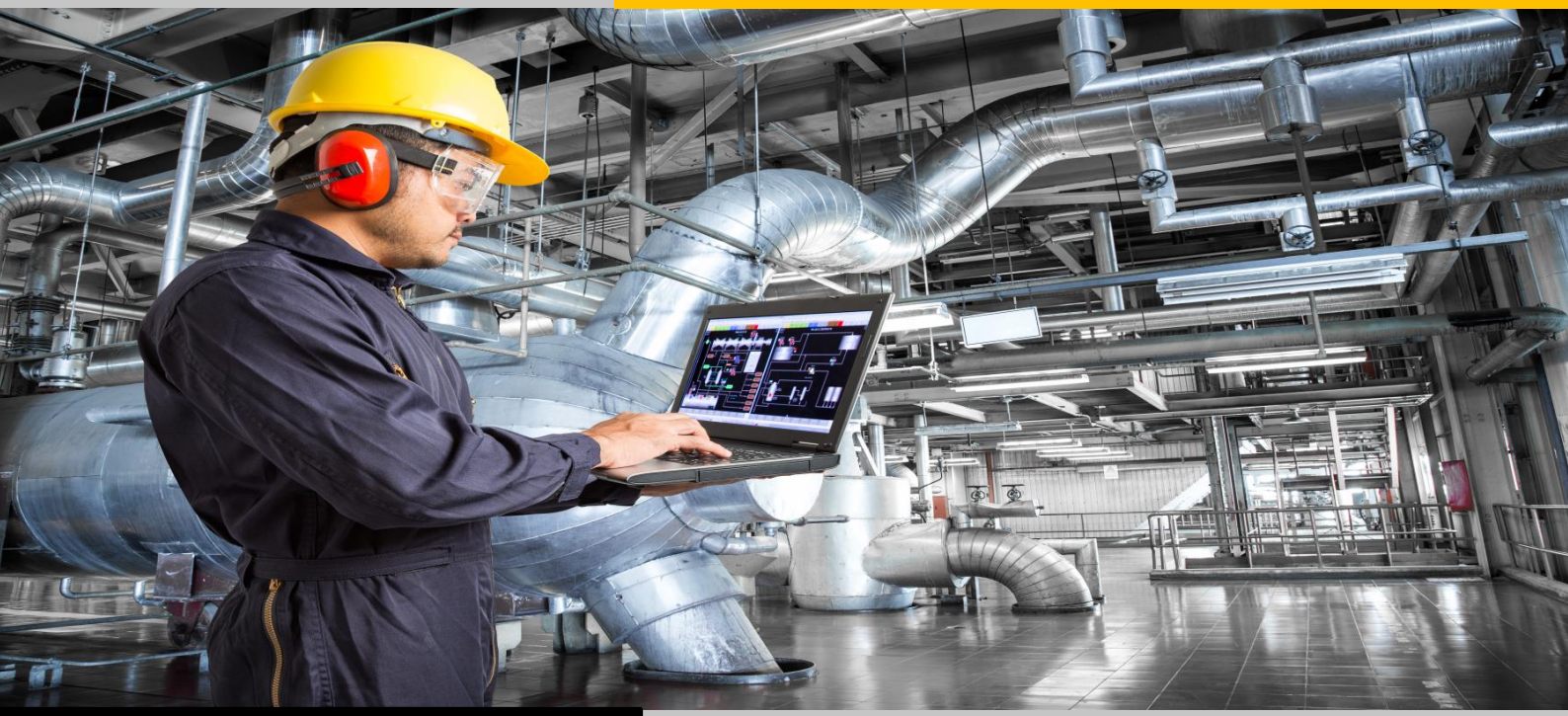
# COURSE CATALOG



## SIM INFOSYSTEMS PVT. LTD.

# TRAINING ACADEMY

## ABOUT SIM INFOSYSTEMS


**"Sim Infosystems is a global leader with over 21 years of experience specializing in the development of software solutions tailored for simulating process / power plant operations, control and safety systems across diversified industries"**

**We have completed more than 160 simulation projects for the Industrial and academic sectors.**

**Our customer base spanning across 85 Industries, 110 institutions and Over 30 countries is a testament to our global footprint and commitment to serving diverse markets.**

## OUR EXPERTISE INCLUDES

**Simulation Software Development**: Advanced software tool to impart technical training, test control strategies, safety systems and optimize performance without risking actual operations.

**Control Systems Development**: These systems incorporate advanced algorithms for process control and optimization to enhance equipment safety, efficiency and plant performance.

**DCS Emulation:** Offers full function Direct connect simulator or provide emulation software for various DCS such as Yokogawa Centum 3000 / VP, Honeywell EPKS, ABB 800XA, Fox I/A, Siemens PCS7, Emerson DeltaV etc.

**Training services:** Provide effective training to operating personal on plant operations, control systems, What-if analysis, emergency handling, safety system start-up / shut down and other standard operating procedure (SOP). These simulators include interactive 2D & 3D graphics & virtual reality (VR).

**Skill Development:** Offer skill development training on various equipment and plant operations to Engineering and Polytechnic students and make them Industry ready.

**R & D and Internship Projects:** Provide virtual plants as a platform for research projects in Academic Institutes. Also provides opportunity for students to carry out internship training / Projects in their respective colleges.

**ProSimulator™** A Made-in-India, advanced simulation based training platform designed to train Engineers & Operators in industry and students in Institutes to acquire the skills and knowledge of Industrial equipment and plants operation and control.

**ProSimulator™** is proprietary simulation technology of Sim Infosystems through which various OTS projects are executed globally in major industries like Oil & Gas, Petro-chemical, Power & Utility, Refineries, Fertilizer, Water treatment etc.

## Academic Accreditations

Ministry of Education
Government of India
सत्यमेव जयते

N·E·A·T
प्रौद्योगिकी के लिए राष्ट्रीय शैक्षणिक सहयोग
National Educational Alliance for Technology
AICTE MINISTRY OF EDUCATION

अखिल भारतीय तकनीकी शिक्षा परिषद्
All India Council for Technical Education

நான் முதல்வன்
உலகை வெல்லும் இளைய தமிழகம்

ANNA UNIVERSITY
PROGRESS THROUGH KNOWLEDGE

INDIAN INSTITUTE OF CHEMICAL ENGINEERS
ESTD. 1947

# TRAINING SERVICES BY SIM INFOSYSTEMS

At Sim Infosystems, training is at the core of our mission to bridge the gap between theory and real-world industrial practice. With over two decades of expertise in process plant simulation and control system development, our training solutions are designed to build competence, enhance safety, and improve operational efficiency.

## Operator Training Programs

- Hands-on training for plant operators, engineers, and technicians.
- Covers plant start-up, normal operation, troubleshooting, and shutdown procedures.
- Focus on critical decision-making under normal and emergency operating conditions.
- Training in various What-if scenarios and events
- Training modules aligned with Standard Operating Procedures (SOPs) and international safety standards.

## Control & Safety Systems Training

- Familiarization with Distributed Control Systems (DCS), Programmable Logic Controllers (PLC), and Emergency Shutdown Systems (ESD) of any DCS systems supplied by global DCS giants like Honeywell, Yokogawa, Emerson, SIEMENS.
- Testing and validation of control strategies in a safe virtual environment.
- Specialized training on safety interlocks, alarms, and hazard handling.

