# Prospectus

## CEA Approved Online Certification Course in

## Transmission and Distribution Systems with Automation SCADA/ DMS & other Technological Interface like Smart Grid, Smart Meter with AI & ML and IoT Complying Industry Rev 4.0


***Duration: 06 Months***

CLICK TO REGISTER

**Central Board of Irrigation and Power**
**Centre of Excellence**
**Plot No-21, Sector-32, Gurgaon, Haryana**
**Website- www.cbip.org**

# CENTRAL BOARD OF IRRIGATION & POWER

**Centre of Excellence, Plot No.21, Sec-32, Gurugram – 122001. www.cbip.org**

# ONLINE CERTIFICATION COURSE (CEA APPROVED) IN TRANSMISSION AND DISTRIBUTION SYSTEMS WITH AUTOMATION SCADA/DMS

## WHY YOU SHOULD JOIN?

The Indian Power Sector is changing substantially in its institutional arrangements for its regulation as well as the structure. Apart from technological and perception changes, major changes have been introduced in the Power Sector through Private participation, reforms and restructuring. It has further created a large demand for the trained persons in Electrical Utilities.

This is an Online Certification Program focusing on Transmission and Distribution for those who desire to make a career in the Power Sector and also for Working Professionals who are looking for Capacity Building. On successfully undergoing this course the Graduate Engineer will find immense opportunities of employment in Indian Power Sector.

## ABOUT CBIP AND THE COURSE:

A prime organization set up by Govt. of India in 1927 and now a registered society providing services to Indian Power, Renewable Energy and Water Resources sector. Recognized as Category-I, Training Institute by Ministry of Power, Government of India under CEA Regulations 2010. The course content complies with the syllabus for Engineers and Supervisors for Operation and Maintenance of Transmission and Distribution Systems as per Safety and Electric Supply Regulations 7(3) of Govt. of India, CEA Certified.

The training program comprises Classroom and Practical sessions. The Practical session (including Hands-on Training, Substation & Site visits) of about 4 weeks (20 days) will be conducted in Physical (Offline) mode at Substation/ Sites at Gurgaon and Delhi/ NCR. The main objective of the course is to provide specialized training to the professionals in Transmission & Distribution and create a technically and professionally trained manpower to make available for Power industry.

## COMPANIES VISITED:

Fresh Graduates and Experienced Engineers those who are looking for Jobs in Power Sector should enrol for the course. The Course is Industry Oriented and CBIP will assist in Placement activities for the CBIP trained participants.

Many of our previous batch trainees are employed with reputed Organizations like ABPS Infrastructure, Lumino Industries, Nangia Andersen, Hyosung T&D, TATA Power DDL, ERDA, Taurus Powertonics, Noida power (NPCL), Skipper Electricals (SEIL), Adani Transmission, Bajaj Electricals, Toshiba T&D, Manav Energy, GEPDEC, Tata Projects and many others.

## IMPORTANT POINTS

The mode of Training will be Online/ Virtual (through MS Teams Platform) for Class-room Sessions which will be of about 22 weeks' duration. The participants shall have to be Physically available for Practical/ Hands- On Sessions which will be conducted in Offline mode for about 4 weeks. The participants will be informed for their availability in prior so that they can conveniently plan for attending the Practical/ Hands- On sessions.

**ELIGIBILITY:**
Bachelor of Engineering or equivalent in Electrical, Electrical and Electronics, Electronics and Communication, Power Engineering or related branches from Recognized Universities/ Institutes.
Working Professionals of Power Sector who are looking for Capacity Building may join having different Engineering Branches.

**AGE LIMIT:** No Age Limit.

**SELECTION CRITERIA FOR ADMISSION:**
Percentage of marks in 10th, 12th & BE/B. Tech should be above 60 % or with equivalent CGPA

**NO. OF SEATS:** 60 (SIXTY ONLY)

**FEES:**
Non-Sponsored Candidates- Rs. 75,000 (In Three Instalments)
Sponsored Candidates-Rs. 90,000 (In Two Instalments)

## IMPORTANT DATES:

- Interview & Counselling through online mode- 6th to 10th January, 2025.
- Commencement of the course- 20th January, 2025
- All the relevant information & subsequent updates shall be available on CBIP Website: - www.cbip.org

## ADDRESS FOR CORRESPONDENCE:

CBIP, Centre of Excellence, Plot No. 21, SECTOR-32, Gurugram-122001.

