

## Design, Engineering, Installation and O & M of Rotating Equipments For Process Industry



### What You Will Learn...

- ▶ Introduction to Oil & Gas, Refinery, Petrochemical industries
- ▶ Introduction to Projects, Engineering, Commissioning, Operations etc
- ▶ Introduction to Pre-FEED, FEED and Detailed Engineering
- ▶ Introduction to rotating equipment and associated systems equipment including: Centrifugal Pumps, Compressors, and Steam Turbines
- ▶ Positive Displacement Pumps, Pulsation Dampers and Accumulators
- ▶ Valves; Safety, Butterfly, Control, Parallel Slide and Actuators
- ▶ Best Hydraulic and Mechanical design practice and Pump /Compressor selection
- ▶ Understanding system parameters and their effect on performance, including Oil and
- ▶ Power industry systems appreciation
- ▶ Bearings and lubrication: rolling element and sleeve and thrust types
- ▶ Shaft sealing, mechanical seals and packed glands
- ▶ General maintenance, installation, operation and commissioning
- ▶ Machinery alignment and Dynamic balancing
- ▶ Vibration and fault diagnosis
- ▶ Machinery selection and coatings technology
- ▶ Root cause analysis

**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 made my journey easy to reach where I wanted. I got placed in Samsung first and now I am working with GE. All thanks to Smartbrains Professionals”

**Aabhishek Pathak**  
GE, Noida

## Detail Engineering Aspects of Process Equipments

- Understanding the BASIC ENGINEERING PACKAGE, Tender requirements of Clients, Engineering Design Basis, Understanding the Client and Project requirements , Issues co agreed between client and the Consultant.
- Preparation of Technical Specifications: Process Data Sheets and Mechanical Data Sheets.
- Information flow between Process and Mechanical and other relevant data required to prepare the Technical Specification.
- Understanding the scope of supply between mechanical, civil& process.
- Enquiry Stage design , drawings and other relevant calculations
- Preparation of General Arrangement Drawings & Fabrication Drawings of Process Equipments.
- Evaluation of Vendor Offers, Preparation of Technical Queries, Technical Bid Evaluation, Technical Recommendation to be given to the Client.

## Pumps

- Different types of pumps, applications in the process industry.
- Operating principle and technology of positive displacement pumps.
- Performance curves of a centrifugal pump: head, efficiency, absorbed power, NPSH.
- Technology of centrifugal pumps, different architectures.
- Mechanical seals: different arrangements, related ancillary systems.
- Operating limits: cavitation, hammer shock, priming issues, case of 2 pumps running together.
- Start-up and operation monitoring: specific case of hot pumps, LPG pumps, vacuum pumps.
- Troubleshooting and common failures

## Reciprocating and Rotary Positive Displacement Compressors

- Different types of positive displacement compressors.
- Reciprocating compressor architecture: number of stages, cylinders, overall layout, typical applications.
- Technology of main components and ancillaries.
- Influence of process conditions on compressor performance: suction or discharge pressure, suction temperature, gas composition.
- Flow control, specific safety devices. Start-up philosophy, Troubleshooting

## Centrifugal Compressors

- Description of a multi-stage centrifugal compressor.
- Technology of main components and ancillaries.
- Pressure increase process for a compressor stage. Performance curves, influence of suction conditions and gas composition.
- Operating window: low and high speed limits, stonewall, surge, typical anti surge protection systems.
- Flow control: throttling valve, speed variation, inlet guide vanes. Specific precautions for start-up. Troubleshooting.

## Start up and Operation of Compressors and Pumps

- Centrifugal and Axial Compressors
- Reciprocating and Rotary Compressors
- Centrifugal and Axial Pumps
- Reciprocating and Rotary Pumps
- Workshop: Examples and Solutions

## Maintenance and Troubleshooting of Rotating Equipment

- Centrifugal and Axial Compressors
- Reciprocating and Rotary Compressors
- Centrifugal and Axial Pumps
- Reciprocating and Rotary Pumps
- Course Summary and Review

## Mechanical Seals

- Mechanical Seals, Functions;
- The Seal System;
- Controlling Flush Flow to the Seal;
- Cause of Seal Failures;
- Seal Configurations;
- Types of Flush System;
- Auxiliary Stuffing Box and Flush Plans.

## Flexible Coupling Design, Installation and Operation

- The Coupling Function;
- Types of Coupling;
- The Coupling System;
- Coupling Installation and Removal;
- Enclosed Coupling Guards;
- Field Retrofits From Lubricated To Dry Couplings.

## Steam Turbine

- Description of a steam turbine, different families, standard applications.
- Operating principle, classification and technology: number of stages, exhaust conditions
- Expansion process through the machine.
- Operation: start-up and performance monitoring. Speed control, safety devices

## Gas Turbine

- Gas turbine design and performance, main types, industrial and aero derivative engines
- pressure and temperature profiles through the machine.
- Influence of environmental conditions: temperature, elevation. Impact of suction
- And exhaust friction losses on turbine performance. Derating from ISO conditions



# 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.



Oil & Energy

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