## Academic & Student Training

- Customized programs for engineering and polytechnic students.
- Courses designed to provide industry-relevant exposure and bridge the gap between classroom theoretical knowledge and practical plant operations.
- Hands-on projects using ProSimulator, with modules on process modelling, control, and optimization.
- Certification upon successful completion, enhancing employability.

## Skill Development Workshops

- Short-term intensive workshops on plant operations, control strategies, and troubleshooting.
- Industry-ready skills development with exposure to real-time plant scenarios.
- Training programs aligned with national and international skill development initiatives.

### Virtual & Digital Learning Platforms

- Interactive 2D/3D and Virtual Reality (VR) Field operation of the plant-based training modules.
- Remote training capabilities for institutions and industries.
- Realistic virtual plants to simulate process operations without the risks of physical equipment handling.

### Research & Development (R&D) Training

- Virtual simulation platforms for academic research projects.
- Support for simulation-based experiments in process control, optimization, and energy management.
- Guidance for M.Tech and Ph.D. scholars in advanced simulation methodologies.

### Internship & Project-Based Training

- Industry-focused internships for students, enabling them to apply classroom learning in simulated environments.
- Capstone projects on simulation model development, plant design, and control optimization.
- Collaboration opportunities between academic institutions and Sim Infosystems.

## APPLICABLE ACADEMIC BRANCHES

Engineering / Diploma students studying / Passed Out / Faculties

- ✓ Chemical
- ✓ Petrochemical
- ✓ Petroleum
- ✓ Mechanical
- ✓ Process control & instrumentation
- ✓ Electrical
- ✓ Power generation
- ✓ Biotech
- ✓ Data science, AI & ML

## APPLICABLE INDUSTRIAL PERSONNEL

Operators / Engineers / Supervisors

- ✓ Chemical
- ✓ Petrochemical
- ✓ Petroleum
- ✓ Mechanical
- ✓ Process control & instrumentation
- ✓ Bioprocess
- ✓ Electrical
- ✓ Power generation
- ✓ Data science, AI & ML

## LIST OF COURSES

| Course Code | Course Title | Hours |
|---|---|---|
| TRA - 01 | Process Control & Instrumentation | 24 |
| TRA - 02 | Basic Process Operations | 40 |
| TRA - 03 | Chemical Reaction Engineering | 40 |
| TRR – 01 | Refinery Operations Overview | 40 |
| TRR – 02 | Atmospheric & Vacuum Distillation Units | 40 |
| TRR – 03 | Fluid Catalytic Cracking Unit Operation | 40 |
| TRR – 04 | Hydrogen Generation & Hydrodesulphurization Units operation | 40 |
| TRR – 05 | Catalytic Reforming & Regeneration (CCR) | 40 |
| TRR – 06 | Sulphur Recovery and Amine Treating Operation | 40 |
| TRR – 07 | Hydrocracker Unit and Isomerization Unit Operation | 40 |
| TRR – 08 | Diesel, Naphtha & Kerosene Hydrotreating Units Operation | 40 |
| TRF - 01 | Fertilizer plant operations Overview | 40 |
| TRF – 02 | Ammonia Plant Operation | 40 |
| TRF – 03 | Urea Plant Operation | 40 |
| TRF – 04 | Sulphuric Acid Plant Operation | 40 |
| TRF – 05 | Phosphoric Acid Plant Operation | 40 |
| TRF – 06 | Complex Fertilizer Plant Operation (Granulation) | 40 |
| TRG – 01 | Gas Oil Separation Operations | 40 |
| TRPC - 01 | Petrochemical Operations | 48 |
| TRW – 01 | Water treatment plant operations | 24 |
| TRM – 01 | Metallurgical plant operation | 40 |
| TRCP – 01 | Chemical Process Industries (CPI) – Inorganic & Organic Chemicals | 40 |
| TRB – 01 | Vaccine & Biopharmaceutical Manufacturing Simulation | 40 |

| | | |
|---|---|---|
| TRB – 02 | Bio process operations<br>Biogas, Bio Diesel, Bio Ethanol | 40 |
| TRB – 03 | Green Hydrogen Production | 12 |
| TRE – 01 | Energy Generation Operations – Non Renewable Energy | 40 |
| TRE - 02 | Energy Generation Operations – Renewable Energy | 24 |
| TRE – 03 | Power Plant - Boiler and Turbine Operations Suite | 40 |
| TRE – 04 | Electrical Operations | 24 |
| TRE – 05 | 350MW Thermal Power Plant Operation | 40 |
| TRE – 06 | 210MW Gas Turbine Operation | 40 |
| TRE – 07 | 600MW Thermal Power Plant Operation | 48 |
| TRE - 08 | Balance of plant operation | 48 |
| TRM - 01 | Dynamic Simulation model development | 64 |
| TR3D - 01 | ProVFO: VR and 3D Field Operations | 40 |

| TRA – 01: Process Control & Instrumentation | Total Hours 24 |
|---|---|

This course provides training in Control and Instrumentation for the process and power industries, blending classroom instruction with hands-on experience using a PC-based, full-scope simulator. Participants will learn the fundamentals of both basic and advanced process control, the role of Distributed Control Systems (DCS), and will develop troubleshooting skills for instrumentation issues to ensure the efficient operation of control systems.

## Course Outcome

- ✓ Hands on experience, understanding the major DCS systems like Honeywell, Yokogawa, Emerson, AVEVA, SIEMENS
- ✓ Understand the Alarms and Events in DCS
- ✓ Learn corrective actions of the events occurred
- ✓ Learn preventive actions to save the system from abnormality
- ✓ Handle emergency scenarios through Malfunction/Disturbance
- ✓ Coordinated control operation between and control room operator and field operator in handling emergencies
- ✓ Controller tuning
- ✓ Complex control system
- ✓ Safety & Interlock system
- ✓ Recent Advances – Historian, APC, Alarm Management System…

## Who should attend?

This program is suitable for engineering students, operators and fresher in process/power industry and chemical / petroleum / instrumentation / petrochemical engineering.

## Course Coverage

- ✓ Principles of process control and Distributed control and DCS operation
- ✓ Automatic Control Systems (Flow, Level, Pressure, Temperature Controls)
- ✓ Advanced Control Systems (Cascade, Split Range, Feed Forward & Feed Back Controls
- ✓ Three element boiler control, control valve characteristics, Interactive & Non interactive level control system Control valve characteristics
- ✓ Basic instrumentation trouble shooting

| TRA – 02: Basic Process Operations | Total Hours 40 |
|---|---|

## Course Overview

A dynamic simulation based training course to understand, analyze and operate various industrial equipment used in chemical process and power industries. This is a simulator based course to provide hands-on experience and understanding to the participants on plant / equipment configuration, control / safety system, process response to changes in real time, Start-ups and Shut-downs, Transient States & Disturbances and Malfunctions.

