

2021-2022

प्रशिक्षण कैलेंडर Training Calendar





*"In this age of globalization, we have
no option but
to make a quantum leap
in energy production
and connectivity."*

Shri Narendra Modi
Hon'ble Prime Minister of India

Our Source of Inspiration...



Shri R. K. Singh
Hon'ble Minister of State (IC)
(Power and New & Renewable Energy)
&
Minister of State
(Skill Development and Entrepreneurship)

GOVERNING COUNCIL NATIONAL POWER TRAINING INSTITUTE



Shri Alok Kumar
Secretary, Ministry of Power
Chairman, Governing Council



Shri Prakash Mhaske
Chairperson, CEA
Vice-Chairman, Governing Council



Shri Ashish Upadhyaya
Additional Secretary & Financial Adviser
Ministry of Power, Permanent Member



Shri S. K. G Rahate
Additional Secretary
Ministry of Power, Permanent Member



Shri Raj Pal
Senior Adviser, Ministry of Power
&
Director General, NPTI
Member Secretary, Governing Council



Vision

To be the Global Centre of Excellence for Training and Skill Development in Power & Energy Sectors.



Mission

Enhancing human and organizational excellence in Power and Energy sectors by blending frontier clean energy technologies to achieve economy and energy security.



Values

We value our drive and commitment to provide cutting edge technologies and top quality service to our clients, sharing our knowledge and caring for their needs.



Attitude

We constantly strive to motivate every power professional to tap his unique human endowments, consciousness, imagination and willpower. Together we make a difference.



NPTI (HTPC) NANGAL



NPTI (SR) NEYVELI



NPTI (NR) BADARPUR



NPTI (HLTC) BENGALURU



NPTI (CO) FARIDABAD



NPTI (PSTI) BENGALURU



NPTI (ER) DURGAPUR



NPTI (NER) GUWAHATI



NPTI SHIVPURI MADHYA PRADESH



NPTI (WR) NAGPUR



NPTI ALAPPUZHA KERALA


FOREWORD



National Power Training Institute (NPTI) is an Apex Body for training Power Sector professionals in upcoming areas and is in service to the Nation for the last five decades. It has trained over 3,65,000 Power Professionals in regular programs. NPTI has been providing dedicated training in the areas of Power and Renewable Energy Sector. With the vision of Hon'ble Prime Minister of India to empower the Power Sector with Renewable Energy, Indian Energy Sector is ramping up with Renewable generation as well as Transmission & Distribution infrastructure to accommodate higher penetration of Renewable Energy.

As an off-shoot of the urge to achieve these objectives in a time bound manner and to sustain in this competitive scenario, organisations will have to focus on upgradation of skills, knowledge and change in the attitude and perception of individuals and groups as well. Most of the training programs being organized at NPTI training Institutes situated different locations of the country in on-line and class room modes with on-job training at Power Plants, etc. as required. The continuous feedback from the participants led us to restructure course curriculum in a very effective manner to meet the expectations of the trainees as well as requirement of Power Sector as a whole.

Government of India is making enormous efforts in providing adequate trained/skilled manpower at various levels to confront the new state-of-the art technologies being adopted in the Power Sector. The trained manpower is valuable asset of an organisation and plays a vital role for its progress and stability. To keep the participants of various courses abreast with latest technologies, NPTI has been continuously upgrading its infrastructural / training facilities. All out efforts are being made to ensure that various courses being offered by NPTI may meet the Power Sector need in line with CEA's guidelines. NPTI is having publications of study material in the areas related to Operation & Maintenance of Thermal, Hydro, Gas Power Plants, Renewable Energy and Transmission & Distribution systems. NPTI has been upgrading its Training Calendar to incorporate programs as per market demand. Continuing with its objective of providing well trained manpower to the Power Sector, NPTI has brought out Training Calendar 2021-22. I am sure training being offered by NPTI will help our stakeholders to deliver best to the Nation.



(RAJ PAL)
Director General

Faridabad
March-2021

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Committee of Parliament on Official Language, Inspection of Second Sub-Committee on 29th October, 2020 at Vigyan Bhawan, New Delhi



Online Inauguration of 26-Weeks Training Program of 5th Batch of Assistant Directors of CEA at NPTI Faridabad

CHAPTER 1: ABOUT NPTI

National Power Training Institute (NPTI), an ISO 9001:2015 & ISO 14001:2015 organization under Ministry of Power, Govt. of India is a National Apex body for Training and Human Resources Development in Power Sector and the world's leading integrated Power Training Institute, with its Corporate Office at Faridabad. NPTI operates on a Pan-India basis through its Eleven (11) institutes. Apart from highly skilled and competent trainers and state-of-art laboratories, NPTI has Hi-tech real time simulators of various power plant capacities, which includes thermal (Supercritical, Subcritical), multifunctional, CCGT, Hydro, SCADA & Smart Grid Operations and Despatcher Training Simulator at its various institutes. Having trained more than 3,60,000 Power Professionals in training programs over the last 5 decades, NPTI is the only Institute of its kind in the world with such a wide geographical spread and covering a wide gamut of training programs in Renewable Energy & Power Sector.

NPTI operates on an all India basis with man-power strength of 194 including 85 officers through its 11 Institutes as per detail below:

Northern Region

1. NPTI Corporate Office, Faridabad
2. NPTI (Northern Region) Badarpur, New Delhi
3. NPTI (Hydro Power Training Centre), Nangal

Southern Region

4. NPTI (Power System Training Institute), Bengaluru
5. NPTI (Hot Line Training Centre), Bengaluru
6. NPTI (Southern Region), Neyveli
7. NPTI, Alappuzha

Eastern & North Eastern Region

8. NPTI (Eastern Region), Durgapur
9. NPTI (North Eastern Region), Guwahati

Western Region

10. NPTI (Western Region), Nagpur
11. NPTI, Shivpuri

MAIN OBJECTIVES OF NPTI

The main objectives of the organization are:

- To function as a National Organization for training in the fields of (a) Operation and Maintenance of Power Plants, and (b) All other aspects of Electrical Energy Systems including transmission, sub-transmission and distribution.
- To act as an Apex Body for initiating and coordinating training programs in the Power Sector of the Country.
- To establish and run Training Institutes for Engineers, Operators, Technicians and other personnel of the Power Sector.

SUBSIDIARY OBJECTIVES

- To identify and assess the training needs of the Power Sector in the Country.
- To coordinate the training activities of the various Utilities and those of other technical Institutions and supplement it with the training programmes of its own training Institutes.

- To establish standard norms regarding qualifications and training for personnel of various levels.
- To serve as a National Certification Authority for the purpose of Certification of competence and/or participation to ensure availability of properly trained personnel to man the Electricity Supply Industry.
- To initiate, conduct and coordinate R&D studies in the field of Operation, Maintenance and Management of Power Generation and Transmission System and to prepare and conduct specialized training programmes.
- To establish, maintain and manage laboratories, workshops, experimental transmission lines, sub-station and other facilities required for maintenance of its objectives.
- To collect information and maintain documentation in the field of electricity generation and distribution.
- To collect, prepare, edit, print and publish material, paper, periodicals or reports in furtherance of the objectives of the society.
- To organize Seminars and Workshops.
- To enter into agreements with any enterprise or institution or person and provide funds to them for specific training programmes, demonstrations, assignments, preparation of training material or technical guidance.

TRAINING AT A GLANCE AT NPTI

NPTI conducts long-term, medium-term & short-term Training Programs for Engineers & Supervisors on various technical and managerial topics pertaining to the Renewable Energy & Power Sector in the areas of Thermal, Hydro, Renewable, Transmission & Distribution, Management, Regulatory Affairs etc. in the all Institutes. The training programs are either NPTI's regular training programs or customized training programs to suit the training needs of the client organizations. These programs are being organized round the year along with Workshops and Seminars on latest developments in the Sector.

To achieve the objective of providing Energy Sector training, the training methodology so adopted creates step by step environment for all round development of skill and knowledge of the participants.

- Class room lectures for imparting formal, theoretical and technical knowledge.
- Case studies/Group discussions.
- Self learning techniques, like computer based self learning training packages and e-learning
- Practical hands-on training in corrective maintenance methods and techniques.
- Simulation techniques and on-job training in Power Stations/Power Systems.

Industry Interfaced Programs and Placement of Students

NPTI conducts the following industry interfaced programs with the objective to create a pool of committed and competent professionals equipped with appropriate technical skills to steer the Indian Power Sector

- One Year Post Graduate Diploma Course in Power Plant Engineering

- One Year Post Graduate Diploma Course in Renewable Energy and Grid Interface Technologies
- One Year Post Graduate Diploma Course in Smart Grid Technologies
- One Year Post Graduate Diploma Course in Energy Market Management
- One Year Post Graduate Diploma Course in Power System Operation
- One Year Post Graduate Diploma Course in Sub-Transmission & Distribution system
- Nine Months Post Graduate Diploma Course in Hydro Power Plant Engineering
- Six Months Post Graduate Diploma Course in Transmission and Distribution System for Engineers
- One Year Post Diploma Course in Power Plant Engineering
- Six Months Post Diploma Course in Hydro Power Plant Engineering
- Six Months Post Diploma Course in Hydro Power Plant Engineering

Our students of Post Graduate Diploma Courses (PGDC) and Post Diploma Courses (PDC) have been recruited by reputed companies. For the list of recruiter companies refer chapter **NPTI Clientele and Recruiters**.

Induction Training

NPTI has imparted induction training to fresh Graduate Engineers/Executives of various Power Sector Organizations for details refer chapter **NPTI Clientele and Recruiters**.

On - Job Training

On-job training is an essential supplement to formal training which provides the trainees an understanding of the functions through involvement with real work situations. Special stress is laid on acquisition of required skills for undertaking specific responsibilities in a particular area of work. On-job experience simplifies and consolidates knowledge in a particular sphere for which special type of work books have been designed according to the needs of area where on-job training is conducted.

Online Training Courses

NPTI is conducting online training programs on all aspects of Renewable Energy and Power sector. After Covid-19 outbreak many short term training programs have been converted and conducted in the online mode as well as offline mode. The long term and medium term training programs are also being conducted in blended mode (online & offline) during Covid-19 pandemic.

NPTI is also conducting a blended training program for REMC Operators, in association with GIZ. The training is a blend of 12 weeks online and 1 week classroom training at NPTI. International and national experts have been involved in preparation of the modules and conducting the classroom training.

NPTI Recognized as Cadre Training Institute for Central Power Engineering Services

NPTI is functioning as an Apex Cadre Training Institute for the engineers/officers of Central Power Engineering Services. NPTI is conducting fifth batch of 26 weeks Induction Training Programs for the Asstt. Directors of CEA. The program includes 20 weeks Technical Training with industry interface and 6 weeks Management Training.



CUSTOMIZED TRAINING PROGRAMS

Training on “Measures Relating to Safety and Electrical Supply”

The major focus on this program is to upgrade the knowledge of safety in handling the electrical equipments in compliance with CEA Safety Regulation 2010 in the areas of work and sub-station. This program is conducted for ONGC executives and B.Tech final year student of various engineering colleges.

Training Program for Forum of Regulators

National Power Training Institute, Faridabad organizes two days residential training program on “Protection of Consumer Interest” for the ombudsman and officials from the Consumer Grievance Redressal Forums, Regulatory commissions of the various states. This program is conducted every year under the aegis of Forum Of Regulators. The objective of the program is to discuss on various regulations, laws, consumer issues and case studies pertaining to the power sector. Recently NPTI Faridabad conducted the program during 16-19 February 2021 in online mode.

Training Program for Distribution Linemen

NPTI has conducted “Urja Sarathi”, “Uttam Urja Sarathi” “Urja Sarathi 2.0” Training Programs for the lineman of BSES Rajdhani Power Ltd., Delhi. Around 2500 Distribution Linemen were comprehensively trained and certified in the areas of basics of Electricity, Poles, Pole erection, mounting, stringing, clearances, sub-station equipment such as DTs, Circuit Breakers, earthing with their safe operating procedures and accent on Safety. The feedback from BSES is that this training has immensely benefitted the Distribution Linemen with zero number of accident and casualty for last one year.

Capacity Building Training Program

NPTI is conducting 4 weeks “Technician Development Program” for the Capacity Building of DISCOMs of NER States. 6 States are participating in this training program.

Power System Operation Training and Certification

NPTI has been conducting Certification of Power System Operators since 2011. Training Courses at NPTI, Corporate Office, Faridabad, Power System Training Institute (PSTI), Bengaluru and NPTI (NER), Guwahati equipped with necessary inputs to take up the various System Operation Certification Examinations.

Basic level on-line System Operator Certification

A total of 1529 System Operators were certified against 1899 who appeared for the Basic Level Certification Examinations.

Specialist level courses on ‘Regulatory Framework in Power Sector’, ‘Power System Reliability’, ‘Renewable Energy Sources and Grid Integration’, ‘Power System Logistics’ and ‘Power Market Specialist’ are being conducted both at Corporate Office, Faridabad and at PSTI, Bengaluru.

Specialist Level Online System Operator Certification

In “Regulatory Framework in Power Sector” 429 System Operators appeared for the certification examination out of which 260 qualified.

In “Power System Reliability” 198 System Operators appeared out of which 126 were qualified.

In “Power System Logistics” 44 System Operators appeared out of which 23 were qualified.

Simulator Training

Simulator at various locations are housed in an existing Simulator Training Centre with classrooms and other infrastructure facilities for a full fledged training activity. The simulator design includes equipment, instrumentation and controls that enables operator to function in all module with optimal specified operation conditions including normal, abnormal or emergency operating conditions. The protections, interlocks, logics and controls of the real plant are incorporated in the simulation system.

PROGRAMS OF NATIONAL IMPORTANCE

Skill Development Training

NPTI has been empanelled as a Government agency with Ministry of Rural Development (MoRD) for conducting NSQF aligned training program on all India basis for Power Sector & Renewable Energy Sector vide notification no. 5/2019, dated: 26.02.2019 and the MoU has been signed with MoRD on 04.04.2019.

Vide Gazette notification No. 449, F. 43001/02/2013-NSDA, dated 05.12.2019 of Ministry of Skill Development and Entrepreneurship & 23rd meeting of NSQC held on 22.08.2019, NPTI has been recognised as an Assessment & Certification body for 60 Qualifications in Power Sector and Renewable Energy Sector.

ATAL Faculty Development Program

NPTI is conducting AICTE Training & Learning Academy (ATAL) faculty development program in the areas of recent technological advancement across India through its eleven (11) institutes.

INTERNATIONAL TRAINING

Professionals from various countries like Afghanistan, Bangladesh, Belarus, Bhutan, Cambodia, Ecuador, Ethiopia, Iraq, Kenya, Libya, Malaysia, Mexico, Myanmar, Nepal, Nigeria, Oman, Papua New Guinea, Philippines, South America, Sri Lanka, Sudan, Syria, UAE, Zambia,

Zimbabwe etc. have also undergone training at NPTI's various training Institutes.

ITEC Program, Ministry of External Affairs, Govt. of India

NPTI is conducting training programs through ITEC, MEA, Govt. of India for the countries of the world i.e. SAARC, African Countries etc. 48 engineers of Bhutan Power Sector were trained under this scheme at NPTI in various training programs during 2019-20.

INFRASTRUCTURAL FACILITIES AT NPTI

The Institutes offer world class infrastructural facilities like, excellent simulators, relevant laboratories and workshops, computer labs well stocked libraries with national and international journals and reference materials, fully air-conditioned classrooms, conference halls and board rooms with video conferencing facility, modern classrooms equipped with latest teaching aids, wi-fi enabled campus, separate hostel for students, executives and international trainees, auditorium, gymnasiums and playgrounds.

GIS Resource Centre

A Geographical Information System (GIS) Resource Centre has been set up at NPTI Corporate Office, Faridabad. The Centre is conducting various courses in GIS and Remote Sensing to meet the requirements of the Power Sector.

Hot Line Training Centre

A facility has been created at NPTI's Hot Line Training Centre (HLTC), Bengaluru for Live Line Maintenance of Transmission Lines upto 400 KV (first of its kind in Asia) which enables the trained personnel to attend the maintenance requirements without power interruptions. Facility for water washing of sub-station equipments is also available.

Models

All the Institutes have good number of Static and Dynamic models relating to various main systems and equipments of Thermal Power Stations, Hydro Power Stations and Power Systems. Models for demonstration in the diversified areas of training in NPTI are also available.



Trainee's from Bhutan in DAS Based 500 MW Simulator System at NPTI Faridabad

Simulators

NPTI has a high-quality, high-fidelity real-time full scope simulator system for process simulation in a real-time scenario for off-job Operator Training. There are two types of Simulator Configuration as given below.

1. DAS Based Simulator System and Conventional & Video Process Control System

Following are the simulator based on the Data Acquisition System and Conventional Video Process control system at various locations.

Location	Capacity	Configuration	Specification
Badarpur-New Delhi, Nagpur	210 MW	Thermal Power Plant	The Simulator at Badarpur is a replica of 210 MW Unit of Badarpur Thermal Power Station, New Delhi and the one at Nagpur replicates 210 MW unit of Khaper Kheda T.P.S. of MAHAGENCO.
Faridabad	500 MW	Thermal Power Plant	This is a replica of the 500 MW Stage-III, Unit-5 of Chandrapur Thermal Power Station of MAHAGENCO and has a unique facility of imparting training on the 'Conventional Control Panels' as well as on the 'Video Process Control' (DDC/ CRT-Key Board based Unit Operation) Panels in Virtual Panel and Control Schematic modes of Unit Operation.

2. DCS Based Simulator System

Following are the simulator based on the Distributed Control System at various locations.

Location	Capacity	Configuration	Specification
A. Single Simulator Configuration			
Faridabad	800 MW	Supercritical Thermal Power Plant	This simulator is replica of NTPC's unit #1 of Kudgi Project (3X800 MW) and is fully modular. The simulator consists of a set of operator stations with all operator functions, instructor's station for instructor tasks, multiple virtual controllers to simulate the exact controls of the reference plant, a simulator programming station and HMI stations
Faridabad	430 MW	Combined Cycle Gas Turbine Power Plant	This is a replica of NTPC Faridabad Gas Power Plant, Siemens Make V-94.2 Model comprising of 2x143 MW Gas Turbines and 1x144 MW Steam Turbine.
Nangal, Panjab	250 MW	Hydro Power Plant	The Simulator has the facility to operate full scope 250 MW hydro simulator replica of Unit-1 of Nathpa Jhakri Hydro Power Plant.
PSTI Bengaluru	745 KV	Dispatcher Training Simulator (DTS)	It has options for all types of generation and Transmission schemes covering 220 KV & above and also for the various generation voltages. The transmission equipment like Transformers, Transmission lines, Capacitor banks, Bus Line Reactors, SVCs, CBs, isolators are simulated in this simulator.
B. Multifunctional Simulator Configurations			
Faridabad, Nagpur, Durgapur, PSTI Bengaluru, Shivpuri, Alappuzha	210 MW-Thermal Power Plant	Multifunctional Simulator configurations	This simulator consists of a set of operator stations with all operator functions, instructor's station for instructor tasks, multiple virtual controllers to simulate the exact controls of the reference plant, a simulator programming station and HMI stations for Integrated Plant Operation.
Faridabad, Shivpuri, Alappuzha	250 MW-Hydro Power Plant		
Faridabad, Nagpur, Durgapur, PSTI Bengaluru, Shivpuri, Alappuzha	500 MW-Thermal Power Plant		
Faridabad	550 MW-Combined Cycle Power Plant		
Nagpur, Durgapur, PSTI Bengaluru, Shivpuri, Alappuzha	800 MW-Supercritical Thermal Power Plant		
Faridabad, Shivpuri, Alappuzha	SCADA & Smart Grid Simulator		

Laboratories/Workshops

The laboratories and Workshops are the prerequisites for providing on-job, hands-on training in the maintenance aspects. The institutes have well equipped laboratories and workshops with wide ranging facilities for imparting training to all cadres including Technicians, Operators and Engineers, in various aspects of Power Generation, Transmission Distribution and Operation. Some of the areas where expertise has been built up are:

- Electrical laboratories with facilities for testing of relays, Control and Instrumentation Laboratories with facilities for testing, calibration and repairs of different types of process control instruments.
- Maintenance workshops for Valves, Bearings & Shaft alignment, Pumps, Motors etc.
- Power System Studies Laboratories are equipped with Transmission and Distribution System Software where studies such as load flow analysis, short circuit studies, transient stability studies, relay coordination studies, optimal capacitor placement, network reduction and optimal separation point can be conducted.

NPTI Publications and Multi Media CBT Packages

NPTI has published around 99 Training Manuals for different courses. NPTI has also developed more than 55 Multimedia Computer Based Training Packages for power professionals.

Library

NPTI Corporate Centre library has a large collection of books and video packages on power generation, transmission and distribution technologies, various branches of engineering, science, industrial relations, management etc. It subscribes to a number of Indian and foreign technical journals and periodicals.

All regional institutes have modern libraries stocking a large collection of books and multimedia films on Power Station Technology, Mechanical Engineering, Electrical Engineering, Power Plant, Chemistry, Control and Instrumentation, Electronics, Computers, Management etc.

Auditorium, Conference Hall, Residential Quarters

All Institutes of NPTI are situated in picturesque landscapes. They have auditorium/ conference hall and classrooms with most modern amenities for conducting the training programs, conferences, seminars and workshops. All the campuses are housed with residential quarters for the employees, guest house, hostels, sports facilities, gymnasium and canteen. The campuses and hostels are Wi-Fi enabled and provide a hygienic and homely atmosphere to the trainees.

Hostel Facilities

Residential Services are available for Regular Trainees, Executives and Foreign National in all the Institutes. Well furnished hostels for Executive and Trainees with modern lodging and boarding facilities are available in all Institutes.

NPTI Corporate Office, Faridabad can accommodate about 550 trainees. An international hostel with 24 double bedded rooms is available at Faridabad.

Well furnished hostels are also available at each of the regional institute of NPTI where modern and hygienic lodging and boarding facilities are available. Those

desirous of availing the hostel facilities will have to intimate in advance to the Principal Director/Director and obtain confirmation for the same. In case a participant does not stay in the hostel, he has to make his own arrangements to reach the Institute. Recreation and indoor sports facilities like Table Tennis, Badminton, Carom, Chess etc. are available for trainees in Hostel, creating a congenial atmosphere of a Home away from Home.

The hostel accommodation is provided to the trainees only for the period of training course.

Classrooms

All the institutes have modern classrooms equipped with latest teaching aids and audio visual aids, required for efficient running of training programs. Video conferencing facility is available in all the institutes.

Medical Services

Services of well qualified doctors are available on part-time basis in each of the Institute Complex.

Faculty Members

NPTI's faculty consists of highly qualified, award winning, scholarly and experienced men and women who are leaders in their respective fields. Our faculty members come from across the country, sharing their perspective, wealth of knowledge, experience, qualification and expertise with students and working Professionals. Faculty members at NPTI have successfully developed numerous industry responsive courses to ensure trainees bring out the best in them and excel in their careers. Details of the faculty members are available on NPTI's website www.npti.gov.in.

HOW TO APPLY FOR PARTICIPATION

All the Institutes work five days a week (Monday to Friday), working hours being 09:30 to 18:00 hrs. The changes in program schedule, if any, are duly intimated. NPTI regularly organizes Training programs/ Seminars/ Workshops in collaboration with National/ International Power Sector Organizations, details of which are prominently displayed on the website.

Nomination along with course fee for various courses may be sent to The Principal Director/ Director of the respective institute at least 15 days in advance from the date of commencement of the course. Aspiring students for PGDC courses may visit the website, and keep abreast with announcements of the various programs and may apply as per the instructions therein. The information and brochures of different workshops, seminars and conferences being conducted at NPTI are also available on the website. Application/ Registration to the workshops/ seminars/ conferences may be done as mentioned in the respective brochures.

CONSULTANCY SERVICES

In order to serve the industry requirements and make best usage of infrastructure and expertise, NPTI has ventured into providing consultancy services in a number of relevant areas of Energy Sector.

CHAPTER 2: FEE STRUCTURE



INTERNATIONAL TRAINING PROGRAMS FEE STRUCTURE

S.No.	Course	Course fee (Foreign Countries)
1.	Regular Course on Power Plant Engineering	For SAARC Countries US \$ 400 per week per participant subject to maximum of US \$ 10,000 up to 52 weeks duration
		For Other than SAARC Countries US \$ 800 per week per participant subject to maximum of US \$ 20000 up to 52 weeks duration
2.	Simulator Training	For SAARC Countries US \$ 800 per week per participant
		For Other than SAARC Countries US \$ 1000 per week per participant
3.	Boarding & Lodging in NPTI Hostel	US \$ 500 per week per participant (AC Rooms on single sharing basis)
4.	Specialized need based Tailor made courses	As per estimate



DOMESTIC TRAINING PROGRAMS FEE STRUCTURE

A. Training Programs at Hot Line Training Centre (HLTC), Bengaluru			
S. No.	Name of the Course	Duration	*Training Fee (₹) per participant
1.	Live Line Maintenance Techniques (LLMT) using Hot Stick Method	11 weeks	1,86,000
2.	Live Line Maintenance Techniques (LLMT) using Bare Hand method (BHM)	05 weeks	1,45,000
3.	Switchyard Maintenance Techniques using LLMT for Linemen/ Supervisors	04 weeks	1,15,000
4.	Familiarization Training Programme on 400 kV cold Lines	04 weeks	87,000
5.	Awareness Course for Executives in Hot Line Activities	01 week	22,000
6.	Live Line Punctured Insulator Detection (PID)	01 week	24,000
7.	Live Line Insulator Washing Techniques (LLIW)	04 days	24,000

* Training Fee includes Boarding and Lodging Charges

NOTE: GST or any other tax as applicable shall be charge extra on various components like training fee, Boarding & Lodging Charges, Transportation Charges.

B. Simulator Training Fee Structure		
Name of the Simulator	Duration	#Training Fee (₹) / Participant
Thermal Simulator- 210 MW/500MW/800MW [#]	1 week	25,000
CCGT 430 MW/ CCGP 550 MW Simulator	1 week	25,000
Hydro Simulator 250 MW	1 week	20,000
Power System Training Simulator	1 week	24,000
SCADA & Smart Grid	1 week	25,000
Multi-Functional Simulator		
a) Combo Offer (Thermal- 210 MW/500MW/800 MW) ^{##}	3 weeks	60,000
b) Integrated Offer of 5 Simulators (Thermal- 210 MW/500MW/800 MW ^{##} , Hydro 250 MW and SCADA & Smart Grid)	5 weeks	90,000
c) Integrated Offer of 6 Simulators (Thermal- 210 MW/500MW/800 MW ^{##} , CCGT-430 MW/550 MW, Hydro 250 MW and SCADA & Smart Grid)	6 weeks	1,00,000

[#]Training Fee Includes Tea/ Snacks and working lunch

Note: 20% discount on Simulator Training Fee may be offered if Participants are more than 20 from an Organisation in a financial Year

^{##} Supercritical Technology Training of 660 MW Power Plant may also be imparted

C. Industry Interfaced / Long Term Courses (Period 17 to 52 Weeks)			
S. No.	Name of the Course	Duration	Training Fee (₹) per participant
1	Post Graduate Diploma Course (PGDC) in Power Plant Engineering*		
	i) Non-sponsored candidates	52 weeks	2,30,000
	ii) Sponsored candidates	52 weeks	3,60,000

2	Post Graduate Diploma Course (PGDC) in Renewable Energy and Grid Interface Technologies		
	i) Non-sponsored candidates	52 weeks	2,30,000
	ii) Sponsored candidates	52 weeks	3,60,000
3	Post Graduate Diploma Course (PGDC) in Smart Grid Technologies		
	i) Non-sponsored candidates	52 weeks	2,30,000
	ii) Sponsored candidates	52 weeks	3,60,000
4	Post Graduate Diploma Course (PGDC) in Energy Market Management		
	i) Non-sponsored candidates	52 weeks	2,30,000
	ii) Sponsored candidates	52 weeks	3,60,000
5	Post Graduate Diploma Course (PGDC) in Power System Operation		
	i) Non-sponsored candidates	52 weeks	2,30,000
	ii) Sponsored candidates	52 weeks	3,60,000
6	Post Graduate Diploma Course (PGDC) in Hydro Power Plant Engineering*		
	i) Non-sponsored candidates	39 weeks	1,75,000
	ii) Sponsored candidates	39 weeks	2,00,000
7	Post Graduate Diploma Course (PGDC) in Transmission and Distribution System*		
	i) Non-sponsored candidates	26 weeks	1,45,000
	ii) Sponsored candidates	26 weeks	1,90,000
8	Post Diploma Course (PDC) in Thermal Power Plant Engineering*		
	i) Non-sponsored candidates	52 weeks	1,45,000
	ii) Sponsored candidates	52 weeks	2,20,000
9	Post Diploma Courses (PDC) in Hydro Power Plant Engineering		
	i) Non-sponsored candidates	26 weeks	80,000
	ii) Sponsored candidates	26 weeks	1,35,000
10	Post Diploma Courses (PDC) in Renewable Energy including Solar Technology		
	i) Non-sponsored candidates	26 weeks	80,000
	ii) Sponsored candidates	26 weeks	1,35,000
11	Graduate Engineers Course (Power Plant Engineering)		
	i) Non-sponsored candidates	52 weeks	2,30,000
	ii) Sponsored candidates	52 weeks	3,60,000

The training fee for industry interfaced /long term courses/programs (PGDC,PDC etc.- in TABLE - C) shall be inclusive of GST. No extra fee towards placement and examination fee shall be charged to the trainees.

D. Medium Term Courses (Period 5 to 16 Weeks)			
12	Specialized Courses	16 weeks	1,44,000
13	Specialized Courses	15 weeks	1,38,000
14	Specialized Courses	14 weeks	1,32,000
15	Specialized Courses	13 weeks	1,26,000
16	Specialized Courses	12 weeks	1,20,000
17	Specialized Courses	11 weeks	1,14,000
18	Specialized Courses	10 weeks	1,08,000
19	Specialized Courses	09 weeks	1,01,000
20	Specialized Courses	08 weeks	94,000
21	Specialized Courses	07 weeks	87,000
22	Specialized Courses	06 weeks	78,000
23	Specialized Courses	05 weeks	69,000
E. Short Term Courses** (Period 1 Day to 4 Weeks)			
24	Specialized Courses	04 weeks	57,000
25	Specialized Courses	03 weeks	45,000
26	Specialized Courses	02 weeks	33,000
27	Specialized Courses	01 week	18,000
28	Specialized Courses	04 days	16,000
29	Specialized Courses	03 days	13,000
30	Specialized Courses	02 days	9,000
31	Specialized Courses	01 day	5,000
32	On-site/ On-plant training programs	01 week	30,000
33	On-site/ On-plant training programs	04 days	27,500
34	On-site/ On-plant training programs	03 days	22,000
35	for On-site/ On-plant training programs	02 days	15,500
36	for On-site/ On-plant training programs	01 day	8,500

* Includes Thermal Training Simulator Training Fee of 2 weeks/ CCGT Simulator Training Fee of 2 weeks/ Hydel Simulator Training Fees of 1 week/ Power System Training Simulator Fee of 1 week as applicable.

** In respect of short term courses, fee is inclusive of tea/snacks and working lunch. In respect of other courses, fee is exclusive of tea/snacks and working lunch. GST shall be charge extra.

Note: A uniform discount of 30% on Existing training fee of all the regular training programs shall be offered for online programs. This discount for online programs shall remain uniform for all the NPTI Institutes/Centers. For specialized courses/on-site/on-plant training programs, minimum number of participants should be 10. If number of participants is less than 10, then fee for 10 participants will be charged.

