STEAG Training Calendar 2023-24

Prepared by:

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STEAG Power Plant Learning Center
STEAG Energy Services India Pvt. Ltd. (SESI)
Corporate Office: A-29, Sector-16, Noida- 201301, India
(Wholly owned subsidiary of STEAG Energy Services GmbH, Essen, Germany)

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STEAG Energy Services (India) Pvt. Ltd.

STEAG Energy Services (India) is a wholly owned subsidiary of STEAG Power GmbH. STEAG is one of the largest electricity producer in Germany owning several hard coal fired power plants, refinery power plants and a fleet of renewable plants. We draw extensive experience to support customers in every aspect of the power generation process. We plan, develop, construct, operate and maintain high-efficiency power plants. The services that STEAG offers encompass every aspect of the energy supply value chain and provides cost-effective consultancy services of international standards.

The STEAG Triad of O&M expertise, highly-qualified engineering and innovative software solutions makes us Unique and enables us to provide all types of Training solutions and high quality Training & Development services.

STEAG Power Plant Learning Center

STEAG Power Plant Learning Center (SPPLC) is Training Institute of SESI. The center is recognized by Central Electricity Authority (CEA), Government of India since August 2010 for providing mandatory training in Operation and Maintenance of thermal power plants under the INDIAN ELECTRICITY RULES. It is e-connected with training facilities in the parent company– STEAG Germany and VGB, Germany.

Vision

To be one of the leading learning center in power plant management & engineering globally.

Mission

Value creation through Training & Development initiatives.

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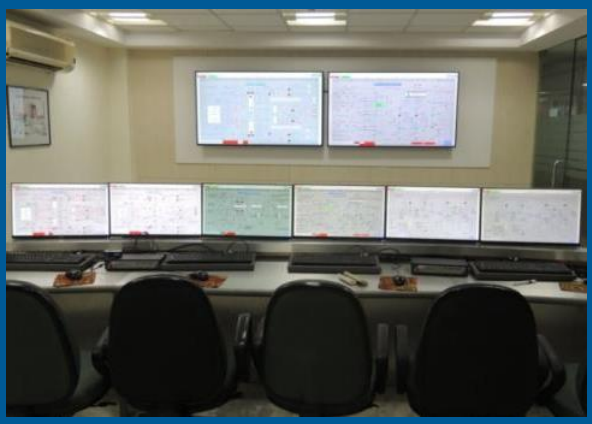
Facilities

Equipped with the state-of-art training facilities:

- Operator Training Simulators:
  - 800 MW PF Generic Supercritical
  - 750 MW GE Frame 9FA Simulator
  - 660 MW PF Generic Supercritical
  - 660 MW PF ABB Bailey
  - 600 MW PF Generic coal-based (Chinese Machine)
  - 430 MW Generic Combined cycle
  - 250 MW Generic Hydro Simulator
  - 195 MW PF Generic coal-based
- Model room
- Class rooms with audio-visual aids
- Lab with calibrated testing equipment and testing facilities
- Library with latest books and journals



Simulator Training Room

Lab Facility

Library

Faculty

The center has 25 core & part-time faculties with average experience of more than 20 years in thermal power sector of various technologies including coal & gas-based power plants. Experienced engineers working at plants being operated and maintained by STEAG also act as faculty for on-site and off-site training.

Services provided by STEAG Power Plant Learning Center

Direct Training Services

- Theoretical training (Online / Offline mode)
- Onsite training
- Simulator based training (Remote & Offline)
- Computer aided training
- Seminars / Workshops / Webinars

Other HRD initiatives and interventions

- Manpower competency assessment
- Training need analysis
- Organizational & management development
- Performance assessment & management

Why STEAG Power Plant Learning Center?

- Theoretical training sessions are conducted by the professionals who are operating and maintaining the thermal power plants; coal, gas-based, supercritical and subcritical.
- Simulator training is imparted by professionals who are not only associated with operations of power plant but also with the development of training simulators.

Experience of conducting training programs for power plant personnel

STEAG has 15+ years of experience in training and has trained 2500 power plant personnel across the globe. Major training programs conducted for national & international clients are given in subsequent pages.

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Areas of Training

- Operation of Thermal Power Plants
- Maintenance of Thermal Power Plants
- Emergencies & Troubleshooting in Power Plants
- Fuel Analysis & Management
- Power Plant Chemistry
- Performance Guarantee (PG) tests
- EHS in Power Plants
- Environmental aspects in Power Plants
- Efficiency Calculations & Monitoring
- Performance and Predictive Analysis with IT Tools
- Energy Auditing (PAT)
- Condition-based Monitoring (CBM)
- Project Management in Power Sector
- Engineering aspects in Power Plants
- Renewable Energy
- Grid Code and Interface with Power Plants
- Commercial aspects of Power Plants

International Clients

- Two weeks Competency Development Programs for Officers from **EGENCO, Malawi (East Africa)** on Project Development, Engineering & Economics.
- Training program organized for experts from VIRA (Vietnam Reliability and Asset Management Energy JSC). The program was organized at STEAG Head Office, Essen, Germany. The program was focused on Combustion Optimization covering operational aspects of Chinese built coal fired generating units.
- Online competence development program for 25 Engineers of **SS Power I Ltd. Bangladesh** conducted on "660 MW Supercritical Power Plant Familiarization, Commissioning and Operational Aspects". The Program includes online theoretical as well as Simulator based training sessions.
- 6-8 days Competency Development Program for C&I technicians of FieldCore (GE) - Six batches (45 technicians) Participants from Egypt, Algeria, Iraq, Oman, Philippines, Ghana & Tunisia attended the training program
- 2 weeks simulator based training program for 10 engineers from Kosti, Sudan (Africa).
- Value-based maintenance training program for Maintenance Managers of Saudi Electricity Company at Riyadh, Saudi Arabia.
- Training program for Operation & Maintenance Engineers of Energy Development Corporation Limited (EDCL), Rwanda (Africa).
- Lease of Simulator to Botswana Power Corporation along with thirteen simulator training programs (2 weeks each) for Operation Engineers of Morupule A Power Station, Botswana Power Corporation, Botswana (Africa).
- Competency Development Program for Morupule B, Botswana Power Corporation covering 256 employees.
- Training of 101 engineers from State Utilities and CEA in Power Plant Diagnostic and Optimization study with the help of EBSILON software under the Indo-German Energy Program (IGEN).
- European Union sponsored two workshops and one study tour in Germany on R&M of thermal power plants and training interventions needed in thermal power generation sector.
- Simulator based training for trainers of National Power Training Institute of Nigeria, (NAPTIN).
- Training of 20 engineers in two batches in operation practices including simulator-based training for Zimbabwe Power Company.
- 2 weeks study tour cum training for top management of Zimbabwe Power Company.