## Course Outcome

- ✓ Enhances and enriches practical knowledge & skill on various process equipment
- ✓ Provides In-depth Process Understanding using industry relevant simulation.
- ✓ Provides industrial working environment, practical working knowledge and skill, hands-on experience of chemical plant / equipment operations.
- ✓ Gives the experience and skill on what-if analysis, troubleshooting, energy optimization and virtual field operation.
- ✓ Enhances Engineering skills and Employability.

## Who should attend?

This program is suitable for engineering students, operators and fresher in process/power industry and chemical / petroleum / instrumentation / petrochemical engineering.

## Course Coverage

- ✓ Control & Instrumentation
- ✓ Fluid dynamics
- ✓ Rotating Equipment – Pumps, compressors
- ✓ Heat Transfer Equipment – Heat exchangers, furnace, steam generator, Refrigeration
- ✓ Mass Transfer equipment – Distillation column, evaporator
- ✓ Other Unit Operations – Ball mill, crystallizer, Cyclone separator
- ✓ Blending and pH Neutralization
- ✓ Cement plant

| TRA – 03: Chemical Reaction Engineering | Total Hours 40 |
|---|---|

## Course Overview

This hands-on simulation-based training course provides a practical understanding of two key multiphase reactors used in chemical processes. Using dynamic simulator, participants will explore reactor design, operation, and performance under varying conditions. The course emphasizes the relationship between process parameters and reactor efficiency, conversion, and reaction rates.

## Course Outcome

- ✓ Understand the fundamental principles and operating conditions of different reactors.
- ✓ Identify key design and operating parameters affecting reactor performance.
- ✓ Ability to observe and analyse the effects of changes in temperature, pressure, concentration, and molar flow rates on reactor performance.
- ✓ Analyse the impact of variables such as bubble size, fluidization velocity, particle size, solid loading, and reactor pressure and reactor volume on conversion and reaction rate.
- ✓ Interpret simulation results to optimize reactor operation. & troubleshoot common operational issues and failures.

## Who should attend?

Chemical engineers, process engineers, plant operation and maintenance staff, technical trainers, and students specializing in chemical/process engineering.

## Course Coverage

- ✓ Chemical Reactors – CSTR, FBR, PFR, Batch reactor
- ✓ Steady State Non-Isothermal Reactor
- ✓ Non-Isothermal Continuous Flow Reactor
- ✓ Fluidized Bed Reactor
- ✓ Slurry Reactor
- ✓ Trickle Bed Reactor

| TRR – 01: Refinery Operation Overview | Total Hours 40 |
|---|---|

## Course Overview

This course covers the petroleum refining process from crude oil receipt to product blending. It equips participants with core principles, key equipment knowledge, and integrated process understanding. Emphasis is placed on maximizing value through conversion to fuels like gasoline, diesel, and jet fuel, while ensuring safety, efficiency, and environmental compliance.

## Course Outcome

- ✓ Understand refinery unit operations such as distillation, hydro processing, and catalytic processes, with emphasis on their role in producing cleaner fuels.
- ✓ Interpret process parameters and control strategies to ensure stable, safe, and efficient refinery operations.
- ✓ Identify operational challenges and failure modes (e.g., instrumentation air failure, feed disturbances) and apply corrective actions.
- ✓ Optimize process conditions (pressure, temperature, catalyst properties, flow rates) for improved yield and energy efficiency.
- ✓ Enhance problem-solving and decision-making skills using dynamic simulation under different operating scenarios.
- ✓ Bridge theory with practice by linking fundamental chemical engineering principles to real refinery

## Who should attend?

Chemical Engineering Students (UG/PG), Faculty & Academics, Refinery Engineers & Operators, R&D Professionals (Fuels, Catalysis) and Training & Skill Development Participants

## Course Coverage

- ✓ Introduction to Refining
- ✓ Crude Oil Processing (CDU & VDU)
- ✓ Conversion Processes ( FCC, Cracking & Coking)
- ✓ Treatment Processes ( Hydrotreating)

| TRR – 02: Atmospheric & Vacuum Distillation Units | Total Hours 40 |
|---|---|

## Course Overview

This simulator course is designed to provide training in the operation of Atmospheric and Vacuum distillation units. It includes classroom instructions, as well as hands-on training with a Simulator. The Atmospheric Distillation unit model includes preheat train, desalter, Crude furnace, Atmospheric Distillation column, side stripper, pump around system, overhead system and stabilizer. The Vacuum Distillation unit model includes Vacuum furnace, Vacuum Distillation column, overhead ejector system and product run down systems.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls in a refinery Atmospheric & Vacuum Distillation units
- ✓ Learn start-up and shut down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in refinery process engineering, unit operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the petroleum refining industry should also find this program beneficial.

## Course Coverage

- ✓ Crude oil characterization
- ✓ Atmospheric Distillation unit, major equipment, controls and Critical operating parameters
- ✓ Vacuum Distillation unit, major equipment, controls & Critical operating parameters
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRR – 03: Fluid Catalytic Cracking Unit Operation | Total Hours 40 |
|---|---|

## Course Overview

This simulator course is designed to provide training in the operation of a Fluid Catalytic Cracking unit (FCCU). It includes classroom instructions, as well as hands-on training with a Simulator. The simulated model includes Preheater section, Reactor/Stripper section, Regenerator section, Fractionator section and Recovery section.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of FCCU
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in Fluid catalytic cracking unit process engineering, operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the petroleum refining industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of conversion processes and Fluid catalytic cracking unit
- ✓ Start-up and shutdown
- ✓ Controls and Critical operating parameters
- ✓ Troubleshooting and handling Malfunctions and disturbances

| TRR – 04: Hydrogen Generation & Hydrodesulphurization Units | Total Hours 40 |
|---|---|

## Course Overview

This simulator course is designed to provide training in the operation of a Hydrogen Generation and Hydrodesulphurization units in an Oil Refinery. It includes classroom instructions, as well as hands-on training with a Simulator.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of Hydrogen Generation Unit and Hydrodesulphurization unit
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in Hydrogen & Hydrodesulphurization unit process engineering, operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the petroleum refining industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of Hydrogen Generation Unit
- ✓ Overview of Hydrodesulphurization unit
- ✓ Controls and Critical operating parameters
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRR – 05: Catalytic Reformer and Regeneration Unit | Total Hours 40 |
|---|---|

## Course Overview

This simulator course is designed to provide training in the operation of Catalytic reforming & regeneration unit (CCR) in an Oil Refinery. It includes classroom instructions, as well as hands-on training with a Simulator.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of Catalytic reforming & regeneration units
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in Catalytic reforming & regeneration unit process engineering, operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the petroleum refining industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of Catalytic reforming
- ✓ Overview of Catalytic regeneration unit
- ✓ Controls and Critical operating parameters
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRR – 06: Sulphur Recovery and Amine Treating Operation | Total Hours 40 |
|---|---|

## Course Overview

This simulator course is designed to provide training in the operation of Sulphur Recovery Unit (SRU) & Amine Treating (ATU) unit. It includes classroom instructions, as well as hands-on training with a Simulator.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of SRU and ATU
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in Sulphur Recovery Unit & Amine Treating (ATU) unit process engineering, operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the petroleum refining industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of Sulphur Recovery Unit
- ✓ Overview of Amine Treating
- ✓ Controls and Critical operating parameters
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRR - 07: Hydrocracker, Delayed Coker Unit and Isomerization Unit | Total Hours 40 |
|---|---|