**Contact information of Nodal Officers-**

**Pradeep Kumar Gupta**, Joint Advisor (BD)
Mob- 9910378062, Email Id: pradeepgupta@cbip.org

**Jaideep Singh**, Chief Manager (Technical)
Mob- 9871718218, Email ID- jaideep@cbip.org

For more details on Certification and Other Training Programs, please visit our website www.cbip.org

Our Facebook Page- https://www.facebook.com/cbipcentreofexcellence
YouTube- https://www.youtube.com/@cbipcentreofexcellenceguru2682
LinkedIn- CBIP KMS Link- https://www.linkedin.com/in/cbip-kms-29b64b22a/

## ABOUT THE COURSE

In order to mitigate the shortage of trained manpower Govt. Of India has already taken many initiatives for providing training and developing the required manpower. However, the requirement of trained manpower is so high that there is a need of training/ retraining of fresh and experienced engineers and groom them by providing the required Classroom and Practical Training and make them readily available for deploying in the Power Sector as per its manpower requirements.

Keeping all these aspects in view, CBIP has taken this initiative to launch the 06 Months Online Certification Program focusing on Transmission & Distribution System modular course following the syllabus of CEA Regulations 2010 for the fresh/ experience graduate engineers who would be groomed as per the requirement of Indian Power Industry.

Hence, there is an ample scope of making a career in EPC (Tendering, Engineering, Procurement & Construction) Operation & Maintenance, QA/QC and Manufacturing under Transmission & Distribution System of Indian Power Sector for the fresh/ experienced Electrical Engineers on completion of this program.

## STRENGTHS OF CBIP

- A 97 years old establishment into dissemination of knowledge in Power, Renewable and water resources sectors. Almost all reputed utilities of Power, Irrigation and Renewable sectors of the country are the institutional members of CBIP.
- The General Body presently comprises of more than 3000 members of the level of Chief Engineers/ equivalent & above and more than 3600 engineers have been trained.
- Has a great networking and close relations with all reputed utilities of these sectors. CBIP, Centre of Excellence is located in posh and well-connected place in Gurgaon.
- Has state of the art infrastructure facilities like digitized library, well equipped lab, classrooms, conference hall, dining hall etc. well equipped with audio visual aids and Air conditioning system.
- Publishes very strong technical publications on very thrust areas in above three sectors. Has the secretariat of at least 10 international organizations and the Secretary CBIP is the secretary or the member secretary of their India chapters.
- A very strong Board with Chairperson, Central Electricity Authority as the President, Chairman, Central Water Commission as the Sr. Vice President, Vice Presidents- Director General, National Water Development Agency, Director (Solar), Solar Energy Corporation of India Limited, CMD, THDC India Ltd. and Managing Director, Jindal Power Limited.
- CBIP has also signed a Memorandum of Understanding (MoU) with Indian Electrical and Electronics Manufacturers Association (IEEMA) which has a network of more than 940 member organizations from public, joint & private sectors like Siemens, ABB, Schneider, L&T and many other including good no. of organizations associated with Transmission & Distribution systems for collaborative ventures/ efforts for enhancement of quality service through various activities viz., joint assignments, training programs, conferences, seminars, consultancy, R&D activities, joint studies and surveys, knowledge sharing and action plans identified by CBIP and/or IEEMA.
- Most of the organizations (Govt. sector & Private) of Indian Power sector involved in Generation, Transmission and Distribution of Power including Renewable Energy (RE), are the members of CBIP.
- CBIP has MoU with Manufacturing companies like SIEMENS, ABB, Schneider/ L&T etc., Electric Utility companies like Tata Power DDL etc., Testing and Research Organisation like ERDA and Academic/ Training Institutions like NIT Durgapur, MSME Tool Room Kolkata, etc.
- CBIP has a strong team of senior training officers, having in-depth knowledge of conducting various long term training programs related to Power sector.

## DIGITAL RECOGNITION/ CERTIFICATION OF THE COURSE

Certificate will be issued by Central Board of irrigation & Power (CBIP) which is a reputed autonomous body in the field of Power & Water Resources having liaison with various Govt./Semi-Govt./Pioneer-Pvt. Sector Organizations including Central Electricity Authority, NTPC, NHPC, Powergrid etc.