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Simulator Training program conducted at BPC, Botswana, Africa

Classroom training to FieldCore C&I technicians

Training program at Germany for VIRA experts

Practical training to FieldCore-GE

Plant visit of EGENCO, Malawi experts

National Clients

- IGEF, STEAG Energy Services India, KWS Energy Knowledge eG (Training Centre in Germany) and vgbe Organized a Five-day remote simulator training program on flexible power plant operation from 4-8 July 2022, at STEAG Power Plant Learning Center, Noida. The Objective was to develop “FLEXPERTS”. Experts from NTPC, DVC, PMI, Tata Power participated in the training program.
- Specialized online training programs for Shree Cement Ltd.
  - Bearing Maintenance & Shaft Alignment
  - CFBC Boiler & Its Auxiliaries Operation
  - Reliability Improvement through Condition Monitoring
  - Steam Turbine Governing & Its Auxiliaries Operation
  - Boiler Water Chemistry for Power
  - Renewable Energy for Power & Cement
- Specialized online training programs for DVC, Kolkata.
  - Coal Sampling & Quality Assessment
  - Steam Turbine – Operation, Maintenance and Condition Monitoring with Case Studies
  - Root Cause analysis of Tripping
  - Power Plant Performance Analysis and Optimization
  - New Technologies and trends of Ash Handling plant and utilizing pond ash
  - Understanding Chinese Steam Turbine Sets in Reference with KWU Design
- 2 weeks training program for 22 POSOCO GETs on “Power Plant Operation and Grid Interface”.
- 2 days training program on “Efficiency Calculations & Monitoring” for HZL-CPP, Zawar Mines Vedanta (Udaipur).
- Specialized training programs for one of the state utilities at Gujarat Energy Training and Research Institute (GETRI). Programs conducted recently are as under:
  - Gas Turbine Operation & Maintenance & Performance Monitoring
  - Performance Monitoring of Thermal Power Plants for Improved efficiency
  - Electrical Protections in Power Generating Stations
  - Advanced Heat Rate Monitoring and Diagnostics
  - Damage Mechanisms inspection & RLA of Steam Turbine
  - Steam Turbine – Operation, Maintenance &CBM, Trouble Shooting & Case Studies
  - Coal Combustion & Clinkering Problems
  - Flexibilization of Power Plants
  - Vibrations and Balancing of Rotating Machinery in Heavy Industries and Power Plants
  - Gas-based Simulator training program for 18 engineers

- Workshops conducted on “Steam Turbine and its Governing System” for DVC & Jindal Power Limited engineers.
- Series of one year graduate engineers induction training program for Independent Power Producers (IPPs)/SESI. More than 250 engineers were trained.
- Training of all Operation and Maintenance engineers of Lalitpur Power Generation Company Ltd. (3*660 MW).
- Boiler Operation and Maintenance program for engineers of DVC, one of the Central Government undertaking.
- Simulator based training in operation of 660 MW supercritical technology based power plant of engineers belonging to Karnataka Power Corporation Ltd.
- Technicians training program in O&M of 2x520 MW IPP - Hinduja National Power Ltd, Vizag.
- 6 specialized training programs for in-service generation engineers organized under aegis of Excellence Enhancement Center (EEC) – An organization under the Indo-German Cooperation initiative.
- Heat Rate Management program for JSW – an IPP
- One week simulator training program for 150 students of post-graduate program of National Power Training Institute (NPTI) on 600 MW Chinese Machine-based simulator.
- 2 weeks simulator training program for 32 engineers of HPGCL on 600 MW Chinese Machine-based simulator.

Simulator Training program for GSECL

Training to POSOCO GETs

Training for Shree Cement Ltd.

Online programs organized on PAN India Level

- Flexibilization of Thermal Power Plants
- Effective Measures for Boiler Performance Enhancement in Coal based power plants
- Execution of Mega Power Projects - Challenges & Mitigation
- Safe and Effective handling of Critical Emergencies in Coal based Power Plants
- Boiler Tube Failure: Mechanisms and their Corrective & Preventive Actions
- Quality Management in Coal and Gas Based Power Plants
- Best Practices for efficiency enhancement in Coal based power plants
- Best Practices to minimize APC in Coal based Power Plants
- Contract Management in Power Plants: Technical & Key Perspectives
- Condenser Performance Monitoring, Analysis & Improvement: Innovative Practices & Case Studies
- Coal based Power Plants: Best Preservation Practices
- Developments and Advancements in Steam Turbine Governing & Protection System
- Grid Code Requirements and Studies for RE Integration
- Boiler Efficiency Improvement: Best Practices & Case Studies
- Compressed Air System in Thermal Power Plants: Design, Selection, O&M and Troubleshooting
- Coal based Power Plants: Key Performance Indicators & Optimization
- Reporting and Data Analytical System in Power Plants: Best Approach for Design & Development