## Course Overview

This simulator course is designed to provide training in the operation of Delayed Coker Unit (DCU) Hydrocracker Unit & Isomerization unit. It includes classroom instructions, as well as hands-on training with a Simulator.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of DCU, Hydrocracker & Isomerization Unit
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in DCU, Hydrocracker Unit & Isomerization Unit operations, technical service and research and development.
Process engineers from design and construction companies as well as those who provide services to the petroleum refining industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of Delayed Coker Unit
- ✓ Overview of Hydrocracker Unit
- ✓ Overview of Isomerization Unit
- ✓ Controls and Critical operating parameters
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRR - 08: Diesel, Naphtha & Kerosene Hydrotreater Unit | Total Hours 40 |
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## Course Overview

This simulator course is designed to provide training in the operation of Diesel Hydrotreating (DHDT), Naphtha Hydrotreating (NHT) and Kerosene Hydrotreater Unit (KHT). It includes classroom instructions, as well as hands-on training with a Simulator. The DHDT, NHT & KHT models consists of feed section, rector section and separation section.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of DHDT, NHT and KHT
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in Diesel Hydrotreating, Naphtha Hydrotreating and Kerosene Hydrotreating process engineering, operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the petroleum refining industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of Diesel Hydrotreating Unit
- ✓ Overview of Naphtha Hydrotreating Treating
- ✓ Overview of Kerosene Hydrotreating Treating
- ✓ Controls and Critical operating parameters
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRF - 01: Fertilizer Plant Operation | Total Hours 40 |
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## Course Overview

This course provides a comprehensive overview of fertilizer manufacturing, covering the entire value chain from raw material handling to finished products. Key focus areas include ammonia and urea synthesis, phosphoric acid production, and sulfuric acid plants. Participants will gain insights into process flow, major equipment, and control strategies used in modern fertilizer plants.

## Course Outcome

- ✓ Understand the overall fertilizer production chain: ammonia, urea, phosphoric acid, and sulfuric acid units.
- ✓ Interpret key process parameters and control strategies for safe, stable, and efficient plant operations.
- ✓ Identify operational challenges, equipment failures, and apply corrective actions.
- ✓ Optimize process conditions to improve yield, energy efficiency, and product quality.
- ✓ Strengthen problem-solving and decision-making skills through simulation-based learning.

## Who should attend?

- ✓ UG & PG students in Chemical/Process Engineering
- ✓ Faculty members using process simulation in teaching
- ✓ Plant engineers & operators in ammonia, urea, phosphoric & sulfuric acid units
- ✓ R&D professionals in fertilizer technology & process optimization
- ✓ Trainees seeking hands-on exposure to fertilizer operations

## Course Coverage

- ✓ Overview of Ammonia plant & Urea Plant
- ✓ Overview of Overview of Sulphuric Acid plan
- ✓ Overview of Phosphoric Acid plant
- ✓ Overview of Granulation Plant
- ✓ Overview of Ammonia Storage Terminal
- ✓ Start-up and shutdown & Troubleshooting and handling Malfunctions and disturbances

| TRF - 02: Ammonia Plant Operation | Total Hours 40 |
|---|---|

## Course Overview

Ammonia plant is the key process in any fertilizer plant and is vital to the profitability of fertilizer plant operations. This course is designed to provide training in the operation of a typical Ammonia plant. It includes classroom instructions, as well as hands-on training with a Simulator.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of Ammonia plant
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in fertilizer plant process engineering, unit operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the fertilizer industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of Ammonia plant
- ✓ Controls and Critical operating parameters
- ✓ Safety system
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRF – 03: Urea Plant Operation | Total Hours 40 |
|---|---|

## Course Overview

The Urea process is a very complex and demanding one. This course is designed to provide training in the operation of a Urea plant. It includes classroom instructions, as well as hands-on training with a Simulator. The Simulator includes Urea Synthesis and High Pressure Recovery, Urea Purification: Medium and Low Pressure Recovery, Urea Concentration and is based on emulated DCS operator console.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of Urea plant
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in fertilizer plant process engineering, unit operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the fertilizer industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of Urea plant
- ✓ Controls and Critical operating parameters
- ✓ Safety system
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRF – 04: Sulphuric Acid Plant Operation | Total Hours 40 |
|---|---|

## Course Overview

This course is designed to provide training in the operation of a Sulphuric Acid plant. It includes classroom instructions, as well as hands-on training with a Simulator. The Simulator includes: Combustion of elemental sulphur with excess air, Oxidation of Sulphur dioxide to Sulphur Trioxide and Absorption of Sulphur Trioxide by water and is based on emulated DCS operator console.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of Sulphuric Acid plant.
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in Sulphuric Acid plant process engineering, operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the fertilizer industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of Sulphuric Acid plant.
- ✓ Controls and Critical operating parameters
- ✓ Safety system
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRF – 05: Phosphoric Acid Plant Operation | Total Hours 40 |
|---|---|

## Course Overview

This course is designed to provide training in the operation of a Phosphoric Acid plant. It includes classroom instructions, as well as hands-on training with a Simulator. The Simulator includes: reaction section (including the dry feed), the filtration section, concentration section, acid cooling, tank farm section and cooling towers and is based on emulated DCS operator console.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of Phosphoric Acid plant.
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in Phosphoric Acid plant process engineering, operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the fertilizer industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of Phosphoric Acid plant.
- ✓ Controls and Critical operating parameters
- ✓ Safety system
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRF – 06: Complex Fertilizer Plant Operation (Granulation) | Total Hours 40 |
|---|---|

## Course Overview

This course is designed to provide training in the operation of a Complex Fertilizer plant (Granulation). It includes classroom instructions, as well as hands-on training with a Simulator. The Simulator includes: Reaction and Granulation Section, PN Reactor Section, Reaction and Pre-Scrubbing Section, Scrubbing Section, Final Washing Section, Ammonia Heating/ Vaporizing Section, Recycle Section (Dryer/Combustion Chamber/Solid Recycle), Solid Raw Material Section, Final Solid Section (Product System) and is based on emulated DCS operator console.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of Complex Fertilizer plant.
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in Complex Fertilizer plant process engineering, operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the fertilizer industry should also find this program beneficial.

## Course Coverage

- ✓ Overview of Complex Fertilizer plant.
- ✓ Controls and Critical operating parameters
- ✓ Safety system
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRG – 01: Gas Oil Separation Operation | Total Hours 40 |
|---|---|

## Course Overview

This course is designed to provide training in the operation of Gas Oil Separation facilities. It includes classroom instructions, as well as hands-on training with a Simulator. The Simulator consists of simulation models for various Gas Oil Separation plants and upstream operations. Each model simulates a Gas Oil Separation plant with its control, instrumentation and safety systems and field devices and is based on emulated DCS operator console.

## Course Outcome

- ✓ Gain knowledge of all major systems and controls of Gas Oil Separation facilities.
- ✓ Learn start-up and shut-down operations
- ✓ Gain experience troubleshooting and handling malfunctions and major upsets

## Who should attend?

This program is useful for personnel involved in Gas Oil Separation facilities process engineering, operations, technical service and research and development. Process engineers from design and construction companies as well as those who provide services to the Gas Oil Separation facilities should also find this program beneficial.

