials of Construction
- Codes & standard for Process Equipment Design
- Pressure Vessels- Vessels, KOD, Scrubbers, Columns design as Per ASME section 8 Div. 1 & 2, PD500.
- Heat Exchanger design, Heat Exchanges/Coolers, Reboilers, Condensers as Per TEMA code.
- Storage tanks-API 650/620.
- Mechanical Datasheet.
- Detail Fabrication drawings, Bill of Materials

Module 03- Vessel Fabrication & installation

- Shop & field fabrication, Bendings, Welding Requirement- WPS, PQR, Welders Qualifications, Hydrotesting & Pneumatic testing, NDT requirement, PWHT



Module 04- software Training Pv Elite

Module 05- Introduction to Skids & Packages

Vendor Furnished Skids & Packages, Interfaces with Plant piping, Utilities, Power supply- Electrical instrumentation, Structural.

Introduction to Boiler, Heaters, Compressors, Chemical dosing Skids, Gas dehydration, Acid gas removal Etc. RFQ, TBE, Purchase specification, VDRI,

Module 06- Non-Standard Equipment

Design Requirement, CAD, FEA, Testing requirement, FRP Tanks/ Scrubbers

Modul 07- Brownfield Engineering & Asset integrity Management

Brownfield Engineering -Mechanical Integrity assessment, Fit for purpose assessment, Asset Life Assessment & Extensions, Condition Monitoring

Freshers Static Equipment design Module 01+02+04

Fresher or Experienced Professional Willing upgrade Skillsets & interested additional modules. Cost for each module is added to total module selected.



DRUMS, PRESSURE VESSEL



COLUMN, DISTILATION, FRACTION



REACTORS



EXCHANGERS



COALESER FILTERS



AIR COOLERS

Module 01- Industry Overview

- Power Plant & FGD, Oil & Gas - Upstream, Midstream, Downstream, Chemical Plants, Desalination, Water & Waste water treatment, New Energy- Green hydrogen, Methanol & ammonia
- Understanding Project lifecycle & Role of Electrical Engineer - Concept Identification, Conceptual Engineering, FEED, Detailed Engineering, Procurement Support, Construction, Testing, Startup & Commissioning, Operation
- Soft skills- Communication, attire, Critical thinking, SMART Objectives , Aptitude Test.

Module 02- Selection & Sizing of Electrical Equipment/System

- Design Basis, Code & standard, Electrical Load list, Single line diagram
- Electric equipment list, Selection, Sizing Equipment Datasheet-Transformers, Switchgears, Capacitors, Sys, Condenser, phase advancer MCCs, UPS, Chargers, Generators, Control Panels, Emergency DG set etc.
- Area Classification Dwg

Module 03- Layouts & drawings

- Electrical Wiring Drawing and Terminal Connection Dwg
- Cable sizing, Cable Schedule, Cable tray/ladder layouts
- Lighting System layouts, Earthing & Grounding Layout Drawing, Substation Layout Drawing
- Switchgear Building Equipment Layout, Typical Details of Electrical installations - Lighting, Earthing & grounding.
- Heat Tracing Calculation, Electrical Heat Tracing Isometric, Heat Tracing Panel schedule



Module 04- Power System simulation & Analysis.

- Load Flow Analysis, Short ckt. Analysis, Transformer Sizing
- Protection System- Cricket breaker/Relay coordination, Insulation coordination.

Module 05- Advanced Power System Analysis

- Transient stability analysis, Harmonic analysis
- Motor Starting analysis, Load Shedding
- Arc Flash Simulation, Cable pulling analysis

Module 06- Advanced Subjects

- PV Cell Power Production & Supply to Grid.