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Training Calendar 2023-24

S. No.	Program	Duration	Dates
1	Advancements in Power Plant Chemistry	2 days	April 10 - 11, 2023
2	Boiler Tube Failure Mechanisms and their Corrective & Preventive Actions	2 days	April 11 - 12, 2023
3	Boiler Operation and Maintenance	3 days	April 13 - 15, 2023
4	ESP O&M and Performance Enhancement	2 days	April 14 - 15, 2023
5	Combustion Mechanism & Optimization	2 days	April 17 - 18, 2023
6	Coal Combustion & Clinkering Problems: Hazards, Remedies & Safety measures	1 day	April 19, 2023
7	Renewable Energy; Classification, Forecasting Requirements and Storage Options	1 day	April 20, 2023
8	Engineering Aspects in Thermal Power Plants	2 days	April 24 - 25, 2023
9	Performance Guarantee (PG) tests – Procedures and Requirements	2 days	April 26 - 27, 2023
10	Best O&M Practices adapted in Thermal Power Plants	2 days	May 01 - 02, 2023
11	Implementation of PAT Scheme in Thermal Power Stations	2 days	May 03 - 04, 2023
12	Gas Turbine Operation, Maintenance & Performance Monitoring	3 days	May 08 - 10, 2023
13	Commissioning of Steam Turbine and Auxiliaries	2 days	May 11- 12, 2023
14	Industrial Safety, Environment Management & Best Practices Adapted	2 days	May 15 - 16, 2023
15	Training on Subcritical Plant based Simulators - • PF Fired Generic 600 MW Subcritical Thermal Power Station or • PF Fired Generic 195 MW Subcritical Thermal Power Station	2 weeks	June 05 - 16, 2023 June 19 - 30, 2023 July 03 - 14, 2023

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S. No.	Program	Duration	Dates
16	Training on Simulator - • 750 MW GE Frame 9FA based Gas Turbine Combined Cycle Power Station	2 weeks	July 17 - 28, 2023 August 07 - 18, 2023
17	Training on Simulator – 430 MW Generic Gas Turbine Combined Cycle Power Station	2 weeks	Aug 21 – Sept 01, 2023 September 04 - 15, 2023
18	Training on Supercritical Plant based Simulators • PF Fired Generic 660 MW supercritical Thermal Power Station or • PF Fired Generic 800 MW supercritical Thermal Power Station	2 weeks	September 18 - 29, 2023 October 09 – 20, 2023 November 06 - 17, 2023
19	Steam Turbine – Operation	2 days	October 04 - 05, 2023
20	Electrical Generator – Operation	2 days	October 25 - 26, 2023
21	Electrical System – Operation	2 days	November 01 - 02, 2023
22	Maintenance of Generators & Transformers	2 days	November 20 - 21, 2023
23	Electrical Protections in Power Generating Stations	2 days	November 22 - 23, 2023
24	Vibrations & Balancing of Rotating Machinery	2 days	November 28 - 29, 2023
25	Energy Management and Auditing in Thermal Power Stations	2 days	December 04 - 05, 2023
26	Coal characterization, Coal blending & Optimization	1 day	November 03, 2023
27	Gas Turbine Controls and Instrumentation	2 days	December 06 - 07, 2023
28	Maintenance Philosophy, Strategies & Maintenance Planning in Power Plants.	3 days	December 11 - 13, 2023
29	Installation, Repair & Maintenance of DC Supply System, Battery and Chargers	2 days	December 14 - 15, 2023
30	Performance measurement, monitoring and analysis based diagnostics in CCPP	3 days	December 18 - 20, 2023

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S.No.	Program	Duration	Dates
31	Condition Monitoring based Maintenance of Power Plant Equipments	2 days	December 21 - 22, 2023
32	Performance Optimization of Steam Turbine and its Auxiliary Systems	2 days	December 26 - 27, 2023
33	Damage Mechanisms, Inspection and RLA of Steam Turbine Components.	1 day	December 01, 2023
34	Steam Turbine Governing System	2 days	December 28 - 29, 2023
35	Condition Monitoring of Electrical Equipments in Power Plant	2 days	January 02 - 03, 2024
36	Variable Frequency Drives – Design and Maintenance	2 days	January 04 - 05, 2024
37	Gas Turbine and Centrifugal Compressor	3 days	January 08 - 10, 2024
38	Statistical Process Control (SPC) & Measurement System Analysis (MSA)	2 days	January 11 - 12, 2024
39	Steam Turbine-Generator Control for Operators	3 days	January 15 - 17, 2024
40	Controls and Instrumentation	3 days	January 22 - 24,2024
41	Balance of Plant for Thermal Power Plant.	3 days	January 29 - 31,2024
42	Best Practices in O&M of Coal Mills	2 days	January 18 - 19, 2024
43	Best Practice in Coal & Ash Handling Plants in Thermal Power Plants	3 days	February 04 - 06, 2024
44	Pumps - Operation & Maintenance.	2 days	February 01 - 02, 2024
45	Boiler Performance & Life Extension	3 days	February 11 - 14, 2024
46	Bearing Maintenance & Shaft Alignment	2 days	February 07 - 08, 2024
47	Valve Maintenance	2 days	February 15 - 16, 2024
48	Instruments and Valves Calibration	1 day	January 25, 2024
49	Renovation and Modernization of Thermal Power Stations	2 days	February 19 - 20, 2024

S.No.	Program	Duration	Dates
50	Project Management in Power Sector	2 days	February 21 - 22, 2024
51	Efficiency Calculations & Monitoring in Power Plants	2 days	February 26 - 27, 2024
52	Power/Control/Instrument Cable Selection, installation, testing, maintenance, Fault Finding & Protections	1 day	February 23, 2024
53	Environmental Issues, Challenges & Solutions for Power Plants	2 days	February 28 - 29, 2024
54	Earthing, Grounding & Lightning Protection	2 days	March 04 - 05, 2024
55	High Voltage Testing of Power System Equipments	1 day	March 01, 2024
56	Operation, Maintenance & Repairs of LT & HT motors	2 days	March 06 - 07, 2024