CHAPTER 3 : TRAINING COURSES

3. TRAINING COURSES

3.1 SIMULATOR TRAINING PROGRAMS

A.	List of Simulator Training Programs along with Locations and Date of commencement	
B.	Details of Program Profile/ Content	
I	DAS Based Simulator System and Conventional & Video Process Control System	
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3.1.2	500 MW Fossil Fuel Power Plant Simulator Training	18
II	DCS Based Simulator System	
3.1.3	430 MW Combined Cycle Gas Turbine Power Plant Simulator Training	18
3.1.4	250 MW Hydro Simulator Training	18
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3.1.6	800 MW/660 MW (Emulated) Super Critical Thermal Power Plant Simulator Training	19
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ii	250 MW-Hydro Power Plant	
iii	500 MW-Thermal Power Plant	
iv	550 MW-Combined Cycle Power Plant	
v	800 MW/660 MW (Emulated) Super Critical Thermal Power Plant Simulator Training	
vi	SCADA & Smart Grid Simulator	

3.2 INDUSTRY INTERFACED LONG TERM TRAINING COURSES (17 WEEKS TO 52 WEEKS)

A.	List of Long-Term Training Programs along with Locations and Date of commencement	
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3.2.2	Post Graduate Diploma Course (PGDC) in Renewable Energy and Grid Interface Technologies	21
3.2.3	Post Graduate Diploma Course (PGDC) in Smart Grid Technologies	21
3.2.4	Post Graduate Diploma Course (PGDC) in Energy Market Management	22
3.2.5	Post Graduate Diploma Course (PGDC) in Power System Operation	22
3.2.6	Post Graduate Diploma Course (PGDC) in Hydro Power Plant Engineering	22
3.2.7	Post Graduate Diploma Course (PGDC) in Transmission & Distribution System	23
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3.3.5	Post Graduate Certificate Course (PGCC) in Power Plant Engineering	26
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3.3.10	Control & Instrumentation for Supervisors / Technicians	27
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3.4 SHORT TERM TRAINING COURSES (1 DAY TO 4 WEEKS)

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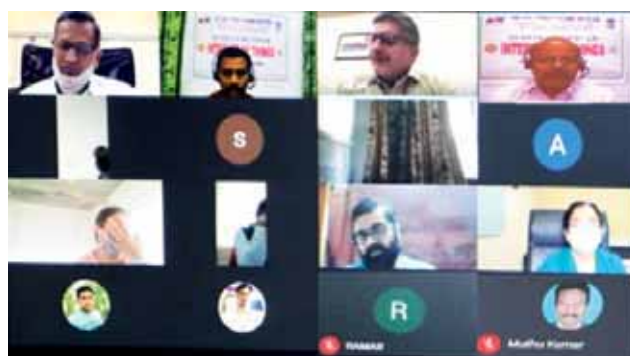
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Inauguration of 1-Weeks Online Training Program for System Operators (POSO) at NPTI Faridabad



Inauguration of ATAL FDP on "Internet of Things" at NPTI Neyveli

3.0 TRAINING COURSES

3.1 SIMULATOR TRAINING PROGRAMS

A. List of Simulator Training Programs along with Locations and Date of commencement

Objective

The main Objective of Simulator System to emulates the behaviour of the entire process simulation in a Real-Time Scenario for a meaning full off-job Operation Reflex Training to reduce plant and system tripping as well as optimum utilization of Auxiliary resources in Power stations.

Who may Attend

Engineering/Diploma Graduates Students/Power Plant Working Professionals (Junior and Middle Level Managers/ Executives/officers) may attend the Simulator Training Programs

The Institutes of NPTI are well equipped with Hi-Tech infrastructural facilities for conducting different courses on technical topics covering the needs of Thermal, Hydro, CCGT, Transmission & Distribution Systems. The training on these simulators will benefit operators, engineers and shift incharge Engineers.

I DAS Based Simulator System and Conventional & Video Process Control System

Following are the simulator based on the Data Acquisition System and Conventional Video Process control system at various locations.

S. No.	Name of Course	Institute	Duration	Date of Commencement	Program Profile/Content Page No.
1.	210 MW Fossil Fuel Power Plant	Nagpur	02 Weeks	12.04.2021, 26.04.2021, 10.05.2021, 31.05.2021, 14.06.2021, 05.07.2021, 19.07.2021, 02.08.2021, 16.08.2021, 30.08.2021, 13.09.2021, 27.09.2021, 11.10.2021, 22.11.2021, 06.12.2021, 20.12.2021, 03.01.2022, 17.01.2022, 31.01.2022, 14.02.2022, 28.02.2022, 14.03.2022	18
2.	500 MW Fossil Fuel Power Plant	Faridabad	02 Weeks	12.04.2021, 23.04.2021, 17.05.2021, 28.05.2021, 14.06.2021, 05.06.2021, 12.07.2021, 23.07.2021, 16.08.2021, 27.08.2021, 13.09.2021, 24.09.2021, 18.10.2021, 29.10.2021, 08.11.2021, 19.11.2021, 06.12.2021, 17.12.2021, 10.01.2022, 21.01.2022, 07.02.2022, 18.02.2022, 14.03.2022, 25.03.2022	18

II DCS Based Simulator System

Following are the simulator based on the DCS System.

S. No.	Name of Course	Institute	Duration	Date of Commencement	Program Profile/Content Page No.
3.	430 MW Combined Cycle Gas Turbine Power Plant	Faridabad	02 Weeks	26.04.2021, 07.05.2021, 17.05.2021, 28.05.2021, 28.06.2021, 09.07.2021, 19.07.2021, 30.07.2021, 23.08.2021, 03.09.2021, 13.09.2021, 24.09.2021, 18.10.2021, 29.10.2021, 22.11.2021, 03.12.2021, 13.12.2021, 24.12.2021, 03.01.2022, 14.01.2022, 07.02.2022, 18.02.2022, 14.03.2022, 25.03.2022	18
4.	250 MW Hydro Simulator Training	Nangal	01 Week	24.05.2021, 27.09.2021, 08.11.2021, 10.01.2022, 21.03.2022	18
5.	Dispatcher Training Simulator (DTS)	PSTI, Bengaluru	02 Weeks	Mutually Agreed basis	18

6.	800 MW/660 MW (Emulated) Super Critical Thermal Power Plant Simulator Training	Faridabad	02 Weeks	19.04.2021, 30.04.2021, 17.05.2021, 28.05.2021, 14.06.2021, 25.06.2021, 19.07.2021, 30.07.2021, 23.08.2021, 03.09.2021, 27.09.2021, 08.10.2021, 25.10.2021, 15.11.2021, 22.11.2021, 03.12.2021, 20.12.2021, 31.12.2021, 17.01.2022, 28.01.2022, 14.02.2022, 25.02.2022, 14.03.2022, 25.03.2022	19
7.	Multifunctional Simulator Configurations				
i	210 MW-Thermal Power Plant	Faridabad	02 Weeks	17.05.2021, 28.05.2021, 05.07.2021, 16.07.2021, 06.09.2021, 17.09.2021, 13.12.2021, 24.12.2021, 07.02.2022, 18.02.2022	19
		Nagpur	02 Weeks	12.04.2021, 26.04.2021, 10.05.2021, 31.05.2021, 14.06.2021, 05.07.2021, 19.07.2021, 02.08.2021, 16.08.2021, 30.08.2021, 13.09.2021, 27.09.2021, 11.10.2021, 22.11.2021, 06.12.2021, 20.12.2021, 03.01.2022, 17.01.2022, 31.01.2022, 14.02.2022, 28.02.2022, 14.03.2022	
		Durgapur	02 Weeks	05.04.2021, 17.05.2021, 05.07.2021, 16.08.2021, 04.10.2021, 15.11.2021, 03.01.2022, 14.02.2022	
		Alappuzha	02 Weeks	Mutually Agreed basis	
		Shivpuri	01 Week	05.04.2021, 07.06.2021, 02.08.2021, 04.10.2021, 20.12.2021, 07.03.2022	
ii	250 MW-Hydro Power Plant	Faridabad	01 Week	03.05.2021, 07.05.2021, 23.08.2021, 27.08.2021, 20.09.2021, 24.09.2021, 06.12.2021, 10.12.2021, 17.01.2022, 21.01.2022, 14.03.2022, 18.03.2022	19
		Shivpuri	02 Weeks	03.05.2021, 05.07.2021, 06.09.2021, 22.11.2021, 10.01.2021	
		Alappuzha	02 Weeks	Mutually Agreed basis	
iii	500 MW-Thermal Power Plant	Faridabad	02 Weeks	19.04.2021, 30.04.2021, 19.07.2021, 30.07.2021, 01.11.2021, 12.11.2021, 03.01.2022, 14.02.2022, 28.02.2022, 11.03.2022	19
		Nagpur	02 Weeks	12.04.2021, 26.04.2021, 10.05.2021, 31.05.2021, 14.06.2021, 05.07.2021, 19.07.2021, 02.08.2021, 16.08.2021, 30.08.2021, 13.09.2021, 27.09.2021, 11.10.2021, 22.11.2021, 06.12.2021, 20.12.2021, 03.01.2022, 17.01.2022, 31.01.2022, 14.02.2022, 28.02.2022, 14.03.2022	
		Durgapur	02 Weeks	19.04.2021, 31.05.2021, 19.07.2021, 06.09.2021, 18.10.2021, 06.12.2021, 17.01.2022, 28.02.2022	
		PSTI, Bengaluru	02 Weeks	Mutually Agreed basis	
		Alappuzha	02 Weeks	Mutually Agreed basis	
		Shivpuri	01 Week	12.04.2021, 26.04.2021, 14.06.2021, 21.06.2021, 09.08.2021, 25.10.2021, 27.12.2021, 31.12.2021,	

iv	550 MW-Combined Cycle Power Plant	Faridabad	02 Weeks	05.04.2021, 16.04.2021, 07.06.2021, 18.06.2021, 02.08.2021, 13.08.2021, 15.11.2021, 26.11.2021, 24.01.2022, 04.02.2022	19
v	800 MW/660 MW (Emulated) Super Critical Thermal Power Plant Simulator Training	Nagpur	02 Weeks	12.04.2021, 26.04.2021, 10.05.2021, 31.05.2021, 14.06.2021, 05.07.2021, 19.07.2021, 02.08.2021, 16.08.2021, 30.08.2021, 13.09.2021, 27.09.2021, 11.10.2021, 22.11.2021, 06.12.2021, 20.12.2021, 03.01.2022, 17.01.2022, 31.01.2022, 14.02.2022, 28.02.2022, 14.03.2022	19
		Durgapur	02 Weeks	03.05.2021, 14.06.2021, 02.08.2021, 20.09.2021, 01.11.2021, 20.12.2021, 31.01.2022, 14.01.2022	
		PSTI, Bengaluru	02 Weeks	Mutually Agreed basis	
		Alappuzha	02 Weeks	Mutually Agreed basis	
		Shivpuri	01 Week	17.05.2021, 12.07.2021, 23.08.2021, 13.09.2021, 08.11.2021, 06.12.2021, 03.01.2022, 24.01.2022	
vi	SCADA & Smart Grid Simulator	Faridabad	01 Week	21.06.2021, 25.06.2021, 27.09.2021, 01.10.2021, 04.10.2021, 08.10.2021, 27.12.2021, 31.12.2021, 21.02.2022, 25.02.2022, 21.03.2022, 25.03.2022	19
		Alappuzha	02 Weeks	Mutually Agreed basis	
		Shivpuri	01 Week	31.05.2021, 26.07.2021, 20.09.2021, 27.12.2021, 13.12.2021, 07.02.2022	

B. Details of Program Profile/ Content

I DAS Based Simulator System and Conventional & Video Process Control System

3.1.1 210 MW Fossil Fuel Power Plant Simulator Training

Program Profile

- Cold start, up to 100% load.
- Partial load to full load and back to partial load.
- Manoeuvring of different auxiliaries.
- Hot start/warm start to full load.
- Planned shut down.
- Over-rides and alarms during different exercises.
- Malfunctions.

3.1.2 500 MW Fossil Fuel Power Plant Simulator Training

To train engineers on full scope replica simulator of 500 MW thermal power station, in all aspects of operation and helping them to make better judgement calls/responses to malfunctions and emergent situations by imparting them hands on practice in:

- Full Scope/Conventional Panel Operation Mode.
- CRT – Keyboard Based Operation Mode.

Program Profile

- Cold start and up to 100% load.
- Partial to full load and back.
- Hot start / Warm start to full load.
- Planned Shutdown.
- Maneuvering of different auxiliaries.
- Operation under emergency conditions.

II DCS Based Simulator System

3.1.3 430 MW Combined Cycle Gas Turbine Power Plant Simulator Training

Program Profile

- Cold start and up to 100% load.
- Partial to full load and back.
- Hot start / Warm start to full load.
- Planned Shutdown.
- Manoeuvring of different auxiliaries.
- Standalone Operation of Gas Turbine.
- Operation under emergency conditions.
- Operation of Gas turbine in Open Cycle Mode.

3.1.4 250 MW Hydro Simulator Training

Program Profile

- Start-up of Machine & load upto 100%.
- Partial load to full load and back to partial load.
- Maneuvering of different auxiliaries.
- Planned shutdown.
- Operation under emergency.
- Over-rides and alarms during different exercises.
- Malfunctions.

3.1.5 Dispatcher Training Simulator (DTS)

Program Profile

- Dispatcher Training Simulator Overview.
- Active and Reactive Power Control.
- Indian National Network including HVDC Lines.
- Prime mover dynamics. (Hydro, Steam, Gas and Pumped storage units)
- Load shedding schemes.

- Islanding schemes.
- SCADA Operation.
- Automatic Generation Control.
- Islanding and Integrated Operation.
- System Occurrence and Restoration.
- System Stability.
- Voltage Control and Voltage Collapse Simulation.
- Prevention of Grid Disturbance.

3.1.6 800 MW/660 MW (Emulated) Super Critical Thermal Power Plant Training Simulator

Program Profile

- Cold start up to 100% load Hot start/warm start up to full load.
- Planned shut down.
- Auto/manual control of parameters.
- Operation under emergency conditions.

3.1.7 Multifunctional Simulators

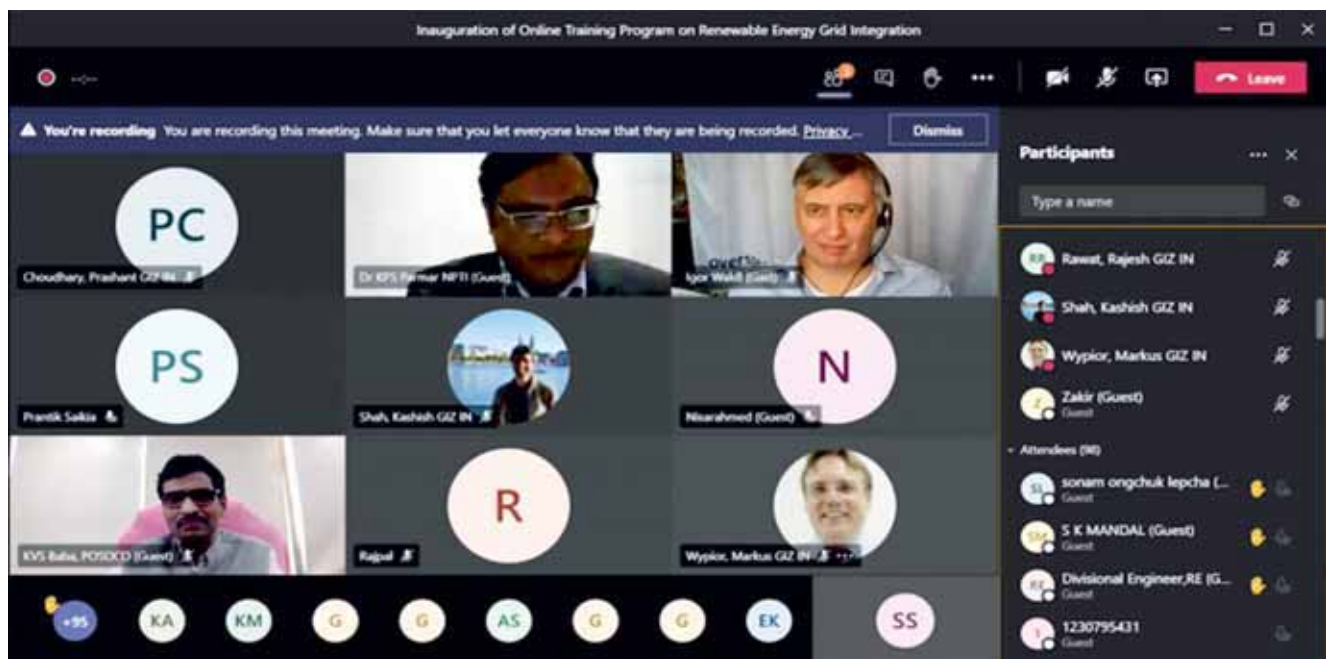
- 210 MW-Thermal Power Plant
- 250 MW-Hydro Power Plant

- 500 MW-Thermal Power Plant
- 550 MW-Combined Cycle Power Plant
- 800 MW-Supercritical Thermal Power Plant
- SCADA & Smart Grid Simulator

The training on the multifunctional configured simulators may be on only the Thermal Power Plants (210/ 500/ 800 MW) or an integration of Thermal (210/ 500/ 800 MW), Hydro (250 MW), SCADA and Smart Grid or even a integration of Thermal (210/ 500/ 800 MW), CCPP (430/ 550 MW), Hydro (250 MW), SCADA and Smart Grid Hands on training on either of the combinations would give a perfect understanding of integrated operation of the power plant & power system.

Program Profile

- Start up to Synchronization and Synchronization to Full load and Back.
- Planned shut down.
- Maneuvering of different auxiliaries.
- Operation under emergency conditions.



Inauguration of 12-Weeks Online Training Program on Renewable Energy Grid Integration for REMC Grid Operators



Training Program on Next Generation Distribution System: Transition Towards Smart Grids from 15th March - 19th March, 2021 sponsored by ITEC Programme, Development Partnership Administration, Ministry of External Affairs, Government of India. Participants from Afghanistan, Azerbaijan, Bhutan, Brazil, Costa Rica, Ecuador, Ethiopia, Fiji, Iraq, Kenya, Kingdom of Eswatini (Formerly Swaziland), Laos, Maldives, Morocco, Nicaragua, Nigeria, Palestine, Suriname, Thailand, Venezuela, Zambia, Zimbabwe

3.2 INDUSTRY INTERFACED LONG TERM TRAINING COURSES (17 Weeks to 52 Weeks)

A. List of Long-Term Training Programs along with Locations and Date of commencement Details of Program Profile/ Content

Objective

To prepare the fresh Graduate Engineers to become Power Station Managers in Operation and Maintenance of Thermal Power Stations, hydro Power Plant, RE Plants, Transmission and Distribution System. Focus of these course is to equip the students with technologies, economics and policy involving energy systems and supply with conventional and Renewable Energy sources. Detailed expertise will be offered in thermal power plant systems, hydropower plant systems, Solar Energy Systems involving photovoltaic as well as thermal Energy Systems, Wind Energy, Biomass, Geothermal, Tidal and Wave Energy, Hydrogen & Fuel Cells, Small Hydro along with problems associated with grid integration issues of various sources, problems and interfacing technologies and concept of Smart Grid, Smart Transmission and Smart Distribution. The candidates shall develop their skills to design, O&M of plants systems to get jobs in these areas.

Who may Attend

Engineering/Diploma Graduates Students/Working Professionals (Junior and Middle Level Managers/Executives/officers) may attend the long term programs (PGDC, PDC, GET etc.).

The admission to the following one year Post Graduate Diploma Courses (PGDC) is done through a Common Entrance Test (CET) held on all India Basis:

- Power Plant Engineering
- Renewable Energy and Grid Interface Technologies
- Smart Grid Technologies
- Energy Market Management
- Power System Operation

Admission notification is published in the national newspapers and NPTI's website, www.npti.gov.in. Aspiring students are encouraged to visit the website for all information about the courses. The prospectus covers all details like the CET date, the eligibility criteria, the counseling date and the date of commencement of the courses. Aspiring students can visit NPTI's website for the prospectus.

S. No.	Name of Course	Institute	Duration	Date of Commencement	Program Profile/Content Page No.
1.	Post Graduate Diploma Course (PGDC) in Power Plant Engineering	Faridabad, Badarpur, Nangal, Neyveli, Durgapur, Guwahati, Nagpur, PSTI, Bengaluru, Alappuzha, Shivpuri	52 Weeks	To be announced, visit NPTI website: www.npti.gov.in	21
2.	Post Graduate Diploma Course (PGDC) in Renewable Energy and Grid Interface Technologies	Faridabad, Durgapur, Nagpur, PSTI, Bengaluru, Alappuzha, Shivpuri	52 Weeks		21
3.	Post Graduate Diploma Course (PGDC) in Smart Grid Technologies	Faridabad, Durgapur, Nagpur, PSTI, Bengaluru, Alappuzha, Shivpuri	52 Weeks		21
4.	Post Graduate Diploma Course (PGDC) in Energy Market Management	Faridabad, Durgapur, Nagpur, PSTI, Bengaluru, Alappuzha, Shivpuri	52 Weeks		22
5.	Post Graduate Diploma Course (PGDC) in Power System Operation	Faridabad, Durgapur, Nagpur, PSTI, Bengaluru, Alappuzha, Shivpuri	52 Weeks		22
6.	Post Graduate Diploma Course (PGDC) in Hydro Power Plant Engineering	Nangal	39 Weeks	06.09.2021	22
7.	Post Graduate Diploma Course (PGDC) in Transmission & Distribution System	Badarpur	26 Weeks	12.07.2021, 02.01.2022	23
		Durgapur	26 Weeks	15.11.2021	
		Nagpur	26 Weeks	19.07.2021	
		PSTI, Bangalore	26 Weeks	To be announced	
		Shivpuri	26 Weeks	08.11.2021	
		Alappuzha	26 Weeks	16.08.2021	

8.	Post Diploma Course (PDC) in Power Plant Engineering	Nagpur	52 Weeks	05.07.2021	23
		Guwahati	52 Weeks	22.02.21	
		Durgapur	52 Weeks	09.08.2021	
		Badarpur	52 Weeks	12.07.2021	
		Shivpuri	52 Weeks	01.11.2021	
9.	Post Diploma Course (PDC) in Hydro Power Plant Engineering	Nangal	26 Weeks	23.08.2021	23
10.	Graduate Engineers Course (Power Plant Engineering)	Durgapur	52 Weeks	06.09.2021	23
		Nagpur	52 Weeks	30.08.2021, 28.02.2022	
11.	Graduate Engineers Course (Thermal Condensed)	Nagpur	26 Weeks	26.07.2021	24
12.	Post Diploma Course in Renewable Energy including Solar Technology	Nagpur	26 Weeks	19.07.2021	24

B. Details of Program Profile/ Content

3.2.1 Post Graduate Diploma Course (PGDC) in Power Plant Engineering

Program Profile

Module No.	Description	Duration (weeks)
1	Power Plant Familiarization & Industrial Safety.	5
2	CCGT, Co-Generation & Hybrid Systems.	2
3	Power Plant Briefing & Scheme Tracing work.	3
4	Power Plant Operation.	2
5	Power Plant Performance & Efficiency. Calculation.	1
6	Nuclear Power Plants.	1
7	Advanced Steam Generation Technology - Supercritical & FBC.	1
OJ-1	Rotational On-Job (Operation).	3
9	Chemistry, Metallurgy, NDT & Welding.	1
10	Renewable Energy (RE) resources, Conventional & RE Systems.	1
11	Solar PV & Thermal Technologies.	3
12	Business Communication & Personality Development.	1
	<i>First Semester Examination</i>	1
13	Power Sector Reforms and Regulations.	1
14	Wind Energy and Hydro.	2
15	Bio Mass, Bio Energy and Waste to Energy.	2
16	Energy Storage Technologies.	1
17	Power Plant Protection.	2
18	Maintenance Planning Inspection & Cost Control.	2
19	Control & Instrumentation.	2
20	IT Application in Power Sector & GIS.	1
21	Load Dispatch.	1
22	Renewable Energy Grid Interface Technologies.	1
23	Erection, Commissioning & Construction Management.	2
24	Energy Audit & Project Management.	1
25	Environment Management.	1
OJ-2	Rotational On-Job. (Maintenance)	4
26	Simulator Training, Visit to Manufacturers Works.	3
	<i>Second Semester Exam</i>	1

3.2.2 Post Graduate Diploma Course (PGDC) in Renewable Energy and Grid Interface Technologies

Program Profile

Module No.	Description
1	Energy Resources and Conventional Energy Systems.
2	Applied Heat and Power Technology.
3	Legislative and Regulatory Framework.
4	Managerial and Interpersonal Skills.
5	Energy Economics.
6	Communication Skills and Technical Writing.
7	Solar Thermal Systems.
8	Solar Photo-Voltaic Systems.
9	Grid Interface Technologies - I.
10	Tariff and Commercial Aspects.
11	Contracts Management.
12	On Job Training / Visits to Solar Thermal/ Solar PV and other RE sites and Lab Work.
13	Wind Energy and Small Hydro.
14	Bio Mass& Bio Energy and Waste to Energy.
15	Hydrogen and Fuel Cells.
16	Geo-thermal, Tidal and Wave Energy.
17	Co-Generation & Hybrid Systems.
18	Energy Storage Technologies.
19	Appraisal & Financing of Renewable Energy Projects.
20	Energy, Environment and Sustainable Development.
21	Grid Interface Technologies – II.
22	Smart Power Flow Controllers and Intelligent Automation.
23	On - Job Training/ Visits to RLDC/SCADA facility.
24	Project Presentation.

3.2.3 Post Graduate Diploma Course (PGDC) in Smart Grid Technologies

Program Profile

Module No.	Description
1	Evolution of the Indian Power Sector.
2	Legislative & Regulatory Framework.
3	Managerial & Interpersonal Skills.
4	Communication Skills and Technical Writing.
5	Smart Grid Policy and Regulations.
6	Introduction to Traditional Power Systems.

7	Introduction to Smart Grids.
8	Smart Grid Control Elements& Internet of Things.
9	Smart Distribution technologies.
10	Energy storage, micro-grids, alternative grid designs.
11	Demand Side Management & Demand Response.
12	Integration of Renewable Energy into the Grid - I.
13	Transmission and Distribution Challenges in Smart Grids.
14	On-Job Training / Visits/ Simulator.
15	Communications and Interoperability.
16	Load Forecasting.
17	Energy Management Systems.
18	Smart Grid Operations.
19	Smart Grid Controls & Smart Power Flow controllers and Intelligent Automation.
20	Smart Grid Applications Layer.
21	Cyber Security.
22	Integration of Legacy Systems.
23	E-mobility.
24	Integration of RE Sources - II.
25	Smart Grid as enablers for Smart Cities.
26	International Benchmarks and Lessons learnt.
27	Smart Grid Maturity Models
28	Pilot Projects/ Case Studies and Business Models for Smart Grids.
29	Visits/ Lab./Simulation.
30	Project Presentation.

3.2.4 Post Graduate Diploma Course (PGDC) in Energy Market Management

Program Profile

Module No.	Description
1	Energy Resources and Electricity Generation Options.
2	Transmission Networks.
3	Power System Operation and Management.
4	Electricity Industry Structure and Regulations.
5	Overview of Economic Theory.
6	Commercial Systems & Transmission Pricing.
7	Electricity Markets Design.
8	Managerial and Interpersonal Skills.
9	Communication Skills and Technical Writing.
10	Visits to IEX/PXIL/RLDC.
11	Load Dispatch Simulator Training.
12	Investing in Generation and Transmission.
13	Ancillary Services Markets.
14	Operation of Market Oriented Power Systems.
15	Electricity Storage Technology and Management.
16	Managing Risk.
17	Integration of Renewables and Effect on Power Markets.
18	Introduction to Smart Grids.
19	Power System Optimisation.
20	Smart Power Flow Controllers and Intelligent Automation.
21	Cyber Security in Power Systems.
22	Climate Change and the impact on Energy Systems.
23	Power Market Simulation Lab.
24	Project Presentation.

3.2.5 Post Graduate Diploma Course (PGDC) in Power System Operation

Program Profile

Module No.	Description
1	Evolution of Indian Power Systems.
2	Legislative and Regulatory Framework.
3	Managerial and Interpersonal Skills.
4	Communication Skills and Technical Writing.
5	Elements of Power System.
6	Principles of Power System Operation.
7	Power System Stability and Control - I.
8	Reactive Power Management.
9	Power System Analysis.
10	On Job Training and Site Visits to Transmission Substation/ O&M of Substation/Switchyard/ NLDC/HVDC/FACTS facility.
11	On Job Training on Load Dispatch Simulator and Power. Systems Lab /HV Lab.
12	Legislative and Regulatory Framework - II.
13	Commercial Aspects and Contracts Management.
14	Transmission Pricing.
15	Power System Stability and Control - II.
16	Power Systems Planning and New Technologies.
17	System Security and Reliability.
18	Smart Power Flow Controllers and Intelligent Automation.
19	Power Markets.
20	Ancillary Services Management.
21	SCADA / EMS and IT & Telecommunication Systems.
22	Protection Systems.
23	System Operation in emergency.
24	Power System Restoration
25	Optimization Techniques and MATLAB.
26	Power Markets Simulation Lab.
27	Training & visit to RLDC/SCADA facility.
28	Project Presentation.

3.2.6 Post Graduate Diploma Course (PGDC) in Hydro Power Plant Engineering

Program Profile

Module No.	Description	Duration (Weeks)
1	General Introduction of Hydro Power Plant Engineering.	2
2	Power plant familiarization of Hydro Power Plant Engineering.	3
3	Planning & cost control.	1
4	Safety & First aid.	1
5	Construction activity of a Hydro Power Plants.	2
6	Electro mechanical equipment using in Hydro Power Plants.	3
7	Hydro mechanical equipment Testing Erection & Commissioning.	1
8	Welding and Ndt.	1
9	Control & Instrumentation.	2
10	Computer application in Hydro Power plant.	1
11	Power Plant Protections.	2
12	Switchyard Equipments.	1
13	Power Plant Operation.	2
14	Load Dispatch.	1
15	Maintenance of Hydro Power Plant Equipments.	1

16	Inspection of Hydro Power Plant Equipments.	1
17	Hydro Power Plant Simulator.	1
18	Introduction to Management.	1
19	Plant Operational Training at Hydro Power Plant (On-JOB).	6
20	Plant maintenance Training at Hydro Power Plant (ON-JOB).	5
21	Final Assessment & Evaluation.	1

3.2.7 Post Graduate Diploma Course (PGDC) in Transmission & Distribution System

Program Profile

Module No.	Description	Duration (Weeks)
1	General Introduction Power Scenario & General Introduction.	1
2	Power Generation Thermal Power Plant Familiarization.	1
3	Power Transmission Lines Engineering and O&M.	2
4	Live Line Maintenance Technique.	1
5	Substation Planning & engineering	1
6	Substation Operation & Maintenance.	1
7	Load Despatch & Grid Management.	2
8	Communications in Power Systems.	1
9	Power Distribution/Distribution Lines/ Cables.	1
10	Systems Engineering O&M.	2
11	Distribution Sub-Stations.	1
12	Distribution Metering.	1
13	Energy Audit and Conservation in Distribution Systems.	1
14	Information Technology applications in T&D.	1
15	Power System Planning Studies.	1
16	Safety, Statutory Safety & Statutory regulations.	1
17	Commercial aspects Commercial aspects in T&D Systems.	1
18	Management of Electrical Contract.	1
19	New Technologies Power System Protection.	1
20	High Voltage Testing Power System Equipment.	1
21	HVDC Transmission System.	1
22	Simulator Training/Lab Simulator Training, Relay Testing.	1
23	Appraisal.	1

3.2.8 Post Diploma Course (PDC) in Power Plant Engineering

Program Profile

Module No.	Description	Duration (Weeks)
1	General Introduction and Orientation.	1
2	Environment & Personal Safety.	8
3	Power Plant Description.	6
4	Power Plant Scheme Description and Tracing.	2
5	Power Plant Operation (Supervisory).	2
6	Power Plant Chemistry.	1
7	Power Plant Instrumentation.	1
8	Power Plant Efficiency Performance.	1
9	Basic Welding Practice & NDT.	1

10	Maintenance Planning Inspection and Cost Control.	6
11	Power Plant O&M (On-Job) .	10
12	Introduction to Management.	1
13	Computer Application.	1
14	Power System Operation and Electrical Protection.	1
15	Power Distribution Engineering and Systems.	3
16	Distribution Metering and Techniques of Loss Minimisation.	3
17	Simulator.	2
18	Protection.	1
19	Final Appraisal.	1

3.2.9 Post Diploma Course (PDC) in Hydro Power Plant Engineering

Program Profile

Module No.	Description	Duration (Weeks)
1	General Introduction & Orientation	0.5
2	Concept of Hydro Power Stations, Site Section, Component and Layout	1.5
3	Hydro Mechanical Equipments	1
4	Hydro Turbines	1
5	Hydro Generator & Excitation	1
6	Transformers	1
7	Switchyard & GIS	1
8	Working Principles, Characteristics & Operation of Auxiliary System	1
9	Hydro Lab. Practical	1
10	Control & Instrumentation	1
11	C & I Lab. Practical	1
12	Electrical Lab. Practical	1
13	Protection & Interlocks	1
14	Power Plant Operation	1
15	Erection, Testing and Commissioning	1
16	Load Dispatch & SCADA	1
17	Power Plant Safety & Acts	1
18	On Job Training	2
19	Mechanical Maintenance	1
20	On Job Training in Mechanical Maintenance	1
21	Electrical Maintenance	1
22	On Job Training in Electrical Maintenance	1
23	Hydro Power Plant Simulator	1
24	Final Evaluation & Project Assessment	2

3.2.10 Graduate Engineers Course (Power Plant Engineering)

Program Profile

Module No.	Description	Duration (Weeks)
1	Introduction.	
2	Power Plant Description.	5
3	Power Plant Scheme Tracing & System Discussion.	2
4	Power Plant Operation.	3
OJ-1	Power Plant Operation (Manual).	4
OJ-2	Power Plant Operation (Supervisory).	4
5	Performance (Formal).	1
6	Safety.	1
7	Plant training. (Practicals)	5
8	Planning & Cost Control.	1

OJ-3	Maintenance. (Supervisory)	8
OJ-4	Performance. (On-job)	1
9	Chemistry.	1
10	Basic Welding.	0.5
11	Non-Destructive Testing.	0.5
12	Protection.	1
13	Introduction to Management.	2
14	Simulator Training.	2
15	Metallurgy.	1
16	Computer Applications.	1
17	Load Dispatch.	1
18	Control & Instrumentation.	2
19	Maintenance & Inspection.	4
20	Appraisal & Valedictory.	1

3.2.11 Graduate Engineers Course (Thermal Condensed)

Program Profile

Module No.	Description	Duration (Weeks)
1	Power Plant Introduction & Industrial Safety	0.5
2	Power Plant Familiarisation	4
3	Power Plant Briefing & Scheme Tracing	2
4	Power Plant Operation	1
5	Rotation On-job (Operation)	1
6	Power Plant Commissioning & Construction Management	1
7	Power Plant Performance & Efficiency Calculation	1
8	Power Plant Chemistry, Metallurgy NDT & Welding	1
9	Gas turbine & Combined Cycle Power Plant	0.5
10	Advanced Steam Generation Technology - Supercritical and FBC	0.5
11	Business Communication & Personality Development	0.5
12	Power Plant Protection	1
13	Energy Audit	0.5
14	Maintenance Planning & Cost Control	0.5
15	Maintenance Practice & Inspection	3
16	Load Dispatch	1

17	Power Reforms and regulations	0.5
18	Control & Instrumentation	1.5
19	Environment Management	0.5
20	Rotational On Job (Maint.)	1
21	Simulator	2
	Project Presentation	0.5
	Examination	1

3.2.12 Post Diploma Course in Renewable Energy including Solar Technology

Program Profile

Module No.	Description	Duration (Weeks)
1	Energy Scenario & Development.	1
2	Major Energy Resources and Conventional Energy Systems	2
3	Legislative and Regulatory Framework in Indian context	1
4	Environmental concerns of Energy Generation	1
5	Socio economical aspects of Energy Resources	1
6	Solar Radiation, Solar Thermal Systems	1.5
7	Solar Thermal Systems and Application	1.5
8	Solar Photo-voltaic Systems	1
9	Solar Photo-voltaic Energy Conversion and Utilization	1
10	Biomass Energy	1
11	Wind and Hydro Energy	2
12	New Energy resources – Hydrogen Energy, Ocean Energy, Geothermal Energy, MHD, etc.	2
13	On Job Training / Visits to Solar Thermal/ Solar PV and other RE sites and Lab Work	2
14	Energy Storage Technologies	1
15	Integration of variable Renewable Energy with Grid	1
16	Appraisal & Financing of Renewable Energy Projects	2
17	Tariff and Commercial Aspects	1
18	On - Job Training / Visits to LDC/ SCADA facility	1
19	Project Presentation Appraisal & Feedback	2



PGDC (T&D) and PDC Batch Participants at NPTI Nagpur

3.3 MEDIUM TERM TRAINING COURSES (5-16 WEEKS)

A. List of Medium-Term Training Programs along with Locations and Date of commencement

Objective:

Medium Term Programs have been designed for the duration of 5-16 weeks as per the Power Sector need for the diploma, engineering graduates and working professionals to trained them as Skilled manpower for Power Station in Operation and Maintenance of Thermal Power Stations, hydro Power Plant, RE Plants, Transmission and Distribution System. Focus of these course is to excel the candidates with technologies, economics and policy involving in the energy sector. The candidates shall develop their skills to work as design engineer as well as O&M expert of plants systems.

