

**GOVERNMENT OF INDIA
CENTRAL ELECTRICITY AUTHORITY
(MINISTRY OF POWER)**

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PUBLIC NOTICE

In exercise of the powers conferred under Section 177 of the Electricity Act, 2003, the Central Electricity Authority (CEA) had issued the "Guidelines for Recognition of Training Institutes in the field of Distribution of Electricity including details of training Curriculum for Engineers, Supervisors and Technicians, 2023" on 12.01.2024. The said Guidelines are proposed to be further amended by including Hotline Training Facility as a separate field for recognition by CEA. The proposed draft Guidelines are available on the CEA Website www.cea.nic.in.

All the stakeholders including public are requested to send their comments on the said draft Guidelines to the Chief Engineer (HRD), West Block-2, Sewa Bhawan, 1st Floor, R. K. Puram, New Delhi-110066 by post or through email hrdcea@nic.in latest by 02.10.2024.



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Chief Engineer (HRD), CEA



भारत सरकार
GOVERNMENT OF INDIA
विद्युत मंत्रालय
MINISTRY OF POWER
केन्द्रीय विद्युत प्राधिकरण
CENTRAL ELECTRICITY AUTHORITY
मानव संसाधन विकास प्रभाग
HUMAN RESOURCE DEVELOPMENT DIVISION

इंजीनियरों, पर्यवेक्षकों और तकनीशियनों के लिए प्रशिक्षण पाठ्यक्रम के विवरण
सहित बिजली वितरण के क्षेत्र में प्रशिक्षण संस्थानों की मान्यता के लिए
मार्गदर्शी सिद्धांत

**Guidelines for Recognition of Training Institutes in the field of
Distribution of Electricity including details of Training Curriculum for
Engineers, Supervisors and Technicians**

2024

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CHAPTER-I

BACKGROUND, OBJECTIVE AND SCOPE

1. **Background:** The clause (g) of section 73 of the Electricity Act, 2003 mandates **Central Electricity Authority (“CEA”)** to promote measures for advancing the skills of persons engaged in the electricity industry. Accordingly, the provisions for training for the personnel engaged in the operation and maintenance of distribution segment of power sector have been made mandatory under the **Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2023 (hereinafter to be referred as “Safety Regulations”)**. The provisions have been made under regulation 8 of the Safety Regulations for mandatory training of the personnel engaged in operation and maintenance of distribution segment of power sector. As per the Safety Regulations, 2023 the Authority shall issue guidelines for the training for operation and maintenance of distribution segment of power sector within six months of the notification of these regulations.

The curriculum for the training of personnel engaged in Operation & Maintenance of distribution segment of power sector was the part of Central Electricity Authority (Measures relating to Safety and Supply) Regulations, 2010. The same needed to be updated and made part of these guidelines.

Accordingly, **Guidelines for Recognition of Training Institutes for Power Sector in the field of Distribution as per CEA (Measures Relating to Safety & Electric Supply) Regulations, 2023 along with updated Curriculum is detailed hereunder.**

2. **Objective:** As per the requirement of **Safety Regulations**, the personnel engaged to operate or undertake maintenance of distribution systems shall require to be imparted statutory training from the institutes recognized by the Central Electricity Authority (CEA) or State Government as per these guidelines for ensuring safe, secure, reliable and economic operations of the distribution systems.
3. **Scope:**
 - (1) These guidelines include the procedure and criteria for recognition of the training institutes for imparting training to the personnel engaged to operate or undertake maintenance of Distribution Systems.
 - (2) These guidelines also include the curriculum to be followed by the training institutes for training of Engineers, Supervisors and Technicians engaged to operate or undertake maintenance of Distribution Systems.
4. **Provisions in Safety Regulations regarding Training of Engineers, Supervisors and Technicians engaged for the Operation & Maintenance of Distribution systems.**
 - (1) In exercise of the power conferred to the Authority under section 177 read with the section 53 of the Electricity Act, 2003, the Central Electricity Authority vide notification no. No. CEA-PS-16/1/2021-CEI Division dated 08.06.2023 has notified the CEA (Measures related to Safety & Electric Supply) Regulations, 2023 which provide for mandatory training for the personnel engaged for the operation & maintenance of Distribution systems.
 - (2) The Regulation 8 of the Safety Regulations provide the details with regard to the mandatory requirement for training for the personnel engaged for the operation & maintenance of Transmission and Distribution system , and also mandates CEA to make guidelines for such trainings in the training institute recognized by the Authority , which is reproduced as under:

“8.Safety measures for operation and maintenance of transmission and distribution systems.