Newly Launched Training Programs

S.No.	Program	Duration	Dates
1	Flexibilization of Thermal Power Plants due to Large Scale Injection of Renewable Energy	2 days	January 04 - 05, 2024
2	Grid Code Requirements and Studies for RE Integration	1 day	February 16, 2024
3	Asset Management System in Thermal Power Plants	1 day	March 11, 2024
4	Indian Grid Code and requirements from power plants to meet the grid code	1 day	March 13, 2024
5	Flue Gas Desulphurization (FGD)	1 day	March 14, 2024
6	Digital transformation in power sector	3 days	March 18 - 20, 2024
7	Advance Level Heat Rate Awareness	1 day	March 15, 2024
8	Techno-Commercial Operations of Thermal Power Plant	2 days	March 21 - 22, 2024
9	Coal/lignite sampling & Quality assessment	2 days	March 25 - 26, 2024

Note: For details of each program / sub-topics, please refer attached **Annexure.**

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Annexure

Details of Programs included in Training Calendar 2023-24

S. No.	Program	Duration	Broad Contents
1	Advancements in Power Plant Chemistry	2 days	• Introduction • Modern water treatment practices • Management of cooling water system • Pre & post operation chemical cleaning management • Effluent treatment practices • Water Chemistry for supercritical plants
2	Boiler Tube Failure Mechanisms and their Corrective & Preventive Actions	2 days	• Water and Steam flow • Combustion & Hot Gases Flow • Boiler Metallurgy • Steam & Water Chemistry • Critical areas in a boiler • External and Internal failure mechanism • Failure common causes • Preventing Failures •
3	Boiler Operation and Maintenance	3 days	• Carnot and Rankine cycles, Thermodynamic principles and laws. • Boiler construction, pressure parts, boiler drum internals. • ID, FD and PA fans, their characteristics, stalling and surging, • Fuels, combustion and combustion equipments, oxygen controls and Stochiometery. • Pre-checks for boiler start ups, boiler filling, boiler purge and start up, pressure raising. • Coal mills, warming and start up of coal mills, removal of oil support and mill controls. • Boiler shutdown and emergencies, boiler protections, boiler losses and efficiency. • Causes of tube failures, tube replacement and hydraulic test of boiler

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S. No.	Program	Duration	Broad Contents
4	ESP O&M and Performance Enhancement:	2 days	• Electrostatic precipitator theory and practice including back filter • Resistivity effects • Power supply and 5automatic voltage control description and operation • Rapper control description and operation • On-line assessment techniques • Electrical diagnostics • Troubleshooting • Factors affecting precipitator performance • Alternative cleaning techniques (acoustics) • Acid gas and mercury mitigation • Proper inspection of electrostatic precipitators
5	Combustion Mechanism & Optimization	2 days	• Combustion process • Coal properties effecting boiler performance • Effect of moister, volatile matter • Ash, fixed carbon, calorific value, grindability of coal on boiler performance • Combustion optimization tools and techniques • O&M practices relating to combustion optimization
6	Coal Combustion & Clinkering Problems: Hazards, Remedies & Safety measures	1 day	• Coal Combustion - Theory • Coal quality Analysis: Proximate & • Ultimate analysis • Reasons of clinkering formation: • Coal related issues & Operation related issues • Remedial action removal of clinker: • On load Methods & Off load Methods • Safety issues: PPEs adoption, Safety hazards • Additional safety requirements, • Readiness for meeting any eventualities
7	Renewable Energy; Classification, Forecasting Requirements and Storage Options	1 day	• Generation pattern in Renewables (Solar PV, Solar thermal and wind) • Factors impacting the renewable generation • Balancing generation of different renewables and its Impact on Grid • Forecasting requirements for renewables • Storage options to smoothen out the renewable generation
8	Engineering Aspects in Thermal Power Plants	2 days	• Mechanical aspects - Plant layout optimization, selection of technology, selection of fuel, state of art technologies, environmental compliances and implementation • C&I aspects - Basic instrumentation, control system design, PLC, DCS, IO system, Expert systems; ATRS, Governing. • Electrical aspects – SLD, layout, power flow diagrams from Generator to Switchyard, • HT /LT supply system

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S. No.	Program	Duration	Broad Contents
9	Performance Guarantee (PG) tests – Procedures and Requirements	2 days	• PG test requirements • Approach & Methodology • Measurement locations • PTC codes • PG tests – Turbine side • PG tests – Boiler side • Instruments required for PG tests
10	Best O&M practices to be adapted in Thermal Power Plants	2 days	• Measures for Improvement of Boiler Efficiency • Boiler Performance Optimization practices – Combustion optimization • Optimization of Plant Start up time • Methods for improving Heat Rate • Measures for reducing APC, SOC, SCC • Technological Advancements for efficiency improvements • Emergency Handling procedures – Runbacks, Black out, HT equipment tripping, etc. • Strategies of Maintenance; Reactive, Predictive, Preventive, CBM, RCM. • Best Troubleshooting procedures
11	Implementation of PAT Scheme in Thermal Power Stations	2 days	• EC Act,2001 • Background and introduction of PAT Scheme • Energy Conservation (PAT) Rules, 2012- salient provisions • Compliance of PAT by TPS • Energy Savings Certificates
12	Gas Turbine Operation, Maintenance & Performance Monitoring	3 days	• Theory and Principles of Gas Turbine working, Construction details of Gas Turbine, Air compressors, Combustors. • Variables affecting the performance parameters of GT • Electrical system for GT Power Plant, Excitation and Black start-up. • Lubrication system and Fuel supply arrangements, Water injection and Fuel treatment • Start up including different types of starting arrangements, Speed raising and synchronization and load raising, Diffusion and pre-mix firing • Surging and stalling of compressors, Compressor washing, cleaning of air filters and routine maintenance practices in GT plants. • Operation of HRSG

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S. No.	Program	Duration	Broad Contents
13	Commissioning of Steam Turbine and Auxiliaries	2 days	• Clearances of main steam line & associated drain lines, EH system & turbine bearing box up. • Turbovisory equipment clearance after C& I adjustment • All interlocks & protection checks • Water chemistry parameters • Condenser tests and clearances • Readiness of CW system circuit • Lubricating oil system checks, clearances • Generator & auxiliaries box up • Turbine steam Seal system preparation & vacuum raising • HP/LP by pass system commissioning
14	Industrial Safety, Environment Management & Best Practices Adapted	2 days	• Safety management in power plant • Industrial safety and hazards, work permits • Indian Electricity Rules on safety. • First aid, Providing and arranging ambulance and first aid. • Global Warming and Greenhouse effect. Ecology and energy needs. Legislation and standards for noise and water pollution. Environment protection act 1986, etc • Fire fighting arrangements and statutory requirements • Classification of fires and fire extinguishers • Handling of electrical and chemical fires • Handling of hazardous chemicals • Disaster Management