## Course Coverage

- ✓ Gas Oil Separation Plant (GOSP), Degassing, Dehydration, GAS Compression, LPG Plant, NGL Recovery, Production Wells, Manifold And 3-PHASE Separator
- ✓ Controls and Critical operating parameters
- ✓ Safety system
- ✓ Troubleshooting and handling Malfunctions and disturbances
- ✓ Start-up and shutdown

| TRPC – 01: Petrochemical Operation Suite | Total Hours 48 |
|---|---|

## Course Overview

The Petrochemical Simulation Suite provides trainees with a practical platform to learn and practice the operation of key petrochemical production processes. Using realistic process simulators, participants gain exposure to reactor operation, separation systems, process control, troubleshooting, and emergency handling. The suite covers essential units in aromatics, olefins, glycols, alcohols, and derivatives, preparing engineers and operators for the challenges of modern petrochemical industries.

## Course Outcome

- ✓ Understand the process flow, reaction chemistry, and separation techniques in major petrochemical plants.
- ✓ Operate unit operations including reactors, absorbers, distillation columns, and heat exchangers.
- ✓ Perform start-up, shutdown, and load variation in petrochemical units.
- ✓ Troubleshoot common faults and respond to abnormal/emergency conditions.
- ✓ Apply simulator practice to improve operational confidence, safety awareness, and decision-making skills.

## Who Should Attend?

- ✓ Process Engineers & Plant Operators in petrochemical, refining, and chemical industries.
- ✓ Control Room Staff & Supervisors overseeing plant operations.
- ✓ Maintenance Engineers supporting process equipment reliability.
- ✓ Graduate & Diploma Engineers / Trainees preparing for petrochemical careers.
- ✓ Faculty & Trainers from technical institutes focusing on chemical and process engineering.

## Course Coverage – Modules

- ✓ PS-7001 – BTX Production

  Simulation of benzene, toluene, and xylene recovery and purification from reformate/aromatic streams.

- ✓ PS-7002 – Ethylene Oxide Production
  Catalytic oxidation of ethylene to ethylene oxide with absorber-stripper operation and process control.
- ✓ PS-7003 – Phthalic Anhydride Production
  Vapor-phase oxidation of o-xylene/naphthalene to phthalic anhydride, including reactor and recovery systems.
- ✓ PS-7004 – Styrene Production
  Dehydrogenation of ethylbenzene to styrene with energy integration and process optimization.
- ✓ PS-7005 – Allyl Alcohol Production
  Simulation of industrial routes to allyl alcohol, focusing on reactor conditions and separation steps.
- ✓ PS-7006 – Ethylene Glycol Production
  Reactor and distillation system modeling for mono-, di-, and tri-ethylene glycol production.
- ✓ PS-7007 – Ethane Cracker Model
  Thermal cracking of ethane into ethylene, propylene, and by-products with furnace and quench operations.
- ✓ PS-7008 – Propylene Glycol Production
  Catalytic hydration of propylene oxide to propylene glycol with purification steps.
- ✓ PS-7009 – Ethanol Rectification Unit
  Separation of ethanol-water mixtures using multi-stage rectification and distillation principles.

| TRW -01: Utilities & Water Systems Suite | Total Hours 24 |
|---|---|

## Course Overview

The Utilities Simulation Suite covers critical utility systems that support power and process plant operations, with dedicated simulators for the Water Treatment Plant and Water Desalination Plant**.** These modules provide trainees with hands-on experience in water purification, demineralization, and desalination processes, ensuring uninterrupted supply for boilers, cooling towers, and other plant systems.

## Course Outcome

- ✓ Understand the role of utility systems in supporting power and process plant operations.
- ✓ Operate and monitor Water Treatment and Desalination Plants using simulators.
- ✓ Apply knowledge of purification, demineralization, and desalination for reliable utility supply.

## Who should attend?

- ✓ Plant Operators & Technicians – involved in day-to-day operation of utility systems (water treatment, desalination, boilers, cooling towers).
- ✓ Process & Utility Engineers – responsible for design, monitoring, and optimization of plant utilities.
- ✓ Maintenance Personnel – supporting utility equipment upkeep, troubleshooting, and reliability.
- ✓ Shift Supervisors & Control Room Staff – overseeing safe and efficient utility operations.
- ✓ Graduate & Diploma Engineers / Trainees – seeking practical exposure to industrial utility systems.

## Course Coverage

- ✓ Normal operation exercises
- ✓ Start-up and shutdown procedures
- ✓ Malfunction scenarios and corrective response

| TRM – 01: Metallurgical Plant Operations Suite | Total Hours 40 |
|---|---|

## Course Overview

The Metallurgy Simulation Suite provides hands-on training in copper smelting and iron & steel processing operations. Through realistic simulators, participants learn the fundamentals of pyrometallurgy, refining, and steelmaking processes, along with equipment operation, process control, troubleshooting, and safety. This suite bridges theory and practice, enabling trainees to gain confidence in handling metallurgical plant operations.

## Course Outcome

- ✓ Participants completing this training will be able to:
- ✓ Understand the end-to-end process flow in copper smelting and steelmaking.
- ✓ Operate and monitor furnaces, converters, reactors, and auxiliary systems.
- ✓ Perform start-up, shutdown, and steady-state operation of metallurgical units.
- ✓ Troubleshoot common operational problems and manage abnormal/emergency scenarios.
- ✓ Apply simulator practice to strengthen safety, efficiency, and decision-making in metallurgical plants.

## Who Should Attend

- ✓ Metallurgy & Process Engineers – Copper, iron, and steel industries
- ✓ Plant Operators & Technicians – Smelting and steelmaking
- ✓ Maintenance & Utility Engineers – Metallurgical equipment
- ✓ Graduate/Diploma Engineers & Trainees – Careers in metallurgy
- ✓ Faculty & Trainers – Mining, metallurgy, and materials institutes

## Course Coverage – Modules

Copper Smelting Unit – Simulation of concentrate smelting, converting, refining, slag handling, and off-gas management.

Iron & Steel Processing Unit – Simulation of blast furnace, BOF, steel refining, casting, and rolling with control of temperature, composition, and quality.

| TRCP – 01: Chemical Process Industries (CPI) – Inorganic & Organic Chemicals | Total Hours 40 |
|---|---|

## Course Overview

The Chemical Process Industries Simulation Suite provides practical training in both inorganic and organic chemical production processes. Participants gain hands-on experience with reactor operation, separation, purification, and process control, along with troubleshooting and emergency handling. This simulator-based training bridges theory and practice, preparing engineers and operators for modern chemical plant operations.

## Course Outcome

- ✓ Understand the process flow, reaction chemistry, and separation techniques in inorganic and organic chemical plants.
- ✓ Operate unit operations including electrolyzers, reactors, distillation columns, and absorbers.
- ✓ Perform start-up, shutdown, and steady-state operations safely.
- ✓ Troubleshoot operational issues and handle abnormal/emergency situations effectively.
- ✓ Apply simulator practice to enhance decision-making, safety awareness, and operational confidence.