- (1) The Engineers or Supervisors engaged or appointed to operate or undertake maintenance of transmission and distribution systems shall hold degree or diploma in appropriate trade of Engineering from a recognised institute or university.***
- (2) The Engineers and Supervisors engaged or appointed to operate or undertake maintenance of transmission and distribution systems shall have successfully undergone the type of training specified in guidelines as per sub regulation (4), within two years from the date of engagement or appointment.***
- (3) The Technicians to assist Engineers or Supervisors shall possess a certificate in appropriate trade, preferably with a two years course from an Industrial Training Institute recognised by the Central Government or State Government and should have successfully undergone the type of training as specified in guidelines as per sub regulation (4), within two years from the date of engagement or appointment:***

Provided that the existing employees, as on the date of notification of these regulations, who are extending technical assistance to Engineers or Supervisors and do not have requisite qualification as mentioned in this regulation, shall have to undergo the training either from Power Sector Skill Council or from training institute recognised by the Authority for carrying out trade specific course as per the guidelines issued by the Authority and get certificate as mentioned above within two years from the date of notification of these regulations.

- (4) The Authority shall issue guidelines for the training for operation and maintenance of Transmission & Distribution systems within six months of the notification of these regulations:***

Provided that the duration and content of the training course shall be as specified in the guidelines.

- (5) Owner of every transmission or distribution system shall arrange for training of their personnel engaged or appointed to operate and undertake maintenance of transmission and distribution system, in his own institute or any other institute recognised by the Authority or State Government as per the guidelines and shall maintain records of the assessment of these personnel issued by the training institute in the format prescribed in guidelines and such records shall be made available to the Electrical Inspector, as and when required.”***

5. Category of Training Institutes:

- (1) There shall be three Categories of training institutes in terms of Safety regulations of CEA:**
- i) Category-I for Engineers under sub regulation 8(2) of Safety Regulation 2023**
 - ii) Category-II for Supervisors under sub regulation 8(2) of Safety Regulation 2023**
 - iii) Category-III for Technicians under sub regulation 8(3) of Safety Regulation 2023**
- (2) All the training institutes of Central Sector to be recognised by the Authority, must have separate training facilities and modules for Engineers, Supervisors and Technicians in categories I, II and III respectively within six months of issuance of these guidelines. All the training institutes of State and Private Sector may explore the possibilities for having separate training facilities and modules for Engineers, supervisors and Technicians in categories I, II and III respectively.**

6. Training Institutes to be Recognised by the Authority:

- (1) The training institutes owned wholly or partly by the Central Government/Central Power Sector Undertakings/ Central Government Organizations willing to offer training to personnel engaged in Distribution segment of Power sector shall be recognized by Authority.

7. Training Institutes owned by State Government or Private Sector to be Recognised by the State Government or by the Authority:

- (1) The training institutes owned wholly or partly by the State Government/State Power Sector Undertakings/ State Government Organizations willing to offer training to personnel engaged to operate or undertake maintenance of Distribution systems, shall be recognized by the Authority or by the respective State Government as per these guidelines.
- (2) The Training Institutes under the control of Private Power Sector Utilities or under any other Private Sector company, willing to offer training to personnel engaged to operate or undertake maintenance of Distribution systems, shall be recognized by the Authority or by the respective State Government ,where the institute is physically located , as per these guidelines .

- 8. The Distribution Utilities/Organizations may provide incentive for their employees who have successfully completed hotline training as per these guidelines and are active in hotline operation and maintenance of distribution lines.**

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CHAPTER-II

RECOGNITION OF THE TRAINING INSTITUTE

9. Application by the training institute for Fresh recognition by the Authority:

- (1) The training institute shall apply to the Authority, furnishing the required information, for its recognition in the prescribed format enclosed **(Form A)**, for last financial year, in these guidelines.
 - (2) The following shall be the mandatory requirements for the recognition of training institute for Engineers, Supervisors and Technicians engaged for the Operation & Maintenance of Distribution systems :
 - (i) The training institute shall have a full time Principal/Director and teaching staff.
 - (ii) There should be a separate building which shall be solely used for the purpose of training. The building shall either be owned by the institute or on lease. However, in case the building is on lease then the lease period shall be more than the period of recognition.
 - (iii) The training institute shall give an undertaking that on recognition for 3 years initially, the institute shall follow the curriculum as per these guidelines
 - (iv) **(a). For the Training Institutes without Hot Line Training Facilities:**
The training institute shall have the facilities of providing training on simulator and slide shows & multimedia etc. The training institute shall have institutional tie up for simulator training/labs/workshops, if not having in-house.