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S. No.	Program	Duration	Broad Contents
15	Training on Subcritical Plant based Simulators - • PF Fired Generic 600 MW Subcritical Thermal Power Station or • PF Fired Generic 195 MW Subcritical Thermal Power Station	2 weeks	• Introduction to simulator, DCS system of Unit, starting of CW, ACW and DMCW system • Cooling tower performance, practice on simulator for CW emergency • Condenser hot well filling, line up of condensate system. Starting of CEP pumps. deaerator filling, starting of vacuum pumps. • Importance of condenser performance, Practice on Simulator • Unit starts up from cold condition. Pressure rising in Boiler, checking interlock and protection. • Practice on Simulator • Charging steam lines, operation of HP/LP by pass, Operation of turbine side drains and vents, rolling and synchronization. • Practice on Simulator • Milling plant operations. Raising of boiler pressure and increasing the load. Starting of second set of auxiliaries. Milling plant and burner arrangements, optimization of secondary air, drum level control. • Practice on Simulator • Attemperators line up, tilting burners operation and discussion. Raising load on Turbine, changing controls from manual to auto. Rising to full load. • Practice on Simulator • Load reduction and shutting down procedures. • Practice on Simulator • Hot and warm start ups. Unit operation in emergency conditions.Changing of power factor, AVR operations in auto/manual. Electrical emergencies. • Practice on Simulator • Emergencies in Boiler. • Emergencies in Turbine/ Generator • Unit emergency shutdown safe practices.



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S. No.	Program	Duration	Broad Contents
16	Training on Simulator - • 750 MW GE Frame 9FA based Gas Turbine Combined Cycle Power Station	2 weeks	• Introduction of GE-9FA/Siemens V 94.2 Gas Turbine/Combined Cycle Power Plant and Simulator • Cold unit start up, charging of electrical system, control and station air system HPU, lub-oil, Hydrogen seal oil start-up • Charging and normalizing of condensate and feed water system, cooling water and CCW pumps start up. Starting of BFPs, boiler drum filling, opening of drains • Line up of gas and fuel system for GT, Start up of GT • Steam Turbine preparation, pressure raising, rolling and synchronization • Load raising, ramp loading and taking unit to full load • Mark V and VI Controls • Unit shut down in Simple Cycle mode • Emergencies • Discussion and hands on practice
17	Training on Simulator – • 430 MW Generic Gas Turbine Combined Cycle Power Station	2 weeks	• Introduction of GE-9FA/Siemens V 94.2 Gas Turbine/Combined Cycle Power Plant and Simulator • Cold unit start up, charging of electrical system, control and station air system HPU, lub-oil, Hydrogen seal oil start-up • Charging and normalizing of condensate and feed water system, cooling water and CCW pumps start up. Starting of BFPs, boiler drum filling, opening of drains • Line up of gas and fuel system for GT, Start up of GT • Steam Turbine preparation, pressure raising, rolling and synchronization • Load raising, ramp loading and taking unit to full load • Mark V and VI Controls • Unit shut down in Simple Cycle mode • Emergencies • Discussion and hands on practice



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S. No.	Program	Duration	Broad Contents
18	Training on Supercritical Plant based Simulators - • PF Fired Generic 660 MW Super – critical Thermal Power Station Or • PF Fired Generic 800 MW Super – critical Thermal Power Station	2 weeks	• Introduction to Simulator • Overview of Plant systems/equipments and DCS in Generic Simulator • Familiarization of Operator screens and Face plate functions, colour coding • Unit Cold Start-up activities – Cooling water system line up and Start-up. • Line up and starting of Fuel Oil system • Condensate water system lineup, Condenser Hotwell filling • De-aerator filling/pegging. • Main Turbine lubricating oil system startup • Generator seal oil startup, Main turbine turning gear system startup. Hydrogen filling • Motor driven boiler feed pumps startup. • Boiler cold flushing and Seperator filling • Turbine gland steam sealing system start-up. Condenser vacuum pulling system startup • Draft plant (air) system startup and Boiler Purging, • Boiler lit up and pressurization • Boiler Hot flushing • Charging of bypass & pressure raising to achieve rolling parameters • Steam Turbine rolling, soaking, excitation and synchronization. • Primary air fan startup. Mill B warming, startup and load raising. • Charging of LP heaters, IP extraction line to De-aerator. • Load raising upto 30% • TDBDFP-A line up, rolling & loading and MDBFP unloading/cut off • Wet to Dry changeover • Mill A Start-up & Load raising • Charging of HP heaters. • TDBFP-B line up, rolling & loading at 50%load • Mills C, D Start-up, Load raising and achieving full load conditions. • Load reduction, Plant planned shutdown. • Hot Start-up • Emergency operations and Runbacks handling

S. No.	Program	Duration	Broad Contents
19	Steam Turbine – Operation	2 days	• Turbine specifications & parameter monitoring • Turbine Rolling • Turbine Protection • Emergencies in Turbine • Turbine Auxilary • CEP • Heaters • Gland Steam system, etc. • Turbine Monitoring & Controls • Vacuum system • Turbine Shutdown
20	Electrical Generator – Operation	2 days	• Seal oil system • Gas cooling (H_2) system • Stator Water Cooling system • Generator Rotor & Excitation System • Generator Protection • Generator Parameter Monitoring • Generator Shut Down
21	Electrical System – Operation	2 days	• Switchyard SLD • Charging a line • Shut Down of a line • Aux. Power SLD • Charging a feeder – Medium voltage, Low voltage • Shut Down of a Feeder – Medium voltage, Low voltage • Emergencies in Electrical system – Power & Control • Emergencies in DC system • Diesel Generator – Startup & Shut Down • Feeding Emergency Bus.