## Who Should Attend?

- ✓ Process Engineers & Plant Operators in chemical industries.
- ✓ Control Room Staff & Supervisors monitoring chemical plant operations.
- ✓ Maintenance Engineers supporting chemical process equipment.
- ✓ Graduate & Diploma Engineers / Trainees preparing for chemical industry careers.
- ✓ Faculty & Trainers in chemical engineering and process industries.

## Course Coverage – Modules

Simulation models of Chlor Alkali Plant, Calcium Chloride Plant, Ethanol Distillation Unit and Methanol Synthesis Unit

| TRB – 01: Vaccine & Biopharmaceutical Manufacturing Simulation Suite | Total Hours 40 |
|---|---|

## Course Overview

The Vaccine & Biopharmaceutical Manufacturing Simulation Suite provides hands-on training for key bioprocess operations used in vaccine and protein-based therapeutics production. Participants learn fermentation, purification, and downstream processing through realistic simulator modules, gaining experience in process control, troubleshooting, and emergency handling.

## Course Outcome

- ✓ Understand the workflow of vaccine and biopharmaceutical production from fermentation to downstream processing.
- ✓ Operate bioreactors, freezers, centrifuges, and filtration systems.
- ✓ Apply process control techniques for yield optimization and quality assurance.
- ✓ Perform start-up, shutdown, and abnormal situation handling safely.
- ✓ Develop operational confidence, safety awareness, and troubleshooting skills in biopharmaceutical manufacturing.

## Who Should Attend?

- ✓ Bioprocess Engineers & Technicians working in vaccine or protein production.
- ✓ Quality Control / QA Personnel in biopharma industries.
- ✓ Maintenance Engineers supporting bioprocess equipment.
- ✓ Graduate / Diploma Trainees aspiring for careers in vaccine and biopharmaceutical manufacturing.
- ✓ Faculty & Trainers in biotechnology, microbiology, and bioengineering institutes.

## Course Coverage – Modules

Simulation of Bioreactor, Biomedical Freezer, Refrigerated Centrifuge, Bio-molecular Ultrafiltration and Protein Precipitation

| TRB – 02: Bio-diesel, Bio-gas and Bio Ethanol Plant | Total Hours 40 |
|---|---|

## Course Overview

This comprehensive course provides a detailed understanding of the production processes for three major biofuels: Biogas, Biodiesel, and Bioethanol. Participants will explore the scientific principles, technological processes, and operational aspects of converting organic materials into sustainable energy. The course combines theoretical knowledge with practical insights into feedstock selection, production techniques, quality control, and economic viability, preparing attendees for roles in the rapidly growing bioenergy sector.

## Course Outcome

- ✓ Understand the process flow, chemical reactions, and separation techniques in biogas, bio-diesel and bioethanol production.
- ✓ Operate reactors, separators, and purification units efficiently.
- ✓ Perform startup, shutdown, and steady-state operations safely.
- ✓ Troubleshoot operational issues and handle abnormal/emergency situations.
- ✓ Apply simulator practice to enhance process efficiency, safety, and operational confidence.

## Who Should Attend?

- ✓ Process Engineers & Plant Operators in biofuel and renewable energy industries.
- ✓ Maintenance Engineers supporting bio-diesel, biogas and bioethanol plant equipment.
- ✓ Graduate & Diploma Trainees preparing for careers in biofuel production.
- ✓ Faculty & Trainers in chemical engineering, renewable energy, and process technology institutes.

## Course Coverage

Biogas courses cover anaerobic digestion, feedstock management, biogas plant design, and process control.

Biodiesel training includes oil extraction, transesterification chemistry, fuel standards.

Bioethanol courses focus on biomass pre-treatments, fermentation, and distillation.

| TRB – 03: Green Hydrogen Production | Total Hours 12 |
|---|---|

## Course Overview

This comprehensive training course provides a deep, practical understanding of green hydrogen production via alkaline water electrolysis. The course moves beyond theory, using an advanced dynamic simulator to explore the core principles, operational parameters, and performance characteristics of an industrial-scale alkaline electrolyzer system.

## Course Outcome

- ✓ Understand principles, reactions, and components of an electrolyzer
- ✓ Operate simulator by adjusting power & parameters
- ✓ Analyze effects of variables on hydrogen yield & efficiency
- ✓ Calculate key performance metrics ($H_2$, $O_2$, water use)
- ✓ Interpret P&ID for system operations
- ✓ Optimize performance for maximum hydrogen production

## Who Should Attend?

- ✓ Process Engineers and Chemical Engineers working in the hydrogen energy sector.
- ✓ Plant Operators and Technicians involved in the operation and maintenance of electrolysis facilities.
- ✓ Research Scientists and PhD Students focusing on renewable energy and hydrogen technologies.
- ✓ Project Managers and Technical Sales Personnel who require a technical understanding of alkaline electrolyzer operations.
- ✓ Energy Consultants and Policy Makers looking to deepen their knowledge of green hydrogen production processes.

## Course Coverage

- ✓ Introduction: Green Hydrogen & Electrolysis Overview
- ✓ Technology: Alkaline Electrolyzer Components & Principles
- ✓ Theory: Core Process Equations & Calculations
- ✓ Hands-On Training: Simulator Operation and Parameter Adjustment
- ✓ Analysis: Process Optimization and Performance

| TRE - 01 Energy Generation Operations – Non Renewable Energy | Total Hours 40 |
|---|---|

## Course Overview

This comprehensive simulator-based program provides hands-on training across a wide range of power plant operations. Participants will gain practical experience in managing and operating various power generation systems including thermal, nuclear, and diesel-based plants. The course emphasizes operational safety, efficiency, and real-time decision-making in a controlled simulated environment.

## Course Outcome

- ✓ Understand the principles and operations of various power plants including thermal, nuclear, and diesel.
- ✓ Operate and troubleshoot boiler systems, turbines, and electrical equipment safely and efficiently.
- ✓ Analyze power plant performance and optimize operational parameters.
- ✓ Gain hands-on experience with combined cycle, thermal, power plant simulations.
- ✓ Apply knowledge of safety protocols, emergency handling, and load management.

## Who should attend?

- ✓ Engineering students (undergraduate & postgraduate) specializing in Electrical, Mechanical, or Power Engineering.
- ✓ Faculty members seeking to integrate power plant simulation into teaching.
- ✓ Power plant operators, engineers, and maintenance personnel.
- ✓ R&D professionals working on energy systems, efficiency improvement, and renewable integration.

## Course Coverage

Over view and operations of

- ✓ Boiler Operations & Turbine Operations & Electrical Operations
- ✓ Combined Cycle Power Plant, Thermal Power Plant & Diesel Generator Operations
- ✓ Nuclear Power Plant

| TRE - 02 Energy Generation Operations – Renewable Energy | Total Hours 24 |
|---|---|

## Course Overview

This simulator-based program provides hands-on training on renewable power plant operations. Participants will gain practical experience in managing and operating hydroelectric, wind, and solar power generation systems. The course emphasizes operational safety, efficiency, and real-time decision-making in a controlled simulated environment.