(b) For Hot Line Training Institute:
 - i. The institute must have (i) Experimental Line with facility to charge with 11 kV for Cold and Live Maintenance Training & Practice (as mentioned in evaluation criteria at A(5)(i)(ii)(iii)) ; and (ii) Specialized Tools to perform Hot Line Maintenance Operations of 11 kV and 33 kV Distribution System complete set as mentioned at Annexure-IV; and (iii) Insulated Device (Insulated Platform mounted on Vehicle) as mentioned at Annexure-V.
 - ii. The Institute shall comply to all safety measures mentioned in Regulation 21 and Schedule-I of CEA Safety Regulations.
 - iii. The Institute shall have their own ambulance facility with basic medical facilities, oxygen cylinder facility , heart monitoring set-up etc. The ambulance shall always be present at the time and place of hotline training.
 - (iv) The training institute shall score a least 60% in the evaluation criteria for getting its recognition from the Authority.
 - (v) The training institute shall have CCTV facility at the examination hall for conducting the term end exam. The training institute may have tie up with independent agency for conducting the exam which shall have CCTV facility at the examination hall for conducting the exam.
 - (vi) The training institute shall have basic medical facilities and high speed internet facilities in its premises.
 - (vii) The budget provision and control of expenditure for training program shall be distinctly and exclusively earmarked for the institute.
- (3) The requisite fee for recognition of the training institute shall be levied from the training institute. The details regarding payment of fees shall be as per the fee schedule issued by the Central Electricity Authority from time to time.

- (4) On receipt of the complete application with information specified above, CEA shall examine the eligibility of the same and if the application is found to be eligible for recognition by Authority, the institute has to submit the above-mentioned fee to the Authority for processing the application for its recognition.
- (5) After receipt of the fee and complete application specified above, the team of CEA officers will make an assessment on the various aspects in accordance with laid down criteria/norms as specified in these guidelines by visiting the institute on a mutually agreed date.

10. Application by the training institute for Renewal of recognition by the Authority:

- (1) The training institute shall apply four months before the expiry of the earlier recognition to the Authority for the renewal of its recognition, furnishing the required information in the prescribed format enclosed (**at Form B**) for last three financial years separately.
- (2) The following shall be the mandatory requirements for renewal of recognition of training institute for Engineers, Supervisors and Technicians engaged for the Operation & Maintenance of Distribution systems :
 - (i) The training institute shall have a full time Principal/Director and teaching staff.
 - (ii) There should be a separate building which shall be solely used for the purpose of training. The building shall either be owned by the institute or on lease. However, in case the building is on lease then the lease period shall be more than the period of recognition.
 - (iii) The training institute shall have at least 2 faculties (core/empaneled/guest) in relevant specialized topics/subjects of the curriculum given in these guidelines.
 - (iv)
 - (a). **For the Training Institutes without Hot Line Training Facilities:**
The training institute shall have the facilities of providing training on simulator and slide shows & multimedia etc. The training institute shall have institutional tie up for simulator training/labs/workshops, if not having in-house.
 - (b) **For Hot Line Training Institute:**
 - i. The institute must have (i) Experimental Line with facility to charge with 11 kV for Cold and Live Maintenance Training & Practice (as mentioned in evaluation criteria at A(5)(i)(ii)(iii)) ; and (ii) Specialized Tools to perform Hot Line Maintenance Operations of 11 kV and 33 kV Distribution System complete set as mentioned at Annexure-IV; and (iii) Insulated Device (Insulated Platform mounted on Vehicle) as mentioned at Annexure-V.
 - ii. The Institute shall comply to all safety measures mentioned in Regulation 21 and Schedule-I of CEA Safety Regulations.
 - iii. The Institute shall have their own ambulance facility with basic medical facilities, oxygen cylinder facility , heart monitoring set-up etc. The ambulance shall always be present at the time and place of hotline training.
 - (v) The training institute shall score at least 60% in the evaluation criteria for getting its recognition from the Authority.
 - (vi) The training institute shall be conducting induction course as per the curriculum given in these guidelines.
 - (vii) The training institute shall have CCTV facility at the examination hall for conducting the term end exam. The training institute may have tie up with independent agency for conducting the exam which shall have CCTV facility at the examination hall for conducting the exam.
 - (viii) The training institute shall have basic medical facilities and high speed internet facilities in its premises.