Module 07- Software

SPEL, ETAP



Module 01- Introduction & Industry Overview

- Oil & Gas - Upstream, Midstream, Downstream, Chemical Plants, Desalination, Water & Waste water treatment, Power Plant & FGD, New Energy- Green hydrogen, Methanol & ammonia
- Understanding Project lifecycle & Role of Instrumentation Engineer - Concept Identification, Conceptual Engineering, FEED, Detailed Engineering, Procurement Support, Construction, Testing, Startup & Commissioning, Operation
- Soft skills- Communication, attitude, Critical thinking, SMART Objectives , Aptitude Test.

Module 02- Instrument Selection Sizing & datasheets

- Instrumentation & Control, Emergency Shut down/Metering philosophy
- Piping & Instrumentation Diagram
- Instrument List
- Selection, sizing & Datasheet for Process Instruments-Inline & off-line
 - Flow Measuring devices - Orifice, Venturi, Annubar, Pitot, Magnetic, Turbine, Ultrasonic, Coriolis flow meters.
 - Level Measurement, Pressure Measurement, Temperature Measurement
 - Control Valves & Relief Devices.
 - BOQ Estimation
 - Instrument Power and Utility Requirements, UPS load List

Module 03- Control Systems, drawings & Layouts ,

- I/O list, Cause & Effect Matrix, Logic Diagram , Specification for DCS/ PLC Control System, Transmitters, Gas Analysers, Gas leak Detection System, JB grouping & wiring, JB Schedule & Layouts. Field Instruments.
- Hoop up drawing, Instrument Location Plans & Installation Details
- Cable Block Diagrams, Instrument Cable Schedule, Cable Interconnection Drawings, Cable Tray & Ladder layouts, Instrument Tubing Schedule, Instrument Earthing Layout and Specification
- Introduction to 3D MODEL- SP3D/E3D/AUTOCAD Plant 3D.

Module 05

- Vendor Offer/Documentation Review

Module 06- Smart Plant Instrumentation

Creating Instruments and Control Loops, • Defining Process Data, • Performing Calculations and Measurements

Working with Spec Sheets, • Managing Documentation , Wiring Operations
• Loop Drawings , • Hook-Ups drawings