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S. No.	Program	Duration	Broad Contents
22	Maintenance of Generators & Transformers	2 days	• Generator Maintenance: Generator cooling system, Bus duct cleaning, Gasket replacement & drier system healthiness checks, NGT maintenance, etc. • Stator ELCID tests etc & dries out, curing of insulation, Rotor / Exciter checks, Excitation Cleaning, dry out & Diode assembly & fuse check, Checking of CBR, etc. • Transformer Maintenance: DGA test, Thermo vision for hot spot check, Type tests, Routine Test of transformer Basics, • Conservator, MOG & cooling system of transformer, Dry out of transformer & Filtration of oil, BDV value Moisture removal & PI value improvement, Insulation check & correction. • Gasket replacement ,oil leakage arresting & other checks such as Buchholz relay, WTI & OTI, etc
23	Electrical Protections in Power Generating Stations	2 days	• Generator Protection and Generator trip logic in Coal fired power plant. • Main Power transformers (GT, UAT, ST) protections including neutral grounding and logics. • HT and LT switchgears protection systems including distribution transformers and HT/LT motors. • Substation / Switchyard (400KV) protection & Earthing & Lightning protection
24	Vibrations & Balancing of Rotating Machinery	2 days	• Simple harmonic motions, natural frequencies, damped and un-damped vibrations, critical speeds etc. • Hydrodynamic lubrication, oil whipping and half frequency whirls, oil properties and its effect on lub oil system. • Alignment of shafts and bearings, dynamic balancing of rotors, misalignment of generator rotors and un-even air gaps. • Case studies, vibration monitoring and signature analysis.
25	Energy Management and Auditing in Thermal Power Stations	2 days	• Provisions of Energy Conservation Act, 2001 • Energy Audit Report Structure • Measuring Tools and tackles for audit • Energy Auditing of various components/ systems – Approach & methodology

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S. No.	Program	Duration	Broad Contents
26	Coal characterization, Coal blending & Optimization	1 day	• Coal quality & assessment • Where and how coal quality parameters are used in power station? • Impact of coal quality on performance of power station • Coal Blending-Purpose & Issues • Practical approach • Coal Burning Profile Analysis • Blending Methodology • Causes for slagging & fouling • Fireside corrosion • Reasons for boiler tube failure • Remedial measures
27	Gas Turbine Controls and Instrumentation	2 days	• Salient features of different makes of Gas Turbine Controls • Gas Turbine Protections • Instrumentation & Control in Gas Turbine
28	Maintenance Philosophy, Strategies & Maintenance Planning in Power Plants	3 days	• Maintenance and its objectives & goals • Maintenance Strategies in thermal power plant – • Reactive, Preventive, Predictive • Concept of Modern Maintenance Strategy – CBM, Reliability Centered Maintenance • Maintenance approach - SMPs • Introduction to maintenance planning • Pre Shut down planning activity • Resource planning • Preparation of annual overhaul plan • Root Cause Analysis Techniques
29	Installation, Repair & Maintenance of DC supply system, Battery and chargers	2 days	• Different types of batteries & chargers. • Selection & sizing criteria of batteries • Installation of battery bank • Maintenance of battery bank & chargers • Testing on battery banks • Trouble shooting of batteries
30	Performance Measurement, Monitoring and Analysis based Diagnostics in CCPP	3 days	• Impact on performance due to off design operating regime. • Performance indicators, monitoring, trending and analysis for detecting internal issues. • Thermodynamics and performance in CCPP. • Performance optimization in CCPP. • Mechanism of performance deterioration with respect to external & internal operating condition changes. • Action plan for improving APC, heat rate

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S. No.	Program	Duration	Broad Contents
31	Condition Monitoring based Maintenance of Power Plant Equipments	2 days	• Objectives of Condition Monitoring. • Major equipments to be covered in Condition Monitoring. • Condition Monitoring methods i.e Vibration analysis, thermography etc. • Procedures for Condition Monitoring, recroding, documentation, fault diagnosis, rectification etc. • Trend analysis and Permanent monitoring
32	Performance Optimization of Steam Turbine and its Auxiliary Systems	2 days	• Thermodynamic aspects of steam turbine design • Performance analysis of steam turbine cycle • Performance assessment of FW heaters, condenser • Impact of operation parameters towards performance deviation • Accurate assessment and minimization of losses
33	Damage Mechanisms, Inspection and RLA of Steam Turbine Components.	1 day	• Material properties, behaviour & microstructure • Understanding fatigue and creep • Damage mechanism & Case Studies on RLA of Steam Turbine and Generator Mechanical components
34	Turbine Governing System	2 days	• Modelling of Turbine and Governor • Importance of Speed Droop • Turbine Protections • Automatic Turbine Test
35	Condition Monitoring of Electrical Equipments in Power Plant	2 days	• Condition monitoring of transformer through DGA, SFRA, FDS and PD measurement, DP/Furfural analysis • Condition monitoring for Rotating machines including Current Signature Analysis for Induction Motors • Condition Monitoring of Switchyard Equipment by various techniques such as LA current monitoring, IRT etc. • Interpretation of Test Results
36	Variable Frequency Drives: Design and Maintenance	2 days	• Power Electronic devices • Components of VFDs • VFD working principle and types of VFD • Motors design consideration for VFD. • VFD commissioning • VFD maintenance • Condition monitoring of VFD. • Fault diagnosis of VFD.