*CBIP institute has been recognized as Category-I training Institute by Ministry of Power, Govt. of India under CEA regulations-2010. The syllabus of the course is as per the mandatory Training requirements specified in Central Electricity Authority regulations-2010.*

*CBIP is also a recognized training partner of National Skill Development Corporation (NSDC), Power Sector Skill Council (PSSC) and Skill Council for Green Jobs (SCGJ). CBIP is also providing the secretariat support to PSSC.*

## METHODOLOGY

The course content complies with the syllabus for Engineers and Supervisors for Operation & Maintenance of Transmission & Distribution Systems as per Safety and Electrical Supply Regulations 7(3) of Govt. of India (CEA Certified). Methodology of the course includes-

- Classroom Lecture Sessions in Online/ Virtual Mode (through MS Teams Platform)
- Physical mode (Offline) Practical/ Hands- on sessions including Sub-station and Switch yard visits of 33kV to 400kV AIS & GIS Substation
- On-Job Operation & Maintenance Training at different Substations
- Group Discussion session and Projects, Seminars
- Laboratory training on transformer, relays and others electrical equipments
- Manufacturing plant visit, maintenance plant visits etc.

**Note:** All theory classes will be delivered through online mode and practical programs will be physical mode

## FACULTY

In-house as well as Renowned/Reputed and well experienced 145 strong faculty members from Power Industry/T&D equipment manufacturers/Contractors like Adani, Tata Power, State Power Utilities /IIT/engineering colleges will be delivering the lectures for the entire program.

## DETAILED COURSE CURRICULUM

| S.N. | Subject/Modules |
|---|---|
| 1 | **General Introduction to Power Sector Familiarization.**<br>Power Generation: Thermal, Hydro, Nuclear and Gas, Renewable Energy Sources, Generation, Transmission & Distribution Scenario of India.<br>Types of generation: Conventional and Renewable, Thermal Power Plant, Hydro Power Plant, Gas Power Plant, Nuclear Power Plant, Co-generation. |
| 2 | **Electrical Safety and Statutory Regulations.**<br>Safety culture and best practices, Safety zone creation, Hazard identification & Risk Management, Incident Investigation, Incident Prevention, determine causes (Root Cause Analysis), Earthing, Protection, Safety/ Fire, Statutory Regulations, Safety Requirement, Hazards, Electrical Accidents and prevention, First Aid, Fire Fighting-Types of fire, firefighting/system, fire extinguishers |
| 3 | **Power System Studies Basic Electrical Engineering and its application with different voltage level-LV, HV, EHV & UHV.**<br>Power System Modelling, Load flow studies, Tutorial on load flow studies, Study state fault analysis, Tutorial on Fault Analysis, Transient stability studies, Relay Co-ordination studies, Tutorials, EMTP Studies. |
| 4 | **Introduction to Grid Sub-station / Switchyard (AIS, GIS, HIS).**<br>Substation Type, Layout of substation, Equipment, Control & Instrumentation in Substations basics, Substation auxiliaries, Substation practices. |
| 5 | **CBIP Manuals Publication**<br>CBIP Sub-station Manual-Publication no.299, CBIP Manual on Power Distribution-GP 355, CBIP Earthing Manual-GP339, CBIP Manual on Power System Protection-GP328 and many more Guidelines for Power Engineers |
| 6 | **EHV Substation Planning and Engineering**<br>Substation Planning, Site selection, Layout of substation & Civil works, Selection of main equipment, Selection of switchgear, Electrical clearances, Instrument transformers-selection & Performance, Control & Instrumentation in Substations, Substation auxiliaries, Substation grounding practices, Demo on grounding. |
| 7 | **Substation Engineering and Practices with Design Calculation**<br>Design aspects of Sub-station equipment-Product identification, Calculations and Technical Specification etc. as per IS/IEC/IEEE |