Module 07- Advanced topics

Fire & Gas Monitoring/ Mapping

Instrumented Process function / SIL



Module 01- Introduction & Industry Overview

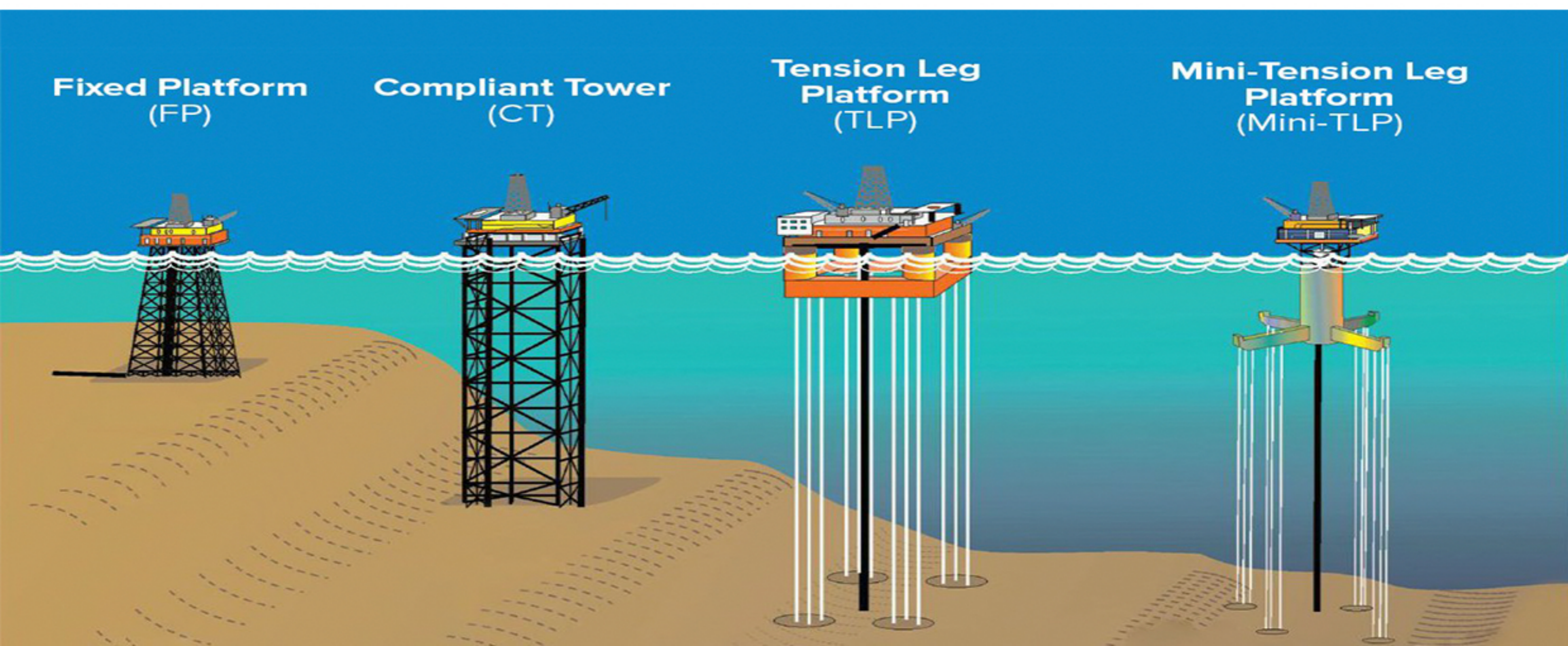
- Oil & Gas - Upstream, Midstream, Downstream, Chemical Plants, Desalination, Water & Waste water treatment, Power Plant & FGD, New Energy- Green hydrogen, Methanol & ammonia
- Understanding Project lifecycle & Role of civil , Structural & architectural- Concept Identification, Conceptual Engineering, FEED, Detailed Engineering, Procurement Support, Construction, Testing, Startup & Commissioning, Operation
- Soft skills- Communication, attire, Critical thinking, SMART Objectives , Aptitude Test.

Module 02- Architectural / Plant Layouts

- Building Plans as Per UDPR- FSI, Side Margin, Rooms, Basement, Parking, ramp Staircase, Lift shaft, Balcony, Parafit wall, Railing, ventilation, MEP, BIM, Rendering
- Typical Plant Facilities Layout

Module 03- Civil/ structural design & detailing

- Understanding Concrete grades & Reinforcement Steel requirement
- Understanding standard Structural steel Profiles & MOC
- Codes & Standard - IS/ BS / Euro / AISC
- Conceptual Structural Plans for RCC Structure, Building, Industrial facilities- Pipe rack, Skids, Indoor Plant, Outdoor Plant facilities, Equipment Foundation, building foundations, Roads, Retaining Wall, Ramps, Trenches, Culverts, Bridges.
- Underground facilities- Storage tank, water treatment Plants, Trench, buried Pipelines, culverts, Pits, ditches, bridges for Piping, Roads, Earth WORK & LAND Preparation.
- Typical Connection details
- Detail Drawings & Boq.