- (ix) The budget provision and control of expenditure for training program shall be distinctly and exclusively earmarked for the institute.
- (3) The requisite fee for recognition of the training institute shall be levied from the training institute. The details regarding payment of fees shall be as per the fee schedule issued by the Central Electricity Authority from time to time.
- (4) On receipt of the complete application with information specified above, CEA shall examine the eligibility of the same and if the application is found to be eligible for renewal of recognition by Authority, the institute has to submit the above-mentioned fee to Authority for processing the application for renewal of recognition
- (5) After receipt of the fee and complete application specified above, the team of CEA officers will make an assessment on the various aspects in accordance with laid down criteria/norms as specified in these guidelines by visiting the institute on a mutually agreed date.
- (6) The training institutes applying for renewal of recognition after the date of expiry of earlier recognition shall be treated as institute seeking for fresh recognition and shall be charged a fee same as that for fresh recognition as mentioned above.
- (7) The training institutes applying for renewal of recognition after the date of expiry of earlier recognition shall not be displayed in the list of training institutes recognized by CEA.

11. Application for recognition (Fresh / Renewal) of Training Institutes with multiple Fields of Training: Application for recognition (Fresh / Renewal) of a Training Institute with multiple Categories of Institutes and multiple Fields of Training: The Training institute applying for Fresh or Renewal for recognition in more than one field amongst Load Despatch, Generation, Transmission and Distribution and also in more than one categories of Institutes, shall have to follow the following procedure provided that such fields of Training for all Category of institute are available in the Institute at same Location.

- (1) The Institute shall submit the required information in the prescribed format, i.e, in Form A for fresh recognition or Form B for renewal of recognition for each of such fields of training and also for such categories of Institutes as mentioned in the relevant Guidelines of CEA in a single application.
- (2) The Institute shall fulfil all the mandatory conditions and general conditions prescribed in such fields of training and also for such categories of Institutes as mentioned in the relevant Guidelines of CEA.
- (3) The requisite fee for the Fresh or Renewal of recognition of training institute shall be levied from the training institute. The details regarding payment of fees shall be as per the fee schedule issued by the Central Electricity Authority from time to time.
- (4) After receipt of the Application specified above, the Central Electricity Authority officer(s) shall make an assessment on the various aspects in accordance with laid down criteria/norms as specified in respective guidelines by visiting the institute on a mutually agreed date.

12. Parameters/Criteria for assessment of the training institute: The training institute shall ensure that for all the requisite Infrastructure/Faculty/Course content /Budget are available, as far as possible, in their own training institutes.

I. Infrastructure:

Apart from Mandatory condition as mentioned above, it is preferable that the institute shall have following:

- (1) Minimum one classroom, seminar/conference hall/ auditorium, library.
- (2) Separate hostels for men and women with mess or there shall be institutional tie-up with other Institutes/utilities/facilities
- (3) In-house simulator training facilities or there shall be institutional tie-up with other Institutes/utilities.
- (4) In-house Certification Exam Facilities or there shall be institutional tie-up with other Institutes/utilities.
- (5) Facilities for demonstration by static models, training resource unit supported with appropriate reprographic facilities, Audio-visual training aides including Computer Based Training (CBT) packages, Liquid Crystal Display (LCD)/Light Emitting Diode (LED)/Video screen Slide and Overhead projectors, virtual reality, gamification, and e-learning platforms.
- (6) Recreation facilities, transport, Canteen, Laundry.

The training institutes shall ensure that the environment provided to the trainees is proper, clean & hygienic such that conducive environment prevails for the trainees while undergoing training at the institutes.

II. Organization and Staffing:

- (1) The training institute shall have a full time Principal/Director of appropriate level officer as described below:
 - a) Central Power Sector Undertaking (CPSU) training institute shall be headed by an Executive Director or equivalent level officer for category-I, GM or above for category-II & category-III.
 - b) State Sector institute shall be headed by an officer of Chief Engineer or equivalent level officer for category-I, Superintending Engineer or above for category-II & category-III.
 - c) Private sector institute shall be headed by an officer having degree in MBA-HR with minimum relevant work experience of 18 years for category-I and 15 years for category-II and category-III.
- (2) The training institute shall have adequate number of regular in- house teaching staff in the field of distribution in addition to the external faculty depending upon the scope and magnitude of the training institute.