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| 8 | **Bus-Bar Scheme under Sub-Station Engineering**<br>Different Bus-Bar Scheme under Sub-Station Engineering applicable in India's Power Distribution Application |
| 9 | **Power System Protection**<br>Overview of Power System Protection, CTs and PTs, Generator Protection, Transformer Protection, Transmission Line Protection – distance schemes, Transmission line protection – unit schemes, Bus Bar Protection, Motor Protection, Over voltages in Power Systems, Protection against over voltages, Insulation Co-ordination, LV Consumer's Premises, Switch-yard/ Sub-station protection practices. |
| 10 | **Operation and Maintenance of EHV Substation Equipments**<br>Testing and commissioning of Sub-station equipments: LA, CT, PT, ISO, TRF, CB, CRP mainly including erection portion.<br>Transformers-Construction, Connections, Tap Changing Mechanism & Parallel Operation, Testing and Protection of transformers, Operation and Maintenance of Transformers, Selection, Sizing, performance Analysis of HV Circuit Breakers, Transformer Neutral Earthing, O&M of HV Circuit Breakers, O&M of Distribution Transformers, O&M of Distribution Switchgear. |
| 11 | **Communication in Power Systems**<br>Communication systems: PLCC, Microwave, Leased lines, communication, Planning and selection of communication systems, Trends in communication, Telemetry, Tele control and Tele protection OPF, Satellite, Power Line Carrier Communication, Optical fibre communication, Satellite |
| 12 | **Power Transmission Engineering and O&M of Lines**<br>EHV Transmission system in India, Tower types, Conductors, Earth wire, Insulators, Statutory clearances, Surveying, Route Alignment, Tower erection, Tower Testing, Stringing, Transmission Line Commissioning, Maintenance of transmission line, Thermo-vision scanning, Hot line maintenance. |
| 13 | **HVDC Transmission Systems**<br>Introduction to HVDC Transmission, Principles of HVDC Conversion, HVDC Lines, HVDC Sub Stations, Reactive Power Management in HVDC Stations, AC & DC harmonics and filtering, HVDC System operation, control and maintenance, HVDC Protection, Insulation Co-ordination, Emergencies and case studies |
| 14 | **Distribution System Engineering**<br>Distribution systems overview, Planning, Design and selection of pole structures, conductors, insulators etc., Pole erection, conductors stringing, Layout of earth wire, neutral wire guarding, jointing of conductors, etc.; Location, construction and erection of pole mounted sub stations; Selection, fixing of switches, fuses etc.; Operation & Maintenance of Distribution Lines. |
| 15 | **O & M of Distribution Substations and Distribution Metering**<br>Distribution Substation -types, layouts, bus bar arrangements; Selection of Distribution substation equipment, Distribution substation relay schemes, O&M of Relay schemes, Substation Operation overview, Code of practice in Sub Station Operations, Work permits, line clear procedure, Maintenance of log books, Records etc., Distribution Substation Operation - Case studies; Types, design and construction of distribution meters, Failure analysis of Distribution Meters. |
| 16 | **Power System Operation- Active and Reactive Power Dispatch, SCADA, AGC & ED, Load Dispatch and Grid Management**<br>Functions of Load Despatch Centres, Supervisor control & Data requisition, Load forecasting, generation scheduling, load management & load shedding, Energy management system functions, Voltage and frequency control, Grid Disturbances-Case Studies, State estimation, Security and contingency analysis, Voltage and frequency control, Automatic Generation Control and economic dispatch, Application of SCADA in power systems, Application of EMS in power systems. |
| 17 | **Indian Electricity Grid Code, Regulatory Issues and Tariff**<br>Introduction to Indian Grid Code, Regulatory Issues, Methods of working out, Tariff structure, types, Inter-utility tariff |
| 18 | **Energy Metering Technology/ Smart meter/ Prepaid meter and Tariff**<br>Energy Metering Introduction, Government initiatives in distribution reforms, Energy meters towards digitization and technology, Metering Protocol, Types of Meters, Smart Metering, Net Metering, Metering Technologies and AMR application. |
| 19 | **Smart Grid Technologies, IT, SCADA, DMS & GIS in Distribution System**<br>Smart Grid architecture, AMI, PMU, WAMS, PMU and WAMS technologies, Smart metering, Cyber security EV charging infrastructure, concept of V2G, G2V etc. |
| 20 | **Power Management and Market Regulations**<br>Quality Management System/ ISO 9001:2005/ EPC Process like Engineering, Procurement and Construction, Tendering to Project Management; HR, Commercial aspects in T&D Systems and Soft skills.<br>Introduction to commercial aspects of transmission and distribution, Tariff structure, types, method of working out, revenue realization, Regional energy accounting, Inter-utility tariff, commercial disputes and solutions. Availability based tariff and open access. TTC, ATC, Reliability Margin, Tariff Regulations, Open Access, RES Integration, Point of Connection Charges, Congestion Charge Regulations, Power exchanges. |