Who May Attend

Engineering/Diploma/Graduates Students/Working Professionals (Junior and Middle Level Managers/Executives/officers) may attend medium term programs.

About Admission

The admission will be done at institute level. Candidates may apply to the respective NPTI institute as mentioned in the table below. The details of admission notice, eligibility criteria, fee etc. will be announced by the respective institute on the NPTI website.

S. No.	Name of Course	Institute	Duration	Date of Commencement	Program Profile/Content Page No.
1.	3 Months Course on “Design, Erection and Commissioning of Solar Power Plants”	Faridabad	3 Months	10.05.2021	26
		Durgapur	3 Months	28.06.2021	
		Shivpuri	3 Months	26.04.2021	
2	3 Months Course on ‘Distribution Substation Management & Optimal Utilization of Components’	Faridabad	3 Months	23.08.2021	26
3.	Live Line Maintenance Techniques (LLMT), Using Hot Stick Method (HSM)	HLTC Bengaluru	11 Weeks	05.04.2021, 02.08.2021, 06.12.2021	26
4.	Live Line Maintenance Techniques (LLMT) using Bare Hand Method (BHM) on 400 KV Lines	HLTC Bengaluru	05 Weeks	01.11.2021	26
5.	Post Graduate Certificate Course (PGCC) in Power Plant Engineering	Faridabad	3 Months	23.08.2021	26
6.	Post Graduate Certificate Course in E-Mobility and Smart Utilities	Faridabad	4 Months	15.11.2021	27
7.	Certificate Course for Hydro Power Plant Engineers and Supervisors	Nangal	12 Weeks	14.06.2021	27
8.	Specialized Training on O&M of Hydro Power Plant	Nangal	12 Weeks	14.06.2021	27
			06 Weeks	06.12.2021	
		Shivpuri	12 Weeks	26.04.2021	
9.	Distribution Engineering	Nagpur	06 Weeks	05.04.2021	27
10.	Control & Instrumentation for Supervisors / Technicians	Nagpur	06 Weeks	05.07.2021	27
11.	Training Program for Supervisor/Managerial Person Deployed in Power Industry	Nagpur	06 Weeks	04.10.2021	27
12.	New and Renewable Sources and Grid Integration in India	Nagpur	06 Weeks	03.01.2022	28
		Faridabad	1.5 Months	12.04.2021	
13.	Executive Development Program for the Supervisory Staff Working in Finance & Accounts Department	Faridabad	1.5 Months	06.09.2021	28
14.	3 Month Skill Development Program on “Thermal Power Plant Operation”	Durgapur	12 Weeks	05.07.2021	28
15.	MNRE Sponsored Solar PV Installer “Suryamitra” for Diploma/ITI Holder	Durgapur	12 Weeks	April 2021 July 2021 October 2021 January 2022	28

B. Details of Program Profile/ Content**3.3.1 Three Months Course on “Design, Erection and Commissioning of Solar Power Plants”****Program Profile**

- General: Global Energy Scenario, Indian Energy Scenario, Energy Policy.
- Solar Radiation: Physics of Solar radiation, Global Beam and diffuse radiation. Related Lab experiments.
- Fundamentals of Solar Cell: Solar PV basics, Solar PV Module, Solar Cell technologies, Crystalline cell, solar photovoltaic modules, Concentrators and PV Modules. Field Visits/Manufacturer's works.
- Balance of Solar PV Systems: Battery technology, Batteries for PV systems, DC –DC converters, Charge Controllers.
- Photovoltaic Power System : PV system configuration, Standalone system. Hybrid system and Grid connected systems.
- Planning & Design : Planning Procedure, System capacity and Energy Demand, Site selection, System concept, Module selection and PV Generator. Charge Controller and Inverter. Selection and inverter sizing, Generator Junction Box and Safety Measures.
- Pre-feasibility study, Feasibility study, Detailed project report, Design basis report, Project execution, Testing and Commissioning.
- Installation and Commissioning: Mounting System Cables, Earthing, Junction Box.
- Grid Integration & Control Techniques.
- Instrumentation & Measurements, Economical and Financial Analysis : SCADA system, sensors, data logger, Monitoring, data management, Analysis and performance. Financial Analysis, Life Cycle Costing, Environmental Analysis.

3.3.2 3 Months Course on ‘Distribution Substation Management & Optimal Utilization of Components’**Program Profile**

- Introduction to Power Plants & Power Scenario.
- Fundamentals of Electricity, Power Quality & Harmonics.
- Planning & Engineering Design of Distribution Substation.
- Erection & Commissioning of Distribution Sub-Station equipment.
- HT & LT Switchgears, & Batteries.
- Cables & Metering: Types of metering, detection of theft/tempering, unauthorized loads, investigation, legal aspects, anti-theft measures and case studies.
- Distribution Lines & PLC: Survey, Route alignment, GPS application, Line Components, Bill of Quantities.
- Protective Relays, Grounding & IE Safety Regulations: Relays – Types, construction, characteristics and location in substation, IR rules, safety Regulations.
- Distribution System Protection: Steady State Fault Analysis (SSFA). Voltage calculation at fault locations, Overvoltage protection, Principles of lightning protection.
- Distribution Automation, Distributed Generation & Integration
- Simulator Training at PSTI, Bengaluru, RT lab/ HV lab/ DTS lab.
- Rural Electrification & Smart Grids.

3.3.3 Live Line Maintenance Techniques (LLMT), Using Hot Stick Method (HSM)**Program Profile**

- General Principles of LLMT.
- Introduction to maintenance of Power lines using Hot Stick Method.
- Practical oriented Operation covering various tower configurations.
- Safety aspects and Regulatory requirements.
- Study Tours to Certain Important substations and transmission line locations.
- Hands on training on commercial lines of various configurations up to 220 kV.
- Field testing of insulators - use of analogue and digital methods, demo on the use of Punctured Insulators - use of analogue and digital methods, demo on the use of Punctured Insulator Detector (PID) test kit.
- Introduction to maintenance using Bare Hand Method of Live Line Maintenance and switchyard maintenance using LLMT.

3.3.4 Live Line Maintenance Techniques (LLMT) using Bare Hand Method (BHM) on 400 kV Lines**Program Profile**

- Brief revision on LLMT using HSM.
- Introduction to maintenance of Power Lines using Bare Hand Techniques.
- Additional Safety aspects and requirements.
- Practical Oriented Operation Covering various tower configurations.
- Hands-on training on 400 kV commercial lines of various configurations.
- Field training on testing of Insulators.
- Introduction to switchyard maintenance using LLMT.
- Study Tours to certain important substations and transmission line locations, if time permits. Major time will be devoted to impart training in the field on 400 kV transmission lines as well as on commercial lines of POWERGRID Corporation of India dealing with practical aspects.

3.3.5 Post Graduate Certificate Course in Power Plant Engineering**Program Profile**

- General Introduction: Concept of Modern Thermal Power Plant, Location /Site Selection, Plant layout & Power Plant Safety.
- Constructional details and basic principles of large pulverized fuel Boiler and auxiliaries.
- Construction and working principles of Turbine and auxiliaries.
- Various types of Valves and Pumps.
- Construction and working principles of Alternators and Excitation Systems, Transformers, Motors, Switchgears, Power Supply System and Switchyard.
- Tariff Calculation.
- Tariff Based Bidding , Concept of UMPPs.
- Fuel Handling Plant, Ash Handling System and Cooling Water System.
- Water Sources and treatment.
- Operation, control and supervision of Boiler, Turbine and Alternator.
- Instrumentation & Control (including DAS & DDC) and Protection system.

- Power Plant Maintenance practices.
- Scheme Tracing/ Plant Visits.
- Simulator Training.

3.3.6 Post Graduate Certificate Course (PGCC) in E-Mobility and Smart Utilities

Program Profile

- General Introduction: - Evolution of Indian Power sector & Indian Electricity Act & Regulation.
- Various types of Power Generation (Hydro, Thermal, Nuclear & RE Sources).
- Basics of Power System, Traditional Grid and Micro Grid, Generation, Transmission & Distribution Challenges in India.
- Introduction to Smart Grids
- Advanced Meter Interface (AMI) - Overview, Smart Meters, DCUs, HES, MDM, Inter-operability, Standards, Protocols.
- ICT & Cyber Security and Smart Grid Security, IoT.
- Load Forecasting, Demand Side Management DER/DR/SCADA/EMS, WAMS.
- Power Electronics, Reactive Power Management & Outage Management, PMU, Project, Procurement, Contract & its Financial Management.
- GIS & Assets Management
- Understand Mobility and its evolutions, Electric Mobility and Environmental Impact Reduction, Economic Analysis, Electric Mobility and Infrastructures: Technical and Economic Dimensions.
- International Standards for EVs and their impact on EV deployment, EV System architecture and concepts, EV Drives and Controllers.
- Energy Storage Systems and New Batteries Technologies, Potentials and Forecasts, EV Charging Systems(V2G and G2V)
- Power grid and renewable energy resources interfacing for EV Development
- Smart Cities & its Pilot projects in India, Innovative Solutions For Smart Cities, Smart Transportation.
- Laboratory Session, Simulator, Plant Visit and On-Job Training.
- Project Works followed by end examinations.

3.3.7 Certificate Course for Hydro Power Plant Engineers and Supervisors

Program Profile

- Safety & First aid, General Introduction of Hydro Power Plant.
- Power Plant Familiarization of Hydro Power Plant Engineering.
- Construction details of Hydro Power Plant components : Generators, Turbine, Valves, Excitation System, Governing System etc.
- Switchgears, protection in HE station.
- Power Plant Operation and function of Load Dispatch Centre.
- Maintenance of Hydro Power Plant Equipment.
- Hydro Power Plant Simulator Training.
- Plant Operational Training at Hydro Power Plant (On-job).
- Plant maintenance Training at Hydro Power Plant (On-job).
- Final assessment & Evaluation.

3.3.8 Specialized Training on O&M of Hydro Power Plant

Program Profile

- Concept of modern hydro power station, site selection, Components, layout.
- Hydraulic system, reservoir, storage capacity, dams and Barrages, intake, surge tank, power tunnels/channel, fore Bay and penstocks, pressure shaft, surge shaft, tail race and tail race tunnel/channel, protection against water hammer And negative pressure in penstocks and suction head, Dewatering of water conductor systems.
- O&M of Hydro Power Plant components; Generator, Turbine, Valve, Excitation system, Governing systems etc.
- Hydro Power Plant Simulator Training.
- Plant visits at Hydro Power Plant sites

3.3.9 Distribution Engineering

Program Profile

- Distribution Engineering: Growth, Developments, Equipment, Standards specification, construction. Practice and guidelines, design aspects-testing and installation of Distribution equipment-Lay out of Sub-Station.
- Safety, Protection, DSM and energy Audit/Metering: Safety Aspects, I.E. Rules and Regulation, Compliance, First Aid, Fire Safety.
- Energy Audit and DSM application in Distribution / Engineering: Energy Audit - need, Objective and Methodology, types, application & techniques, DSM - Methodology and Techniques, Loss reduction - Voltage control, VAR control, Reactive Power Compensation.
- Metering: Metering techniques, various types - LT meters and its application, Installation Testing and Commissioning of LT meters, defects and remedies - HT metering techniques.
- Billing, Power System Study, Distribution Planning Trends and Development: Billing system, Computer application in billing system, Distribution planning, Optimization of capacity and location of Distribution Transformers.

3.3.10 Control & Instrumentation for Supervisors/Technicians

Program Profile

- Concept of instrumentation in Thermal Power Station.
- Instrumentation layout.
- Basic Science, Basic electricity and Basic Electronics.
- Pressure, Level, Low and Temperature measurement.
- Air supplies, pneumatic Instruments and drives.
- Telemetry.
- Introduction to Automatic Control System.
- DAS/DDC.
- Turbovisory instruments and Analytical Instruments.
- Practicals/Demonstrations.

3.3.11 Training Program for Supervisor/ Managerial Person Deployed in Power Industry

Program Profile

- Personality Development: Skills, Attitudinal Development, Leadership, Team Building, Value & Ethics.
- Business Communication skills, Negotiation.
- Man Power Planning (MPP).
- Quality of work Life (QWL).

- Career Planning & Quality Circles.
- Financial Management & Overview.
- Performance Appraisal.
- Man Power Audit.
- Human Resource Development.
- Case Studies.

3.3.12 New and Renewable Sources and Grid Integration in India

Program Profile

- Energy Sector Reforms, Regulations Environment and RE.
- Wind Energy Systems.
- Solar thermal power systems.
- Direct energy Conversion – Solar Photovoltaic, Fuel Cells.
- Waste to Energy.
- Solar passive Architecture.
- Biomass Energy Systems.
- Bio-Fuels
- RE and Grids Integration
- Economic Viability
- Case studies

3.3.13 Executive Development Program for the Supervisory Staff Working in Finance & Accounts Department

Program Profile

- Status & Responsibilities of Financial Executives: Development of Managerial Skills.
- Personality Development, Business Communication Skills, Negotiation Skills, Leadership, Team Building, Values & Ethics etc.
- Financial Management & Planning.
- Computer Awareness for finance personnel.
- Capital Budgeting, Costing & decisions.
- Operating & Financial Leverage Analysis.
- Dividend issues, policy & Decisions.
- Budgeting & Accounting.
- Foreign Exchange, Taxation Rules & Regulations.
- Financial Performance Evaluation & Risk Management.

- Cash Flow Management.

3.3.14 3 - Month Skill Development Program on “Thermal Power Plant Operation”

Program Profile

- General Introduction: - Concept of Modern Thermal Power Plant, Location /SiteSelection, Plant layout & Power Plant Safety.
- Constructional details and basic principles of large pulverized fuel Boiler and auxiliaries.
- Construction and working principles of Turbine and auxiliaries.
- Various types of Valves and Pumps.
- Construction and working principles of Alternators and Excitation Systems, Transformers, Motors, Switchboards, Power Supply System and Switchboard.
- Fuel Handling Plant, Ash Handling System and Cooling Water System.
- Water Sources and treatment.
- Operation, control and supervision of Boiler, Turbine and Alternator.
- Instrumentation & Control (including DAS & DDC) and Protection system. (Introduction)
- Power Plant Maintenance practices.
- Plant Visits.

3.3.15 MNRE sponsored Solar PV Installer “Suryamitra” for Diploma/ITI Holder

Program Profile

- Carry out the Site survey for installation of Solar PV system
- Assess the customer's Solar PV requirement.
- Procure the Solar PV system component
- Identify and Use the Tools and tackles used for Solar PV system installation
- Install the Civil/Mechanical and Electrical components of a Solar PV system
- Test and Comission Solar PV system
- Maintain Solar PV system
- Maintain personal Health & Safety at project site



Inauguration of 8-Weeks Training Programme on O&M of TPP-UPL Meja Batch at NPTI Badarpur

3.4 SHORT TERM TRAINING COURSES (1 DAY TO 4 WEEKS)

A. List of Short-Term Training Programs along with Locations and Date of commencement

Objective

The short term training programs are customized/ need based programs, specifically designed for working professional as well as induction level trainees. These programs provide and/or upgrade specific skills and knowledge required to enhanced performance of expected duties and responsibilities in a very short time span. Short term training programs are refreshers programs of durations 1 day to 4-weeks. These programs are benefiting the working professionals in the sector by upgrading themselves with the latest technological advancement in the sector in very short duration.

S. No.	Name of Course	Institute	Duration	Date of Commencement	Program Profile/Content Page No.
I. POWER GENERATION AND ITS ANCILLARY EQUIPMENTS					
1.	An Overview of Supercritical Technology	Durgapur	03 Days	13.09.2021	36
		Shivpuri	03 Days	08.09.2021	
2.	Advanced O&M Practices of Supercritical Thermal Power Plant	Nangal	01 Week	19.04.2021 25.10.2021	36
3.	Issues Related to Supercritical Technology	Faridabad	02 Days	24.01.2022	36
		Nevyeli	02 Days	20.01.2022	
4.	Flexible Operation of Thermal Power Plants in India	Faridabad	03 Days	16.06.2021	36
		Durgapur	03 Days	14.06.2012	
5.	Thermal Power Station Operation	Faridabad	01 Week	25.10.2021	36
		Badarpur	01 Week	17.05.2021	
		Nevyeli	03 Days	10.05.2021, 28.03.2022	
		Nagpur	04 Days	06.09.2021	
		Shivpuri	03 Days	24.11.2021	
6.	Boiler Operation/ Boiler & Its Auxiliaries Operation	Badarpur	01 Week	22.11.2021	36
		Nevyeli	01 Week	20.09.2021, 27.12.2021	
		Durgapur	01 Week	20.09.2021	
		Nagpur	04 Days	18.05.2021	
		Shivpuri	04 Days	04.05.2021	
7.	Boiler Firing System & Equipments	Nevyeli	03 Days	07.07.2021	36
		Shivpuri	03 Days	07.07.2021	
8.	Boiler Efficiency	Durgapur	02 Days	22.07.2021	37
		Shivpuri	02 Days	22.07.2021	
9.	Renovation & Modernization of Thermal Power Plant/ Station	Faridabad	01 Week	06.12.2021	37
10.	Steam Turbine & Its Aux. Operation	Badarpur	01 Week	17.01.2022	37
		Nevyeli	01 Week	08.11.2021	
			03 Days	14.02.2022	
		Durgapur	01 Week	29.11.2021	
		Nagpur	04 Days	15.03.2022	
		Shivpuri	01 Week	31.05.2021	
11.	Steam Turbine Governing	Faridabad	03 Days	28.07.2021	37
		Durgapur	03 Days	14.07.2021	
		Shivpuri	03 Days	26.04.2021	
12.	Generator & Auxiliaries Including Excitation System	Faridabad	01 Week	23.08.2021	37
		Badarpur	01 Week	06.12.2021	
		Nevyeli	03 Days	01.11.2021	
		Durgapur	03 Days	11.08.2021	
		Nagpur	03 Days	07.07.2021	
		Shivpuri	03 Days	01.12.2021	
13.	Emerging Trends in Excitation System & AVR	Shivpuri	03 Days	09.02.2022	37
14.	Thermal Power Plant Efficiency & Performance Monitoring	Faridabad	03 Days	08.11.2021	37
		Nevyeli	03 Days	04.08.2021, 02.02.2022	
		Durgapur	03 Days	04.08.2021	
		Nagpur	03 Days	23.06.2021	
		Shivpuri	03 Days	01.11.2021	
15.	Large Capacity CFBC Boilers	Nevyeli	03 Days	25.10.2021	38
		Shivpuri	03 Days	21.06.2021	
16.	Regenerative Feed Heating System	Shivpuri	01 Week	17.05.2021	38
17.	Fans & Air Heaters	Nevyeli	03 Days	02.08.2021	38
		Shivpuri	03 Days	01.06.2021	
18.	Electrostatic Precipitator	Nevyeli	03 Days	26.07.2021	38
		Shivpuri	03 Days	07.06.2021	
19.	Valves and Pumps in Power Plant Engineering	Faridabad	03 Days	21.06.2021	38
		Shivpuri	03 Days	14.06.2021	
20.	Operation & Maintenance (O&M) of Coal Mills & Feeders	Nevyeli	03 Days	12.07.2021	38

21.	Vibrational Analysis	Faridabad	03 Days	05.04.2021	38
		Nevyeli	03 Days	11.08.2021	
		Durgapur	03 Days	23.06.2021	
22.	Trouble Shooting of Steam Turbine	Durgapur	03 Days	01.09.2021	38
		Shivpuri	03 Days	01.09.2021	
23.	Reliability Centered Maintenance of Rotary Equipments	Badarpur	01 Week	12.07.2021	39
24.	Non-Destructive Testing & Welding Defects	Badarpur	01 Week	23.08.2021	39
25.	Electrical Motor for Power Plant & its Maintenance	Nevyeli	03 Days	29.11.2021	39
26.	Fan & Air Heaters Maintenance	Badarpur	01 Week	07.06.2021	39
		Shivpuri	01 Week	03.01.2022	
27.	Bearing Maintenance and Shaft Alignment	Badarpur	01 Week	17.05.2021	39
		Nevyeli	03 Days	09.03.2022	
		Nagpur	04 Days	20.12.2021	
		Shivpuri	03 Days	07.03.2022	
28.	Pump Maintenance	Nevyeli	03 Days	09.02.2022	39
		Nagpur	03 Days	23.03.2022	
		Shivpuri	03 Days	10.05.2021	
29.	Selection, O&M and Condition Monitoring of Large Electrical Motors and Generators for Industries and Power Plant Applications	PSTI Bengaluru	03 Days	01.12.2021	39
30.	Condition Based Maintenance Aspect of Electrical Equipment's	Durgapur	03 Days	27.10.2021	40
31.	Valve and Pump Maintenance	Badarpur	01 Week	15.11.2021	40
32.	Pumps Operation, Maintenance and Performance Monitoring	Faridabad	03 Days	11.10.2021	40
		Badarpur	01 Week	13.12.2021	
		Nevyeli	01 Week	19.04.2021	
		Nagpur	03 Days	06.10.2021	
		Shivpuri	03 Days	06.10.2021	
33.	Valve Actuators Maintenance	Nevyeli	03 Days	03.05.2021	40
34.	Valve Maintenance	Nevyeli	03 Days	16.06.2021	40
35.	Boiler Tube Failure and Case Studies	Durgapur	01 Week	26.07.2021	40
		Nevyeli	02 Days	24.05.2021	
36.	Welding Practices	Durgapur	01 Week	23.08.2021	40
37.	Advanced Welding and Testing Technologies	Nevyeli	03 Days	30.06.2021, 06.09.2021, 07.03.2022	41
38.	Condition Based Maintenance for Rotary Equipment	Durgapur	03 Days	06.10.2021	41
39.	Power Plant Chemistry for Operation Engineers	Badarpur	01 Week	06.09.2021	41
		Durgapur	01 Week	12.07.2021	
		Nevyeli	03 Days	21.02.2022	
		Nagpur	04 Days	01.03.2022	
		Shivpuri	03 Days	28.06.2021	
40.	Insulation Audit of Power Plants & Power Industries	Shivpuri	01 Days	31.08.2021	41
41.	Best Practices in O&M of Air Compressor	Nevyeli	02 Days	06.05.2021, 23.08.2021	41
42.	Super Critical Power Plants – Innovations & Case Studies	Alappuzha	03 Days	18.05.2021	41
II. HYDRO POWER AND RENEWABLE ENERGY SYSTEMS					
43.	Small, Mini and Micro Hydro Power Generation	Nangal	03 Days	28.04.2021	42
		Faridabad	03 Days	20.10.2021	
44.	Hydro Turbines, Governing & its Protection Systems	Nangal	03 Days	11.05.2021	42
		Shivpuri	01 Week	10.01.2022	
		Shivpuri	03 Days	06.12.2021	
45.	Hydro Generator & Its Excitation Systems	Nangal	03 Days	21.12.2021	42
		Shivpuri	01 Week	24.01.2022	
46.	Valves & Pumps in Hydro Power Plants	Nangal	03 Days	13.07.2021	42
		Shivpuri	03 Days	14.07.2021	
47.	Auxiliaries in Hydro Power Plants	Nangal	03 Days	15.09.2021, 23.02.2022	42
		Shivpuri	03 Days	11.08.2021	
48.	Hydro Power Plant Operation	Nangal	01 Week	26.07.2021, 11.10.2021, 24.01.2022	42
		Shivpuri	01 Week	07.02.2022	
			03 Days	26.07.2021	
49.	Specialized Training Program on Hydro Power Plant Engineering	Faridabad	03 Weeks	10.05.2021	42
		Nangal	01 Week	17.05.2021, 15.11.2021	

50.	Solar Power Technologies	Durgapur	03 Days	02.03.2022	42
		Neyveli	03 Days	07.06.2021, 23.06.2021, 05.07.2021, 27.10.2021, 13.12.2021	
		Shivpuri	03 Days	14.03.2022	
51.	Entrepreneurship Development Program on Solar PV Rooftop	Faridabad	01 Week	20.09.2021	42
		Shivpuri	01 Week	14.02.2022	
52.	Solar PV (Photovoltaic) System Design and Installation	Neyveli	01 Week	16.08.2021	43
			02 Days	22.04.2021, 03.01.2022, 03.03.2022	
53.	Solar Power Generation Technology - On Grid & Off Grid	Faridabad	02 Days	13.09.2021	43
		Durgapur	02 Days	09.08.2021	
54.	Solar PV Panel - Installation, Maintenance and Testing	Neyveli	01 Week	13.09.2021	43
55.	Hybrid Renewable Energy Systems (HRES)	Faridabad	02 Days	20.12.2021	43
		Neyveli	03 Days	28.07.2021	
56.	Condition monitoring of Hydro Turbine Generator Set	Shivpuri	03 Days	05.04.2021	43
57.	Capability Curve and Reactive Power Control of Hydro Generators	Shivpuri	03 Days	03.05.2021	43
58.	Control and Instrumentation in Hydro Power Plant	Shivpuri	03 Days	16.06.2021	43
59.	Hydrology Studies in Hydro Power Plant	Shivpuri	03 Days	02.08.2021	44
60.	Tunnel and Tunneling Concept in Hydropower Project	Shivpuri	03 Days	27.09.2021	44
61.	Major Civil Structure and its Maintenance in Hydropower Plant	Shivpuri	03 Days	01.12.2021	44
62.	An Overview of Solar Thermal Technology	Shivpuri	03 Days	13.12.2021	44
63.	Solar Photovoltaic Power Plant Integration with Grid and Storage Batteries	Alapuzzaha	03 Days	10.01.2022	44
		PSTI Bengaluru	03 Days	15.11.2021	
64.	Advance O&M techniques in Hydro Power Plants	Nangal	03 Days	10.08.2021 23.11.2021 15.02.2022	44
65.	Best O&M Practices of Hydraulic Gates in Hydro Electric Plant	Nangal	02 Days	16.03.2022	45
66.	Green Energy for Clean Environment/Green Energy Technologies	Faridabad	01 Day	05.07.2021	45
67.	Development of Floating Solar PV System (FSPV) in India	Faridabad	01 Day	17.11.2021	45
68.	Waste to Energy Technology: Green Energy Development	Faridabad	02 Days	15.11.2021	45
		Shivpuri	03 Days	13.09.2021	
69.	Skill Development Program on Renewable Energy	Faridabad	04 Weeks	03.01.2022	45
		Neyveli	01 Week	17.05.2021, 15.11.2021	
III. TRANSMISSION AND DISTRIBUTION SYSTEM					
70.	Power System Studies	PSTI Bengaluru	03 Days	26.04.2021	46
71.	Power System Studies & Load Despatch	Faridabad	03 Days	07.04.2021	46
		Neyveli	03 Days	09.08.2021	
		Nagpur	03 Days	22.09.2021	
72.	Flexible AC Transmission System (FACTS)	Badarpur	01 Week	22.11.2021	46
		Shivpuri	03 Days	10.01.2022	
73.	HVDC Transmission Systems	PSTI Bengaluru	03 Days	15.09.2021	46
		Shivpuri	02 Days	06.09.2021	
74.	Operation & Maintenance (O&M) of Transmission Lines & Sub-Station	Faridabad	01 Week	03.05.2021	46
		Durgapur	01 Week	05.07.2021	
		Shivpuri	01 Week	07.03.2022	
75.	Operation & Maintenance (O&M) of HT/LT Switchgear	Faridabad	01 Week	19.07.2021	46
		Guwahati	01 Week	06.09.2021	
		Shivpuri	01 Week	07.03.2022	
76.	High Voltage Testing of Power System Equipment	PSTI Bengaluru	03 Days	03.01.2022	46
77.	Operation & Maintenance (O&M) HVDC Transmission Systems	Faridabad	01 Week	02.08.2021	46
		Nagpur	01 Week	23.08.2021	
		Shivpuri	01 Week	21.03.2022	
78.	Power System Energy Losses	Neyveli	03 Days	01.09.2021	47