- (3) During the training period, the trainees shall be under the administrative control of the head of the training institute.

III. Faculty

- (1) The faculties of the training institute shall have experience of minimum 5 years in the relevant functional areas of distribution. Core faculty shall also have undertaken at least one week training from an institute with all-India recognition in their domain of knowledge at least once a year.
- (2) The faculties shall be familiar with latest instructional techniques and apply innovative means for administering the training inputs.
- (3) The faculties getting salary from allocated budget of training institute shall be considered as core faculty of the training institute.
- (4) Besides Core Faculties, the training institutes may empanel faculties with relevant experience in distribution for delivering lectures/ imparting knowledge by using simulator.
- (5) Empaneled Faculties of an institute shall consist of the trainers who have delivered at least five lectures in a financial year in the institute.
- (6) The external (Guest) faculties shall be specialized in the subject with adequate experience on the topic in which lecture has to be delivered.

IV. Training Methodology

- (1) Training shall be imparted in Classroom through lectures and talks of eminent speakers, group discussion in conference hall, visits to Manufacturing units, control room, simulator and on-job training.
- (2) The minimum batch size for any classroom training programme is 10 for considering the respective training programme in the evaluation process.
- (3) The trainee shall be imparted practical training on the site (or equivalent site), where the trainee is expected to be posted after training.

V. Training programs

- (1) The training institute shall prepare an annual training program calendar based on training need analysis of its own organization or for meeting the requirement of other utilities of Power Sector.
- (2) The training calendar shall include Induction course as outlined in these CEA guidelines.

VI. Term-End Exam

- (1) After undergoing Induction course training the trainee shall have to successfully pass the term end exam.
- (2) The term end exam shall be based on the model question banks based on the curriculum contained in these guidelines.

- (3) The training institute shall maintain question banks on the basis of course for training for the personnel engaged in operation and maintenance of distribution systems in consultation with the Central Electricity Authority and experts from the relevant fields.
- (4) The examination shall be conducted under CCTV surveillance to make it fair and transparent.
- (5) On-job performance may be measured through demonstrated capability to contribute towards taking major equipment in/out of service, handling unit emergencies, maintaining parameters within range, feedback after six months to the training Institute etc. Suggesting innovative methods to reduce the occurrence of the fault, adherence to safety norms.
- (6) The term End exam shall carry weightage of 70% of theory and 30% of practical trainings, and the overall passing marks for the Term end exam (for both theory and practical) shall be 60%.

For Hot Line Training Institute , the term End exam shall carry weightage of 30% of theory and 70% of practical trainings, and the overall passing marks for the Term end exam (for both theory and practical) shall be 60%.

- (7) The committee evaluating the performance of the trainees shall comprise of representative/s from training institute and a senior officer from the organization who has deputed the trainee.
- (8) The format for certificate to be issued to trainees on successful completion of the training and for maintaining the records of training of personnel is given at **Annexure-III**.

13. Criteria/Norms for Recognition and Grading of Institute

- (1) Recognition and Grading of institutions shall be made based on the information furnished by Institutes for last financial year as per Questionnaire enclosed at Form A and assessment of the visiting team of CEA for fresh recognition.
- (2) Recognition and Grading of institutions shall be made based on the information furnished by Institutes for last three financial years separately as per Questionnaire enclosed at Form B and assessment of the visiting team of CEA for renewal of recognition.
- (3) For institute seeking for fresh recognition, weightage and norms for each parameter/activity for appraisal shall be as under for the last financial year:

(i) **For the Training Institutes without Hot Line Training Facilities**

S.No		Max · Score (a)	Score				remark
			(a*1)	(a*0.7)	(a*0.4)	(a*0)	Remarks
A.	Infrastructure	30					
(1)	No. of Classrooms	5	≥ 3	2	1	0	Minimum one classroom
(2)	E-Library	1.5	Yes	-	-	No	E-Library shall have Journals and relevant Technical Standards etc.
(3)	Laboratories/ Workshops (Meter & Testing Lab/ Protection Lab/ Distribution Transformer Testing Lab/ SCADA Lab/ Ring Main Unit Lab/ Smart Grid lab/ Computer Lab/ Practice yard at various locations: CSL, DP, MMG)	10	≥ 6	4-5	2-3	< 2	Weightage as per the number of labs out of the given list.
(4)	Multi Media Packages	1.5	≥ 20	> 10	> 0	0	
(5)	Models	1	≥ 20	> 10	> 0	0	
(6)	Simulator (Own/Tie-Up) (Distribution Automation Simulator ,SCADA Simulator)	5	Yes	-	-	No	