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| 21 | **Practical Experiences**<br>**Live Project Demonstrations**<br>Live project demonstrations on Power Distribution (Right from LV-220/430V, MV-11kV, 33kV, 66kV, extended upto HV-132kV and 220 kV voltage level)<br>**Visits**<br>Visits to Manufacturing works, Transmission Lines, Power Plants, Manufacturing units, Testing Centres, etc. Visits to Switchyard/ Substation from 33 kV to 220 kV AIS for Familiarization of equipments like Transformers, Circuit Breaker, Isolator, Lightning Arrestor. Control and Relay Panel, Control room building, switchgear and its function with operation (On-Job) and workshop practices. Distribution system on-job training mainly like 66/33/11kv- Single Line Diagram, Power Flow Diagram, Operational Logic, Interconnection Diagram between equipments via control cable and protecting the switchyard by Control and Relay Panel and finally practical training on Un-manned or state-of-art technology-based substation i.e., SCADA/ DMS/ Automated Plant.<br>**Lab**<br>Lab Smart Meter Simulator Training, CT & PT Testing, Transformer oil sample Testing, Relay Testing, Power System Studies, Instrumentation, Switchgear Labs.<br>**High Voltage Testing for Power system Equipments**<br>Philosophy of HV Testing, Generation and Measurement of HVs, Testing of Power Transformers, Testing of Insulators, Testing of Surge Arrestors, Testing of Switchgear, Testing of Transformer oil, Dissolved Gas Analysis, Partial Discharges.<br>**Power Cables and Jointing Techniques**<br>Power Cable -Design, Construction, Testing, Operation & Maintenance; Trouble shooting of Power Cables; LT and HT Cable jointing, Termination and Accessories; Cable fault detection and repair; Demo on LT & HT Power cable jointing - End joint & Straight through joint. |
| 22 | **RE and Grid Integration**<br>Indian power sector & Challenges in integration of Renewable Energy, International Power scenario in Renewable Energy source, Renewable Energy with Grid Integration including ISTS scheme upto 765kV (Solar, Wind, Energy Storage/ Hydrogen), RE grid integration technologies, Grid integration challenges, Regulation Perspective of Integration, Policy framework for clean and sustainable power, Harvesting maximum solar energy, Operational issues and performance improvement of solar plant, Hybrid power system, RE lab, RES Integration, over view of Grid integration uses, System flexibility, RE road map and future aspects, RE Policies and market issues, Solar& Wind forecasting, RE mixing for large grid integration, Floating solar and other ancillary services. Energy Storage technologies. |
| 23 | **Quality Management ISO 9001:2005 Tendering, Engineering and Procurement / Material Management/ Personal Management** |
| 24 | **Project & Final Appraisal**<br>Seminars and Assessments, Weekly assignments, Module tests, Seminar, On Job Project Training Work Final Assessment. |

## ELIGIBILITY

- Bachelor of Engineering or equivalent in Electrical Engineering (EE), Electrical & Electronics Engineering (EEE), Power Engineering or related branches from recognised Universities/ Institutes with minimum 60% marks

- Working Professionals of Power Sector will have added advantage of Capacity Building by joining this Industry Oriented Online course. Working Professionals of Power Sector having pursued Engineering Degree other than Electrical may also join the program. However, they must be able to cope up with the syllabus of Electrical Engineering (EE), Electrical & Electronics Engineering (EEE) as the course content complies with the syllabus for Engineers and Supervisors for Operation and Maintenance of Transmission and Distribution Systems as specified in Safety and Electric Supply Regulations 7(3) of Govt. of India, by Central Electricity Authority (CEA).

- Those appearing in their final year examination can also apply. However, they must submit their degree/ provisional degree at the time of counselling/start of the course. The candidates shall also have to submit medical fitness certificate at the time of admission with no colour blindness

## ADMISSION FEE: 06 MONTHS

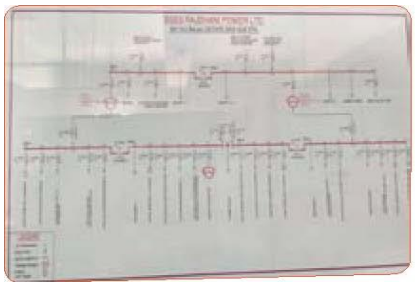
(a) For Passed-out Engineering Student (Non-sponsored Category): Rs. 75,000/- including GST, excluding lodging & boarding during the Practical/ Hands- On sessions [payable in three instalments of Rs. 35,000 (seat book during admission), Rs. 20,000 (within 3rd month) and Rs. 20000 (within 5th month)].
(b) For Sponsored Candidates: Rs. 90,000/- including GST, excluding lodging & boarding during the Practical/ Hands- On sessions (may be paid in two instalments of 50,000 and Rs 40,000.)