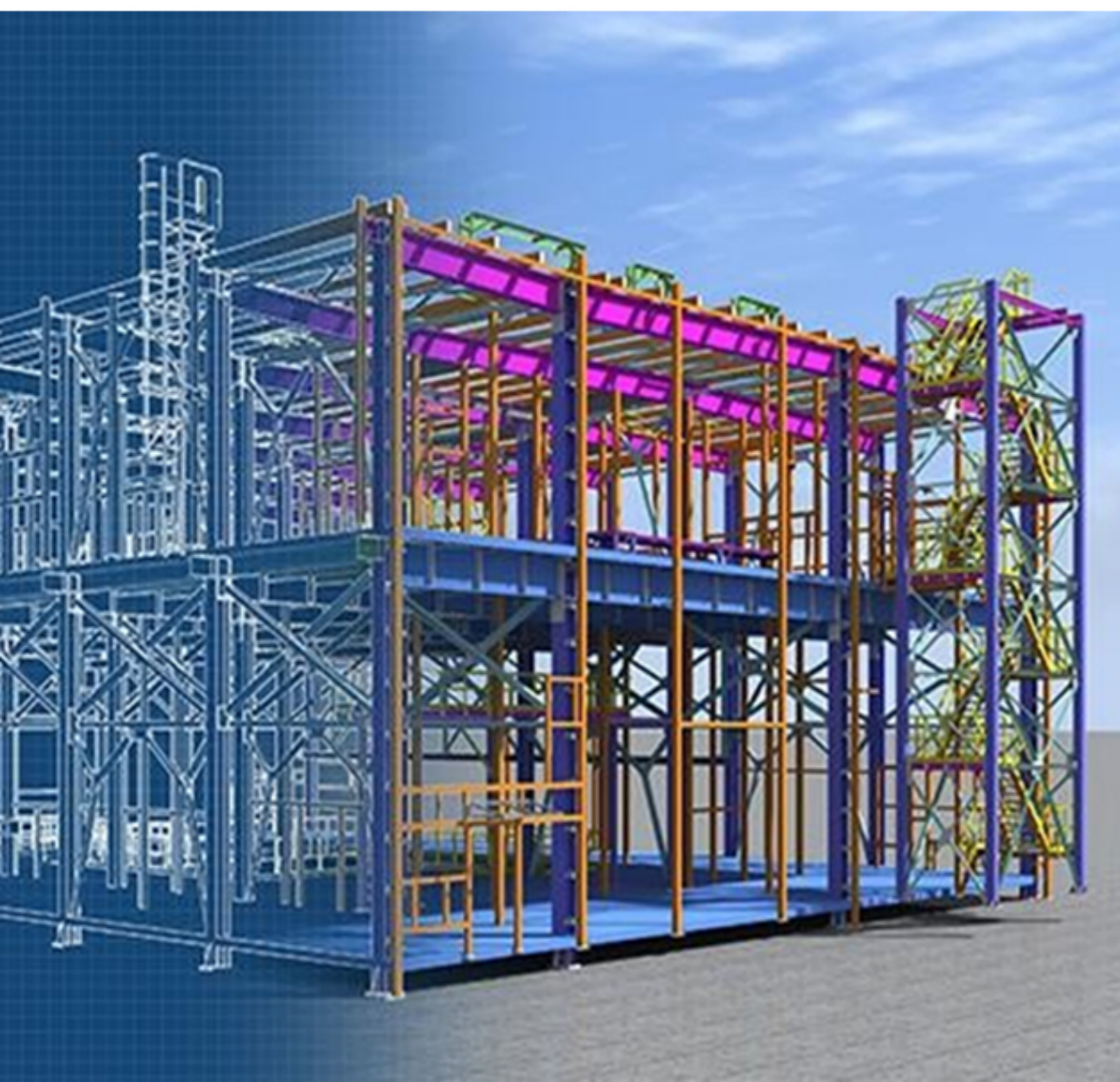