## Course Outcome

- ✓ Understand the principles and operations of renewable power plants including hydro, wind, and solar.
- ✓ Operate and troubleshoot turbines, electrical equipment, and renewable energy systems safely and efficiently.
- ✓ Analyze power plant performance and optimize operational parameters.
- ✓ Gain hands-on experience with hydroelectric, wind, and solar power plant simulations.
- ✓ Apply knowledge of safety protocols, emergency handling, and load management.

## Who should attend?

- ✓ Engineering students (undergraduate & postgraduate) specializing in Electrical, Mechanical, or Power Engineering.
- ✓ Faculty members seeking to integrate renewable power plant simulation into teaching.
- ✓ Power plant operators, engineers, and maintenance personnel working in renewable energy.
- ✓ R&D professionals focusing on renewable energy systems and efficiency improvement.

## Course Coverage

Overview and Operations of:

- ✓ Hydroelectric Power Plant
- ✓ Wind Mill Farm
- ✓ Solar Power Plant

| TRE - 03 Power Plant - Boiler and Turbine Operations Suite | Total Hours 40 |
|---|---|

## Course Overview

The Power Plant Operations Suite provides a comprehensive, simulator-based learning platform covering both Boiler Operations and Turbine Operations. Participants gain hands-on experience in fuel handling, steam generation, steam flow control, and power plant auxiliary systems. Through realistic simulations, trainees practice normal operations, start-up, shutdown, troubleshooting, and emergency handling, building the competence required for safe and efficient thermal power plant operation.

## Course Outcome

- ✓ Understand the design and function of boiler and turbine systems in thermal power plants.
- ✓ Operate and monitor subsystems including fuel handling, flue gas & air, steam generation, condensate, deaerator, condenser, and cooling systems.
- ✓ Apply knowledge of combustion control, steam flow regulation, lubrication management, and heat recovery.

## Who should attend?

- ✓ Power Plant Operators & Technicians – involved in daily operation of boilers, turbines, and auxiliaries.
- ✓ Shift Engineers, Supervisors & Control Room Personnel – overseeing power generation processes.
- ✓ Maintenance Engineers & Utility Staff – engaged in supporting plant equipment reliability and troubleshooting.
- ✓ Graduate / Diploma Engineers & Trainees / Faculty – preparing for roles in thermal power plant operation.

## Course Coverage

- ✓ Perform start-up, shutdown, load change, and abnormal operation handling on simulators.
- ✓ Troubleshoot operational issues and respond to emergency scenarios with confidence.
- ✓ Enhance decision-making, teamwork, and safety awareness in power plant environments.

| TRE – 04: Power plant - Electrical Operations Suite | Total Hours 24 |
|---|---|

## Course Overview

The Electrical Operations Suite provides an integrated simulation environment for mastering the critical electrical and auxiliary systems of power plants and extending to grid operations and transmission management. Covering systems from generator cooling and auxiliary supply to high-voltage switchyard and grid distribution, this suite enables participants to gain hands-on operational skills, fault handling expertise, and safety awareness required in modern power generation and distribution.

## Course Outcome

- ✓ Principles of generator & auxiliary power distribution
- ✓ Operation of 6.6 kV, 415 V & 220 kV systems
- ✓ Generator cooling water management
- ✓ Grid operation, transmission & power flow
- ✓ Faults, relay protection & emergency handling
- ✓ Start-up, shutdown & recovery procedures

## Who Should Attend

- ✓ Electrical & Control Engineers in power plants and industries.
- ✓ Operators & Supervisors of generator, switchyard, and distribution systems.
- ✓ Grid Operation & Transmission Engineers.
- ✓ Maintenance Teams responsible for auxiliary and electrical systems.
- ✓ Graduate/Diploma Trainees & Faculty involved in power system training.

## Course Coverage

- ✓ Generator System & Cooling Water Operations
- ✓ 6.6 kV & 415 V Power Distribution Systems
- ✓ 220 kV Switchyard Operations – protection, interlocks, and fault handling
- ✓ ES-2001 Transmission & Distribution Simulator – grid operation, power flow, load management
- ✓ Start-up, Shutdown & Emergency Handling for electrical systems
- ✓ Protection System Familiarization & Fault Analysis

| TRE – 05: 350 MW Gas Turbine Operation | Total Hours 40 |
|---|---|

## Course Overview

The 350 MW Gas Turbine Operations Simulator offers hands-on training in gas turbine power generation. Participants learn to operate and optimize all major subsystems—fuel, air, combustion, turbine, exhaust, cooling, lubrication, and control—while practicing start-up, shutdown, load management, troubleshooting, and emergency handling in a realistic simulated environment.

## Course Outcome

- ✓ By the end of this course, participants will be able to:
- ✓ Explain the working principles of gas turbines and their role in power generation.
- ✓ Operate key systems: air intake, compressor, combustor, turbine, exhaust, and auxiliaries.
- ✓ Apply knowledge of fuel handling, combustion control, and heat recovery integration.

## Who Should Attend?

- ✓ Gas Turbine Operators & Technicians – responsible for daily operations.
- ✓ Control Room Engineers & Supervisors – monitoring and managing turbine performance.
- ✓ Maintenance Engineers – supporting reliability of fuel, cooling, and lubrication systems.
- ✓ Graduate & Diploma Engineers / Trainees / Faculty– preparing for careers in power plant operations.

## Course Coverage

- ✓ Gas turbine fundamentals, Air intake, compressor, combustion & exhaust systems
- ✓ Fuel supply, cooling, and lubrication systems
- ✓ Normal operation, start-up & shutdown procedures
- ✓ Load management & performance optimization
- ✓ Troubleshooting common faults & emergency handling

| TRE – 06: 210 MW Thermal Power Plant | Total Hours 40 |
|---|---|

## Course Overview

The 210 MW Thermal Power Plant Simulator Training offers practical learning in boiler, turbine, and auxiliary operations. Participants gain hands-on experience in the Rankine cycle, steam generation, fuel handling, and power generation, with simulator practice in startup, shutdown, load changes, troubleshooting, and emergency handling for safe and efficient plant operation.

## Course Outcome

- ✓ Explain the working of a 210 MW thermal power plant based on the Rankine cycle.
- ✓ Operate and monitor boiler, turbine, and auxiliary systems.
- ✓ Perform start-up, shutdown, and load change operations safely.
- ✓ Identify and troubleshoot common operational problems.

## Who Should Attend

- ✓ Power Plant Operators & Technicians – engaged in daily operation of boilers, turbines, and auxiliaries.
- ✓ Shift Engineers, Control Room Staff & Supervisors – overseeing plant operations and performance.
- ✓ Maintenance Engineers & Utility Staff – supporting equipment reliability and troubleshooting.
- ✓ Graduate & Diploma Engineers / Trainees – seeking career preparation in power generation.
- ✓ Faculty & Trainers – from technical institutes teaching thermal power plant systems.