(7)	Quality of Infrastructure	6					
(i)	Maintenance of Training Institute	1	Excellent	Very Good	Good		
(ii)	Air-Conditioning	1	Excellent	Very Good	Good		
(iii)	Cleanliness/ Hygiene	1	Excellent	Very Good	Good		
(iv)	No. of Facilities (Transport, Laundry, Gym ,Indoor/outdoor Sports)	1	>=3	2	1	0	
(v)	High Speed Internet	1	Yes			No	
(vi)	Medical facilities (First Aid/On-call Doctor/ Nursing Room/Basic Medicines etc.)	1	Excellent	Very Good	Good		
	Sub Total	30					
B.	Faculty (Core +Empaneled + Guest)						
(1)	Qualification of Faculty	10	(No. of Ph.D.*10+No. of PG*9+No. of Graduates*8)/Total(Core+Empaneled+Guest Faculties)				
(2)	Experience of Faculty	10	(No. of Faculty having Experience more than 10 yrs *10 + No. of faculty having Experience more than 5yrs*5)/Total (Core+Empaneled+Guest Faculties)				
(3)	Ratio of (Core+ Empaneled) to (Core+ Empaneled+Guest) (in %)	5	>=60	41-59	20-40	<20	
(4)	Training of Core Faculty (in % of total Core Faculties)	5	>=80	60-79	40-59	<40	Training of Core Faculties
(5)	No. of Papers Published in Conference or Seminars by Core Faculties and No. of Core Faculties Empaneled with other Institutes	2.5	>=3	2	1	0	
(6)	No. of Memberships in National or International Body of the training institute and No. of Working Models or Simulation Models made by Core Faculties	2.5	>=3	2	1	0	
	Sub Total	35					
C.	Course						

(1)	Total Courses Conducted relevant to Power Sector (Days)	15	≥ 100	60-99	10-59	<10	
(2)	Total Simulator days (in % of Total Course Conducted relevant to Power Sector in Days)	10	$\geq 1\%$	>0.7%	>0.5%	>0.3%	
	Sub Total	25					
D.	Utilization of Budget (in %)	10	≥ 80	60-79	40-59	<40	
	Grand Total	100					

(ii) For the Hotline Training Institute

S.No		Max. Score	Score				remark
		(a)	(a*1)	(a*0.7)	(a*0.4)	(a*0)	Remarks
A.	Infrastructure	30					
(1)	No. of Classrooms	5	≥ 3	2	1	0	Minimum one classroom
(2)	E-Library	1.5	Yes			No	E-Library shall have Journals and relevant Technical Standards etc.
(3)	Multi Media Packages	1.5	≥ 20	>10	>0	0	
(4)	Models	1	≥ 20	>10	>0	0	
(5)	Experimental Line with Facility to charge with 11 kV for Cold and Live Maintenance Training & Practice	8.0					
(i)	11kV Experimental Line with Pole Double or Multi Circuit line with pin and Disc Insulators at least 3 span and	3.0	Yes			No	

	Dead end /H pole configurations.						
(ii)	33 kV Experimental Line Pole/Tower Single or Multi circuit with lattice Structure with Pin and Disc Insulators.	3.0	Yes			No	
(iii)	11 kV/ 33 kV Experimental Substation with Transformer, GO Switch, HT & LT Fuse Unit etc.	2.0					
(6)	Specialized Tools for Hot Line Maintenance of Distribution System	7.0					
(i)	Insulated Device (Insulated Platform mounted on Vehicle) (Specification as per Annexure V)	5.0	Yes			No	
(ii)	Specialized tools to perform Hot Line Maintenance Operations of 11 kV & 33 kV Distribution System Complete set (as per Annexure - IV)	2.0	Yes			No	
8	Quality of Infrastructure	6					
(i)	Maintenance of Training Institute	1	Excellent	Very Good	Good		
(ii)	Air-Conditioning	1	Excellent	Very Good	Good		
(iii)	Cleanliness/ Hygiene	1	Excellent	Very Good	Good		
(iv)	No. of Facilities (Transport, Laundry, Gym ,Indoor/Outdoor Sports)	1	≥3	2	1	0	
(v)	High Speed Internet	1	Yes			No	