79.	Project Management of EHV Lines & Towers including Sub - Station	Nagpur	01 Week	13.12.2021	47
80.	Distribution Engineering	Guwahati	01 Week	07.03.2022	47
81.	Distribution Automation	PSTI Bengaluru	03 Days	26.07.2021	47
82.	Transformers	Neyveli	03 Days	07.02.2022	47
		Shivpuri	03 Days	10.01.2022	
83.	Condition Monitoring Residual Life Assessment (RLA) & LE of Substation Equipment	Faridabad	03 Days	07.02.2022	47
		PSTI Bengaluru	03 Days	07.02.2022	
		Alapuzzaha	03 Days	13.12.2021	
84.	Substation Planning & Engineering	PSTI Bengaluru	03 Days	13.12.2021	47
85.	Power System Protection	Alapuzzaha	03 Days	15.11.2021	48
		PSTI Bengaluru	02 Weeks	14.06.2021	
		Shivpuri	02 Weeks	07.06.2021	
86.	Advanced Power System Protection	Faridabad	01 Week	14.02.2022	48
		PSTI Bengaluru	01 Week	21.06.2021	
		Shivpuri	01 Week	05.07.2021	
87.	Electrical Protection System	Badarpur	01 Week	10.01.2022	48
		Neyveli	03 Days	14.07.2021, 16.07.2021	
		Durgapur	01 Week	07.06.2021	
		Nagpur	04 Days	14.09.2021	
		Shivpuri	01 Week	12.04.2021	
88.	Relay Maintenance	Neyveli	03 Days	25.08.2021	48
		Shivpuri	03 Days	25.08.2021	
89.	Electrical Protection System - Numerical Relay	Durgapur	02 Days	28.06.2021	48
		Shivpuri	03 Days	13.09.2021	
90.	Protection Philosophy, Interlock and Relays Integration	Durgapur	02 Days	27.05.2021	48
91.	Operation & Maintenance (O&M) of Transformers and Circuit Breakers	Badarpur	01 Week	20.09.2021	48
		Shivpuri	01 Week	04.10.2021	
92.	Operation & Maintenance (O&M) of Distribution System	Nagpur	01 Week	22.11.2021	48
		Shivpuri	01 Week	08.11.2021	
93.	Operation & Maintenance of EHV Sub-Station	Shivpuri	02 Weeks	02.08.2021	49
94.	Transmission & Distribution Equipment Maintenance	Shivpuri	01 Week	06.09.2021	49
95.	Distribution Transformers Failure - Trends in O&M	PSTI Bengaluru	03 Days	19.05.2021	49
		Shivpuri	03 Days	05.04.2021	
96.	Operation & Maintenance (O&M) of Transformer	Guwahati	01 Week	07.02.2022	49
		Shivpuri	01 Week	14.02.2022	
97.	Switchgear Maintenance	Neyveli	02 Days	26.04.2021	49
		Shivpuri	02 Days	22.04.2021	
98.	Transformer Maintenance	Shivpuri	03 Days	21.12.2021	49
99.	Best Practices in Operation & Maintenance (O&M) of Distribution Transformers Leading to Zero Breakdown	PSTI Bengaluru	03 Days	To be announced	50
100.	Operation and Maintenance (O&M) of Sub-Station	Guwahati	01 Week	07.06.2021, 15.11.2021	50
		Nagpur	01 Week	24.01.2022	
101.	O&M, Testing of Power Transformers and HT Circuit Breakers	PSTI Bengaluru	03 Days	20.10.2021	50
102.	Switchgear and Transformer Maintenance	Durgapur	01 Week	26.04.2021	50
103.	Power Quality, Harmonics Mitigation and Reactive Power Management	Alapuzzaha	03 Days	09.08.2021	50
		PSTI Bengaluru	03 Days	30.08.2021	
104.	Power Quality Measurement	Faridabad	03 Days	07.03.2022	50
105.	Emerging Technologies in Reducing AT&C Losses	Durgapur	03 Days	10.05.2021	51
106.	Distribution Network Planning for UG Cable Systems	Faridabad	03 Days	To be announced	51
107.	Power Cables and Jointing Techniques	PSTI Bengaluru	03 Days	02.06.2021	51
		Neyveli	03 Days	20.10.2021	
108.	Distribution Metering	Guwahati	01 Week	17.05.2021	51
109.	Transmission Line Maintenance and Introduction to Live Line Maintenance Techniques	Badarpur	01 Week	21.02.2022	51
110.	Hands - On Training on Power System for Engineering (PSSE)	PSTI Bengaluru	01 Week	09.08.2021	51

111.	Operation and Maintenance (O & M), Testing of Power Transformers	Alapuzzaha	03 Days	13.07.2021	51
112.	Online Internship Training Program on Power Transmission, Distribution & Generation	Alapuzzaha	04 Weeks	01.09.2021	51
113.	Best Practices in Distribution Operation & Management	Faridabad	01 Week	28.02.2022	52
114.	Best O&M practices of Switchgear and Transformers	Nangal	01 Week	07.06.2021	52
IV. HOT LINE TRAINING					
115.	Awareness Programme For Executives in Hot Line Activities	HLTC Bengaluru	01 week	31.05.2021, 27.09.2021 31.01.2022	53
116.	Switchyard Maintenance Techniques using LLMT for Linemen/ Supervisors	HLTC Bengaluru	04 week	28.02.2022	53
117.	Familiarization Program on Cold Lines	HLTC Bengaluru	04 week	21.06.2021	53
118.	Live Line Punctured Insulator Detection (PID) on EHV Lines	HLTC Bengaluru	01 week	26.07.2021, 25.10.2021	53
119.	Live Line Insulator Washing Techniques on EHV Switchyard/Lines at Onside	HLTC Bengaluru	04 Days	To be announced	53
V. CONTROL AND INSTRUMENTATION ENGINEERING					
120.	Power Plant Instrumentation	Durgapur	03 Days	01.12.2021	54
		Nagpur	04 Days	22.02.2022	
121.	Control & Instrumentation (C&I) in Power Station (For Operation Engineers)	Nagpur	03 Days	16.06.2021	54
		Neyveli	03 Days	09.06.2021	
		Shivpuri	03 Days	16.02.2022	
122.	Control & Instrumentation in Power Station	Badarpur	01 Week	04.10.2021	54
123.	Data Acquisition & Distributed Digital Control System in Thermal Power Station	Nagpur	03 Days	16.02.2022	54
124.	Power Plant Auto Control	Neyveli	03 Days	11.10.2021	54
125.	Power System Communication SCADA & EMS	PSTI Bengaluru	03 Days	14.04.2021	54
126.	Intelligent Load Management System	Durgapur	02 Days	20.12.2021	54
127.	Vibration Diagnostics and Fault Analysis	Durgapur	03 Days	15.11.2021	54
128.	PLC & SCADA in Thermal Power Plant	Neyveli	02 Days	27.05.2021	55
		Shivpuri	02 Days	16.09.2021	
129.	Burner Management System/ FSSS	Neyveli	03 Days	20.12.2021	55
VI. DISASTER AND SAFETY MANAGEMENT					
130.	Fire Prevention, Protection & Safety	Faridabad	03 Days	15.12.2021	56
		Nagpur	03 Days	08.12.2021	
		Shivpuri	03 Days	08.12.2021	
131.	Disaster Management, Electrical Safety Procedures and Accident Prevention	Shivpuri	03 Days	12.01.2022	56
132.	Electrical Safety and Inspection of Electrical Installations, Accident, Prevention Recent Trends	Faridabad	03 Days	27.10.2021	56
		Alapuzzaha	02 Days	16.06.2021	
		PSTI Bengaluru	03 Days	20.09.2021	
		Guwahati	01 Week	16.08.2021, 06.12.2021	
133.	Safety in Power Station	Nangal	02 Days	12.10.2021 09.03.2022	56
134.	Operational Safety	Durgapur	02 Days	06.09.2021	56
135.	Electrical & Fire safety for Distribution Utilities	PSTI Bengaluru	03 Days	07.03.2022	56
136.	"Measures Relating to Safety and Electrical Supply"	Faridabad	01 Week	To be announced	57
137.	Industrial Safety	Faridabad	02 Days	16.08.2021	57
138.	Industrial Plant Safety	Shivpuri	03 Days	04.10.2021	57
139.	Electrical Safety in Power Utilities On-line Workshop	Neyveli	02 Days	22.11.2021	57
VII. GRID INTEGRATION, SMART GRID & SMART CITIES, EV AND ENERGY STORAGE SYSTEM					
140.	Renewable Energy & Grid Integration Technologies	Faridabad	03 Days	13.09.2021	58
		Alapuzzaha	03 Days	11.10.2021	
		Nangal	02 Days	16.06.2021, 09.02.2022	

141.	SPV Power Plant - Integration with Grid and Storage Batteries	PSTI Bengaluru	03 Days	15.11.2021	58
		Shivpuri	03 Days	06.12.2021	
142.	Smart Grids and Renewable Energy Integration	Faridabad	01 Day	22.09.2021	58
		Shivpuri	02 Days	09.12.2021	
143.	Role of Smart Grids on the Indian Power Sector: Current Developments, Challenges and way Forward	Badarpur	02 Days	07.02.2022	58
		Shivpuri	02 Days	13.12.2021	
144.	Development of Microgrid (MG) and Macrogrid (MCG) in India	Faridabad	03 Days	28.04.2021	58
		Shivpuri	03 Days	15.12.2021	
145.	Smart Grid and Smart Metering Technologies and Applications	Faridabad	03 Days	19.05.2021	58
		PSTI Bengaluru	03 Days	05.07.2021	
		Shivpuri	03 Days	27.12.2021	
		Alapuzzaha	03 Days	14.03.2022	
146.	Smart Grid for Utility Engineers	Durgapur	02 Days	30.09.2021	58
		Shivpuri	03 Days	21.09.2021	
147.	Smart Power Flow Controller for Smarter Grid Applications	Faridabad	01 Day		59
		PSTI Benagluru	01 Day		
148.	Smart Grids for Smart Cities	Faridabad	03 Days	31.05.2021	59
		Shivpuri	03 Days	28.04.2021	
149.	Battery Maintenance	Neyveli	03 Days	06.10.2021	59
		Shivpuri	03 Days	08.11.2021	
150.	E-Mobility Mission of India: Concepts & Implications	Shivpuri	02 Days	30.12.2021	59
151.	E-Mobility & Charging Infrastructure	Neyveli	03 Days	12.04.2021	59
			02 Days	07.03.2022	
		PSTI Bengaluru	03 Days	16.08.2021	
		Alapuzzaha	02 Days	08.02.2022	
152.	E-Mobility- Concept & Implication	Neyveli	02 Days	19.07.2021	59
153.	Battery Energy Storage & Micro Grids in India	Faridabad	02 Days	12.07.2021	60
		Neyveli	03 Days	06.12.2021	
			02 Days	07.04.2021	
154.	Renewable Energy and Grid Interface Technology & Regulatory Framework	Faridabad	02 Days	06.05.2021	60
155.	Grid Integration of Hybrid Generation: Review of existing Sub-Station Controls required for upcoming RE Mix in Switchyard and handling Intermittency with Grid and Energy Storage options	Faridabad	03 Days	28.09.2021	60
156.	Smart Transmission & Distribution System	Faridabad	01 Week	22.11.2021	60
VIII. IT, ICT, GIS & RS, BIG DATA ANALYTICS AND CYBER SECURITY					
157.	IT General for Utility Engineers	Shivpuri	01 Day	02.08.2022	61
158.	Cyber Security in Power Sector	Faridabad	01 Day	09.08.2021	61
		Shivpuri	03 Days	04.08.2021	
159.	Smart Grid Technologies, Internet of Things and Cyber Security	Faridabad	02 Days	14.07.2021	61
		Shivpuri	02 Days	01.02.2022	
160.	Block Chain Technology.	Neyveli	02 Days	10.06.2021, 22.07.2021, 10.02.2022	61
		Shivpuri	02 Days	29.11.2021	
161.	Internet of Things for Smart Grid Applications.	Neyveli	02 Days	15.04.2021, 16.12.2021 24.02.2021	61
162.	GIS and Remote Sensing Application in Hydropower Project	Shivpuri	03 Days	15.11.2021	61
163.	Internet of Things for Robotics: On-Line Webinar	Neyveli	05 Days	21.03.2022	61
164.	Data Science & Big Data Analysis with industrial orientation (Energy & Utility)	Neyveli	03 Days	28.06.2021, 06.12.2021	61
165.	Cyber Security Issues in Smart Grid System – Online - Webinar	Neyveli	02 Days	31.01.2022	62
166.	Internet of Things for Smart Grid – Online - Workshop	Neyveli	02 Days	27.01.2022	62
167.	Data Sciences & Big Data Analytics	Neyveli	03 Days	06.12.2021	62
IX. ENERGY EFFICIENCY, ENERGY AUDIT AND DEMAND SIDE MANAGEMENT					
168.	Energy Efficiency Management in Power System	Durgapur	03 Days	27.09.2021	63

169.	Energy Audit and Loss Reduction in T&D Systems	Faridabad	02 Days	12.08.2021	63
		PSTI Bengaluru	03 Days	07.06.2021	
		Shivpuri	02 Days	03.01.2022	
170.	Energy Efficiency in Electrical Utilities	Faridabad	03 Days	07.07.2021	63
		PSTI Bengaluru	03 Days	21.02.2022	
171.	Energy Conservation and Energy Audit (For Generation Sector)	Neyveli	03 Days	10.03.2022	63
		Guwahati	03 Days	12.07.2021	
		Nagpur	03 Days	16.11.2021	
		PSTI Bengaluru	03 Days	10.05.2021	
		Alapuzzaha	02 Days	08.04.2021	
		Shivpuri	03 Days	02.03.2022	
172.	Energy Audit & Demand Side Management in Power Utilities	Neyveli	03 Days	04.10.2021	63
		Shivpuri	03 Days	11.10.2021	
173.	Big Data Analytics & Data Science Training covering descriptive, prescriptive & predictive analytics hands-on case studies with Industrial orientation (Energy & Utility)	Faridabad	01 Week	28.06.2021	63
		Neyveli	03 Days	28.06.2021, 06.12.2021	
		Shivpuri	03 Days	03.05.2021	
174.	Energy Conservation and Energy Audit in Power Utilities	Neyveli	05 Days	14.03.2022	64
175.	Accelerating Energy Efficiency in India: Initiatives & Opportunities	Faridabad	02 Days	26.04.2021	64
176.	Efficient Energy Management	Faridabad	01 Day	25.06.2021	64
X. POWER MANAGEMENT AND MANAGEMENT DEVELOPMENT PROGRAMS					
177.	Regulatory Framework in Power Sector	Faridabad	02 Days	21.02.2022	65
		Durgapur	02 Days	06.01.2022	
		Shivpuri	03 Days	02.02.2022	
178.	Open Access, Power Trading and Tariffs - ABT Scenario	Faridabad	03 Days	03.03.2022	65
		PSTI Bengaluru	03 Days	12.07.2021	
179.	Management of Renewable Energy (Solar Energy in Particular); Finance and Economics of Renewable Energy	Faridabad	02 Weeks	21.02.2022	65
		Guwahati	02 Weeks	13.09.2021	
180.	Finance for Non-Finance Executives	Durgapur	02 Days	17.08.2021	65
181.	Contract Management	Faridabad	02 Days	24.05.2021	65
		Durgapur	02 Days	05.05.2021	
182.	Behavioral Science	Durgapur	02 Days	20.01.2021	65
		Shivpuri	02 Days	10.06.2021	
183.	Maintenance Planning & Cost Control	Shivpuri	03 Days	20.12.2021	65
184.	Electricity Act and Regulation	Nangal	03 Days	19.01.2022	66
185.	Government e-Marketplace (GeM) and General Financial Rules (GFR) 2017	Shivpuri	01 Week	04.10.2021	66
186.	Government e-Marketplace (GeM) for Sellers & Service Providers	Faridabad	02 Days	04.10.2021	66
187.	Procurement Procedures & Contracting	Faridabad	03 Days	06.01.2022	66
188.	Regulatory Issues in Power Sector	Faridabad	05 Days	07.03.2022	66
		Shivpuri	03 Days	02.02.2022	
189.	Leadership Skills and Stress Management	Faridabad	02 Days	07.06.2021	66
190.	Human Resource Development Program for Finance Officer/ Manager	Faridabad	01 Week	10.01.2022	67
XI. ENVIRONMENTAL MANAGEMENT					
191.	Environmental Issues in Thermal Power Stations and FGD Technology	Faridabad	02 Days	17.01.2022	68
		Durgapur	02 Days	16.12.2021	
		Shivpuri	02 Days	11.10.2021	
192.	Environmental Pollution & Pollution Control Related to Power Plants Engineering	Badarpur	01 Week	19.07.2021	68
		Nagpur	03 Days	09.03.2022	
193.	Air Pollution Monitoring & Control Technologies	Faridabad	02 Days	16.09.2021	68
		Neyveli	02 Days	05.04.2021, 14.06.2021, 24.01.2022	
194.	Environmental Impact Assessment and Environment Management Plan	Faridabad	03 Days	31.01.2022	68

XII. OTHER TRAINING PROGRAMS AS PER THE REQUIREMENT OF CLIENT ON MUTUALLY AGREED BASIS					
195.	Maintenance & Protection of Transformers	Durgapur	02 Days	Mutually Agreed Basis	68
196.	Emergency Operation of TPS and Power Plant Safety	Durgapur	02 Days	Mutually Agreed Basis	68
197.	Zero Accident Mindset to Protect Personnel Environment and Equipment	Durgapur	02 Days	Mutually Agreed Basis	68
198.	Potential Hazards in Power Plant	Durgapur	02 Days	Mutually Agreed Basis	68
199.	Safe Handling Procedures in Mechanical/Electrical (Rotary and Static)	Durgapur	02 Days	Mutually Agreed Basis	68
200.	Fire Hazards in Power Plant	Durgapur	02 Days	Mutually Agreed Basis	68

B. Details of Program Profile/ Content

I. POWER GENERATION AND ITS ANCILLARY EQUIPMENTS

3.4.1 An Overview of Supercritical Technology

Program Profile

- General Aspects of Supercritical Technology: History of the Supercritical Technology.
- Difference between Current Trends and Supercritical Technology, Parameters and Design Variations, Efficiency and Environmental Aspects.
- Process Know-How: Constructional Features and Pressure Part
- Arrangements, Steam and Water Flow Circuit.
- Boiler Circulation System, Boiler Tube Material and Boiler Water Chemistry and its Treatment.
- Operational Aspects: Protection, Interlocks and Control, Safe Light Up and Shut Down, Part Load Operations.

Who may attend : Working Engineers of Thermal Power Stations with 2-3 years experience.

3.4.2 Advanced O&M Practice of Supercritical Thermal Power Plant

Program Profile

- Flexible condition and operation practices.
- Pre-checks of plants equipment's.
- Plant Operation and unit stabilization.
- Critical parameter monitoring.
- Data Analogy and unit equipment health monitoring.
- Emergencies and critical operation conditions in plant.

Who may attend : Professionals from Power Sector, Engineers, Academicians, Equipment manufacturers, Researchers, Engineering, Managers.

3.4.3 Issues Related to Supercritical Technology

Program Profile

- Introduction to supercritical technology, advantages - World scenario in super critical technology.
- Arrangement of super critical boilers.
- Comparison between spiral water wall circulating and vertical tubing.
- Special alloys for super critical boilers and welding techniques.

Who may attend : Engineers working in Power Stations.

3.4.4 Flexible Operation of Thermal Power Plants in India

Program Profile

- Operational dynamics of thermal power plants.
- Design & Operational challenges in thermal power plants.
- Fuel characteristics viability for flexible operation in India.
- Plant load variability for sustainability of flexible operation.
- Recent advancement for flexible operation in supercritical and ultra-supercritical plants.

Who may attend : Professionals from Power Sector, Engineers, Academicians, Equipment manufacturers, Researchers, Engineering, Managers.

3.4.5 Thermal Power Station Operation

Program Profile

- Power Station Schemes.
- Boiler and Turbine controls.
- Excitation systems and AVR.
- Cold, Warm and hot start-ups.
- Steam Turbine governing and protection systems, trouble shooting.
- Boiler, Turbine, Generator and Integrated unit operation under normal and emergency conditions.
- Unit shut down procedures and safety.
- Performance monitoring.
- Duties and responsibilities of operation engineers.

Who may attend : Engineers having 1-2 years experience in Thermal Power Stations.

3.4.6 Boiler Operation/ Boiler & Its Auxiliaries Operation

Program Profile

- Working principle, function and classification of Boilers.
- Description of Boiler components.
- Function and working principle of Boilers Auxiliaries- Mills & Feeders, fan, Air pre-heaters, soot blowers, etc.

Who may attend : Engineers having 1-2 years experience in Thermal Power Stations.

3.4.7 Boiler Firing System & Equipments

Program Profile

- Combustion of Fuels.

- Different firing systems – tangential firing, wall firing and down shot firing- their requirements and applications Igniters.
- Oil atomizers.
- Coal Burners.
- Burner Management system.
- Direct Ignition of Pulverized Coal.
- Operation Procedure, Maintenance.
- Trouble Shooting in firing system components.

Who may attend : Operation & Maintenance engineers of Thermal Power Station with 4-5 years experience.

3.4.8 Boiler Efficiency

Program Profile

- Different aspects of Efficiency measurements and measurement procedures.
- Boiler tuning for load ramping and condition of boiler Efficiency at various loading.
- ASME PTC 4.0 salient features of boiler performance checks.
- Case studies to improve boiler performance parameters.

Who may attend: Efficiency & Operation Engineers, system performance Managers, who are having prior knowledge of various tools and technical measurement system for boiler performance / operation / commissioning. This is an executive (Technical) program aimed for professional power engineers.

3.4.9 Renovation & Modernization of Thermal Power Plant/Station

Program Profile

- Norms for renovation & Thermal Power Station & Funds allocation.
- Scope of renovation & area of renovation.
- Renewal life Assessment Techniques for Turbine, Boilers and generator.
- Life extension studies and techniques for Thermal Power Station auxiliary.
- Stress Analysis and data interpretation.
- Case Studies.

Who may attend: Middle Level Managers/ Working Engineers with 2 to 3 years experience.

3.4.10 Steam Turbine & Its Aux. Operation

Program Profile

- Constructional features of turbine, turbine auxiliaries like condenser, pumps, feed heaters etc.
- Operational procedure of associated systems such as condensate, feed, lube oil, CW etc. On line cleaning system, Operation of boiler feed pump and condensate extraction pump.
- Interlock protection of turbine and its auxiliaries.
- Starting and shutting down of turbine.
- Operation of turbine under normal and emergency conditions.
- Emergencies & case studies.

Who may attend: Engineers with 3-4 years experience in Thermal Power Station.

3.4.11 Steam Turbine Governing

Program Profile

- Introduction to Governing System, Concept of Nozzle Control and Throttle Control.
- Hydrodynamic Governing of LMW Turbine, Speed Governor and Follow Up Piston.
- Governing Oil System, Load cum Speed Governor.
- Summation Pilot Valve, Intermediate Pilot Valve and Servomotor of Nozzle.
- Control Valves, Protection of LMW Governing System
- EHG and MHG of KWU Governing System.
- Concept of Minimum Gate Principle and Electro-Hydraulic Converter and Hydro-Hydraulic Converter.
- Application of Different Governing Oils of KWU System.
- Follow Up Piston and Development of Secondary Sensitive Oil and its Application.
- Protection System of KWU Governing System and its Application on Different Modes of Start Up.
- Application of Governing System in Accordance with HP/LP Bypass System.
- Concept of Digital Electro-Hydraulic (DEH) Governing System of Chinese Units.
- Application of High Pressure Governing Oil in DEH System.

Who may attend: Working Engineers of Thermal Power Stations.

3.4.12 Generator & Auxiliaries Including Excitation System

Program Profile

- Generator construction and design aspects.
- Generator characteristics, synchronization & parallel operation
- Generator protection.
- Excitation & AVR-various types and their selection aspects.
- Problems faced.
- Case studies.

Who may attend: Engineers with 2-3 years experience in erection, commissioning operation and maintenance of generator system.

3.4.13 Emerging Trends in Excitation System & AVR

Program Profile

- Excitation System - Introduction, Types, Selection and Salient Features.
- Static Excitation System – Construction, operational Features and Case Studies.
- Brushless Excitation System – Description, operational Features and Case Studies Developments in AVR and Limiters.

Who may attend: Engineers with 2-3 years experience in erection, commissioning operation and maintenance of generator system.

3.4.14 Thermal Power Plant Efficiency & Performance Monitoring

Program Profile

- Steam cycle theory and optimization.
- To identify and record the factors and data needed for monitoring efficiency and performance.
- Analysis of the performance of different systems and equipments like station heatbalance, mill performance,

condenser performance, feed heaters performance, boiler efficiency, turbine efficiency etc.

- Correlation among different systems and their effect on performance.
- Application of computer for performance calculation and analysis.
- Improvement of plant availability through efficiency and performance monitoring.
- Plant on-job/practicals.

Who may attend : Power Station Engineers having 2-3 years experience in operation and maintenance.

3.4.15 Large Capacity CFBC Boilers

Program Profile

- Introduction to CFBC Technology Advantages, Scope, Fuel flexibility, etc.
- Description of various components of CFBC Boiler.
- Environmental benefits.
- Limitations, major concerns in the O&M of CFBC Boilers.
- Visit to CFBC Boilers.

Who may attend : Engineers working in Power Stations.

3.4.16 Regenerative Feed Heating System

Program Profile

- Different types of heater – H.P. & L.P.
- Theory of heating, construction of HP & LP heaters.
- System of steam extraction.
- layout of system – various considerations.
- Operation of the individual components.
- Cutting in and cutting out procedures of heaters.
- Performance monitoring of heaters and identification in the system.
- Various interlocks and protections and Automatic systems.

Who may attend : Operators working in Thermal Power Station with 3-4 years experience.

3.4.17 Fans & Air Heaters

Program Profile

- Fans: Different types of fans and their applications, engineering, design and selection criteria.
- Construction details and components description for different types of fans.
- Fan operation techniques in series/ parallel conditions.
- Fan characteristics and performance monitoring.
- Condition Monitoring: Vibration measurement, rubbing sound measurement and other diagnostic studies.
- Fan maintenance procedures and practices.
- Air Heater: Different types, their design construction and selection aspects etc.
- Alignment & Adjustment Techniques of seals.
- Lubrication.
- Problems-Case studies and analysis.

Who may attend : Engineers with 1-2 years of experience in O&M of Boilers/ auxiliaries in a Thermal Power Station/ Industry.

3.4.18 Electrostatic Precipitator

Program Profile

- General discussion on pollution.
- Types of ESP & selection aspects.

- Principles of construction & functioning of ESP.
- Corona and Ionization.
- Description of Dust precipitator.
- Installation, Operation and Maintenance of ESP.
- Mechanical Parts Maintenance.
- Electrical control circuit maintenance and checking.
- Efficiency and performance of ESPs and Factors affecting the performance.

Who may attend : Engineers engaged in operation and maintenance of power station & process industry with 2-3 years experience.

3.4.19 Valves & Pumps in Power Plants Engineering

Program Profile

- Description of different types of Pumps and their construction, Selection & Operational aspect.

Who may attend : Operators/Technicians working in Thermal Power Plant.

3.4.20 Operation & Maintenance (O&M) of Coal Mills & Feeders

Program Profile

- Description of different types of Mills & Milling system components such as Raw Coal Feeders, Classifiers and variators etc. their design, construction and selection aspects.
- Description of Coal grinding Principles and grinding elements.
- Frequently eroding parts and eroding characteristics analysis.
- Proper maintenance techniques and replacement procedures of eroding parts.
- Driving Mechanisms and their maintenance procedures.
- Lubrication and sealing system.
- Maintenance planning for Milling system.
- Routine Maintenance and Breakdown Maintenance of Milling Plant.
- Overhauling of Milling Plant.
- Preventive measures for stopping erosion of Pulverized Coal lines bends and their proper alignment.

Who may attend : Engineers with 2-3 years experience in Operation and Maintenance in a Power Station.

3.4.21 Vibrational Analysis

Program Profile

- Introduction to Machinery vibration.
- Basic machinery vibrations.
- Machine vibration analysis.
- Balancing of rotating machinery & Alignment technologies.
- Advanced vibration analysis.
- Advanced vibration control.
- Practical rotor dynamics & modelling.
- Vibration measurement.

Who may attend : Engineers/ Research Scholars.

3.4.22 Trouble Shooting of Steam Turbine

Program Profile

- Details of Steam Turbine, bearing and its Lubrication.
- Turbine dynamics and vibration theory.
- Causes of Vibration in Turbine and Case Studies.

- Measurement and interpretation of vibration signatures.
- Condition Monitoring and Performance Monitoring.
- Types of turbine Failure and its remedy.

Who may attend : Engineers from SEBs/Power Utilities/corporations with 2-3 years of experience.

3.4.23 Reliability Centered Maintenance of Rotary Equipments

Program Profile

- Introduction to Reliability Centered Maintenance (RCM); steps and benefits of RCM.
- First approach to RCM-Functions, failure and significant of Rotary equipments, consequences of failure as per RCM.
- Reliability centered maintenance tasks for Rotary equipments.
- Condition monitoring of rotary equipments-as an important role for RCM.
- Description of condition monitoring equipments.
- Description of vibration and signature analysis.
- RCM recording systems and documentation system.
- Preventive maintenance techniques of pumps, fans, turbine and other rotary equipments.
- Overhauling job schedule for the above mentioned equipments.
- Trouble shooting and failure diagnosis of rotary equipments.
- Bearings, Lubrication and tribology.
- Balancing and Alignment of rotary equipments.

Who may attend : Experienced Engineers working in Power Plants, Utility Industries and other Industries.

3.4.24 Non-Destructive Testing & Welding Defects

Program Profile

- Introduction to Non Destructive Testing Procedures.
- Welding defects and associated Non Destructive Testing Methods.
- Types of material defects.
- Various NDT Techniques and their Applications.
- Dye Penetrant Test.
- Magnetic Participle Test.
- Ultrasonic NDT Methods.
- Ultrasonic Flaw Detectors.
- Eddy Currents Non Destructive Testing.
- Radiography & Test Applications.
- Applicable ASTM Standards.
- Various Types of weldings Defects & Preparation of Welding Procedures in various positions as per AWS.

Who may attend : Engineers/Supervisors with one or two years relevant experience may attend.

3.4.25 Electrical Motor for Power Plant & its Maintenance

Program Profile

- Theory of different types of motors.
- Constructional details of different types of motors.
- Terminal connections and terminal box.
- Mounting/Enclosures, insulation material used in motors.
- Stripping down seven inspections of motors.
- Cleaning and inspection.
- Bearings used in motors.
- Assembling, testing and commissioning.
- Problems of motor-case studies.

Who may attend : Maintenance technicians with 2-3 years experience with basic knowledge of electricity upto ITI Standard.

3.4.26 Fan & Air Heaters Maintenance

Program Profile

- Classification of Fans and Air heaters and their applications in thermal power stations.
- Constructional details, operation and maintenance techniques of different Fans & Air Heaters.
- Causes of erosion, corrosion, vibration and their remedies. Load regulating system of Fans.
- Problems of Fan & Air heaters – Case Studies.

Who may attend : Technicians working in power station with 2-3 years experience.

3.4.27 Bearing Maintenance and Shaft Alignment

Program Profile

- Classification of Bearings.
- Inspection of Bearings.
- Bearing materials.
- Friction and its effect on bearing performance.
- Top side gaps adjustments of sleeve/ bearings/ journal grooving on plain bearings, scrapping of journal bearings selection of bearing lubrications and their purification.
- Handling and Storage of bearings.
- Care and maintenance of plain bearings, Anti friction bearings.
- Types of coupling and their uses.

Who may attend : Maintenance technicians with 2-3 years experience in the relevant field.

3.4.28 Pump Maintenance

Program Profile

- Description of different types of pumps, their construction, operation and applications.
- Single stage horizontal.
- Double stage vertical, Multi stage horizontal.
- Gear pump: Description of associated parts (fixed and movable)
- To acquaint the trainees with essential maintenance procedures like: Gland packing.
- Bearing removal and inspection, coupling design.
- Clearance and renovation of wear-rings impellers.
- Correct use of tools.
- Inspection of parts for wear and tear.
- Inspection of parts for wear and tear.
- Use of measuring instruments.
- Producing a joint for replacement.

Who may attend : Maintenance Technicians with 2-3 years experience in the relevant field.

3.4.29 Selection, O&M and Condition Monitoring of Large Electrical Motors and Generators for Industries and Power Plant Applications

Program Profile

- Maintenance-Introduction types scheduling, Testing & Requirements of CBM.
- On line monitoring system of Rotating machines including partial discharge monitoring foe stator windings and Rotor Flux Monitoring system foe Turn shorts and case studies.

- On-line vibration monitoring system and case studies-turbo generator and HT Motors.
- Field Visits

Who may attend : Engineers with 2-3 years experience.

3.4.30 Condition Based Maintenance Aspect of Electrical Equipments

Program Profile

- Maintenance: Introduction, Types, Scheduling, Testing and Requirement of CBM.
- Online monitoring system of Rotating Machines including Partial Discharge Monitoring for Stator Windings and Rotor Flux Monitoring System for Turn Shorts and Case studies.
- On Line Vibration Monitoring System and Case Studies: Turbo Generator & HT Motors.

Who may attend : Engineers with 2-3 years experience.

3.4.31 Valve and Pump Maintenance

Program Profile

- Description of different types of valves, their construction, operation and applications.
- Correct use to tools, Dismantling.
- Identifying the types of valves.
- Replacement of worn out or damaged parts.
- Description of different types of pumps, their construction, operation and applications.
- Single stage and multi stage centrifugal pump.
- Maintenance of BFP & CEP.
- Trouble Shooting.

Who may attend : Engineers from SEBs/Power Utilities/corporations with 2-3 years of experience in relevant field of power station.