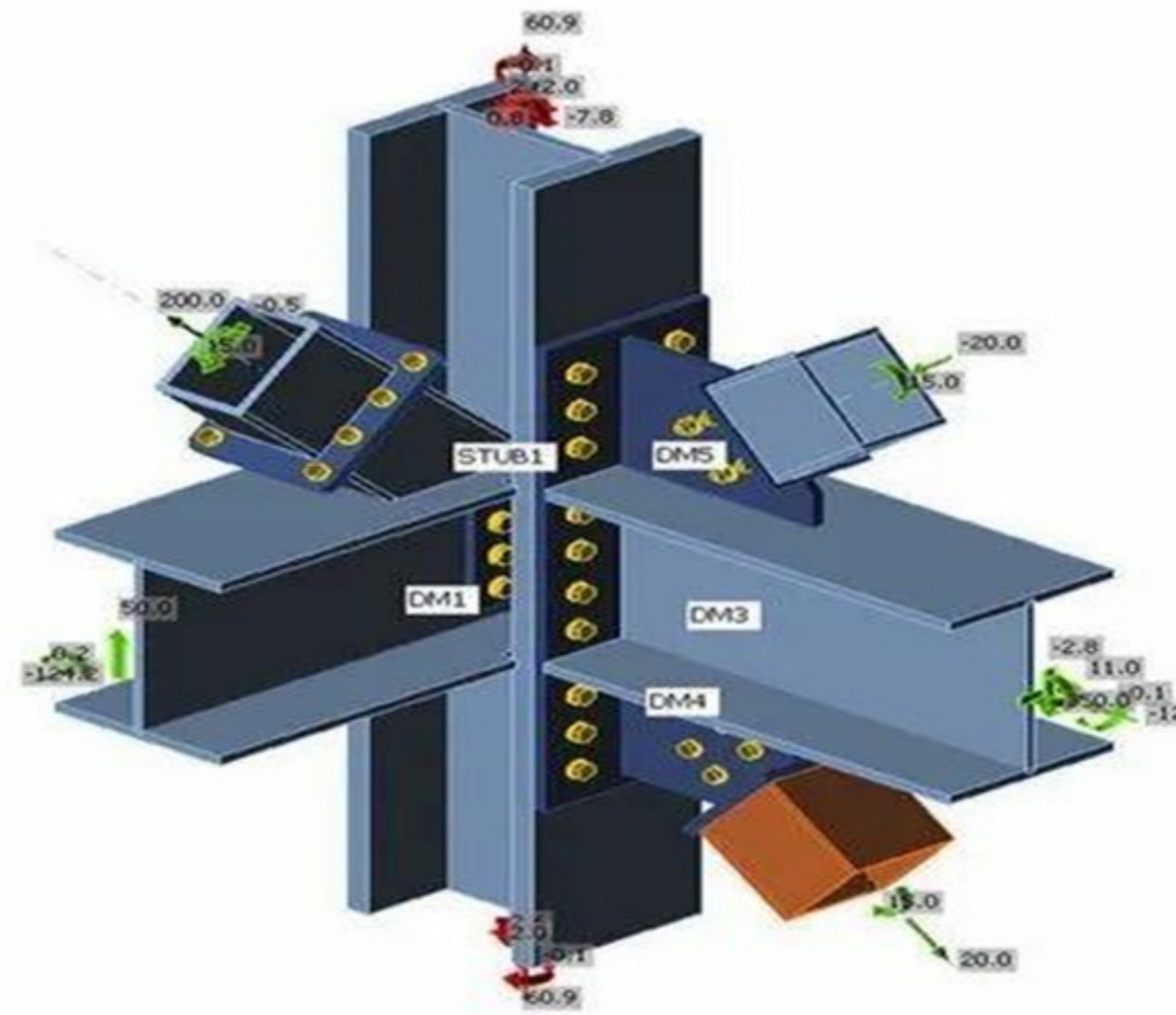
Module 04- structural analysis