(vi)	Medical facilities (First Aid/On-call Doctor/ Nursing Room/ Basic Medicine etc.)	1	Excellent	Very Good	Good		
	Sub Total	30					
B.	Faculty (Core +Empaneled + Guest)						
(1)	Qualification of Faculty	10	(No. of Ph. D*10+No. of PG*9+No. of Graduates*8) / Total (Core +Empaneled +Guest Faculties)				
(2)	Experience of Faculty	10	(No. of Faculty having Experience (in Hot Line Maintenance) more than 10yrs *10 + No. of Faculty having Experience (in Hot Line Maintenance) . more than 5yrs*5) / Total (Core+Empaneled+Guest Faculties)				
(3)	Ratio of (Core+ Empaneled) to (Core+ Empaneled+Guest) (in %)	5	≥ 60	41- 59	20-40	< 20	
(4)	Training of Core Faculty (in % of total Core Faculties)	5	≥ 80	60- 79	40-59	< 40	No. of Core Faculties Trained
(5)	No. of Papers Published in Conference or Seminars by Core Faculties and No. of Core Faculties	2.5	≥ 3	2	1	0	

	Empaneled with other institutes						
(6)	No. of Memberships in National or International Body of the training institute and No. of working models or simulation models made by Core Faculties	2.5	≥ 3	2	1	0	
	Sub Total	35					
C.	Course						
	Total Courses Conducted relevant to Power Sector (in Days)	15	≥ 100	60-99	10-59	<10	
	Total Live Line Maintenance Training (in % of Total Course Conducted in Days)	10	$\geq 1\%$	$>0.7\%$	$>0.5\%$	$>0.3\%$	
	Sub Total	25					
D.	Utilization of Budget (in %)	10	≥ 80	60-79	40-59	<40	
	Grand Total	100					

(4) The institute seeking for renewal of recognition shall be considered for assessment for each parameter and activity for appraisal is as under for last three financial years separately:

(i) **For the Training Institutes without Hotline Training Facilities**

S.No		Max. Score	Score				remark
		(a)	(a*1)	(a*0.7)	(a*0.4)	(a*0)	Remarks
A.	Infrastructure	30					
(1)	No. of Classrooms	5	≥ 3	2	1	0	Minimum one classroom
(2)	E-Library	1.5	Yes			No	E-Library shall have Journals and relevant Technical Standards etc.
(3)	Laboratories/ Workshops	10	≥ 6	4-5	2-3	<2	Weightage as per the

	(Meter & Testing Lab/ Protection Lab/ Distribution Transformer Testing Lab/SCADA Lab/ Ring Main Unit Lab/ Smart Grid lab/ Computer Lab/ Practice yard at various locations: CSL, DP, MMG)						number of labs out of the given list.
(4)	Multi Media Packages	1.5	≥ 20	> 10	> 0	0	
(5)	Models	1	≥ 20	> 10	> 0	0	
(6)	Simulator (Own/Tie-Up) (Distribution Automation Simulator, SCADA Simulator)	5	Yes			No	
(7)	Quality of Infrastructure	6					
(i)	Maintenance of Training Institute	1	Excellent	Very Good	Good		
(ii)	Air-conditioning	1	Excellent	Very Good	Good		
(iii)	Cleanliness/ Hygiene	1	Excellent	Very Good	Good		
(iv)	No. of Facilities (Transport, Laundry, Gym, Indoor/Outdoor Sports)	1	≥ 3	2	1	0	
(v)	High Speed Internet	1	Yes			No	
(vi)	Medical facilities (First Aid/On-call doctor/Nursing Room/Basic Medicines etc.)	1	Excellent	Very Good	Good		
	Sub Total	30					
B.	Faculty (Core +Empaneled + Guest)						
(1)	Qualification of Faculty	7.5	(No. of Ph.D.*7.5+No. of PG*6+No. of Graduates*4.5)/Total(Core+Empaneled+Guest Faculties)				
(2)	Experience of Faculty	7.5	(No. of Faculty having Experience more than 10yrs *7.5 + No. of Faculty having Experience more than 5yrs*5)/Total (Core+Empaneled+Guest Faculties)				
(3)	Ratio of (Core+ Empaneled) to (Core+ Empaneled+Guest) (in %)	5	≥ 60	41-59	20-40	< 20	