3.4.32 Pumps Operation, Maintenance and Performance Monitoring

Program Profile

- Different types of pumps, their application & selection criteria for Power Station.
- Theory & working principles of different type of Pumps.
- Design & selection aspects and construction of boiler feed pump.
- CW Pumps.
- Special aspects of positive displacement Pumps.
- Components material selection for pumps installation & commissioning.
- Operation & trouble shooting.
- Maintenance Aspects.
- Pump Characteristics on series/parallel operation.
- Performance assessments techniques & Monitoring Case Studies.

Who may attend : Engineers of Power Plant & Industry.

3.4.33 Valve Actuators Maintenance

Program Profile

- Different types of actuators and their selection.
- Description and working of: Electric, Pneumatic and Hydraulic Actuators.
- Maintenance of seals.
- Gears and Levers.
- Setting and checking of actuators.
- Limit switches and torque switches.
- Actuator control equipment including position control.

- Feed back circuits and thyristors.

Who may attend : Power station technicians working in electrical and C&I maintenance sections.

3.4.34 Valve Maintenance

Program Profile

- Description of different types of valves, their construction, operation and applications.
- Correct use of tools, Dismantling.
- Identifying the types of valves.
- Replacement of worn-out or damaged parts.
- Use of correct lapping discs.
- Overhaul and maintenance of cover joints and bonnet joints.
- Correct method of cutting & jointing.
- Overhauling of valves.
- Hydraulic testing of valves.

Who may attend : The course is for technicians with 2-3 years experience in relevant field of Power Station.

3.4.35 Boiler Tube Failure and Case Studies

Program Profile

- Types of Boiler Tube Failure and their classification.
- Causes of different types of tube fails and their analysis.
- Understanding and locating tube failure by operational parameters at running condition.
- Job involvement for physically locating the tube failure at shut down condition.
- Tube failure rectification.
- Control of boiler tube failures.
- Different case studies.

Who may attend : Engineers working in Thermal Power Plant & other industries who deal with boiler (either operation or maintenance or both).

3.4.36 Welding Practices

Program Profile

- Different types of welding and their processes.
- Gas welding – techniques, equipments used, choice of flames, flux & filler metals, gas welding joints.
- Oxy-fuel Gas Cutting-Process, techniques and equipments used.
- Shielded (Coated) Metal Arc Welding (SMAW) techniques machines & equipments used, joints design, classification and proper selection of electrodes.
- High Pressure Welding-TIG welding and its techniques, power sources & equipments used.
- MIG/MAG Welding—Techniques, equipments, accessories, shielding gases, filler rods.
- Welding Techniques for ferrous and nonferrous metals.
- Welding Defects, NDT, Heat Treatments.

Who may attend : Operator working in Thermal Power Station with 3-4 years experience.

3.4.37 Advanced Welding and Testing Technologies

Program Profile

- Introduction to welding and different welding process.
- Need for inspection and testing of welding - Stages of inspection.
- Testing methods for detecting external & internal flaws.
- Types of weld surface defects – its causes and remechal measures.
- Application of NDT and DT Eddy current testing Techniques.
- LPT, MPT, RFI, UT.
- Interpretation & Evaluation of Indicators.
- Test Procedure & Standards.

Who may attend : Engineers/ Managers/ Researcher from Utilities.

3.4.38 Condition Based Maintenance for Rotary Equipments

Program Profile

- Aims and objectives of CBM.
- Various methods adopted for CBM.
- Vibration analysis of rotary equipments.
- Procedure of balancing of rotary equipments.
- Alignment of rotary equipments.
- Case study on balancing and alignment.

Who may attend : Maintenance/Performance Monitoring Engineers with 3-4 years experiences.

3.4.39 Power Plant Chemistry for Operation Engineers

Program Profile

- Corrosion/depositions in Boiler, Steam Turbine condensers and their prevention techniques.
- Acid cleaning of boiler/condensers etc.
- Unit preservation during idle time.
- Characterization of coal for the power plant.
- Optimization of combustion.

Who may attend : Operation Engineers with experience as Shift In-charge Engineers/ Operation Engineer.

3.4.40 Insulation Audit of Power Plants & Power Industries

Program Profile

- Brief Introduction about EA & EC, present power scenario in India
- SWOT analysis of EA in Thermal Power Plant & Process Industries
- Latest technologies, Materials & Procedures
- Economic Analysis w.r.t. reduction in energy losses & saving of money
- Case Study

Who may attend : Working Professionals from Power Sector, Degree/Diploma/Engineering Mechanical Engg., Power Engg., Electrical & Electronics,, Instrumentation and Electronics, Electrical Engg.

3.4.41 Best Practices in O&M of Air Compressor

Program Profile

- Instrument air System – Components – Principle of working – Reciprocating Air compressor- Lubrication & Cooling System
- Performance & Efficiency of Compressor- vLeaks – Control strategy Energy Audit & Energy saving Methods
- Best Practices in operation of Compressor- Start-up & Stop – Loading & Unloading Characteristics
- Best practices in Maintenance of Compressor- Condition Monitoring – Pulsation & Vibration – Case Studies

Who may attend : Supervisors/Technicians /Engineers Working in Utilities/Power Plants with 2- 3 Years' Experience

3.4.42 Super Critical Power Plants – Innovations & Case Studies

Program Profile

- Efficiency improvement in supercritical power plants
- Material development for pressure parts
- Diversification of Alloy material reliability improvements
- Supercritical power plants operation dynamics improvement
- Case studies for reliability improvements
- Case studies for efficiency improvements

Who may attend : Engineering/Diploma Graduates Students/Power Plant Working Professionals (Junior and Middle Level Managers/Executives/officers).



On-Site Training on Advanced O&M Practices in Supercritical Thermal Power Plant for STPL Employees (2nd Batch)

II. HYDRO POWER AND RENEWABLE ENERGY SYSTEMS

3.4.43 Small, Mini and Micro Hydro Power Generation

Program Profile

- General Principles & Theory.
- Introduction of small, mini and hydro power generations.
- Hydrology and estimation of water potential.
- Basic features of hydro Turbines.
- Plant visit.

Who may attend : Engineers working in Hydro Power Plants.

3.4.44 Hydro Turbines, Governing & its Protection Systems

Program Profile

- General Principles and description of different type of governing systems. Speed control devices and wicket gate operation.

Who may attend : Engineers working in Hydro Power plants.

3.4.45 Hydro Generator & Its Excitation Systems

Program Profile

- Constructional details and working principles of Generator and excitation systems. Types of Excitation systems and their components main and iplot exciters, Thyristor, FCB & AVR.

Who may attend : Engineers/Sr. Engineers working in Hydro Power Plant.

3.4.46 Valves & Pumps in Hydro Power Plants

Program Profile

- **Hydro Plant Valves:** Constructional details and features of valves and their types (Butterfly, Spherical, Needle etc).
- **Hydro Plant Pumps:** Constructional details and working principals of various types of pumps used in H.E. stations and their operation & control system.

Who may attend : Working professionals from hydro power station.

3.4.47 Auxiliaries in Hydro Power Plants

Program Profile

- **Electrical Auxillaries:** station lighting and automatic changeover. Station batteries and charging methods. Station emergency lighting arrangements, Elevator/lifts, Ventilation system, EOT cranes and hoists, Compressed air system, Dewatering and drainage system, Communication systems etc.
- **Mechanical Auxillaries:** Oil pressure units, Lubrication principles and their characteristics, HP lubrication system, Braking and jacking system, Central release lubrication system, Carbon dust collection system for slip rings, exciters and brake pads, Cooling water system etc.

Who may attend : Engineers/Shift Engineers/Operators working in hydro power plant.

3.4.48 Hydro Power Plant Operation

Program Profile

- General principals of Hydro machine start and stop procedure and sequence. Operation of modern Hydro power station & features of pumps storage plant. Generator-Synchronizing, loading, parallel operation, active and reactive power sharing and frequency control, operation during emergency conditions. Declared capacity, scheduling & ABT based system UI, CI etc.

Who may attend : Engineers/Shift Engineers/Operators working in Hydro Power Plant.

3.4.49 Specialized Training Programme on Hydro Power Plant Engineering

Program Profile

- Class room session.
- Concept of modern hydro power plant.
- Site selection, components and layout.
- Description of Hydro Power plant components & Operational aspects.
- Plant visits at Hydro Power Plant sites.
- Hydro Power Plant Simulator.

Who may attend : Newly recruited and working engineers & supervisors in hydro power station (Mechanical, Electrical & Instrumentation).

3.4.50 Solar Power Technologies

Program Profile

- Introduction to JNNSM.
- Solar PV.
- Solar Thermal.
- Wind Power.
- Bio-Mass Power.
- Waste to energy.

Who may attend : Engineers with 2-3 years experience.

3.4.51 Entrepreneurship Development Program on Solar PV Rooftop

Program Profile

- Provide basic information on solar PV Rooftop and raise awareness amongst entrepreneurs on the following.
- Concept, design and components with specific focus on technical architecture of solar PV rooftop system.
- Policy and regulatory framework for Solar PV Rooftop at the national and state level.
- Business models followed in the solar PV Rooftop market and role of respective stakeholders.
- Provide specific information to the entrepreneurs on Solar PV Rooftop project costing and financing, Preparation of feasibility reports.

Who may attend : Science Graduates, Engineering Graduates (Mechanical, Industrial, Production, Electrical and Electronics), Management Graduates (Preference will be given to Science and Engineering Graduates).

3.4.52 Solar PV (Photovoltaic) System Design and Installation

Program Profile

- Classroom Topics.
- World Energy Scenario and Indian Perspective, Renewable Energy Technologies, Role of Solar PV and policies in India, Basics of Electricity, Introduction to Instruments.
- Introduction to Solar Radiation, Optimum orientation of Solar PV modules, Solar related measuring devices.
- Solar PV Electricity, Introduction of Solar PV Modules, Interconnections of PV Modules, Impact of environmental parameters on module performance.
- Introduction to Battery technologies, Charge controller, MPPT, Solar PV inverters.
- Types of Solar PV systems, Introduction to Solar PV system design.
- Grid Solar PV system design with DC load, Grid Solar PV system design with water pump, Example of Solar Power packs for homes/industrial applications, Example of Solar Power packs for homes/ industrial applications.
- Design of Grid, Connected Solar PV systems
- Wires and Cable sizing, Junction Boxes, Combiner Boxes, Fuses, etc.
- Solar PV system Installation, Monitoring and Trouble Shooting, Introduction to Solar lamps, Solar Products available in the market.
- Proposed Laboratory Experiments: Solar Radiation Measurement, Measurement of PV module parameters, Series and Parallel connections of modules, Inverter, Rectifier and Transformer, Measurement of Battery, Charge Controller and Inverter parameters, Testing of Standalone PV system.
- Proposed Field Sessions: PV Panel Assembly, PV String Assembly, Grid connected PV Plant Assembly and Testing, PV plant Operation and Maintenance checks, Solar PV Modules/ BoS components manufacturing site visit.

Who may attend : Newly recruited and working engineers & supervisors in solar PV power station (Mechanical, Electrical, Electrical & Instrumentation).

3.4.53 Solar Power Generation Technology - On Grid & Off Grid

Program Profile

- Overview of renewable energy in India – Feasibility studies.
- Introduction to PV Technology Basic of Solar Cell & PV modules – Engineering Process Technology.
- Solar Charge Controller – Types, Basic of Solar Inverter.
- Introduction to SPV Design: Types of SPV system & their components.
- Basic Understanding of SPV System Integration.
- On grid / hybrid / grid-interactive SPV System.
- SPV Project implementation, basic criteria, requirements, standards & Procedures.
- Manufacturing Technology of Solar PV Modules.

Who may attend : Engineers and Jr. Engineers with 1-2 years of experience.

3.4.54 Solar PV Panel - Installation, Maintenance and Testing

Program Profile

- PV System Configuration.
- Site Selection.
- Module Selection.
- Selection & Inverter.
- Generator Junction Box & DC Main Switch.
- Safety Measures - Mounting System.
- Grid Interface.

Who may attend : Technician/Diploma/Degree holders.

3.4.55 Hybrid Renewable Energy Systems (HRES)

Program Profile

- Integral components of Hybrid renewable energy system and its configuration.
- Optimization modeling of hybrid renewable energy system
- Sustainability and reliability of HRES.
- Economic energy storage solution of HRES.
- Cost economics of HRES
- Constructional and operation challenges of HRES system.

Who may attend : Professionals from Power Sector, Engineers, Academicians, Equipment manufacturers, Researchers, Engineering, Managers.

3.4.56 Condition Monitoring of Hydro Turbine Generator Set

Program Profile

- Operation of hydro power Station & there features,
- Generator synchronization and parallel operation,
- Active and reactive power, sharing between the power station,
- Operation during emergency condition,
- Monitoring and controlling of the operational parameters during normal and abnormal operating condition including ABT best system UI charges etc.,
- Case studies.

Who may attend : Working Professionals from Power Sector, Degree/Diploma Engineering Electrical, Electrical & Electronics, Power Engg. Mechanical, Civil Instrumentation and Electronics, Professionals in Utilities

3.4.57 Capability Curve and Reactive Power Control of Hydro Generators

Program Profile

- Generator characteristics and capability curve
- Excitation and ABR
- MW, MVAR Control
- Case studies

Who may attend : Working Professionals from Power Sector, Degree/Diploma Engineering Electrical, Electrical & Electronics, Power Engg. Mechanical, Civil Instrumentation and Electronics, Professionals in Utilities

3.4.58 Control and Instrumentation in Hydro Power Plant

Program Profile

- UNIT AUXILIARIES: Guide bearing and shaft seal arrangements, Oil pressure units, HP lubrication system, Braking and jacking system, Central grease

lubrication system, Carbon dust collection system from slip rings, exciters and brake pads, Cooling water system

- Constructional details and working principles of Francis turbines and auxiliaries: Principle of operation, types and characteristics of turbines.
- Type of Governors - Hydraulic and Electronic. Working Principle.
- Constructional details and working principles of Synchronous AC Generator.
- Generating Transformer: Constructional details and its principle of operation. Generator Transformer connections
- Switchyard and its equipment
- Significance of C&I for Hydro Power Plant, Process Control Philosophy.
- Concepts of Close and Open Loop Controls, Proportional, Integral and Derivative Controllers.
- Measurement Techniques for Pressure Parameters
- Measurement Techniques for Temperature Parameters.

Who may attend : Degree/Diploma Engineering Electrical, Electrical & Electronics, Power Engg. Mechanical, Civil Instrumentation and Electronics, Professionals in Utilities

3.4.59 Hydrology Studies in Hydro Power Plant

Program Profile

- General Requirement of Hydropower Schemes
- Remote Sensing/GIS in power Sector
- Water Availability and Flow Duration Curves
- Preparation of DPR for Water Resources Projects
- Impact of climate change on hydropower

Who may attend : Working Professionals from Power Sector, Degree/Diploma Engineering Electrical, Electrical & Electronics, Power Engg. Mechanical, Civil, Instrumentation and Electronics.

3.4.60 Tunnel and Tunneling Concept in Hydropower Project

Program Profile

- Tunnel Geology for site selection and advanced geological forecasts
- Tunnel engineering & Design Aspects including seismic issues including BIM etc.
- State-of-the-art concept of TBM Tunneling
- Case studies during Tunneling
- Precast Lining segments
- Concept of Immersed Tunnels and Tunnel in Himalayas
- Escape tunnel, Ventilation shaft and Cross passages
- Preparation of TBM Tunneling and associated Launching arrangement
- Structural monitoring system in tunnels through Instrumentation and new technologies
- NATM tunneling
- Various Equipment's used in Tunneling
- Water proofing & Codal Provisions of Tunneling
- Safety & Quality Aspects in Tunneling
- Panel Discussions

Who may attend : Degree/Diploma Engineering Electrical, Electrical & Electronics, Power Engg. Mechanical, Civil Instrumentation and Electronics, Professionals in Utilities

3.4.61 Major Civil Structure and its Maintenance in Hydropower Plant

Program Profile

- Design flood estimation of hydro power project
- Geospatial and hydrological modelling to access hydro power potential zone and site location
- Geospatial information system for power project
- Impact of climate change on hydro power
- O&M of major civil structure
- Problem faced and case studies

Who may attend : Working Professionals from Power Sector, Degree/Diploma Engineering Electrical, Electrical & Electronics, Power Engg. Mechanical, Civil Instrumentation and Electronics, Professionals in Utilities

3.4.62 An Overview of Solar Thermal Technology

Program Profile

- Introduction about Solar Thermal Technology, present power scenario in India
- SWOT analysis of Solar Thermal Technology
- Latest technologies
- Economic Analysis

Who may attend : Working Professionals from Power Sector, Degree/Diploma/Engineering Mechanical Engg., Power Engg., Electrical & Electronics, Instrumentation and Electronics, Electrical Engg.

3.4.63 Solar Photovoltaic Power Plant Integration with Grid and Storage Batteries

Program Profile

- Overview of renewable energy in India-Feasibility studies.
- Introduction to PV Technology Basic of Solar cell & PV modules Engineering process Technology.
- Solar charge controller –types Basic of Solar Inverter.
- Introduction to SPV Design; types of SPV system & their components.
- Basic understanding of SPV System Integration.
- On-Grid/Hybrid/Grid-interactive SPV System.
- SPV Project implementation, basic criteria requirements, standards & Procedures.
- Manufacturing Technology of Solar PV Modules.
- Field Visits. Lectures, lab sessions

Who may attend : Working Professionals from Power Sector, Degree/Diploma/Engineering Mechanical Engg., Power Engg., Electrical & Electronics, Instrumentation and Electronics, Electrical Engg.

3.4.64 Advance O & M Techniques in Hydro Power Plants

Program Profile

- Operation & Predictive, Preventive and emergent maintenance of Turbine & auxiliaries.
- Generator & Excitation system, Power Plant Auxiliaries Operation & Transformer

Who may attend: Professionals from Power Sector, Engineers, Academicians, Equipment manufacturers, Researchers.

3.4.65 Best O & M Practices of Hydraulic Gates in Hydro Electric Plant

Program Profile

- Hydro Mechanical components.
- Constructional details and selection criteria of Hydro Mechanical Gates.
- Inspection and Testing procedure for Hydro Mechanical Equipment's.
- Best O&M practices of Hydro Mechanical Gates & Hydraulics.
- Preventive & annual Mtc. of Gates.
- Butterfly and Needle valve and hydraulic components.
- Best Mtc. practices of Hydro Mechanical Gates & Hydraulics.
- Constructional details and Mtc. of Spherical/ Butterfly and Needle Valves.
- Feed Back Session

Who may attend: Working professionals

3.4.66 Green Energy for Clean Environment/Green Energy Technologies

Program Profile

- Issues and Challenges for development of Green Energy in India.
- Current Technologies for Green Energy Development.
- Regulatory Framework for Green Energy in India.
- Green Energy Corridors.
- Greening the Grid Report.

Who may attend: Professionals from Power Sector, Engineers, Academicians, Equipment manufacturers, Researchers, Engineering and Science Graduates and Entrepreneurs.

3.4.67 Development of Floating Solar PV System (FSPV) in India

Program Profile

- Concept note and design documentation for FSPV
- Constraints and challenges in FSPV system.

- Layout and materials integration plan.
- Challenges in erection and commissioning, Testing.
- Integration and water saving potential of FSPV System.

Who may attend : Professionals from Power Sector, Engineers, Academicians, Equipment manufacturers, Researchers, Engineering, Managers.

3.4.68 Waste to Energy : Green Energy Development

Program Profile

- Waste characteristics analysis.
- Waste generation analysis.
- Waste to energy : Technology selection.
- Environment norms for plant.
- Commercial aspect and tariff structure of waste to energy.
- Case studies of waste to energy plant.

Who may attend : Professionals from Power Sector, Engineers, Academicians, Equipment manufacturers, Researchers, Engineering, Managers.

3.4.69 Skill Development Program on Renewable Energy

Program Profile

- Solar Energy conversion (Photovoltaic, Thermal and combination of both).
- Wind power and its generation of electricity, applications and future scopes.
- Biomass energy utilization, conversion technologies (Thermo chemical, bio-chemical).
- Biofuels (biodiesels, biogas, producer gas and natural gas) their production and utilization.
- Hydro-electric power generation and its different types.
- Hybrid energy system.
- Energy Storages.
- Cost analysis of different clean technologies.

Who may attend : Engineers/Faculties/ Research Scholars/ PG students.



KSEB Hydro Simulator Training at NPTI Alappuzha on 16.02.2021

III. TRANSMISSION AND DISTRIBUTION SYSTEM

3.4.70 Power System Studies

Program Profile

- Load flow: Modeling and case studies.
- Short circuit studies; Z bus matrix and symmetrical components.
- Balanced and unbalanced faults and case studies.
- Over current relay coordination-case studies.
- Stability studies-modeling case studies.
- Laboratory : Use of MiPower software.
- Field visits.

Who may attend: Transmission and distribution engineers involved in system design, planning, protection and control, engineers from R & D organizations and Academic institution.

3.4.71 Power System Studies & Load Despatch

Program Profile

- Growth of power system in India.
- Representation of power system components.
- Characteristics & performance of power transmission lines.
- Load flow studies and problems.
- Different types of faults and their analysis by computer methods.
- Power system protection devices.
- Power system stability.
- Load Despatch and its computerization.

Who may attend : Engineers of Power Sector engaged in power system and load dispatch centres.

3.4.72 Flexible AC Transmission System (FACTS)

Program Profile

- Introduction.
- Thyristor Controlled FACTS devices - Static Var Compensator (SVC), Thyristor Controlled Series Capacitor (TCSC), Thyristor Controlled Reactor (TCR).
- Phase Shifting Transformer.
- Voltage Source Converter based FACTS controllers- STATCOM, Static Synchronous Series Compensator (SSSC), Unified Power Flow Controller (UPFC).
- HVDC.
- Applications of FACTS.
- Tutorials.
- Technical Visits.

Who may attend : Practicing engineers involved in planning, design and implementation of FACTS devices.

3.4.73 HVDC Transmission Systems

Program Profile

- Introduction to HVDC.
- Principles of HVDC Conversion.
- HVDC Lines.
- HVDC Sub Stations.
- Reactive Power Management in HVDC Stations.
- AC & DC harmonics and filtering.
- HVDC System operation, Insulation Coordination, Emergencies and case studies.
- HVDC System operation Control and maintenance
- Field Visits.

Who may attend : Practicing engineers from generation,

transmission, distributed systems, industrial and other consumers of electricity, electrical inspectors and electrical consultants.

3.4.74 Operation & Maintenance (O&M) of Transmission Lines & Sub-station

Program Profile

- Transmission and Distribution - a business mission.
- Operation Procedures and practices of Transmission line and Sub-Station.
- Equipment inspection and Selection aspects.
- Equipment Failure analysis and its maintenance.
- Maintenance of Sub-Station equipments.
- Hot line Maintenance and ERS of Transmission line.
- Routine, Preventive and breakdown Maintenance.
- Protection System and its equipment.
- Safety aspects and fire protection devices.

Who may attend : Engineers with minimum 2-3 years experience in O&M of Transmission and Distribution or Power Station.

3.4.75 Operation & Maintenance (O&M) of HT/LT Switchgear

Program Profile

- Types of Switchgears.
- Selection Criteria for Switchgears.
- Design & Construction Data.
- Erection/Commissioning.
- Check-list and precautions.
- Fault finding.
- Testing procedures & Equipments.
- Case Studies.

Who may attend : Engineers with 2-3 years experience in switchgear electrical installation of industry.

3.4.76 High Voltage Testing of Power System Equipment

Program Profile

- High voltage technology.
- Solid insulating media, liquid insulation media.
- Gas & Vacuum Insulation.
- Generation of high voltage for testing.
- High voltage measurements.
- High voltage testing of transformers.
- Testing of Circuit Breakers.
- Testing of Surge arrestors.
- Testing of Insulators, Cables, Capacitors.
- High Power Testing of switchgear.
- Partial Discharges.
- Field visits.

Who may attend : Engineers involved in procurement, installation and testing of power system equipment's.

3.4.77 Operation & Maintenance (O&M) HVDC Transmission Systems

Program Profile

Performance improvement of HVAC Transmission Systems depends on various factors like voltage rating, area location, type of tower, loading, design and technology

of various hardware. It also depends on methods of monitoring and maintenance technique used.

- Various issues & challenges in Transmission systems.
- Types of Tower, various hardware & fittings.
- Methods of Monitoring.
- Types of faults & causes.
- Thermo-scanning, etc.
- Improved Transmission Monitoring (WAMS) using PMU/PDCs.
- Better coordination between transmission and distribution (Grid Discipline).
- Maintenance of transmission line.
- Live/hot line insulator cleaning and replacement.
- FACTS devices.
- Methods of reduction of AT & C losses.

Who may attend : Engineers, Technicians & personal working in Transmission & distribution utilities.

3.4.78 Power System Energy Losses

Program Profile

- Growth of power system in India.
- Transmission Losses.
- Distribution losses/transformer losses.
- HT metering.
- Remedial measures to minimize various system losses.
- Energy management system, Flattening of load demand, Energy auditing and reporting techniques.
- Power System Planning, economic operation, maintenance to minimize losses.
- Computer application in Power System.

Who may attend : Assistant Engineers/ Executive Engineers/Superintending Engineers working in transmission & distribution.

3.4.79 Project Management of EHV Lines & Towers including Sub - Station

Program Profile

- Project management Techniques for Transmission Line Projects.
- Software methods for Project preparation and control etc.
- Financial Implications of Project Management.
- Site Survey, detailed survey, Foundation work etc.
- Estimation of EHV Lines work, Sub-Station etc.
- Construction of EHV Lines and Tower and Sub-Station
- Commissioning of Lines and Sub-Station etc.
- Sub-Station visit.

Who may attend : AE, Dy. EE, EE of Transmission Utility & Project Personnel from Contractor Company.

3.4.80 Distribution Engineering

Program Profile

- Growth
- Development
- Equipment
- Standards specification
- Construction Practice
- Guidelines
- Design aspects-testing
- Installation of Distribution Equipment
- Layout of Sub-Station.

Who may attend : Engineers engaged in distribution of

electricity with 2-3 years experience.

3.4.81 Distribution Automation

Program Profile

- Design of LT Distribution System.
- LT distribution System - Feeder Reconfiguration and Transformers Load balancing.
- Customer Site Automation function: Load Control.
- Remote Meter Reading.
- Time-of-use rates.
- DTS Lab Voltage/ Var Control using Capacitors.
- Regulators.
- LTC.
- Equipment for Feeder Automation and Customer Automation.
- Digital Protection of Substation and feeders
- Remote connect/ disconnect.
- System Level Function: Fault Location.
- Isolation and service restoration.

Who may attend : Engineers engaged in distribution of electricity with 2-3 years experience.

3.4.82 Transformers

Program Profile

- Standardization & Specifications of transformers used in Power station.
- Selection of transformer, protection & schemes of protection and testing.
- Types & causes of Transformer failures.
- Testing of solid dielectric.
- Testing of liquid dielectric, standards.
- Predictive maintenance of failures.
- Dissolved gas analysis techniques.
- Case studies on transformer breakdown.
- Drying of Transformers.

Who may attend : Engineers with 3-4 years experience in the relevant field.

3.4.83 Condition Monitoring Residual Life Assessment (RLA) & LE of Substation Equipment

Program Profile

- RLA – Objective and Methods.
- Testing procedures and Methodologies.
- RLA of Oil filled transformers.
- RLA of Instrument Transformers.
- RLA of circuit breakers.
- RLA of other sub station switchgear.
- RLA of power cables.
- Testing and calibration of substation meters.
- Field Visits.

Who may attend : Engineers from State Electricity Boards, Power Utilities /Corporations, R & D organizations, Academic institutions.

3.4.84 Substation Planning & Engineering

Program Profile

- Planning of substation & Preparation of Project Report.
- Layout of Substation, Choice of Switching Schemes and Bus Bar/Bay Design.
- Selection of Substation Main Equipment.
- Design Consideration of Substation Equipment and Earthing.

- Electrical Clearances and pre-commissioning Inspection.
- Over Voltages & Selection of Surge Arrestors.
- Engineering of Protection System for Substation.
- Cost estimates of Sub-Station and Case Study.
- Measurement of Soil Resistivity.
- RPC System.
- Metering in Sub-Station.
- Sub-Station Automation.
- Case Study.
- Field Visits.

Who may attend : Engineers from State Electricity Boards, Power Utilities/ Corporations, R & D organizations, Academic institutions

3.4.85 Power System Protection

Program Profile

- Fault analysis.
- Relay input sources.
- Protection of Generators & motors.
- Protection of bus bars.
- Protection of Transformers.
- Protection of EHV lines.
- Protection of Distribution systems.
- Protection against over voltages.
- Insulation Co-ordination.
- Testing of Surge Arrestors.
- Testing & commissioning of relays.
- Present trends in protection
- Case Studies.
- Laboratory Sessions.
- Tutorials.
- Field visits.

Who may attend : Engineers from state Electricity Boards, Power Utilities/ Corporations, R & D organizations, Academic institutions.

3.4.86 Advanced Power System Protection

Program Profile

- Overview of System Protection.
- Numerical Relays.
- Protection of Transformers, Transmission lines, Bus bars, Feeders.
- Integrated Protection, Control & Monitoring.
- Intelligent electronic Devices in System Protection.
- Software architecture and performance characteristics of numerical relays.
- Wide Area Protection.
- Video Sessions.
- Field Visits.

Who may attend : Engineers from State Electricity Boards, Power Utilities/ Corporations, R & D organizations, Academic institutions.

3.4.87 Electrical Protection System

Program Profile

- Requirement of protective system (criteria for selection & choice of protection scheme).
- Instrument transformers, system grounding, fault parameters, fault analysis, sequential recorder & disturbance recorders.
- Generator protection (This topic will be covered in detail with special reference to 210 MW & 500 MW generators).

- Transformers and Bus-bar protection schemes, Transmission line protection (principles of relaying and commissioning).

Who may attend : In-service Power Station Engineers having 2-3 years experience in the relevant field.

3.4.88 Relay Maintenance

Program Profile

- Basic protection requirements.
- Basic relay terminology.
- Different types of relays.
- Fault discrimination methods.
- Relay characteristics and setting, testing etc.

Who may attend : Technicians having 2-3 years experience in the relevant field.

3.4.89 Electrical Protection System - Numerical Relay

Program Profile

- Protection Systems- Basic Concepts, Fundamental Requirements, Types, Selection and Settings.
- Generator Protection.
- Transformer Protection.
- Bus Bar & LBB.
- Transmission Line Protection.

Who may attend : Engineers from State Electricity Boards, Power Utilities/ Corporations, R & D organizations, Academic institutions.

3.4.90 Protection Philosophy, Interlock and Relays Integration

Program Profile

- Protection Requirement and relays basics.
- Circuit Breakers.
- Various Types of Relays.
- Switchgear.
- Protection, Transmission line protection etc.
- Protection Interlocks and its procedure.
- Feedback Session.

Who may attend : Experienced and fresh Diploma and Graduate Engineers.

3.4.91 Operation & Maintenance (O&M) of Transformers and Circuit Breakers

Program Profile

- Transformers-Construction, connections.
- Tap Changing Mechanism & Parallel Operation.
- Selection and sizing of Transformer, Transformer Neutral Earthing and Substation.
- Earthing Practices.
- Testing of Transformers.
- Condition Monitoring of Transformers.
- Protection of Transformers.
- Maintenance of Transformers.
- Application and Design of Air and Gas Insulated Circuit Breakers
- Selection, Sizing, Performance Analysis of Circuit Breakers
- O & M of Circuit Breakers.
- Testing and Condition Monitoring of Circuit Breakers.
- Testing of Circuit Breakers.
- Field visits.

Who may attend : Engineers from state Electricity Boards, Power Utilities/ Corporations, R & D organizations,

Academic institutions.

3.4.92 Operation & Maintenance (O&M) of Distribution System

Program Profile

Performance improvement of power distribution systems depends on various factors like voltage rating, area location, method of power distribution, loading, design and technology of various hardwares. It also depends on methods of monitoring, metering and maintenance technique used.

- Various issues & challenges in Distributions management systems.
- Types of poles, various hardwares & fittings.
- Methods of Monitoring.
- Metering.
- Maintenance of distribution line.
- Advanced Distribution Operations.
- Integration with R-APDRP systems.
- Advanced Metering Infrastructure (AMI).
- Better Co-Ordination between transmission and distribution (Grid Discipline).
- Types of faults & causes.
- Maintenance of distribution lines.
- Methods of reduction of AT & C losses.

Who may attend : Engineers, Technicians & personal working in Transmission & distribution utilities.

3.4.93 Operation & Maintenance of EHV Sub-station

Program Profile

- Introduction to sub-station.
- Types of layout etc.
- Soil testing and site selection.
- Equipment inspection & selection aspects.
- Civil foundation for main equipments, tower, ground work.
- Structure and tower erection and fabrication alignment.
- Earthing, cable trench, cable tray.
- Protection system & its equipment.
- Design and erection.
- Switchyard HV equipments erection.
- Switchyard, compressor, lightening arrestors.
- Different safety aspects, fire protection devices, erection and commissioning.