## SPONSORED CANDIDATES

The Candidates who are sponsored from any organization have to enclose a sponsorship certificate from their respective organizations in the format given in the CBIP web site.

## HOW TO APPLY

Application may be submitted through online through CBIP Website along with demand draft/multicity cheque of Rs. 100/- in favour of "Central Board of Irrigation and Power".



**Points to be noted:**

(a) All the future notifications/ information & subsequent updates will be available on CBIP website. The candidates are advised to be regularly in touch with the website.

(b) Please Attach self-attested copies of proof of Date of birth, certificates / mark sheets of 10th / 12th / Degree issued by Registrar/controller of the concerned university and send to neeraj@cbip.org / pradeepgupta@cbip.org.

## ADDRESS FOR CORRESPONDENCE

**Shri A. K. Dinkar,** Secretary CBIP
**Shri Sanjeev Singh,** Director (Energy), CBIP
**Nodal Officers:**
Shri Pradeep Kumar Gupta, Joint Advisor (BD), Mob- 9910378062, Email Id: pradeepgupta@cbip.org
Shri Jaideep Singh, Chief Manager (Technical), Mob- 9871718218, Email ID- jaideep@cbip.org
Central Board of Irrigation and Power, Centre of Excellence, Plot No-21, Sector-32, Gurgaon, Haryana-122001
Tel No: 0124-4380272, 4035267, E-mail: training@cbip.org

## IMPORTANT DATES

| Sl. No. | Description | Dates |
|---|---|---|
| 1 | Interview & Counselling through online mode | 6th to 10th January, 2025 |
| 2 | Commencement of the course | 20th January, 2025 |

**CLASS TIMINGS**
**For Online Class- room sessions-** it will be 11 Hrs per week with timings as below:

- 18:00 Hrs – 20:00 Hrs (2 hrs each day preferably Monday, Wednesday and Friday)
- 10:00 Hrs – 13:00 Hrs and 14:00 Hrs – 16:00 Hrs (5 hrs on Sunday) Lunch 13:00 Hrs - 14:00 Hrs.

**Practical/ Hands- On sessions will be conducted in Physical (Offline) mode. The duration & timings will be shared in due course of time.**

## LODGING/ BOARDING

Separate rooms and PGs are available for Ladies and Gents. Participants have to bear the expenses of Lodging and Fooding. However, CBIP will assist the candidates for lodging etc. and only Working Lunch will be provided during Practical/ Hands- on Sessions.

## PAYMENT PROCESS

All selected candidate may do the Payment as per following details:
Mode of Payment
(a) By Cheque/ Demand Draft
(b) Net Banking through NEFT/ RTGS/ IMPS in favour of "Central Board of Irrigation and Power", payable at Gurgaon

## BANK DETAILS IN CASE OF E- TRANSFER

| | |
|---|---|
| Beneficiary Name | : Central Board of Irrigation & Power |
| PAN No. | : AAAJC0237F |
| GST No. | : 06AAAJC0237F1ZW |
| Bank Details | : Indian Overseas Bank, SCO 26, Sector-31, Gurgaon, Haryana, PIN-122002 |
| Saving Bank Account No. | : 236701000000922 |
| Branch RTGS/ NEFT/ IFSC | : IOBA0002367 |
| Branch Code | : 2367 |

## REFUND POLICY

Fee once deposited will not be refunded back. In case a selected candidate wishes to withdraw from the course for any reason, no part of course fee will be refunded except the security deposit.

## HOW TO REACH CBIP, CENTRE OF EXCELLENCE, PLOT NO-21, SECTOR-32, GURGAON, (TRAINING INSTITUTE)

Gurgaon, is the second largest city in the Indian state of Haryana and is a part of the National Capital Region (NCR). It is about 15 Kilometres from IGI Airport, New Delhi. Gurgaon is well connected to Delhi via an expressway (NH 8 highway) and Delhi Metro.