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37	Gas Turbine and Centrifugal Compressor Course	3 days	• Brayton, Carnot and Rankine cycles, Theory and principles of Gas Turbine working. • Construction details of Gas Turbine, air compressors, combustors. • Air intake system, GT exhaust, air intake and air filters, online cleaning of air filters, • Different type of starting arrangement of Gas Turbines, GT auxiliaries, • Electrical system for Gas Turbine power plant, Excitation and black start up. • Lubrication system and fuel supply arrangements, water injection and fuel treatment. • Start up, speed raising and synchronization and load raising, • Diffusion and pre-mix firing. • Construction details of centrifugal air compressors, principles and velocity diagrams. • Performance of centrifugal compressors and performance curves. • Surging and stalling of compressors, compressor washing.
38	Statistical Process Control (SPC) & Measurement System Analysis (MSA)	2 days	• Introduction to Statistics, Understanding Process, Process Control • Understanding Variation, Types of Variation, Causes of Variation • Identifying causes, Introduction to Control Charts, Application of Control Charts • Selecting and plotting charts, Interpretation of charts, Improving process capability • Importance of Measurement, Measurement Errors, Components of MSA • Short & long study – GRR, Attribute MSA, Tips to improve MSA



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39	Steam Turbine-Generator Controls for Operators	3 days	• Turbine Systems: Lubricating Oil Systems, Gland Steam, abnormal operations of these systems. • Turbine Supervisory-Eccentricity, Speed Detection, Valve Position, Vibration, Shell Expansion, Differential Expansion. • Steam Turbine Control: Speed Control, Load Control, Pressure controls, Initial and limit pressure controls. • Steam Turbine Control: Critical speeds and rotor dynamics, speed raising and over speed protection. • Steam Turbine Control: Co-ordinated master controls, boiler and turbine follow modes ,run back, frequency influence. • Generator excitation systems, principles of AVR. • Generator cooling systems, Hydrogen filling and sealing system. • Steam turbine and Generator protections, plant emergencies. • Generator synchronization, Generator Transformer, auxiliary and station transformer, neutral grounding.
40	Controls and Instrumentation	3 days	• Basics of C&I • Distributed Control System (DCS) in Plant • Programmable logic controller (PLC) • Field Instrumentation • Basic of Vibration Monitoring System • Furnace safeguard supervisory system (FSSS) • Digital Electro Hydraulic control system (DEH)
41	Balance of Plant Mechanical Systems for Thermal Power Plant.	3 days	• Water Intake and Pre-treatment (cover both fresh and sea water) • Water post-treatment. • CW and ACW systems • Fuel Oil System (HFO & LDO) • CHP • AHP • Compressed Air System • Fire Water System • Fire Detection & Protection • Effluent & Sewage Treatment System • HVAC • H_2 Plant



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S. No.	Program	Duration	Broad Contents
42	Best Practices in O&M of Coal Mills	2 days	• Coal Sizing for different type of boilers • Coal Quality and Coal Mills • Type of Coal Mills and their application • Operation of coal mills • Maintenance of coal mills
43	Best Practice in Coal & Ash Handling Plants in Thermal Power Plants	3 days	• Coal Analysis and Importance of different constituents. **CHP** • Coal Storage and Stacking • Coal Quantity & Quality Estimation • GCV determination • Coal Stockpile Utilization Strategies • Coal Blending Practices • Coal Conveying Practices • CHP Maintenance Practices • HSE practices **AHP** • Ash analysis and its importance • Bottom ash handling • Fly ash handling • Ash conveying practices • Ash storage practices • HSE Controls
44	Pumps Operation & Maintenance	2 days	• Types of pumps and application • Construction features • Characteristic curves • Pump selection • Safe operating practices (start-up, normal operation, shut-down, changeover) • Preventive Maintenance Practices • Common failure causes and remedies
45	Boiler Performance and Life Extension	3 days	• Coal quality and boiler performance • Factors affecting boiler performance • PTC 4.1 • Performance parameter measurement • Performance calculation examples / exercises • Determining boiler performance with field instruments and regular tracking. • Operational practices towards better performance. • Maintenance practices towards better performance. • Regular NDT • RLA • Life extension strategies

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46	Bearing Maintenance & Shaft Alignment	2 days	• Journal & Antifriction Bearings, concepts and applications • Bearing hydrodynamics • Construction feautres and metallurgy • Operational monitoring • Maintenance practices • Failures, causes & remedies
47	Valve maintenance	2 days	• Type of valves and application • Valve selection • High pressure valves • Operation practices • Maintenance Practices • Failures, causes and remedies • Motorized valves and actuators
48	Instruments and Valves Calibration	1 day	• Basics of Calibration • List of instruments required for calibration • Proper use of Tools and Tackles • Methods of calibration for instruments • Calibration check list • Instruments measurement Techniques and their working principle : Pressure measuring instruments, Temperature measuring instruments, Flow measuring instruments, Level measuring instruments • Valves Calibrations : Pneumatic valves calibration / Hydraulic valves calibration • Motorised valves limit & torque setting • Precautions during measurement
49	Renovation & Modernization of Thermal Power Stations	2 days	• Introduction • Elements of R&M ➢ Performance ➢ Obsolescence ➢ Upgradation • Importance of maintenance with regard to R&M • Assessing plant condition – RLA • Retain, Repair, Replace decisions • R&M of Boiler • R&M of Turbine • R&M of BoP • R&M of controls • R&M planning & timelines • Execution aspects • Performance Testing after R&M

S. No.	Program	Duration	Broad Contents
50	Project Management in Power Sector	2 days	• Introduction • Planning Power Plants • Key development phases • Overall project timelines for different type of power plants • L1, L2 and L3 schedules • PM in different phases • Project closure
51	Efficiency Calculations & Monitoring in Power Plants	2 days	• Theory and Practices for Efficiency calculations • Uses of efficiency data; Reporting & Trending • Efficiency calculation equation and variables/ parameters involved • Efficiency of Turbine, Heaters, Condenser, Cooling Tower • Boiler efficiency • Impact of coal quality on boiler efficiency. • Aux power consumption improvement; various methods and present day best industry practices • Boundary conditions for plant efficiency • 'Module' for on line working of efficiency. • Calculation of Station Heat Rate – 'Gate to Gate' • Use of correction curves, Uncertainty • Calculation of Turbine cycle Heat Rate extracting typical DCS plant data – Semi online mode • Calculation of Boiler efficiency using typical DCS plant data – Semi online mode • Demonstration of software tools for offline /online simulation.
52	Power/Control/Instrument Cable Selection, installation, testing, maintenance, Fault Finding & Protections	1 day	• Cable selection • Power cable, Control cable, Instrument Cable • Cable layout system: Power cables, Control & instrument cable • Testing of various cables Power cables: • Installation Test, Acceptance Test, Maintenance Test • Fault Finding in cables of various cables: • Mechanical Fault of cable, Electrical Fault of cable, Miscellaneous fault (heating etc) • Protections of cables : HT/LT cables, control & instrument • Maintenance of cables: Jointing of HT cables, Other repairing of cable, Use of spare core on control cables & instrument cables Other repairing of cable