Who may attend : Engineers with 2-3 years experience in electrical operation and maintenance of Power Station and transmission & Distribution.

3.4.94 Transmission & Distribution Equipment Maintenance

Program Profile

- Transmission and distribution system familiarisation.
- Maintenance involved during erection and commissioning of T&D equipment.
- Transmission and distribution system and equipment maintenance procedure.
- Preventive and predictive maintenance program & schedule.

Who may attend : Maintenance technicians with 2-3 years experience in the field.

3.4.95 Distribution Transformers Failure - Trends in O&M

Program Profile

- Design and Manufacturing of Distribution Transformers,
- Erection, Testing and Commissioning of Distribution Transformers.
- Transformer Oil characteristics.
- Filtration and Reclamation Techniques.
- Maintenance of Distribution Transformers.
- Field Visits

Who may attend : Engineers from State Electricity Boards power Utilities/ corporation. Industrial Manufacturer dealers in transformers.

3.4.96 Operation & Maintenance (O & M) of Transformer

Program Profile

- Standardisation and Specification of Transformers used in the Power station.
- Commissioning of Transformers.
- Types and Causes of Transformer failure.
- Testing of Solid dielectric.
- Transformer Oil-Its analysis, sampling and testing procedure.
- Transformer Maintenance Practices.
- Dissolved gas Analysis Techniques.
- Case Studies.

Who may attend : This course is meant for operation and Maintenance Technicians with 2-3 years experience in relevant field.

3.4.97 Switchgear Maintenance

Program Profile

- Introduction to circuit breakers, Arc formation, Arc quenching etc. Constructional details of different types and makes of circuit breakers like air circuit breakers, minimum oil circuit breakers, air blast circuit breakers, vacuum circuit breakers, SF6 breakers etc.
- Selection Criteria for switchgear.
- Design & Construction Data.
- Erection/Commissioning.
- Check-list and precautions.
- Maintenance & Testing procedures & Equipments.
- Case studies.

Who may attend : This course is meant for maintenance technicians with 2-3 years experience in Switchgear maintenance.

3.4.98 Transformer Maintenance

Program Profile

- Standardization & specifications of transformers used in Power Station.
- Selection of transformer, erection/ commissioning.
- Testing & causes of Transformers failures.
- Testing of solid dielectric.
- Insulating oil, identification, sampling and testing procedures.
- Transformers maintenance procedures.
- Dissolved gas analysis techniques.
- Case studies.
- Drying of Transformer.

Who may attend : This course is meant for maintenance technicians with 2-3 years experience in Transformer maintenance.

3.4.99 Best Practices in Operation & Maintenance (O&M) of Distribution Transformers Leading to Zero Breakdown

Program Profile

- State of the art of Transformers.
- Tests to check the adequacy of Transformers.
- Insulation co-ordination of Transformers.
- Earthing, Loading, Maintenance & protection of Transformers.
- Failure, Failure analysis & condition monitoring of Transformers.
- Condition Monitoring of Transformer Oil.
- Diagnostic Monitoring by DGA with case histories.
- RLA of Paper Insulation by Furan analysis.
- Field visits.

Who may attend: Engineers involved in the Operation, Maintenance and Testing of Transformer from state Electricity Boards, Power Utilities, R & D organizations, Academic Institutions, Transformer manufactures transformer Oil processors and servicing organizations etc.

3.4.100 Operation and Maintenance (O&M) of Sub-Station

Program Profile

- Introduction to Substation.
- Types of Substation, Layout etc.
- Selection of Equipments and inspection Procedures.
- Civil foundation for main equipments, tower, grounds work etc.
- Earthing, cable trench and cable tray.
- Switchyard Operating Procedures.
- Equipments in Switchyard & their functions.
- Methods of Monitoring /Thermo-scanning, etc.
- Types of faults in substation.
- Methods of Inspection. Testing & Monitoring of various Switchyard equipments & its schedule.
- Procedures of substation & line maintenance.
- General practices of EHV/HV/LV substation operation & maintenance.
- Overview of GIS Substation.
- Substation Automation.

Who may attend : Engineers, Technicians & personal working in Transmission & distribution utilities.

3.4.101 O&M, Testing of Power Transformers and HT Circuit Breakers

Program Profile

- Transformers - construction, connections.
- Tap changing mechanism & parallel operation.
- Selection & sizing of transformers, transformer neutral earthing & substation earthing practices.
- Testing of transformers.
- Condition monitoring of transformers.
- Protection of Transformers.
- Application & design of Air & Gas Insulated circuit breakers.
- Selection & sizing, performance analysis of circuit breakers.
- O&M testing, condition monitoring of circuit breakers.
- Fields Visits.

Who may attend : Industrial/other consumer of electricity, electrical inspectors/assisting officers, utility representatives, manufacturers/dealers of electrical equipment/power cables/LT/HT switchgear.

3.4.102 Switchgear and Transformer Maintenance

Program Profile

- Introduction to circuit breakers, Arc formation, Arc quenching etc.
- Constructional details of different types and makes of circuit breakers like air circuit breakers, minimum oil circuit breakers, air blast circuit breakers, vacuum circuit breakers, SF6 breakers etc.
- Insulating oil, identification, sampling and testing procedures.
- Oil Testing details for Crackle Testing, Break down testing, Oil filtration.
- Reading of schemes, control and wiring diagrams.
- Transformer construction details.
- Transformer maintenance procedures.

Who may attend : This course is meant for maintenance technicians with 2-3 years experience in Switchgear and Transformer maintenance.

3.4.103 Power Quality, Harmonics Mitigation and Reactive Power Management

Program Profile

- Introduction to power quality.
- Power Quality – impacts, manifestations.
- Consequences of power quality.
- Power quality measurement.
- Harmonics – sources, measurements and mitigation.
- Filters – Active and passive filters, selection of filters.
- Statcoms, custom power devices, Static Var Compensators.
- Reactive Power Control Equipment.
- Performance of Reactive Power Equipment under different Operating Conditions.
- Comparative Study of AVR, OLTCs, Power Capacitors, Shunt Reactors, SVCs, TCRs, Statcoms etc, in reactive power management.
- Automatic Power factor controllers.
- Harmonics – causes, measurement and mitigation.
- Thyristor based and voltage source converter based FACTS Controllers.
- Case Studies.
- Technical Visits.

Who may attend : Practicing Engineers/ supervisors of industry, Utilities and faculty of educational institutions involved in maintenance of power quality and mitigation of harmonics.

3.4.104 Power Quality Measurement

Program Profile

- Importance of Power Quality.
- Index parameter of power quality measurements.
- Gaps and technological development in Power Quality.
- Potential step and sustainable solution for Power Quality Measurement.
- Challenges and advancement in Power Quality measurement solutions.

Who may attend : Professionals from Power Sector, Engineers, Academicians, Equipment manufacturers, Researchers, Engineering, Managers.

3.4.105 Emerging Technologies in Reducing AT&C Losses

Program Profile

- IE rules.
- Source of technical Losses and methods of reducing them.
- Application of new Technologies (HVDS&ABC) in distribution System.
- Source of commercial Losses.
- Setting and checking of actuators and methods of reducing them.
- Legal empowerment to control the menace of power theft.
- AT&C Losses.
- Role of consumer association and franchises to control commercial losses.

Who may attend : Engineers from SEBs/ Power Utilities/ corporations with 2-3 years of experience.

3.4.106 Distribution Network Planning for UG Cable Systems

Program Profile

- Types of Networks & Preparations for UG cabling.
- Introduction to project Management, Planning & Management of Distribution Systems Current rating of cables.
- AB Cables Design & condition Monitoring UG Cable System.
- Conversion of OH Cables to ABC & UG.
- Planning & procurement of cables.
- Type of installation & corrective measure.
- Selection of route.
- Reconnaissance survey, Preliminary survey, Engineering, design considerations for OH_UG Lines/ Towers & Associated substations.
- Cable laying – Methods for LV, MV and HV cables.
- Preparations of DPR, Project Monitoring & Control, Project execution-Issues and Challenges with Case studies.
- Field Visits to UG Substation.

Who may attend : Engineers with minimum 2-3 years experience in O&M Distribution Networks.

3.4.107 Power Cables and Jointing Techniques

Program Profile

- Design & construction of Power Cables.
- Testing of cables.
- Testing of cable accessories.
- Demo of Cable Jointing.
- Failure of cables and case studies.
- Condition monitoring of power cables.
- Field Visits.

Who may attend : Engineers from State Electricity Boards Power Utilities/ Corporations, R & D organizations, Academic institutions, Power consumers, consultants/ contractors etc.

3.4.108 Distribution Metering

Program Profile

- Energy meters: Types & Construction.
- Testing, setting and calibration.
- Failure analysis.
- IE Rules.

- Theft/Tampering and Inspection of consumer premises.
- Distribution meter reading.
- Rationalization and computerization.
- Field visits

Who may attend : Engineers from state Electricity Boards/ Power utilities/ Distribution System, R & D organizations, Academic institutions, manufacturers, contractors, consultants etc.

3.4.109 Transmission Line Maintenance and Introduction to Live Line Maintenance Techniques

Program Profile

- Substation maintenance philosophy and guidelines.
- Work permits, line clear procedure, maintenance of log books, records etc.
- Maintenance schedules : Routine, preventive, predictive, breakdown and emergency maintenance schedules.
- Transformer, switchgear and reactor maintenance.
- Transformer oil testing and dissolved gas analysis.
- Introduction Live line maintenance techniques.
- Type of tools used in live line maintenance.
- Live insulator testing methods & introduction to hotline washing (wet & dry).
- Case study.
- Audio visual shows on hot stick-methods and bare hand techniques.

Who may attend : Executives in the rank of Jr. Engineers and above working in transmission line maintenance.

3.4.110 Hand - On Training on Power System for Engineering (PSSE)

Program Profile

- Basic of Power System.
- Hand flow Studies.
- Conting analysis and Voltage Stability.
- Short Circuit Studies, dynamics.

Who may attend : Engineers

3.4.111 Operation and Maintenance (O&M), Testing of Power Transformers

Program Profile

- Standardization & Specifications of transformers used in Power station.
- Selection of transformer, protection & schemes of protection and testing.
- Types & causes of Transformer failures.
- Testing of solid dielectric.
- Testing of liquid dielectric, standards.
- Predictive maintenance of failures.
- Dissolved gas analysis techniques.
- Case studies on transformer breakdown.
- Drying of Transformers.

Who may attend : Engineers with 3-4 years experience in the relevant field.

3.4.112 Online Internship Training Program on Power Transmission, Distribution & Generation

Program Profile

- Overview of Electricity and Power
- Global Power Scenario
- Indian Power Scenario

- Electricity supply and Economic Growth
- Power and Energy Resources
- Conventional and Renewable energy resources
- Overview of Different types of Conventional Energy resources
- Overview of different types of Renewable energy resources
- Energy generation from Coal, Hydro, Gas, Tidal etc.
- Energy generation from Solar, Biomass, Waste, Wind etc.
- Overview of different types of coal and Coal energy. World and Indian Scenario of Coal.
- Overview of Electricity Generating electrical equipments like Synchronous generator, wind generator etc.
- Electricity Transmission and distribution equipments like Power and Distribution Transformer, Switchgear, Current & Voltage Transformer, Isolators, Lighting Arrestor, PLCC etc.
- Overview of different types and make of circuit breakers like air circuit breakers, minimum oil circuit breaker, Air circuit breaker, vacuum circuit breaker and SF6 breaker etc.
- Overview of Transformer components and constructional details.
- Electricity Generation from Solar energy, various equipments used in solar energy Installations.
- Solar Energy generation analysis using PV sys Software.
- Overview of Micogrid, Macrogrid and Hybrid Renewable energy system.
- Introduction of Control Loops in Electrical Power Generation.
- Measurement of various parameters in Electrical systems like voltage, current, Power, Temperature, Vibration, Pressure etc. Using electronics measurement devices.
- Overview of Supervisory control and Data acquisition System.

Who may attend : College students Engineering (Pursuing) in Electrical, Mechanical, Instrumentation and Electronics Engineering.

3.4.113 Best Practices in Distribution Operation & Management

Program Profile

- Distribution Transformer: Types of Transformers and functions, Specification and Selection of DTs, Design and Performance Characteristics, Testing, Quality Control, Erection and Commissioning, Operation and Maintenance.
- Instrument Transformers: Design of CVTs (Capacitor Voltage Transformers), IVTs (Inductive Voltage Transformers), CTs, Insulation design, Quality concepts, Quality checks, Tests, Erection and Commissioning, Failure analysis.
- Insulators: Types of Insulators, Components, Testing's (Mechanical, Electrical, Thermal and Other tests), Insulator Selection, Handling Installations and Trouble Shootings.
- Surge Arresters: Concepts of Metal oxide Arresters, Polymer arresters, Zinc oxide arresters, Application of Surge arresters up to 420kV, Testing aspects, Arresters for transmission line protection, Pollution behavioral aspects of metal oxide arresters.
- Electrical Cables: Manufacturing process, Design of Conductors, Insulations, Armouring, Outer Sheeting,

Quality, Cable laying and Installation, Electrical Stress, Generalized Installation.

- Capacitors: Reactive power control, Reactive power management, Definition and origin of low power factors, Types of power factors, Effect of harmonics. Installation of APFC panel, Testing and Quality control, VAR support and power factor correction.
- Switch Gears and Control-Gears.
- Energy Meter: Metering Applications and Key Features, Installation Audits Requirements Field Testing Requirement, Growing meters technology, Revenue Protection, Regulatory requirements, Remote meter readings, prepayment technology, Load managements.
- Latest trends in Distribution Equipment and International Practices.
- Field Visit - Sub-Station Visit.

Who may attend : Junior Engineer, Workmen, Technicians.

3.4.114 Best O&M practices of Switchgear and Transformers

Program Profile

- Introduction to circuit breakers, Arc formation, Arc quenching etc. Constructional details of different types and makes of circuit breakers like air circuit breakers, minimum oil circuit breakers, air blast circuit breakers, vacuum circuit breakers, SF6 breakers etc.
- Selection Criteria for switchgear.
- Design & Construction Data.
- Erection/Commissioning.
- Check-list and precautions.
- Maintenance & Testing procedures & Equipments.
- Case studies.
- Standardization & specifications of transformers used in Power Station.
- Selection of transformer, erection/ commissioning.
- Testing & causes of Transformers failures.
- Testing of solid dielectric.
- Insulating oil, identification, sampling and testing procedures.
- Transformers maintenance procedures.
- Dissolved gas analysis techniques.
- Case studies.
- Drying of Transformer.

Who may attend : This course is meant for maintenance technicians with 2-3 years experience in Transformer and Switchgear maintenance.



AEGCL PEP Program February 2021 at NPTI-NER.

IV. HOT LINE TRAINING

3.4.115 Awareness Programme For Executives in Hot Line Activities

Program Profile

- Introduction to Hot Line Tools, Activities & Maintenance.
- Live participation in maintenance operation on 66KV, 220 KV Commercial lines.
- Live insulator Testing methods.
- Video and Film shows on Hot Stick Method and Bare Hand Technique.
- Introduction to Hot Line Washing (Wet & Dry).
- Extension of LLMT activities to switchyard.

Who may attend : Executives in the rank of Junior Engineer and above who are not trained in Hot line Activities.

3.4.116 Switchyard Maintenance Techniques using LLMT for Linemen/ Supervisors

Program Profile

- Electrical Safety & Safe Clearances.
- General practice of switchyard maintenance.
- Practice on climbing towers and switchyard structure, precaution at different working positions.
- Use of different hardware used in the maintenance works (Ropes, earthing equipment, load handling equipments, etc.).
- Hands on demo/training on live switchyard location using Hot Stick Method (HSM) and using Bare Hand Methods (BHM).
- Use of thermo vision Camera for detection of Hot Spots in Maintenance Works.
- Introduction to live line washing of insulators, video films on LLMT.

Who may attend : Foremen, Linemen, Asstt Linemen, Supervisors, Junior Engineers, asst. Engineers etc. actively involved in EHV Substation Maintenance activities having physical fitness. It is preferred that one of the nominee be from Executive cadre.

3.4.117 Familiarization Program on Cold Lines

Program Profile

- Electrical Safety, First Aid and Fire fighting.
- Safety precaution at different working positions.
- Tower climbing practices.
- Use of different hardware used in maintenance works (Ropes, earthing equipment, load handling equipment etc).
- General Practice of Maintenance work on Transmission Line.



Training on LLMT using SYMT at NPTI (HLTC) Bangalore

- Introduction to Live Line Maintenance Techniques.

Who may attend : Supervisors in the rank of Junior Engineer and ITI qualified Technicians who had undergone their basic/Induction level course after recruitment.

3.4.118 Live Line Punctured Insulator Detection (PID) on EHV Lines

Program Profile

- Testing of Live Insulator string using software based Positron PID kit.
- Downloading of stored result from Memory of Kit to PC.
- Analysis of results (Graphical & Analytical Method).
- Preparing Test Report.

Who may attend : Supervisors in the rank of Jr. Engineers and ITI qualified technicians who had undergone their basic/induction level course after recruitment.

3.4.119 Live Line Insulator Washing Techniques on EHV Switchyard/Lines at Onside

Program Profile

- Types and effect of Pollution on performance, its prevention and solutions.
- Safety aspects in Line/Hot Line Washing.
- Hot Line Washing Equipment set up and it's operating procedures.
- Safety aspects in Hot Line Washing of line and substation insulators.
- Care and methods of Washing on sub station equipment line Circuit Breakers, Current Transformers and Potential Transformers etc.
- Practice of Hot Line Washing on Live Lines at Tension Point, Suspension Point Post Insulators etc.
- Introduction to Dry Washing and Hot Spray Systems.

Who may attend : It is preferred that only those who had worked in the relevant field and associated with some of the EHV line maintenance activities quite some time, say, 2 to 3 years, after completing their entry level (Induction level) training course on cold lines may only be sponsored so that many of the techniques need not have to be repeated. It is preferred that the participants of the course should have been exposed to some of the Live Line Maintenance jobs at least a couple of years before they are sponsored for this training this will enable the trainer to ease his efforts by simply recalling those techniques and concentrate more on the techniques relevant to actual line situation that are needed. Supervisors in the rank of Junior Engineers and ITI qualified Technicians may be considered for this course.



V. CONTROL AND INSTRUMENTATION ENGINEERING

3.4.120 Power Plant Instrumentation

Program Profile

- General Description of Power Plant Instrumentation and control and their layout details.
- Working principles of Instruments.
- Temperature/Flow/Level and Pressure measurement.
- Control valves and actuators.
- Programmable Logic Controllers (PLC), their applications.
- Introduction to Distributed digital control system Hardware and Software configuration.

Who may attend : Engineers from SEBs/Power Utilities/ corporations with 2-3 years of experience.

3.4.121 Control & Instrumentation (C&I) in Power Station (For Operation Engineers)

Program Profile

- General description of Power Station Instrumentation and control and their layout details.
- Basic Principles and working principles of instruments.
- Temperature Measurement.
- Flow Measurement.
- Introduction to On-Line Analytical Instrument.
- Introduction to Turbovisory Instruments & Vibration Analysis.
- Discussion on Protection & Interlocks.
- Introduction to Automatic Control Loops.

Who may attend : Engineers with 2-3 years experience in the relevant field.

3.4.122 Control & Instrumentation in Power Station

Program Profile

- General description of Power Station Instrumentation and control and their layout details.
- Basic Principles and working principles of instruments.
- Temperature Measurement.
- Flow Measurement.
- Introduction to On-Line Analytical Instrument.
- Introduction to Turbovisory Instruments & Vibration Analysis.
- Discussion on Protection & Interlocks.
- Introduction to Automatic Control Loops.

Who may attend : Engineers with 2-3 years experience in the relevant field.

3.4.123 Data Acquisition & Distributed Digital Control System in Thermal Power Station

Program Profile

- Introduction to Data Acquisition system Hardware & Software configuration.
- Introduction to Distributed Digital Control.
- Hardware & Software Configuration.
- Advantages of Distributed Control System.
- Configuration of single loop and multi loop Controller.

Who may attend : Engineers working in Power station with 3-7 years experience.

3.4.124 Power Plant Auto Control

Program Profile

- Auto Control Action Theory (PID) and their relevance to process reaction rate and dead time.
- Auto loops in Power Station with their built up action Hardware and Software.
- Selection and application of final control elements such as control valves, dampers, etc.
- Feed forward and feed back signal selections.
- Actuators: electric, Pneumatic and Hydraulic; their relative merits and applications.
- Thyristor drives and thyristor controlled drives.
- Limit switches and Torque switches
- Coordinated control concept and applications.
- Microprocessor based programmable logic controllers (PLC's) Distributed Digital Control System concepts.
- Periodical tuning Techniques and tuning requirements.
- Commissioning of Automatic control loops with individual action, tuning techniques on Automatic Control Simulators.

Who may attend : Engineers with 2-3 years experience in the relevant field.

3.4.125 Power System Communication SCADA & EMS

Program Profile

- Data Acquisition System.
- Supervisory Control.
- Communication: VSAT, Microwave, Optical Fibre.
- Communication networks & protocols.
- SCADA in Transmission and Distribution.
- EMS Hardware: Control Centre.
- EMS Software: SCADA & Database.
- EMS Software: Generation applications.
- EMS Software: Networking applications.
- Field Visits

Who may attend : Engineers from State Electricity Boards, Power Utilities/ Corporations, R & D organizations and Academic institutions.

3.4.126 Intelligent Load Management System

Program Profile

- Intelligent Load Management System, SCADA.
- Use of SCADA in GRID Operation.
- Visit To SCADA Control Room.

Who may attend : Experienced Diploma and Graduate Engineers DISCOMS & GENCOS.

3.4.127 Vibration Diagnostics and Fault Analysis

Program Profile

- Principles of Vibration.
- Basic motion, period, frequency, natural frequency, reasons, critical speeds.
- Data Acquisition Instrumentation, Transducer operation – selection, Signal processing, FFT application.
- Fault Analysis Spectrum analysis, mass unbalance, misalignment, mechanical looseness, bearing defects, central fault recognition.
- Instrumentation Transducer operation, Transducer selection.
- Sensor mounting issues, Mounted Natural Frequency.

- Signal processing, FFT application.
- Linear versus logarithmic, Trending.
- Workshop.

Who may attend : Engineer and supervisors with at least 2 years experiences in O & M of Power Station and other industries.

3.4.128 PLC & SCADA in Thermal Power Plant

Program Profile

- Introduction to PLC.
- Application of PLC in Thermal Power Plant.
- Data Acquisition System.
- Supervisory System – Communication System-Wireless.
- Communication Networks & Protocol SCADA in Thermal Plant.



One week On-line Training Program for MUNPL for Operation and Maintenance of Steam Turbine at NPTI Faridabad

Who may attend : Engineers.

3.4.129 Burner Management System/FSSS

Program Profile

- Flame sensors; their types, selection, application and installation techniques.
- Flame scanning intelligence.
- logics and logic circuit built around solid stat relay devices for working out permissive.
- Fuel sequencing, fuel cut off and boiler trip protections.
- Logics and logic circuits for sequential start up and shut off procedures.

Who may attend : Fresh Engineers engaged in Control and Instrumentation.



500MW Simulator Training program for Megha Engineering and Infrastructure Ltd., Hyderabad at NPTI Allapuzha



PGDC Students of Power Plant Engineering and Renewable Energy & Grid Interface Technologies at NPTI Faridabad



Two weeks Simulator Training Program at NPTI Shivpuri for PGDC Students from NPTI - SR

VI. DISASTER AND SAFETY MANAGEMENT

3.4.130 Fire Prevention, Protection & Safety

Program Profile

- Different types of fire hazards in Power Plant and Industry.
- Plant design & layout with respect to fire hazards and prevention.
- Classification of fire and various methods to combat fire.
- Fire fighting arrangement in different areas of Power Plant and Industry.
- Safety connected with fire hazards in Electrical Installations.
- Application of different safety rules in Industry.
- Management of fire fighting & First Aids.

Who may attend : Engineers and Senior Supervisor of Thermal Power Station and process industries.

3.4.131 Disaster Management, Electrical Safety Procedures and Accident Prevention

Program Profile

- Disaster and Impacts Warning Systems and Response Management and Mitigation.
 - Impact of different types of disasters, Trigger mechanisms and wiring systems.
 - Check lists and preparedness to address disasters.
 - Development of an On-Site and Off-site Disaster management Plan.
 - Development of Mock Drill Format's Institutional set up for disaster.
- Electrical safety procedures and Manuals.
 - Indian Electricity Rules, The Safety systems & Procedures, Accident prevention methods, Safety codes.
- Accident prevention techniques and Accident Reporting procedures.
 - Recording and Reporting systems, Review and methods to avoid recurrence.
 - Accident analysis, Technical prone to accident analysis.
 - Ergonomics, Reports filling details.
 - Investigation reports, Steps to avoid recurrence.
- Standard earthing practices.
 - Standard earthing practice, Materials towards earthing, Earthing at substation, lines, service centers, etc.
- Power Grid Collapses.
 - Role of distribution utility, Causes and remedies, Black start procedures, Restoration procedures, Islanding systems, equipment, and procedures.
- Firefighting Techniques-Electrical and Oil fires.
- Firefighting norms for sub stations, Firefighting equipment's and systems, Care and operations for combating fire.
- First aid practices for different emergencies.
- First aid victims under different cases – fractures, burns, electrical shock, unconsciousness, snake bite, fall from height, cuts and wounds, Artificial respiration systems, Treatment for electrical shocks, Mechanical accidents.
- Case Studies based on the above topics.
- Incorporation exercise based on the above topics.

Who may attend : Managing Director, CEOs, Superintending Engineer, Chief Engineer, Executive

Engineer, Assistant Engineer and their Equivalent.

3.4.132 Electrical Safety and Inspection of Electrical Installations, Accident, Prevention Recent Trends

Program Profile

- Overview & Safety Requirements of IE Rules.
- Design of Electrical installations.
- Earthing System Design.
- Circuit Breakers and Protective Relays.
- Basic Protection Schemes of Power Equipments.
- Inspection procedures for statutory inspection by Electrical inspectors.
- Check Point of Electrical inspection
- Pre-commissioning tests of Transformers, Switchgears and Power Cables.
- First Aid and Fire Fighting Practices in Industrial Installations/Substations.
- Field Visit.

Who may attend : Industrial / other consumers of electricity, electrical inspectors/ assisting officers, utility representatives, manufacturers / dealers of electrical equipment / power cables / LT / HT switchgear.

3.4.133 Safety in Hydro Power Station

Program Profile

General safety precaution, treatment of electrical or acid/alkali burns, permit to work, first aid, protective gear/clothing, safety in movement and storage of materials, safety aspects of switchyard. Fire safety procedure. Fire protection of generator. Firefighting and emulsifier type protection.

Who may attend : Engineers/Shift Engineers/Operators working in Hydro Power Plant.

3.4.134 Operational Safety

Program Profile

- Permit to work Practice/procedure.
- Fire Fighting basics and process.
- Fire extinguisher types and selection.
- Fire Fighting Demonstration.
- Precautions and process while handling equipments and Safety Equipments.

Who may attend : Operators, ITI Holders, Diploma & Engineers (Fresher & Experienced).

3.4.135 Electrical & Fire safety for Distribution Utilities

Program Profile

- Clearances & compliances of CEA (Measures relating to safety & electrical Supply) Regulations.
- Safety & system Earthing.
- Methods of earthing.
- Safety aspects in Service connection & Installation.
- Tools & Plants for Maintenance.
- Operation & Maintenance procedures for Distribution System.
- Breakdown Operations in distribution systems.
- HT- LT Metering & Testing.
- Safety aspects in Street Lighting.

- Fire fighting techniques for Electrical and oil fires in sub stations and First Aid practices for different emergencies.

Who may attend : Engineers, Technicians & personal working in Transmission & distribution utilities.

3.4.136 “Measures Relating to Safety and Electrical Supply”

Program Profile

- Clearances and Compliances of CEA (Measures relating to safety and electrical supply Regulation 2010: Minimum clearance between phase to phase and phase to ground for different Voltages, CEA (Measures relating to safety and electrical supply Regulation 2010 pertaining to Sub-stations.
- **HV Sub-station:** main equipments used including Gas Insulated Switching system and their safety norms.
- Detailing of High Voltage Lines, Types of Towers, types of insulators and their electrical and mechanical characteristics and safety aspects.
- Introduction to Indian Standard Specification for Electrical wiring, Energy Conservation Switch Yard Operation and Maintenance-Circuit Breakers and Isolators and Bus bars: their types, operating mechanism, maintenance procedures and case studies. Current Transformers, Potential Transformers and Lightning Arrestors.
- **Control Room:** Necessity and function of boards, types of boards, types of relays and indicators, mimic diagram. Function of various relays, their settings. Remote control of breakers, isolators, tap changers. All in respect of safety.
- **Earthing:** Safely earthing and system earthing, methods of earthing. Peterson coil earthing, earthing of Lightning arrestors- importance and advantage. Earth electrodes, earth mats, values and measurement of earth resistance.
- Capacitors and their functions, Types, ratings and case studies of failure. Safety requirements.
- **Transformers:** Function and Maintenance aspects. Safety opted in O&M.

Who may attend : Engineers, Technicians & personal working in Power Sector, Transmission & distribution utilities.

3.4.137 Industrial Safety

Program Profile

- To Familiarize about industrial safety requirement
- Classification of Industrial safety and level of safety in various industries



Observation of Plant Safety at NPTI Nangal

- Classification of fire and various methods to combat fire.
- Fire fighting arrangement in different areas of Power Plant and Industry.
- Safety connected with Industrial and fire hazards in Industry and mitigation.
- Application of different safety rules in Industry.
- Fire extinguisher types and selection.
- Fire Fighting Demonstration

Who may attend : Engineers, Technicians & personal working in Power Sector, Transmission & distribution utilities.

3.4.138 Industrial Plant Safety

Program Profile

- Industrial safety norms/ guidelines.
- Walking and working surfaces and PP equipment
- Material handing safety at Plant site
- Electrical safety based on American safety standard
- Machine guarding. Firefighting and first aid
- Industrial operational safety and emergency action plan.

Who may attend : Degree/Diploma Engineering Electrical, Electrical & Electronics, Power Engg. Mechanical, Civil Instrumentation and Electronics, Professionals in Utilities

3.4.139 Electrical Safety in Power Utilities On-line Workshop

Program Profile

- To familiarize about the electrical safety standard in Power Utilities and different procedures for safe electrical operation .
- Overview & Safety Requirements of IE Rules.
- Safe operation of Electrical installations.
- Checking of Earthing System
- Electrical Safety procedures for Circuit Breakers and Protective Relays.
- Inspection procedures for statutory inspection by Electrical inspectors.
- Electrical Safety Check Point of Electrical inspection of Electrical installations.
- Electrical Safety Check Point of Transformers, Switchgears and Power Cables.
- First Aid and Fire Fighting Practices in Industrial Installations/Substations

Who may attend : Engineers, Technicians & personal working in Power Sector, Transmission & distribution utilities.



Observation of Industrial Safety at NPTI Guwahati

VII. GRID INTEGRATION, SMART GRID & SMART CITIES, EV AND ENERGY STORAGE SYSTEM

3.4.140 Renewable Energy Generation & Integration with Grids

Program Profile

- Overview of Power Scenario and Importance of Renewable Energy.
- Solar Energy.
- Wind Energy.
- Bio-Mass Energy.
- Renewable Energy Purchase Obligations.
- Tariff Regulations related to Renewable Energy.
- Renewable Energy Power Evacuation Issues.
- Net Metering and grid Connectivity for Renewables.
- Role of Smart Grid in Integration of Renewable Energy and DSM.
- Renewable Energy Certificates.
- Grid Operation and balancing of Renewable Energy Power.
- Inter Connection Standards of Distributed Generation.
- Field Visits.

Who may attend : Engineers from State Electricity Boards/ Power Utilities/ Distribution Systems, R&D organizations, involved in implementation of renewable source and their integration.

3.4.141 SPV Power Plant - Integration with Grid and Storage Batteries

Program Profile

- Overview of renewable energy in India-Feasibility studies.
- Introduction to PV Technology Basic of Solar cell & PV modules- Engineering process Technology.
- Solar charge controller –types Basic of Solar Inverter.
- Introduction to SPV Design; types of SPV system & their components.
- Basic understanding of SPV System Integration.
- On Grid/Hybrid/Grid-interactive SPV System.
- SPV Project implementation, basic criteria requirements, standards & Procedures.
- Manufacturing Technology of Solar PV Modules.
- Field Visits.

Who may attend : Professionals from Power Sector, Engineers, Academicians, Researchers, Entrepreneurs.