## Course Coverage

- ✓ Plant fundamentals & Rankine cycle
- ✓ Boiler systems (fuel, combustion, steam, flue gas & air)
- ✓ Turbine systems (steam expansion, condensate, feed water, cooling)
- ✓ Auxiliaries (lubrication, sealing, water treatment, electrical)
- ✓ Control & protection systems (DCS/PLC, interlocks, safety)
- ✓ Operational practices (start-up, shutdown, load change, monitoring)

| TRE – 07: 600 MW Thermal Power Plant | Total Hours 48 |
|---|---|

## Course Overview

600 MW Thermal Power Plant Simulator Training – Hands-on learning of boiler, turbine, and auxiliaries with Rankine cycle applications, fuel handling, and power generation. Simulator practice covers start-up, shutdown, load changes, fault diagnosis, and emergency handling for safe and efficient plant operation.

## Course Outcome

- ✓ Understand the design and operation of a 600 MW thermal power plant.
- ✓ Operate boiler, turbine, and auxiliary systems with confidence.
- ✓ Perform start-up, shutdown, and load change procedures safely.
- ✓ Monitor plant performance and optimize efficiency.
- ✓ Diagnose and troubleshoot system malfunctions.
- ✓ Manage abnormal and emergency conditions effectively.

## Who Should Attend

- ✓ Power plant operators, engineers, and technicians involved in large-unit operations.
- ✓ Control room staff & supervisors overseeing 600 MW utility plants.
- ✓ Maintenance & utility engineers responsible for reliability and troubleshooting.
- ✓ Graduate/diploma engineers & trainees aiming for careers in power generation.
- ✓ Faculty & trainers from technical institutes focusing on thermal power systems.

## Course Coverage

- ✓ Plant Fundamentals – Layout, Rankine cycle, unit features
- ✓ Boiler Systems – Fuel, combustion, steam, flue gas & air
- ✓ Turbine Systems – Steam expansion, condensate, feed water, cooling
- ✓ Auxiliaries – Lube, sealing, water treatment, electrical
- ✓ Operations – Start-up, shutdown, load, efficiency, interlocks, safety
- ✓ Troubleshooting – Faults, alarms, emergency actions

| TRE– 08: Power Plant – Balance of Plant (BOP) | Total Hours 24 |
|---|---|

## Course Overview

This course provides trainees with a comprehensive understanding of Coal and Ash Handling systems in thermal power plants. Participants will learn the principles, equipment, and operations involved in coal unloading, conveying, crushing, feeding, and storage, as well as ash collection, disposal, and environmental management. Through simulator-based sessions, trainees gain hands-on experience in system operation, troubleshooting, and safe practices for reliable and efficient plant performance.

## Course Outcome

- ✓ Explain the working principles of coal handling and ash handling systems.
- ✓ Identify key equipment and their functions (conveyors, crushers, feeders, hoppers, ESP, etc.).
- ✓ Operate and monitor coal handling and ash handling systems using simulators.
- ✓ Apply operational practices for start-up, shutdown, and load changes.
- ✓ Handle common disturbances, equipment failures, and emergency situations.
- ✓ Understand environmental and safety aspects of coal and ash management.

## Who Should Attend?

- ✓ Power plant operators and engineers
- ✓ Plant maintenance personnel
- ✓ Engineering students and diploma holders in mechanical/electrical streams
- ✓ Trainees preparing for thermal power plant operations

## Course Coverage

Coal unloading, conveying, crushing, storage, feeding, ash collection & disposal, system monitoring, safety, troubleshooting, and simulator training.

| TRM – 01: Dynamic Simulation Model Development | Total Hours 64 |
|---|---|

## Course Overview

This professional training course provides a comprehensive, hands-on introduction to the development of dynamic process simulators using the ProSimulator platform. Participants will learn the entire lifecycle of creating a high-fidelity Operator Training Simulator (OTS), from data collection and mathematical modelling to coding in C++, graphics development, and final testing. The course emphasizes a practical approach, blending engineering principles with software tools to build realistic, dynamic models for process design, automation testing, and operator training.

## Course Outcome

- ✓ Explain the architecture and components of a full-scope Operator Training Simulator (OTS).
- ✓ Apply fundamental engineering principles (mass, heat, momentum balance, reaction kinetics) to develop rigorous mathematical models.
- ✓ Develop dynamic process models using Microsoft Visual C++ within the ProSimulator framework.
- ✓ Configure the Instructor Station and Operator Station interfaces to control and monitor the simulation.
- ✓ Design and build real-time, animated process graphics using the GLG Toolkit.
- ✓ Perform design testing, dynamic testing, and validation of the simulator to ensure accuracy and reliability.

## Who Should Attend?

- ✓ Process Simulation Engineers responsible for building or maintaining training simulators.
- ✓ Control Systems Engineers involved in automation logic testing and validation.
- ✓ Process Design Engineers seeking to understand dynamic process behaviour.
- ✓ Plant Engineers and Specialists involved in procedure development.
- ✓ Engineering Faculty & Postgraduate Students in Chemical/Process Engineering aiming to integrate dynamic simulation into teaching or research.

## Course Coverage

ProSimulator Model Development Course Topics

- ✓ Model Development Lifecycle
- ✓ VC++ Programming for Simulation
- ✓ Instructor Station Configuration
- ✓ Operator Station Setup
- ✓ GLG Graphics Development
- ✓ Simulator Testing & Validation
- ✓ Hands-On Project Workshop

| TR3D – 01: ProVFO: VR and 3D Field Operations Simulator | Total Hours 24 |
|---|---|

## Course Overview

The ProVFO (Virtual Field Operations) is a next-generation Virtual Reality (VR) training platform integrated with ProSimulator™ for real-time plant operation training. It offers an immersive, interactive 3D virtual plant environment that allows trainees to practice and visualize real-world operations. With dedicated models for Distillation Unit, Boiler, and Centrifugal Pump, the training covers fundamental to advanced plant operations, human factors, safety, and team communication.

## Course Outcome

- ✓ Navigate and operate a 3D virtual process plant environment.
- ✓ Understand and perform operations of Distillation, Boiler, and Pumping Systems.
- ✓ Integrate field and control room operations for seamless plant management.
- ✓ Improve communication, collaboration, and team coordination in plant operations.
- ✓ Analyze process internals through 3D animations and VR interactions.
- ✓ Demonstrate enhanced operator proficiency and situational awareness.
- ✓ Apply safe operating practices to improve plant reliability and safety.

## Who Should Attend?

- ✓ Outside Operators & Console Operators working in process, power, or chemical plants.
- ✓ Supervisors & Shift In-charges responsible for plant operations.
- ✓ Process Engineers & Maintenance Teams involved in equipment operation.
- ✓ Graduate / Diploma Trainees seeking practical exposure to industrial operations.
- ✓ Faculty & Trainers delivering plant operation and safety training.

## Course Coverage

- ✓ Introduction to ProVFO & VR-based Plant Training
- ✓ Distillation Unit Operations – Column internals, start-up, shutdown, troubleshooting.
- ✓ Boiler Operations – Fuel handling, combustion, steam generation, safety interlocks.
- ✓ Centrifugal Pump Unit – Start-up, shutdown, performance monitoring, troubleshooting.
- ✓ Field & Console Coordination – Integrated operation with ProSimulator™.
- ✓ Human Factors in Operations – Communication, collaboration, decision-making.
- ✓ Operator Proficiency Assessment – Skill evaluation in VR environment.
- ✓ Safety Awareness Training – Identifying hazards, emergency response in VR.