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S. No.	Program	Duration	Broad Contents
53	Environmental Issues, Challenges & Solutions for Power Plants	2 days	• Introduction & Historical Trends • Future environmental outlook • Environmental guidelines and standards • Key environmental issues with different type of plants. • Power Plant emissions / wastes / discharges from different systems and their effect on the environment. • Present technologies for environmental pollution control • Future of env control technologies.
54	Earthing & Grounding	1 day	• Introduction • Key design aspects of earthing / grounding • Earthing pit • Earthing / grounding calculations and exercises • Regular testing & monitoring • Maintenance aspects, earthing pit recharging
55	High Voltage Testing of Power System Equipments	1 day	• Introduction to High Voltage testing. • Testing on Generators • Testing on Transformers • Testing on Motors • Testing on Power cables • Testing on Busducts. • Testing on Switchgears. • Difference between destructive and Non-destructive testing.
56	Operation, Maintenance & Repairs of LT & HT motors	2 days	• Introduction to Motors. • Design and constructional features of Motors. • Design Standards of motors. • Difference on HT and LT motors. • Testing on Motors. • Parameters observations on running of motors. • Various maintenance schedules

Details of Newly Launched Programs

S. No.	Program	Duration	Broad Contents
1	Flexibilization of Thermal Power Plants due to large scale injection of Renewable Energy	2 days	• Flexibility Concept • Need for Flexible Operation in India • Challenges with Flexibility and Measures required • Development in Europe for Flexible Operation • Case Studies

2	Grid Code Requirements and Studies for RE Integration	1 day	• Need for Grid Codes
			• Typical Grid Code Requirements
			  ○ Germany
			  ○ India
			• Advantages of Grid Compliance Studies
			• Use of Advanced Software Tools
			• Conducting Grid Code Studies

3	Asset Management System in Thermal Power Plants	2 days	• Introduction • Asset management policy& objectives • Asset management plan • Asset Management Standards &Practices • Defining the right key performance indicators • Asset Management assessment • Asset Management core leads • Asset Management Focus areas; Preventive &Corrective Maintenance, FMEA – RCM, Process Optimization, Shutdown Management & CA, etc.
4	Indian Grid Code and requirements from power plants to meet the grid code	1 day	• Grid code provisions - Power Plant Stations • System operator requirement : Grid code • What Grid Code Expect? And how to meet them by power generating station? • Real Time Capability/Schedule Revision - What to be done by power generating station? • Day to Day Operation Management by power generating stations to meet grid requirements • System Healthiness as per Grid Code • Disturbance Recorders (DRs) and Event Loggers (ELs)
5	Flue Gas Desulphurization (FGD)	1 day	• Introduction to FGD • Stringent Environment norms & time line • Mechanism of FGD • Types of FGD systems • Wet scrubbing system • Dry scrubbing system • Dry sorbent injection • Spray Dry Absorbers • Mercury removal • Advantages & disadvantages of FGD • Commercial aspects of FGD • Miscellaneous facts and statistics

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S. No.	Program	Duration	Broad Contents
6	Digital transformation in power sector	1 day	• Introduction • Digital Applications in Indian Power Sector • Digitalization– German Experience • Big Data & digital twins • Remote Monitoring and Management of Renewable Plants • IoT/AI technology • Distribution sector reformation by digitalization • Disaster Management & Risk Mitigation
7	Advance Level Heat Rate Awareness	3 days	• Impact of design on Performance. • Operational efficiency Vs design. • Performance degradation • Restoration of performance based on conditioning monitoring • Performance testing – Guarantee Vs Routine. • Factors affecting Heat Rate • Deviations and its impacts on performance, • Improvement in the process monitoring, calibration. • Auxiliary power, factors affecting auxiliary power. • Sustaining performance. • Usage of offline instruments for performance testing • Usage of DCS based performance trending for operation and maintenance Engineers • Boiler performance testing techniques • Turbine performance testing and performance analysis • Usage of PADO for Performance Tracking • Diagnostic Analysis
8	Techno-Commercial Operations of Thermal Power Plant	2 days	• Understanding of Grid code • Availability Based Tariff (ABT)-CERC Tariff order 2019-24 • Plant operation optimization in UI regime. • Efficiency management as tool of commercial operation
9	Coal/lignite sampling & Quality assessment	1 day	• Coal Classification • General Principles of Sampling • Sampling Procedure • Coal Sample Reduction & Preparation • Proximate Analysis • NCV/GCV • Grindability Index

Upcoming Webinars

- Boiler Tube Leakage: Mechanism and Mitigation
- Performance and Predictive Analysis of Coal & Gas based Power Plants with IT Tools
- Quality Management in Thermal Power Plants
- Management of AOH & COH in Power Plants
- Asset Management System in Thermal Power Plants
- Ambient Air Quality Norms, Monitoring Systems and Registration in CPCB Portal
- Hybrid Renewables with storage for Micro-grid and Smart City
- Digitalization vs. AI (with IoT) in Power Plant
- Novel methods for efficiency enhancement in power sector
- Difference between various steam turbine models and their management
- Design & Sizing of Solar & wind based power plants
- Erection & commissioning of Solar & wind power plants
- Green Hydrogen: Challenges and Utilization
- Effective Handling of Critical emergencies in Solar and Wind based power plants
- Operation philosophy of Hybrid power plants
- New trends in Solar power generation
- Waste to Energy in India: Issues & Challenges
- Waste to Energy Plants: Effective Leachate Treatment

Contact Us

For any queries / clarifications, please contact us at below details.

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