3.4.142 Smart Grids and Renewable Energy Integration

Program Profile

- Importance of emerging role of Smart Grids for future Power Systems.
- Differences between Traditional Grids and Smart Grids.
- Grid Integration and Renewable energy storage, integration and prediction.
- Grid integration challenges and prospective solutions.
- The role of Smart Grid in Integrating Renewable Energy.
- Comprehensive overview of Smart Grid Pilot Projects

Who may attend : Engineers/ Managers/Researchers from power industry including R&D Labs, Student or Faculty interested in the area of RE integration in Smart grids.

3.4.143 Role of Smart Grids on the Indian Power Sector: Current Developments, Challenges and way Forward

Program Profile

- India's energy realities and emerging needs.
- Smart Grids - Concept and application areas.
- Global Developments.
- Developments in India.
- One model of Mini Grid.
- Integration of Mini Grid to Smart Grid.
- How to make Mini Grid to Smart Grid.
- Challenges to Accelerated Deployment.
- Case Study.
- Way Forward.

Who may attend : Engineers working in Transmission & Distribution sector.

3.4.144 Development of Microgrid (MG) and Macrogrid (MCG) in India

Program Profile

- Concept note and detailing of Microgrid and Macrogrid in India.
- Architecture and modeling of Microgrid and Macrogrid.
- Uncertainty and modeling challenges in MG, MCG.
- Optimal solution and recent development of MG, MCG.
- Challenges in implementation of MG and MCG.
- MG, MCG development for Rural India and Potential.

Who may attend : Professionals from Power Sector, Engineers, Academicians, Equipment manufacturers, Researchers, Engineering, Managers.

3.4.145 Smart Grid and Smart Metering Technologies and Applications

Program Profile

- Smart Grid Goals, History, Scale and Scope.
- Functions and Features of Smart Grid, Demand Response Support.
- Net metering and Grid Connectivity of Renewable Sources.
- National and International Specification on Smart Meters and energy meters.
- Smart Meters - Issue and Concerns.
- Standardization of Smart Metering.
- Inter Operability Testing Methods and Special Purpose Energy Metering.
- Technology challenges and way forward.
- Demonstration at PSTI.
- Role of Smart Meters in Arresting Theft/Tampering.
- Field Visits.

Who may attend : Engineers from State Electricity Boards/ Power utilities / Distribution Systems, R & D organisations, Academic institutions, manufacturers, contractors, consultants etc.

3.4.146 Smart Grid for Utility Engineers

Program Profile

- Smart Grid Basics/ Overview and Evaluation of Micro Grid.
- Developing a Smart Grid Roadmap in India.
- On-going Smart Grid Activities in India.

- Smart Grid for Distribution Network and Initiates.
- RE based Distributed Generation and Smart Grid of the future.
- Grid Integration of Solar in to Power System.

Who may attend : Engineers involved in the operation and control of Distribution system and Academician with 2-3 years experience in the relevant field.

3.4.147 Smart Power Flow Controller for Smarter Grid Applications

Program Profile

- Principles of active and reactive power compensation.
- Traditional power flow controllers – voltage regulating transformer, phase angle regulator, shunt inductor/capacitor, and series inductor/capacitor.
- Voltage-sourced converter (VSC) – 2 and 3 level poles.
- 6, 12, 24 and 48-pulse harmonic neutralized VSCs.
- PWM VSC, VSC-based technology and its implementation, comparison of simulation and field results; Sen Transformer.

Who may attend : Junior and Middle Level Managers/ Executives from DISCOMs/TRANSCOs/ Regulators/ Consultants/ Faculty/ Researchers/P.G Students.

3.4.148 Smart Grids for Smart Cities

Program Profile

- Concept and Salient features of smart grid as per GOI initiatives.
- Infrastructure upgrade of sub transmission and distribution networks.
- Smart city's energy requirements coming from solar, renewable energy utilization.
- And de-centralized distribution generation for smart cities.
- Smart efficient street lighting.
- Outage management system.

Who may attend : Engineers from State Electricity Boards/ Power utilities/ Distribution System, R&D organizations, Academic institutions, manufactures, contractors, consultants etc.

3.4.149 Battery Maintenance

Program Profile

- Introduction and constructional details of batteries.
- D.C. supply system.
- Charging and discharging of batteries.
- Preparation of electrolytes.
- Battery plate assembly and dismantling practices.
- Care & maintenance of batteries.

Who may attend : Technicians working in Power Stations with 2-3 years experience.

3.4.150 E-Mobility Mission of India: Concepts & Implications

Program Profile

- Hybrid and Electric Vehicles for India (E-Mobility - Road, Rail, Metro & Drones).
- International Standards for EVs and their impact on EV deployment, R&D and manufacturing in India. (Future Trends and Market in EV deployment).
- EV System architecture concepts.
- EV Motor drives and controllers.

- Storage Systems & New Battery Technologies, Potential and Forecasts.
- EV Charging Systems. (Smart Grid, Charging Infrastructure and V2G).
- Power grid and renewable energy resources interfacing for EV Development. (ICT services for EV ecosystem).

Who may attend : Indian and global EV manufacturing industry in the automotive hub of India automotive industry leaders, Govt. leaders, policy makers, business people, innovators, technicians, consultants, and research and development professionals, all looking for greater efficiency, safety, and low carbon vehicle.

3.4.151 E-Mobility & Charging Infrastructure

Program Profile

- EVs: A clean mobility option.
- Motion and dynamic equations for vehicles.
- Propulsion requirements for vehicles.
- HEV architectures.
- EV architectures.
- Mechanical systems used in EVs and HEVs.
- Fundamentals of Regenerative Braking.
- Electrical machines for EVs and HEVs.
- DC-DC Converters.
- Boost and Buck-Boost Converters.
- Multi Quadrant DC-DC Converters.
- Voltage Control of DC-AC Inverters Using PWM.
- Control Systems for the HEV and EVs.
- The fuzzy logic based control system.
- Batteries for EVs.
- Fuel cell and supercapacitors.
- Electric vehicle charger.
- Electric vehicle charger technology.
- The EV charging station architecture.
- EV chargers and portfolio management.
- EV charging and the grid.
- Smart grid and EVs.

Who may attend : Engineering students and Working Professionals

3.4.152 E-Mobility: Concept & Implication

Program Profile

- Hybrid and Electric Vehicles for India (E-Mobility - Road, Rail, Metro & Drones).
- International Standards for EVs and their impact on EV deployment, R&D and manufacturing in India. (Future Trends and Market in EV deployment).
- EV System architecture concepts.
- EV Motor drives and controllers.
- Storage Systems & New Battery Technologies, Potential and Forecasts.
- EV Charging Systems. (Smart Grid, Charging Infrastructure and V2G).
- Power grid and renewable energy resources interfacing for EV Development. (ICT services for EV ecosystem).

Who may attend: Indian and global EV manufacturing industry in the automotive hub of India automotive industry leaders, Govt. leaders, policy makers, business people, innovators, technicians, consultants, and research and development professionals, all looking for greater efficiency, safety and low carbon vehicle.

3.4.153 Battery Energy Storage & Microgrids in India

Program Profile

- Energy Storage System Status in Global & Indian Market.
- Current Energy Storage Systems.
- Types and features of energy storage systems. (Classification of EES systems, Mechanical storage systems, electrochemical storage systems, Chemical energy storage, Electrical storage systems & Thermal storage systems).
- Standards & Technical Comparisons.
 - Standards for EES.
 - Technical comparison of EES technologies and On-grid solutions & off-grid solutions.
- Peak Load Management & DSM.
 - Benefits of storage and managing peak load.
- Markets for EES.
 - Present status of applications.
 - Utility use. (Conventional power generation, grid operation & service).
 - New trends in applications. (Smart Grid, Smart Microgrid, Smart House, Electric vehicles).
- Lead acid batteries.
 - Basics operating technology and battery performance requirement for different applications.
 - Different designs of lead acid to meet the performance requirements.
 - Materials & methods of manufacture of lead acid batteries.
 - Effect of material used Vs different performance requirements.
- T Q A of Lead acid batteries.
 - Understand various manufacturing processes, advantages and shortcomings of these processes.
 - Basic process of quality assurance.
 - Key quality control & test points for acceptance or rejection.
 - Symptoms for trouble and corrective measures.
- Lithium ion batteries.
 - Basic chemistry and their comparison related to performance, applications & cost.
 - Manufacturing advances, Battery components, Equipment & Recycling.
 - Energy Storage system Design considerations for grid applications.
- T Q A of Lithium ion batteries.
 - Safety, Standards, Testing and Certification related to ESS.
 - Key quality control & test points for acceptance and rejection.
 - Case studies of Energy storage projects in global scenario.

This two-day workshop will provide participants with knowledge of Microgrids, its architecture, Battery energy storage systems of both lead acid type and Lithium ion type its testing & quality analysis.

Who may attend: Officers of the power sector organizations, GENCO's, DISCOMs, Regulatory commissions, TRANSCOs and all power sector stakeholders.

3.4.154 Renewable Energy and Grid Interface Technologies and Regulatory Framework.

Program Profile

- Solar Energy.
- Wind Energy.

- Bio-Mass Energy.
- Renewable Energy Purchase Obligations.
- Tarriff Regulations related to Renewable Energy.
- Renewable Energy Power Evacuation Issues.
- Net Metering and grid Connectivity for Renewables.
- Role of Smart Grid in Integration of Renewable Energy and DSM.
- Renewable Energy Certificates.
- Grid Operation and balancing of Renewable Energy Power.
- Interconnection Standards of Distributed Generation.
- Point of connection and feed-in-tariff
- IEGC Grid Code standard for Solar and wind Farms.

Who may attend: Officers of the power sector organizations, GENCO's, DISCOMs, Regulatory commissions, TRANSCOs and all power sector stakeholders.

3.4.155 Grid Integration of Hybrid Generation: Review of existing Sub-Station Controls required for upcoming RE Mix in Switchyard and handling Intermittency with Grid and Energy Storage options

Program Profile

- Hybrid Generation Fundamentals and Challenges, Concepts of Grid Interface Technologies.
- Review of existing substation for Interconnection with upcoming RE Generation: Analytical Approach.
- Energy Balancing Mechanism and Scheduling of RE System with Adequate Controls for RE Interconnection in existing Switchyard.
- Hybrid Generation Era Grid Codes: Technical Standards and handling of Intermittency in Integrated Large Grid.
- Evolving Energy Storage Technologies (Pumped Storage, Battery Storage Technologies, Thermal Storage and Flywheels).
- Renewable Energy Regulation in Energy Market : Technology Options for Effective Open Access.

Who may attend : Engineers/Shift Engineers/Operators working in Hydro Power Plant.

3.4.156 Smart Transmission & Distribution System

Program Profile

It consist of various parameters of smart grid implementation such as economy, design technology options, reliability, quality & pay-back period. It includes various policies for advanced metering infrastructure (AMI) and AMI projects in India.

- Requirements for AMI infrastructures.
- Working of Advanced Metering Infrastructure (AMI).
- Metering Demand.
- Meter Data Management Systems (MDMS).
- Virtual and Aggregated Net Metering.
- Response (DR), including Virtual Power Plants (VPPs).
- Monitoring (WAMS) using PMU/PDCs.

Who may attend : Engineers, Technicians & working professionals in Transmission & distribution utilities.

VIII. IT, ICT, GIS & RS, BIG DATA ANALYTICS AND CYBER SECURITY

3.4.157 IT General for Utility Engineers

Program Profile

- Introduction to Computer, Internet, networking, Email, Hardware Etc.
- Elements of Word, Excel, PowerPoint or similar packages.
- Customer Care Services.
- Management Information System.
- E-Governance including advantages/Applicability of IT to present distribution system including Success Stories / Case Studies, Security / Access Rights.
- Data Center Operation and Maintenance.

Who may attend : Chairman/MD, Director, Chief Engineer, Chief Accounts Officer, Superintendent Engineer, Executive Engineer, Assistant Engineer, Deputy/Accounts Officer (or) any other equivalent rank mentioned above.

3.4.158 Cyber Security in Power Sector

Program Profile

- Evolution of cyber threats.
- Cyber security key challenges covering: Appreciation of threat itself, Challenges in the discovery of the threat, identifying the perpetrator or the source of the threat, determining the appropriate response, Lack of international legal framework.
- Cyber security objectives: Confidentiality, Integrity, Availability.
- Cyber security requirements : Identification, Authentication, Authorization, Trust, Access Control, Privacy.
- Components of cybersecurity strategy: Prevention, Detection, Response, Recovery.
- Five step methodology: Selection of use cases with cyber security considerations, Risk assessment methodology, Development of security architecture, High level security requirements, Assessment of smart grid standards.
- Privacy and smart grid.
- Research and development themes: Device level, Cryptography and key management, Systems level, networking issues.

Who may attend : Power Sector Professionals involved in Information security of the Power Sector, researchers, professionals from academic and R&D Institutions.

3.4.159 Smart Grid Technologies, Internet of Things and Cyber Security

Program Profile

- Conventional Electrical Grid, its Operation and Control.
- Smart Grid System, its architecture and Advantage.
- IoT aided Renewable Energy System – Solar & Wind – Smart
- Electric Vehicle – Smart Cities etc.
- Cyber Security Issues in IoT Based Smart Grid Systems & Solutions – Challenges.

Who may attend : Engineers Professionals.

3.4.160 Block Chain Technology.

Program Profile

- Introduction to Block Chain

- Smart Contracts and ledgers, Ethereum frame work
- Crypto Currency – Concepts & Applications
- Application of Block Chain Technology to power Industry

Who may attend : Engineers from Utilities/Faculties/ Research Scholars/PG & UG Students

3.4.161 Internet of Things for Smart Grid Applications.

Program Profile

- Conventional Electrical Grid , its operation & control
- Smart Grid System, its Architecture and advantage
- IoT aided Renewable Energy System – Solar –Wind- Electric Vehicles – Smart Cities
- Issues & Challenges in IoT based Smart Grid Systems

Who shall attend: Engineers/IT Professionals from Utilities/Faculties/Research Scholars/PG & UG Students

3.4.162 GIS and Remote Sensing Application in Hydropower Project

Program Profile

- Principles of remote sensing and Image processing. Creation of data base in GIS
- Open Data sources
- RS and GIS applications in estimation of inflow for projects
- Design flood estimation for hydropower projects
- Geospatial and hydrological modelling to assess hydropower potential zones and site location
- GIS in small hydroplaning resource management
- Geospatial information support for Power Projects
- Sediment yield modelling and reservoir sedimentation using GIS
- Impact of climate change on hydropower

Who may attend : Degree/Diploma Engineering Electrical, Electrical & Electronics, Power Engg. Mechanical, Civil Instrumentation and Electronics, Professionals in Utilities

3.4.163 Internet of Things For Robotics: On - Line Webinar

Program Profile

- Introduction to Embedded and IoT
- Arduino Programming & Proteaus Emulator
- Arduino Simulation & Serial Communication & Hands on Practice using Emulator
- Introduction to RaspberryPi - Inverse Kinematics Logic
- Different Type of Actuators 9 Dc Motor, Servo Motor & Stepper Motor)

Who may attend : Engineers/IT Professionals from Utilities/Faculties/Research Scholars/PG & UG Students

3.4.164 Data Science & Big Data Analysis with Industrial Orientation (Energy & Utility)

Program Profile

Energy Utilities has been helping Power sector to analyze their historical data. Data Analysis gave the utilities to predict events and suggest actions. What to do with that information, and how to mine it for trends, insights and predictors of future behaviour, has increasingly become a key driver for a successful Power business. Past few years have witnessed a phenomenal growth in the reach of data

Sciences. Big Data Analytics is basically looking for domain of analytics is to skills and perspective actions. Energy and Power Utilities are looking for Data Scientists, Data Engineers, Big Data Analysts, Data Strategist, Data Architect, Data Visualization Analyst, Data Quality Manager etc.

- Over view of data science
- Composition and types of data
- Data matrix and data mining
- Data mining and clustering of data
- Big Data Quality and data visualization

Who may attend : Engineering Professionals

3.4.165 Cyber Security Issues in Smart Grid System – Online - Webinar

Program Profile

- Evolution of cyber threats in Smart Grid.
- Cyber security key challenges in Smart Grid
- Cyber security objectives: Confidentiality, Integrity, Availability.
- Challenges in the discovery of the threat, identifying the perpetrator or the source of the threat, determining the appropriate response, Lack of international legal framework.
- Cyber security requirements: Identification, Authentication, Authorization, Trust, Access Control, Privacy for Smart Grid
- Components of cyber security strategy: Prevention, Detection, Response, Recovery.
- Cyber security considerations for Smart Grid, Risk assessment methodology, Development of security architecture, High level security requirements, Assessment of smart grid standards. Research and

development themes. Cryptography and key management, Systems level, networking issues.

Who may attend : Engineers from State Electricity Boards/ Power utilities/ Distribution System, R&D organizations, Academic institutions, manufactures, contractors, consultants etc.

3.4.166 Internet of Things for Smart Grid – Online - Workshop

Program Profile

- Conventional Electrical Grid, its Operation and Control.
- Smart Grid System, its architecture and Advantage.
- Internet of Things aided Renewable Energy System – Solar & Wind – Smart
- Internet of Things aided Smart Grid System
- Electric Vehicle – Smart Cities etc
- Cyber Security Issues in Internet of Things Based Smart Grid Systems , Solutions and Challenges.

Who may attend : Engineers from State Electricity Boards/ Power utilities/ Distribution System, R&D organizations, Academic institutions, manufactures, contractors, consultants etc.

3.4.167 Data Sciences & Big Data Analytics

Program Profile

- Current Challenges for Utilities.
- Big Data for Utilities transformation.
- Descriptive, Prescriptive & Predictive analytics.
- Case Studies with industrial Orientation (Energy & Utility).

Who may attend : Engineers/Faculties/ Research Scholars/ PG students.



800 MW Simulator Training Program for Trainees of SJVNL at NPTI Faridabad

IX. ENERGY EFFICIENCY, ENERGY AUDIT AND DEMAND SIDE MANAGEMENT

3.4.168 Energy Efficiency Management in Power System

Program Profile

- Salient features of power generation, transmission and distribution system equipments and their functioning and monitoring.
- Measurement of performance parameters and energy efficiency calculations.
- Energy efficient technologies.
- Demand side management.
- Investment decisions for enhancement of energy efficiency.

Who may attend : Engineers working in the area generation, transmission and distribution.

3.4.169 Energy Audit and Loss Reduction in T&D Systems

Program Profile

- General Introduction – Electrical System.
- Electric motor.
- Compresses Air System.
- HVAC& Refrigeration System.
- Power quality, Harmonics,manifestation measurement, migration.
- Fans & Blowers.
- Pumps & umping System.
- Cooling tower, Lighting System, Diesel Generating System.
- Energy efficient technologies in Electrical Systems.
- Compressed Air Systems.
- Tutorials, Case studies, Labs and Technical visits- This complies with the syllabus of BEE's Energy Manger-Paper-3.

Who may attend : Engineers from State Electricity Boards/ Power Utilities/corporation, PSU, R&D organizations, Academic Institutions, entrepreneurs & consultations, contractors involved in energy Audit & energy Audit & energy conservation project.

3.4.170 Energy Efficiency in Electrical Utilities

Program Profile

- General Introduction- Electrical systems.
- Power quality.
- Harmonics- manifestation measurement.
- Mitigation.
- Electric Motor.
- Compressed Air System.
- HVAC & Refrigeration System.
- Fans & Blowers.
- Pumps & Pumping System.
- Cooling Tower.
- Lighting System.
- Diesel Generating System.
- Energy Efficient Technologies in Electrical Systems.
- Tutorials
- Case studies.
- Labs and Technical Visits-this complies with the syllabus of BEE's Energy manger - Paper - 3.

Who may attend : Engineers form State Electricity Boards, Power Utilities/ Corporations,PSUs,R&D organizations, Academic institutions, entrepreneurs and consultants/

contractors involved in energy audit and energy conservation projects.

3.4.171 Energy Conservation and Energy Audit (For Generation Sector)

Program Profile

- Potential areas in the Power Industries for energy saving.
- Energy Saving methods with typical examples and exercises for power stations.
- Ways to minimise losses in power transmission & distribution system.
- Better use of electrical energy.
- Proper storage and use of fuel.
- Waste Heat areas and their utilization.
- Co-generation techniques for energy boosting.
- Energy Management System, energy Auditing and their implementation techniques for power industries.

Who may attend : Engineers with 3-4 years experience in Thermal Power Stations.

3.4.172 Energy Audit & Demand Side Management in Power Utilities

Program Profile

- Energy Scenario in the country and scope of energy conservation.
- Energy Losses: An Integrated optimal strategy for reduction of T&D Losses.
- Demand forecasting techniques.
- EMS & LMS and Role of Energy Managers.
- DSM Techniques.
- DSM Methodologies.
- DSM through Loss Reduction in Primary and Secondary Distribution System.
- Need for Energy Audit and Audit Procedures.
- Energy Audit – Macro Level & Micro Level.
- HT - Metering & Metering Technique.

Who may attend : Engineers with 3-4 years experience in Thermal Power Station.

3.4.173 Big Data Analytics & Data Science Training covering descriptive, prescriptive & predictive analytics hands on case studies with Industrial orientation (Energy & Utility)

Program Profile

Today's technologically - driven society, terabytes of data is being generated every day. Businesses have information about their customers, suppliers, products, subscribers and everyone else they have interaction with. Traditionally, business intellig ence has been helping firms analyze their historical data. However, tables turned when Data Analytics gave the power to predict events and suggest actions. What to do with that information, and how to mine it for trends, insights and predictors of future behaviour, has increasingly become a key driver for a successful business. Due to its potential, the past few years have witnessed a phenomenal growth in the reach of data analytics. Big Data Analytics is basically looking for two types of people – those who can channelize large amount of information and those who can translate business problems to analytical problems, while the ability to communicate remains intrinsic to both

roles. The domain of analytics is going to be immensely lucrative for young professionals with the right skills, aptitude and attitude. As more and more businesses and government organizations across the world are going to put their faith in data-driven decisions, a plethora of roles are emerging in this – such as Internet of Things (IoT) architect, marketing technologist, technology broker and chief data officer apart from the in demand roles like Data Scientists, Data Engineers, Big Data Analysts, Data Strategist, Data Architect, Data Visualization Analyst, Data Quality Manager etc. Recent Industry salary reports indicate that there is 32% increase in demand with people having Analytics qualifications over and above degrees in IT or business administration or even doctorates (2016) and data scientists earn more than CA's & engineers. A well-trained business analyst is going to be a much sought-after professional in the foreseeable future.

Who may attend : Engineering Professionals.

3.4.174 Energy Conservation and Energy Audit in Power Utilities

Program Profile

- Potential areas in the Power Industries for energy saving.
- Energy Saving methods with typical examples and exercises for power stations.
- Ways to minimise losses in power transmission & distribution system.
- Better use of electrical energy.
- Proper storage and use of fuel.
- Waste Heat areas and their utilization.
- Co-generation techniques for energy boosting.
- Energy Management System, energy Auditing and their implementation techniques for power industries.

Who may attend: Engineers with 3-4 years experience in Thermal Power Stations.

3.4.175 Accelerating Energy Efficiency in India: Initiatives & Opportunities

Program Profile

- Energy Efficiency: Potential and Benefits.
- Energy Efficiency initiatives: Targets, Strategies and Engagement.
- Energy Efficiency in Transport Sector: Potential, Saving measures & Investment.
- Energy Efficiency in Buildings Sector: Potential, Saving measures & Investment.
- Energy Efficiency in Industrial Sector: Potential, Saving measures & Investment.
- Lighting and Appliances - Instruments, Policies, Schemes/Programmes, Innovations.
- Energy Efficiency Finance: Public and Private Sector Investment.
- Energy Efficiency Progress: Examples from Developed and Emerging Economies.

Who may attend: The Workshop is Sector neutral and participation from across Industries, Transportation sector, Municipal corporations, Real estate developers, Researchers, Professionals from academic and R&D Institutions is solicited.

3.4.176 Energy Efficiency in Electrical Utilities

Program Profile

- Three-phase consumers with star and delta connections (R, L, C, RL, RC and RLC loads).
- Measurement with active and reactive energy meters: for symmetric and asymmetric RL loads in the event of a phase failure.
- In the event of over-compensation (RC load) for active loads in the event of energy-flow reversal.
- Determination of the first and second power maxima.
- Determination of the power maximum in the event of an asymmetric load.

Who may attend: Professionals from Power Sector, Engineers, Academicians, Equipment Manufacturers, Researchers, Engineering, Managers.



Inauguration of 4-Days Online Training Program for Forum of Regulators

X. POWER MANAGEMENT AND MANAGEMENT DEVELOPMENT PROGRAMS

3.4.177 Regulatory Framework in Power Sector

Program Profile

- Electricity Act 2003- legal framework, national electricity policy and tariff policy.
- Energy Conservation Act/Indian Electricity Grid Code, Regulations and Grid standards-Regulations 2010.
- CEA Regulations, connectivity, metering, construction of electrical lines, AT & C losses.
- Procedures, grant of approval for interstate transmission of power.
- Terms and conditions for Short term open access.
- Renewable energy generation regulations.
- Renewable energy scheduling, dispatch and deviation settlement - Regulations 2015.

Who may attend : System Operators from SEBs, Power Utilities/ Corporation, PSU, R&D Organization, Academic Institution.

3.4.178 Open Access, Power Trading and Tariffs - ABT Scenario

Program Profile

- Open Access in Transmission & Distribution.
- Electricity Act Provisions.
- Power Trading in Multi buyer and multi seller environment.
- Availability based tariff concept and importance.
- Balancing and settlement mechanism.
- Power trading rules in changed scenario.
- Role of Regulatory Commissions.
- Open Access challenges for Power Market.
- Power Exchanges and its functioning.
- Field visits/Demonstration.

Who may attend : Engineers with 2-3 years experience in power trading activity system operations from SEB's/ power utilities/corporations/PSU's R&D organization, Academic Institutions.

3.4.179 Management of Renewable Energy (Solar Energy in Particular); Finance and Economics of Renewable Energy

Program Profile

- Introduction to various forms of Renewable Energy Generation, Solar Energy in Particular.
- Managing Integrity of Renewable Energy to the Grid, Balancing of Grid, Concept of Smart Grid.
- Design aspects of installation of mini/micro Grid Solar Power Plant, Technical & Administrative Issues.
- Introduction to Renewable Energy Finance.
- Tariff Support Schemes.
- Project Finance Calculations.
- Basic Technical Calculations.
- Government Policy and Support Schemes.
- Project Finance Examples with Case Studies.

Who may attend : Individuals considering a consultancy job and/or those who have to evaluate the benefits of adopting renewable energy technology. Industrialists/ Entrepreneurs intending to invest in the Renewable Energy Sector. Working Technical Executives from various Power Sector Stake-Holders and Load Dispatch Centres.

3.4.180 Finance for Non Finance Executives

Program Profile

- Financial Statements - To study Profit & Loss Account and Balance Sheet as well as Cash Flow Analysis and to understand every term of these statements.
- Financial Statement Analysis - To study Ratio Analysis and to assess the financial health of an organization through Overhead Allocation Cost Analysis and Decision Making Financing and the Estimation of the Cost of Capital Investing and the Estimation of Risk Associated.
- Working Capital Management Capital Expenditure Decisions.

Who may attend : All technical and administrative personnel with 2-3 years experience.

3.4.181 Contract Management

Program Profile

- Purchase & Contract Management.
- Key Issues.
- On generation of Indent to Placement of Orders and Closing of Contract.
- E-Procurement and guidelines.
- Benefits of E-procurement over Off-line system of procurement.
- E-tendering.
- Some case studies and analysis.
- Quality Assurance Philosophy.
- Integrated Management System.
- ISO 9001 & ISO 18001 regarding OHSAS, ISO-14000 regarding EMS.

Who may attend : Finance Executives, Engineers, Management Level Executives with 2-3 years experience.

3.4.182 Behavioral Science

Program Profile

- Freud's theory of personality.
- Ice Breaker and warm up activities.
- Personnel Effectiveness and Behavioral skills.
- Personality development – Case Study.
- Evaluation and Human Behavior.
- Models of Human Behavior.
- Activity of Personnel effectiveness and leadership.

Who may attend : Jr. Level, Middle Level, Supervisor Level & Executives (Technical & Non-Technical).

3.4.183 Maintenance Planning & Cost Control

Program Profile

- Aims and objective of maintenance efficient, service, high plant availability, maintenance and planning engineer's duties.
- Integration of maintenance with operational requirements, plant reliability, plant outages and daily work programs.
- Preventive maintenance of running units.
- Planning of major plant overhauls during shut downs.
- Planning techniques-critical path analysis, charting systems etc.

- Purchasing and stores control-standards, cost codes, control of stores and store records.
- Cost control, Direct costs, indirect costs, outage costs, budgeting and costing works, budgetary control.
- Contract procedures, Conditions of contract, project evaluation, interest and depreciation charges.
- Use of computers in maintenance planning.

Who may attend : Engineers/Officers working in Power Stations/Industries with 5-10 years experience.

3.4.184 Electricity Act and Regulation

Program Profile

- Over view of IEA-2003.
- Electricity Grid Code.
- Status of Deregulation and Power Tariff.
- Open access and ABT

Who may attend : Engineers with 2-3 years experience in power trading activity system operations from SEB's/ power utilities/corporations/PSU's R&D organization, Academic Institutions.

3.4.185 Government e-Marketplace (GeM) and General Financial Rules (GFR) 2017

Program Profile

The 5-Day program will enable the participants to:

- Gain an overall understanding of the Government e-Marketplace (GeM) and General Financial Rules 2017.
- Understand how GeM and GFRs 2017 would impact the functioning of your organisation and changes in the procurement process required for compliance.
- Acquire practical knowledge of the different procurement procedures required under GFRs 2017 and GeM such as Registration of Organization, Creation of User Accounts, Placement of Order for Good & services, Receipt of Goods, PRC/CRAC, Bidding and Reverse Auction.

Who may attend: Officers of Central Government Ministries / Departments / State Governments including its attached / subordinate offices, Central Public Sector Units (CPSUs) / PSUs and Autonomous Bodies / Sellers / Service Providers registered on GeM.

3.4.186 Government e-Marketplace (GeM) for Sellers & Service Providers

Program Profile

- Overview of GeM, Terms and Conditions for sellers & services providers, GFRs 2017 – an overall perspective.
- Hands on training on GeM –: Registration of Organization / Creation of User Accounts.
- Overview of GeM, Terms and Conditions for sellers & services providers, upload of product and services on GeM.
- Hands on training on GeM– Acceptance of Order for Goods& Services / Creation of invoice, Acceptance of Payment Procedure for Payment in GeM.
- Hands on training on GeM – Participation in online Reverse Auction and Bidding.

Who may attend: Officers of Central Government Ministries / Departments / State Governments including its attached / subordinate offices, Central Public Sector Units (CPSUs) / PSUs and Autonomous Bodies / Sellers / Service Providers registered on GeM.

3.4.187 Procurement Procedures & Contracting

Program Profile

- Introduction & Concept of Public Procurement, Purchase Planning, Cost estimation & Indenting
- Tendering, Bidding & Contents of Bid documents
- Bid opening & Evaluation
- Issue of Letter of Award
- Post Award Execution
- E-Procurement
- General Financial Rules (GFR) relevant for procurement / Contracting
- Import purchasing
- Indian Contract Act
- INCOTERMS 2010
- Arbitration & Conciliation Act
- Bank Guarantees
- Taxes & Duties relevant for procurement
- Various types of insurance activities
- Procurement of Goods through Government-E-Market (GeM)

Who may attend: Officers of Central Government Ministries / Departments / State Governments including its attached / subordinate offices, Central Public Sector Units (CPSUs) / PSUs and Autonomous Bodies / Sellers / Service Providers registered on GeM.

3.4.188 Regulatory Issues in Power Sector

Program Profile

The course will include topics that directly address regulatory approaches aimed at enhancing the financial health of the Distribution Utilities by:

- Controlling Aggregate Technical and Commercial (AT&C) Losses.
- Improving efficiency.
- Improving the quality and reliability etc., of customer service.
- Economic, legal, and social rationale for electricity regulation.
- Role of regulation under the new legislation and economic environment.
- Types of regulation and making approaches.
- Regulation of quality of electricity supply and services.
- The role of the Middle Management executives of the utilities under independent regulatory framework.

Who may attend : Executive Engineer, Assistant Engineer, Deputy/Accounts Officer (or) any other equivalent rank mentioned above.

3.4.189 Leadership Skills and Stress Management

Program Profile

- Integrity.
- Development of Ability to delegate and effective Communication.
- Self-awareness and Gratitude.
- Learning agility and Empathy.
- Human body and stress
- Reason for stress
- Identification of stress
- Stress management techniques
- Healthy life style for stress management

Who may attend: Engineering and Management Professionals.

3.4.190 Human Resource Development Program for Finance Officer/ Manager

Program Profile

- Personality Development – Skills
- Attitudinal Development, Leadership, Team Building, Value & Ethics.