- Codes & Standard
- Building Structure analysis, Water Tank., Shear wall & retaining Wall.
- Industrial Steel Structural Design & analysis- Piperack, Staircase, Skids, Indoor/ Outdoor Plant facilities, RCC water tank & underground facilities buildings
- Equipment Foundation
- Connection Design
- Lifting analysis
- Modal analysis

Module 05- structural analysis software

Module 06- structural Design & detailing software

Module 07- Connection Design Software.





Oil and Gas Upstream

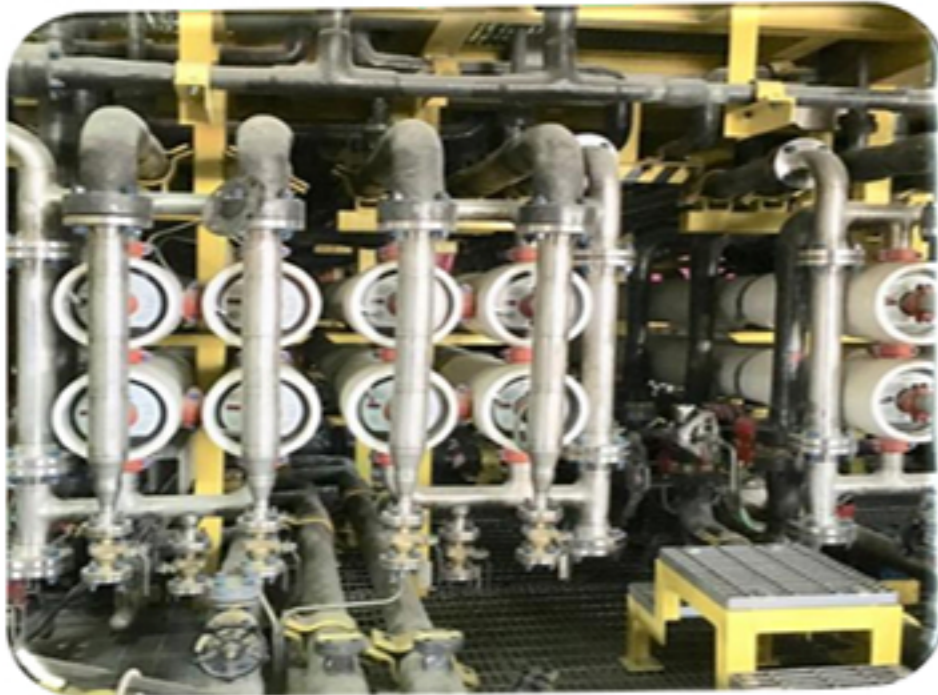
- Wellheads & Gathering lines
- Crude Handling facilities
- Produced water Treatment
- Gas handling & compression Pipelines

Mid Stream

- Pipelines
- Oil Terminals
- Gas Terminal
- LNG Storage & Regasification

Downstream

- Refinery
- Petrochemicals
- Utilities
- Offsite facilities
- Pipelines



Water & Waste water Treatment

- Sea Water Desalination
- Raw Water treatment
- Demineralized Water
- Condensate Polishing
- Produced Water Treatment
- Zero liquid Discharge
- Pumping Station & Pipeline
- Cooling water System
- Effluent Treatment
- Sewerage Treatment
- Domestic/Municipal water Treatment



Power

- Thermal Power Plant
- Combined Cycle Power Plant
- Co-Generation
- Power barge
- Boilers
- HRSG
- BOP
- Heaters
- Flue Gas Desulphurization

Chemical & Allied Process Industries



- Organic & Aromatics
- Inorganic Chemicals
- Industrial gases
- Caustic Soda
- Soda ash
- Chloro-Alkalies
- Phosphoric acid
- Organic chemicals
- Pharma
- Food
- Ethanol



Offshore Projects

- Field Development Studies, Topsides/ Modules of Wellheads(WHP) Central Processing Platforms(CPP), FPSO, FLNG



New Energy & Clean Environment

- Solar Power/Green Hydrogen/Green Methanol /Green Ammonia Plant
- CO2 Capture, FGD/SCR- SOx NOX Control, Dust, Ash & Fume Handling Systems



Product & Systems

- Non-Metallics- Piping, Equipment, Duct & Stack, Structural Profiles, Liners.
- Metallic- Equipment, Boilers, Fired Heaters, Thermal Oxidiser, Reformers, Incinerator, Scrubbers, Bag filters, ESP, SCR, FGD, Ducting, Stack.

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Thank you

Office no. 403/422, 4th Floor, Vision One Mall , Bhumkar Chowk Rd ,Wakad,
Pune, Maharashtra 411033

contact no : 7385563815 / 9284479261

Academy@sepadutech.com