- Business Communication skills, Negotiation.
- Man Power Planning (MPP).
- Beyond the Present Role: Potential Systems.
- Quality of work Life (QWL).

Who may attend: Finance persons working in Power Stations/Industry with 5 to 10 years of experience.



8-weeks Training Program for Utility Power Tech. Ltd. (MEJA Thermal Power Plant) at NPTI Badarpur



Simulator Training at NPTI Nagpur

XI. ENVIRONMENTAL MANAGEMENT

3.4.191 Environmental Issues in Thermal Power Stations and FGD Technology

Program Profile

- Introduction to air and noise pollution.
- Noise and air pollution control legislation.
- Nature of air and noise pollution and its effect including pollution control methodology.
- FGD Technology for flue gas treatment.
- Noise and air pollution measurements & Control mechanisms including few case studies like Bhopal and green tribunals.
- Introduction to water pollution monitoring and analysis.
- Effect of water pollution, pollution control legislation.
- Removal of pollutants from waste water – sewage and sludge treatment.
- Zero discharge concepts Case studies of water pollution control implementation.
- Method of Environment Impact.

Who may attend : Junior / Senior Engineers of any process and power plant, Operational personnel Policy makers with 2-3 years experience.

3.4.192 Environmental Pollution & Pollution Control Related to Power Plants Engineering

Program Profile

- General description of different types of Industrial Pollution.
- Introduction to Air, Water and Noise Pollution.
- Nature of Air Pollutants.
- Water quality and health.
- Role of air and Noise Pollution control in modern society.
- Pollution control theory.
- Noise & Air Pollution Measurement & Equipment, the role of waste water treatment and the removal of Toxic Pollutants.
- Sewage and sludge treatment.
- Effects of pollutants in the Aquatic environment.
- Evaluation Pollution Effects on Plant Productivity.
- Legislation and the control of Air, Noise and Water Pollution.

Who may attend : Engineers/Chemists working in process Industry/Power Stations.

3.4.193 Air Pollution Monitoring & Control Technologies

Program Profile

- Basics of Air pollution control.
- Combustion control & No, Reduction.
- Dust Collector Mechanisms.
- Flue Gas desulphurisation.
- Denitrification of Exhaust Gas.
- Toxic Gas Treatment.
- Measurement of Air Pollutants.
- Environment monitoring system.
- Environment Impact Assessment Test.

Who may attend : Engineers/ Managers/ Researcher/ PG student

3.4.194 Environmental Impact Assessment and Environment Management Plan

Program Profile

- Methods for Environment Impact Assessment.
- Analysis of Environment Management Plant.
- Intepration of Environment and Impact Assessment.

Who may attend : Engineers/Faculties/ Research Scholars/ PG students.

XII Other Training Programs As Per The Requirement Of Client On Mutually Agreed Basis

3.4.195	Maintenance & Protection of Transformers
3.4.196	Emergency Operation of TPS and Power Plant Safety
3.4.197	Zero Accident Mindset to Protect Personnel Environment and Equipment
3.4.198	Potential Hazards in Power Plant
3.4.199	Safe Handling Procedures in Mechanical/ Electrical (Rotary and Static)
3.4.200	Fire Hazards in Power Plant

Note: Any Other Training Program as Per Customers Requirement



Online Training Program on Vibration Diagnostic and Fault Analysis for Engineers of L&T Power at NPIT Durgapur

3.5 SKILL DEVELOPMENT TRAINING PROGRAMS

NPTI has been empanelled as a Government agency with Ministry of Rural Development (MoRD) for conducting NSQF aligned training program on all India basis for Power Sector & Renewable Energy Sector vide notification no. 5/2019, dated: 26.02.2019 and the MoU has been signed with MoRD on 04.04.2019.

Vide Gazette notification No. 449, F. 43001/02/2013-NSDA, dated 05.12.2019 of Ministry of Skill Development And Entrepreneurship and 23rd meeting of NSQC held on 22.08.2019, NPTI has been recognised as an Assessment & Certification body for 60 Qualifications in Power Sector and Renewable Energy Sector. List of qualifications is given below:

Power Sector			
S.No.	Qualification File	Qualification Code	NSQF Level
1.	Assistant-Electricity-Meter-Reader-Billing-and-Cash-Collector	PSS/Q3001	3
2.	Assistant-GIS-Mapping-Power-Distribution	PSS/Q3006	3
3.	Assistant-Technician-Street Light Installation & Maintenance	PSS/Q3003	3
4.	ATS-Power Electrification		5
5.	Assistant Sub-Station (66/11,33/11KV)	PSS/Q3002	3
6.	Cable Jointer (ATS)		5
7.	Cable Jointer Electrical Power System	PSS/Q1002	4
8.	Consumer Energy Meter Technician	PSS/Q0107	3
9.	Distribution Linemen	PSS/Q30102	4
10.	Electrical Winder		2
11.	Electrician (CTS)	DGT/1001	5
12.	Electrician Domestic		2
13.	Electrician Domestic Solutions	PSS/Q6001	3
14.	Electrician Industrial		3
15.	Electrician (Steel Plant) (ATS)		5
16.	Electrician Transmission Line		2
17.	Engineer - Power Distribution	PSS/Q7001	6
18.	Junior Engineer (JE)-Power Distribution	PSS/Q3004	5
19.	Linemen (ATS)		5
20.	Lineman Construction - Distribution	PSS/Q0108	4
21.	Lineman Distribution (Multi Skilled)	PSS/Q2011	4
22.	Mechanic (HT, LT Equipments and Cable Jointing (ATS))		5
23.	Power Electrician (ATS)		5
24.	Senior Lineman-Distribution	PSS/Q0103	5
25.	Stream Turbine Cum Auxiliary Plant Operator (ATS)		5
26.	Technician Helper (Distribution)	PSS/Q0101	2
27.	Technician Distribution Transformer Repair	PSS/Q3003	4
28.	Wireman (ATS)		5
29.	Wireman (CTS)	DGT/1009	4

Renewable Energy Sector			
S.No.	Qualification File	Qualification Code	NSQF Level
1.	Solar PV Installer – Civil	SGJ/Q0103	4
2.	Solar PV Installer (Suryamitra)	SGJ/Q0101	4
3.	CTS - Solar PV Installer – Electrical	SGJ/Q0102	4
4.	Solar Electric System Installer and Service Provider	RNE701	3
5.	Rooftop Solar Grid Engineer	SGJ/Q0106	5
6.	Solar Proposal Evaluation Specialist	SGJ/Q0105	7
7.	Solar LED Lighting Product (Design and Manufacturing)	NL/M/L4/C022	4
8.	MES - Solar PV Technician	RNE805	3
9.	Manufacturing Assistant - Solar Hot water System	RNE703	3
10.	MES - Solar Hot water System Installation and Service Technician	RNE702	3
11.	CTS - Solar Technician Electrical	DGT/1126	4
12.	Solar PV Business Development Executive	SGJ/Q0107	5
13.	Solar PV Structural Design Engineer	SGJ/Q0109	5
14.	Solar PV Designer	SGJ/Q0110	7
15.	Solar PV Project Helper	SGJ/Q0111	2
16.	Solar PV Engineer (option: Water pumping System)	SGJ/Q0112	5
17.	Solar PV project manager (E & C)	SGJ/Q0114	7
18.	Solar PV Maintenance Technician – Electrical (Ground Mount)	SGJ/Q0115	4
19.	Solar PV Maintenance Technician – Civil (Ground Mount)	SGJ/Q0116	4
20.	Solar Lightening Technician (Options: Home Lightening system/ Street Light)	SGJ/Q0201	4
21.	Solar PV Manufacturing Technician	SGJ/Q0119	4
22.	Recyclable Waste Collector and Segregator	SGJ/Q6101	4
23.	Safai Karamchari	SGJ/Q6102	3
24.	Waste Picker	SGJ/Q6103	3
25.	Waste Water treatment Plant Helper	SGJ/Q6602	4
26.	Waste Water treatment Plant Technician	SGJ/Q6601	4
27.	Solar power plant installation, Operation and maintenance, petty contractor, Solar product retailer		5
28.	Certification Course in: Sustain and enhance technical knowledge in Solar energy Systems		5
29.	Certification Course on. Laboratory Technicians for energy efficacy, Star labelling and other electrical testing for environmental criteria		6
30.	Solar PV System Installation Engineer	ELE/Q5902	5
31.	Solar & LED Technician (Electronics)	ELE/Q5902	4



Shri S.M. Chauthaiwale, GM-Cum-Business Unit Head of NTPC - SAIL visited NPTI-ER on 28-12-2020 and interacted with the participants of Skill Development organised under CSR of NSPCL

CHAPTER 4: WORKSHOPS AND SEMINARS



WORKSHOPS AND SEMINARS AT NPTI : 2021-22

S. No.	Name	Duration	Date	Organising Institutes
01.	E- Mobility and Charging Infrastructure development in India	01 Day	08 th October, 2021	NPTI - Faridabad
02.	Development of Smart Power Architecture for Power Distribution Utilities	02 Days	10 th -11 th January, 2022	NPTI - Faridabad
03.	One day National Seminar on Block Chain Technology	01 Day	3 rd September, 2021	NPTI - Badarpur
04.	One day National Workshop on Energy Storage & E Mobility	01 Day	3 rd December, 2021	NPTI - Badarpur
05.	National Conference on “Regulatory Framework in Electricity Industry India- Challenges, Governance& Future Roadmap”	02 Days	9 th -10 th December, 2021	NPTI - Durgapur
06.	National Seminar on “Future Scenario and Challenges of Indian Power Sector”	02 Days	17 th -18 th February, 2022	NPTI - Durgapur
07.	Workshop on Electric Vehicle and its Eco System	01 Day	10 th -11 th January, 2022	NPTI - NER
08.	Workshop on Grid Connected PV Plant	01 Day	21 st January, 2022	NPTI - NER
09.	Seminar/Workshop on Live Line Maintenance on Distribution Lines using Rubber Gloves method using Ariel Vehicle	02 Days	To Be Announced	NPTI (HLTC), Bangalore
10.	Workshop on EV charging station	02 Days	To Be Announced	NPTI (HLTC), Bangalore
11.	Workshop on SF6 Breaker Maintenance	03 Days	To Be Announced	NPTI (HLTC), Bangalore
12.	SCADA and Substation Automation	02 Days	To Be Announced	NPTI (HLTC), Bangalore
13.	Recent Development in Transmission line and Switch yard Maintenance	02 Days	To Be Announced	NPTI (HLTC), Bangalore
14.	Substation Maintenance	02 Days	To Be Announced	NPTI (HLTC), Bangalore
15.	Distribution line Maintenance	02 Days	To Be Announced	NPTI (HLTC), Bangalore
16.	02-Days National Workshop on Energy Options for Integrated Grid Operation in Renewable Energy Era	02 Days	28 th – 29 th October, 2021	NPTI (PSTI), Bangalore
17.	02-Days National Workshop on Cyber Security Issues in Upcoming Smart System Infrastructure	02 Days	20 th – 21 st January, 2022	NPTI (PSTI), Bangalore
18.	Energy Storage Technologies – On-line Workshop	02 Days	30 th August, 2021	NPTI - Neyveli
19.	Electrical Safety in Power Utilities– On-line Workshop	02 Days	22 nd November, 2021	NPTI - Neyveli
20.	Renewable Energy & Integrity Challenges – On-line Workshop	02 Days	23 rd December, 2021	NPTI - Neyveli
21.	Internet of Things for Smart Grid – On-line Workshop	02 Days	27 th January, 2022	NPTI - Neyveli
22.	Cyber Security Issues in Smart Grid System- On-line Webinar	02 Days	31 st January, 2022	NPTI - Neyveli
23.	Renewable Energy Technologies – Indian Perspective and Challenges	01 Day	24 th September. 2021	NPTI - Nagpur
24.	New Technologies in Indian Power Transmission Sector - Opportunities and Challenges	02 Days	09 th December, 2021	NPTI - Nagpur

CHAPTER 5: NPTI PUBLICATION

To dissipate the knowledge among the technical domain, NPTI publishes huge number of books, manuals, notes etc. These resource materials are prepared by domain experts and are meant to give in depth exposure and knowledge to the readers in related fields.

S.No.	Title	Price (₹)	Price (US\$)
A) THERMAL POWER PLANT			
1	Thermal Power Plant Familiarisation (Vol.I)	400	20
2	Thermal Power Plant Familiarisation (Vol.II)	600	30
3	Thermal Power Plant Familiarisation (Vol.III)	425	21
4	Thermal Power Plant Familiarisation (Vol.IV)	400	20
5	Thermal Power Plant Operation	600	30
6	Thermal Power Plant Metallurgy	175	09
7	Ash Handling	250	13
8	Fuel Handling System Operation (Hindi)	250	13
9	Schematic Diagram (210 MW Thermal)	350	18
10	Fuel Handling System Operation	250	13
11	Environmental Management in Power Sector	600	30
12	Thermal Power Plant Performance and Efficiency Monitoring	425	21
13	Thermal Power Plant Chemistry	350	18
14	500 MW Fossil Fuel Power Plant Simulator Operating Procedures	550	28
15	Atmospheric F B C Boilers	250	13
16	Boiler Feed Pump Design, Construction & Operation	250	13
17	Circulating F B C Technology	250	13
18	Power Station Safety	350	18
19	Safety in Power Station (Hindi)	200	10
20	210 MW Thermal Schematic Diagrams (Combustion Engineering Boiler & KWU Turbine)	200	10
21	HP - LP Bypass System	350	18
22	Pulverisers and Feeders	200	10
23	Pulverised Fuel Fired Boilers	350	18
24	KWU Steam Turbine Governing and Protection System	425	21
25	210 MW Turbo Generator Operation and Stability	200	10
26	Lubrication Systems for Power Station	300	15
27	210 MW Simulator Training	550	28
28	Steam Turbines for Power Generation	650	33
29	Vibration	200	10
B) HYDRO POWER PLANT			
30	Hydro Power Plant Familiarisation	400	20
31	Hydro Power 2000: An Indian Perspective	1000	50
32	Silting Problems in Hydro Power Plants & Their Possible Solutions	495	25
33	Up rating and Refurbishment of Hydro Power Plants	495	25
34	Hydro Environment Interface	950	48
35	Small Hydro	595	30
C) COMBINED CYCLE GAS TURBINE POWER PLANT			
36	Gas Turbine and Combined Cycle Power Plant	400	20
D) CONTROLS AND INSTRUMENTATION			
37	Control & Instrumentation (Vol. I)	600	30
38	Control & Instrumentation (Vol. II)	425	21
39	Control & Instrumentation (Vol. III)	350	18
40	Data Acquisition System & Distributed Digital Control	250	13
41	Condition Monitoring of Power Transformers	250	13
42	Programable Logic Controller & Fuzzy Logic Controller and their Applications in Instrumentation	250	13
43	Control Valves Selection and Sizing	300	15
44	Programable Logic Controls	50	18
E) REGULATORY ISSUES			
45	Journal on ERC Orders-2nd Edition	595	30
F) MAINTENANCE MANUALS			
46	Motor Maintenance	200	10
47	Battery Maintenance	250	13
48	Battery Maintenance (Hindi)	250	13
49	Valve Maintenance	350	18
50	Pump Maintenance	400	20
51	Pump Anurakshan (Hindi)	350	18
52	Relay Maintenance	200	10

53	Maintenance Planning & Cost Control	250	13
54	Maintenance of Power Transformers	350	18
G) POWER PLANT AUXILIARIES			
55	Fans & Heaters	425	21
56	Fan & Heater (Hindi)	425	21
57	Compressor & Compressed Air	200	10
58	Valves	400	20
59	Power Station Pumps	350	18
H) POWER SYSTEMS MANUALS			
60	Electrical Protection System	350	18
61	Power System Studies and Load Despatch	350	18
62	Modernisation of Power Distribution (Focus on APDRP)	595	30
63	Power Transmission & Distribution	495	25
64	Load Management in Power Sector	400	20
65	Static Excitation System	250	13
66	Energising Your Power Utility	395	20
67	Basics of Electric Power System	200	10
I) SUB STATION MANUALS			
68	O&M of EHV Sub-Stations Vol. I	250	13
69	O&M of EHV Sub-Stations Vol. II	200	10
J) RENEWABLE ENERGY SOURCES			
70	Renewable Energy	595	30
71	Non-Conventional Power Plants	350	18
K) ENERGY AUDIT MANUAL			
72	Manual on Energy Conservation and Management	250	13
73	Energy Audit and DSM in Power Utilities	400	20
L) OTHER MANUALS			
74	Computer Ka Aadharbhoot Gyan (Hindi)	250	13
75	National Training Policy for the Power Sector	200	10
76	Rashtirya Prashikshan Neeti (Hindi)	200	10
77	Environmental Pollution & Pollution Control	250	13
78	Selected Readings on Finance for Non-Finance Executives	260	13
79	Overview of Indian Power Sector-Organizational Setup	180	09
80	Inventory and Store Management	130	07
81	Selected Readings on General Management	240	12
82	Selected Readings on Communication in Power Sector	270	14
83	Selected Readings on "Power System Communication"	110	06
84	Procurement Procedures & Contracting	500	25
85	Overview of Indian Power Sector - Regulatory Framework	350	18
86	Boiler Tube Failure Analysis and Prevention	160	08
87	Power Distribution Franchisee	360	18
88	CSR and Hydro Sector	230	12
89	Rehabilitation and Resettlement "Challenges in Hydro Sector"	260	13
90	Distribution Franchisee Business : A Case Study of Nagpur	400	20
91	Management of Transmission System	620	32
92	Hydro Power Plant Familiarisation (Chetram Meena)	500	25
93	Fundamentals of O& M of Hydro Power Plant (Vol. I)	190	10
94	Fundamentals of O& M of Hydro Power Plant (Vol.II)	300	15
95	Fundamentals of O& M of Hydro Power Plant (Vol. III)	260	13
96	Fundamentals of O& M of Hydro Power Plant (Vol. IV)	160	08
97	Fundamentals of O& M of Hydro Power Plant (Vol. V)	270	14
98	EHV Power Transformers : Reliability Issues	150	08
99	Energy Audit and Energy Conservation Techniques for Thermal Power Stations	530	27

1. Packing and forwarding charges ₹ 50/- per book payable extra.
2. **Special Offer:** All books carry 10% discount for all and 30% discount for students.
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CHAPTER 6: MULTIMEDIA COMPUTER BASED TRAINING (CBT) PACKAGES

In order to enable distance mode of learning, NPTI has prepared a huge collection of CBT's, which consist of expert lectures/tutorials/demos which cover huge gamut of topics related to power sector and other allied sectors. These are very useful as a self learning tool for fresh and practicing engineers.

Sl. No.	Name of the Multimedia CBT Package	Price of 1st copy	Price of 2nd 3rd & 4th	All other copies
COAL THERMAL				
A) BOILERS				
1.	Combustion System in Boilers	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
2.	Boiler Drum and Drum Internals	-do-	-do-	-do-
3.	Super Heater, Re-heater and De-Super Heater	-do-	-do-	-do-
4.	Air Heater	-do-	-do-	-do-
5.	Fuel Handling System, Feed Heating System & Exhaust System	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
6.	CFB Boiler	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
B) TURBINES				
7.	Water/Steam cycle of a Thermal Power Plant	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
8.	Steam Turbine Construction	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
9.	Turbine Governing System (KWU)	-do-	-do-	-do-
10.	Regenerative Feed Heating System	-do-	-do-	-do-
11.	Turbine Vacuum System	-do-	-do-	-do-
12.	HP-LP Bypass System	-do-	-do-	-do-
13.	Turbine Lubricating Oil System	₹ 15,000/-	₹ 10,000/-	₹ 8,000/-
14.	P. I. D. Control	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
C) GENERATORS				
15.	Working Principles of Generator & Electrical Systems in a Thermal Power Station	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
16.	Generator Construction	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
17.	Generator Excitation System	-do-	-do-	-do-
18.	Generator Seal Oil System	-do-	-do-	-do-
19.	Generator Cooling System	-do-	-do-	-do-
D) AUXILIARIES				
20.	Power Station Fans	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
21.	Electrical Motors in Power Station	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
22.	Coal Mills & Milling Systems	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
23.	Electrostatic Precipitators	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
24.	Cooling Water System	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
25.	Compressed Air, Water Treatment & Fire Prevention Systems	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
26.	Lub Oil Handling System	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
27.	Couplings for Power Transmission	₹ 15,000/-	₹ 10,000/-	₹ 8,000/-
28.	Pumps used in Power Station	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
29.	Boiler Feed Pump for Power Station	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
30.	Valve Maintenance	₹ 15,000/-	₹ 10,000/-	₹ 8,000/-
CCGT / GAS THERMAL				
31.	Combined Cycle Gas Turbine (CCGT) Plant	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
32.	Gas Turbine	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
33.	Control System of CCGT Plant	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
34.	Water Treatment of CCGT	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
HYDRO				
35.	Hydro Generator Construction	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
36.	Silting Problems in Hydro Power Plants	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
37.	Hydro Turbine	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
38.	Hydro Environment interface	₹ 15,000/-	₹ 10,000/-	₹ 8,000/-
39.	Hydro Generator Protection	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
40.	R & M for Hydro Power Station	₹ 10,000/-	₹ 8,000/-	₹ 6,000/-
T & D				
41.	Power Transformers	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
42.	Condition Monitoring of Power Transformers	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
43.	Maintenance of Power Transformers	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
44.	Power Station Switchgear	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
45.	Switchgear Maintenance	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-

46.	Sub Station Maintenance Management - A System Approach	₹ 15,000/-	₹ 10,000/-	₹ 8,000/-
47.	Drying out System of Power Transformers and Reactors	₹ 15,000/-	₹ 10,000/-	₹ 8,000/-
48.	Cable and Cable Jointing	₹ 25,000/-	₹ 15,000/-	₹ 12,000/-
49.	Motor & Motor Maintenance	₹ 15,000/-	₹ 10,000/-	₹ 8,000/-
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51.	Renewable Energies	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
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52.	Project Management through the Technology Consciousness	₹ 40,000/-	₹ 25,000/-	₹ 15,000/-
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53.	Rajbhasha Hindi Ki Sambhidhanic Sthiti aur Karyalaya Prayog	₹ 6,000/-	₹ 4,000/-	₹ 3,000/-
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Skill Development on “Welding Practice-Arc & Gas” sponsored by Bokaro Power Supply Co. Ltd. under CSR activities at NPTI Durgapur



Two Weeks Simulator Training Program at NPTI-Shivpuri, for PGDC Students from NPTI SR

CHAPTER 7: CONSULTANCY SERVICES

In order to serve the industry requirements and make best usage of infrastructure and expertise, NPTI has been providing consultancy services to various Power Sector Organisations. The salient details are mentioned below.

i) DPRs under R-APDRP, Part-B for the 11th Plan

- Energy & Power Department of Sikkim (2 Towns)
- Purvanchal Vidyut Vitran Nigam limited (PuvVNL), Varanasi (29 Towns).
- Tripura State Electricity Corporation Ltd. (TSECL), Tripura (16 Towns).
- Assam Power Development Corporation Ltd. (APDCL), Assam (69 Towns).

ii) Tier-I, Third Party Inspection Agency (TPIA) Quality Inspection Works for Rajiv Gandhi Grameen Vidyut Yojana (RGGVY) for the 10th & 11th Plans

- **Mangalore Electricity Supply Company Ltd. (MESCOM), Karnataka**, for their Chikmagalur & Kadur Districts for 11th Plan.
- **Gulbarga Electricity Supply Company Ltd. (GESCOM), Karnataka**, for all their Districts viz., Bidar, Raichur, Koppal, Bellary etc.
- **Hubli Electricity Supply Company Ltd. (HESCOM), Karnataka** for all their 5 Districts viz. Dharwad, Gadag, Haveri, Bijapur & Bagalkot.

iii) Other Consultancy Assignments completed

- NPTI provided Consultancy services to **WAPCOS** for preparation of DPR for establishment of Power Training Institute in **Bhutan**.
- NPTI provided Consultancy services to **NHPC** for preparation of DPR for establishment of Hydro Power Training Institute in **Jammu & Kashmir**.
- NPTI in association with TATA Consulting Engineers (TCE) has completed an assignment of preparation of a Feasibility Study for establishing a "National Power Academy" in the Kingdom of **Saudi Arabia**.
- NPTI worked as **REC Quality Monitors (RQM) for Tier – II Inspection of RGGVY works** for the Six (6) states viz., Mizoram, Manipur, Meghalaya, Nagaland, Tripura and Jammu & Kashmir. The assignment included Quality Inspections of Pre-shipment and Village Electrification Works as Rural Electrification Corporation's Quality Monitors (RQM).
- NPTI carried out an assignment of Commercial System Analysis of the Power Distribution Company of **Purvanchal Vidyut Vitran Nigam Ltd. (PuvVNL), Varanasi** for Reduction in Revenue Loss in its various electricity circles.
- Based on the appreciable performance of the assignments carried out **PuvVNL, Varanasi** again awarded Meter Testing, Checking and replacement in its various electricity distribution circles.
- **Bureau of Energy Efficiency (BEE)** awarded a Consultancy Assignment for Training of Master Trainers on "Demand Side Management & Energy Efficiency" for various DISCOMs in India. The assignment includes visits to various Distribution Utilities across India to assess their training needs and formulate/design syllabus and Course Contents and train the junior & middle management level officers for the best DSM & Energy Efficiency practices for furthering the cause in their respective Distribution Utilities.
- **Dakshinanchal Vidyut Vitran Nigam Ltd. (DvVNL), Agra**, engaged NPTI for Preparation of DPRs of 17 Distribution Circles of DvVNL, comprising 21 Districts of Uttar Pradesh under Integrated Power Development Scheme (IPDS).
- **Dakshinanchal Vidyut Vitran Nigam Ltd. (DvVNL), Agra** engaged NPTI for Preparation of DPRs of 07 Districts of DvVNL of Uttar Pradesh under Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

iv) Current Consultancy Work/Projects

- **PMA work in NESCO & WESCO, Odisha**: - NPTI bagged a Consultancy assignment as Project Management Agency (PMA) for DDUGJY & IPDS works in WESCO & NESCO Utility area of OPTCL.
- **IPDS project of APDCL, Assam**: - NPTI has bagged Letter of Award (December 2018) for engagement as Project Management Agency (PMA) for the works under IPDS from Assam Power Distribution Company Ltd (APDCL).
- **NTPC- TPIEA Work**: - NPTI has been awarded the work of Third-Party Inspection Agency (TPIA) by NTPC for TPIA Inspection of 15 Districts of Odisha under 12th Plan DDUGJY Projects being implemented by NTPC. NPTI has to conduct inspection of 7000 Villages and submit the reports accordingly to NTPC.
- **PuvVNL - Project Management Agency (PMA)/Consultant** - NPTI has been appointed as Project Management Agency (PMA)/Consultant to provide services for the works of Unmetered to metered consumers in rural areas of all districts under in PuvVNL to provide complete Project Management services by hand holding the project of PuvVNL, Varanasi DISCOM in the state of Uttar Pradesh under "the works of Unmetered to Metered consumers in rural areas of all districts under in PuvVNL."
- **PuvVNL DPR** – NPTI has been awarded the work for "Preparation of DPR including SCADA system for conversion of HT/LT over head line to undergrounding, erection of DT and electrical connection of consumer from over head to underground and other associated construction work of different area of Varanasi City under Purvanchal Vidyut Vitran Nigam Ltd."
- **Vigilance Inspection of UPPCL**– NPTI has been appointed as an agency to carry out the Third Party Audit of Performance of billing agencies in rural areas of Uttar Pradesh Power Corporation Limited, a holding company of five Discoms viz. Dakshinanchal Vidyut Vitran Nigam Ltd. (DvVNL), Madhyanchal Vidyut Vitran Nigam Ltd. (MvVNL), Paschimanchal Vidyut Vitran Nigam Ltd. (PvVNL), Purvanchal Vidyut Vitran Nigam Limited. (PuvVNL) and KESCO – Kanpur. **UPPCL Mainpuri** – NPTI has conducted the work of "Third Party Independent Evaluating Agency for Quality Monitoring (Assurance) work in Saubhagya Scheme in 30 villages of District Mainpuri, Uttar Pradesh".
- **Audit of TRW of UPPCL**- NPTI has been awarded the work of Technical, Material & Financial Audit of medium & small Distribution Transformer Repair Workshops in Discoms of Uttar Pradesh.
- **TPIA Work of Delhi Transco Limited**- NPTI has been awarded the Third party inspection of equipments/material, civil works, electrical works and technical audit of substation and Tr. Lines of Delhi Transco Limited.
- **TPIA work of DvVNL Agra**- NPTI has been awarded the work of Third Party Inspection Agency(TPIA) for inspection for Materials /Equipments procured in favour of Dakshinanchal Vidyut Vitran Nigam Limited. (DvVNL), Agra.
- **DPR of Ayodhya city under MvVNL**- NPTI has been awarded LOI for the work of "Preparation of DPR with estimate including SCADA System for conversion of HT (33KV & 11KV)/LT over head line to undergrounding, erection of distribution transformer and electrical connection of consumer from over head to underground with GPS and other associated construction work for existing and proposed system of different area of Ayodhya city Nagar Nigam limits under Madhyanchal Vidyut Vitran Nigam Ltd."

CLIENTELE AND RECRUITERS OF NPTI



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Afghanistan, Bangladesh, Belarus, Bhutan, Cambodia, Ecuador, Ethiopia, Iraq, Kenya, Libya, Malaysia, Mexico, Myanmar, Nepal, Nigeria, Oman, Papua New Guinea, Philippines, South America, Sri Lanka, Sudan, Syria, UAE, Zambia, Zimbabwe



NATIONAL CLIENTELE

NPTI has been catering to the Training Needs of Power Sector Organizations and Process Industries such as Steel, Cement, Aluminum, Fertilizers, Refineries viz., ACC, AECO, APGENCO, Avantha Power & Infrastructure Ltd., B.C. Roy Engineering Collage, Durgapur, (W.B.), BBMB, BEIET Batinda, BHEL, BIET Jhansi, Bokaro Power Supply Corporation Ltd., BPCL, BSES, C.E.T. Bhubaneswar (Odisha), C.V. Raman Engineering College, Bhubaneswar (Odisha), CEA, CESC, Chhattisgarh State Power Generation Corporation Ltd., Chhattisgarh State Power Transmission Ltd., CLP (I) Pvt. Ltd., CSPTCL, CVPPL, Dakshin Haryana Bijli Vitran Nigam Ltd., DPL, DTL, DVC, ECIL, FACT, Forum of Regulators, GAIL, GITA Bhubaneswar, GITAM Hyderabad, GMR Energy Ltd., GRASIM Industries, HINDALCO, Hindustan Copper Limited, HPGCL, Ideal Energy Power Ltd., IFFCO, IIIT Bhubaneswar, IIT Indore, IOCL, IRCON, IREDA, ITM Gwalior, Jindal Power, JSS Academy Noida (U.P.), KPCL, KRIBHCO, KSEB, L&T Power Ltd., Lanco Infratech Ltd., Lanco Kondapalli Power Ltd., Lanco Power, Lanco Vidarbha Thermal Power Ltd., MOIL Nagpur, MPEB, MPPTCL, MSETCL, NALCO, National Hydroelectric Power Corporation Ltd., NEEPCO, Neotia University (Kolkata), NFL, NHDC, NIST Bhubaneswar (Odisha), NIT Hammirpur, NIT Riapur, NIT Warangal (Telangana), NITS Gwalior, NLC, NPC, NTPC Baruani, NTPC, OHPC, ONGC, OPGCL, P.K. University, Shivpuri (M.P.), POSOCO, Power Grid Corporation of India Ltd., PPN Power, Generating Company Ltd., Rajasthan Rajya Vidyut Utpadan Nigam Ltd., Reliance Infrastructure, RRVNL, S R Group of Institutions Jhansi, SAIL, SJVNL, South Eastern Coalfields Limited, Sterlite Grid Ltd., Sterlite Power Transmission THDC, Tata Power Company Ltd., THDC LTD., Torrent Power Ltd., Toshiba, Udipi Power Corporation Ltd., UP Rajya Vidyut Utpadan Nigam Ltd., UPRVNL, VCE Burla Odisha, WAPCOS, etc.



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Visit of Campus Recruitment Team of JSW Energy at NPTI Faridabad





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Bengaluru - 560082

Maharashtra

South Ambazari Road, Gopal Nagar,
Nagpur - 440 022

Tamil Nadu

Block 14, NLC Township, Neyveli - 607803

Haryana

NPTI Complex, Sector-33,
Faridabad - 121 003

Kerala

Pallippuram, Cherthala Taluka,
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New Delhi

Badarpur, New Delhi -110044

West Bengal

City Centre, Durgapur - 7132616

Karnataka

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Banashankari II Stage, Bengaluru - 560070

Madhya Pradesh

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District: Shivpuri -473551

Punjab

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District: Ropar - 140124