(4)	Training of Core Faculty (in % of total Core Faculties)	5	≥ 80	60-79	40-59	<40	No. of Core Faculties Trained
(5)	No. of Papers Published in Conference or Seminars by Core Faculties and No. of Core Faculties Empaneled with other Institutes	2.5	≥ 3	2	1	0	
(6)	No. of Membership in National or International Body of the training institute and No. of Working Models or Simulation Models made by Core Faculties	2.5	≥ 3	2	1	0	
	Sub Total	30					
C.	Courses						
(1)	Total Classroom (i.e. theory) part of Induction Courses conducted (Days)	10	≥ 100	60-99	10-59	<10	
(2)	Total Refresher Courses conducted (Days)	2.5	≥ 50	30-49	10-29	<10	
(3)	On-Job Training Days (in % of Total Induction Course conducted (i.e. theory+simulator+on-job) in Days)	2.5	$\geq 20\%$	>10%	>0%	0	
(4)	Total Simulator Days (in % of Total Induction Course (i.e. theory+simulator+on-job) conducted in Days)	5	$\geq 1\%$	>0.7%	>0.5%	>0.3%	
(5)	Average score obtained in Induction Course under CCTV Surveillance	10	Average Score entered by Institute (on the scale of 1-10)				
	Sub Total	30					
D.	Utilization of Budget (in %)	10	≥ 80	60-79	40-59	<40	
	Grand Total	100					

(ii) For the Hotline Training Institutes

S.No		Max. Score	Score				remark
		(a)	(a*1)	(a*0.7)	(a*0.4)	(a*0)	Remarks
A.	Infrastructure	30					
(1)	No. of Classrooms	5	≥ 3	2	1	0	Minimum one classroom
(2)	E-Library	1.5	Yes			No	e-Library shall have Journals and relevant Technical Standards etc.
(3)	Multi media packages	1.5	≥ 20	> 10	> 0	0	
(4)	Models	1	≥ 20	> 10	> 0	0	
(5)	Experimental Line with facility to charge with 11 kV for Cold and Live Maintenance Training & Practice	8.0					
(i)	11 kV Experimental Line with Pole Double or Multi Circuit line with pin and Disc Insulators at least 3 span and Dead end /H pole configurations.	3.0	Yes			No	
(ii)	33 kV Experimental Line Pole/Tower Single or Multi circuit with lattice Structure with Pin and Disc Insulators.	3.0	Yes			No	

(iii)	11 kV/ 33 kV Experimental Substation with Transformer, GOS, HT & LT Fuse Unit, LA etc.	2.0					
(6)	Specialized Tools for Hot Line Maintenance of Distribution System	7.0					
(i)	Insulated Device (Insulated Platform mounted on Vehicle) (Specification as per Annexure V)	5.0	Yes			No	
(ii)	Specialized tools to perform Hot Line maintenance operations of 11kV & 33 kV Distribution System Complete set (as per Annexure - IV)	2.0	Yes			No	
8	Quality of Infrastructure	6					
(i)	Maintenance of Training Institute	1	Excellent	Very Good	Good		
(ii)	Air-Conditioning	1	Excellent	Very Good	Good		
(iii)	Cleanliness/ Hygiene	1	Excellent	Very Good	Good		
(iv)	No. of Facilities (Transport, Laundry, Gym , Indoor/Outdoor Sports)	1	≥ 3	2	1	0	
(v)	High Speed Internet	1	Yes			No	
(vi)	Medical Facilities (First Aid/On-call Doctor/Nursing Room/Basic Medicine etc.)	1	Excellent	Very Good	Good		
	Sub Total	30					
B.	Faculty (Core +Empaneled + Guest)						
(1)	Qualification of Faculty	7.5	(No. of Ph. D*7.5+No. of PG*6+No. of Graduates*4.5)/Total(Core+Empaneled+Gu est Faculties)				
(2)	Experience of Faculty	7.5	(No. of Faculty having Experience (in Hot Line Maintenance) more than 10 yrs *7.5 +				

			No. of Faculty having Experience (in Hot Line Maintenance) more than 5 yrs*5)/Total (Core+Empaneled+Guest Faculties)				
(3)	Ratio of (Core+ Empaneled) to (Core+ Empaneled+Guest) (in %)	5	>=60	41-59	20-40	<20	
(4)	Training of Core Faculty (in % of Total Core Faculties)	5	>=80	60-79	40-59	<40	No. of Core Faculties Trained
(5)	No. of Papers Published in Conference or Seminars by Core Faculties and No. of Core Faculties Empaneled with other Institutes	2.5	>=3	2	1	0	
(6)	No. of Memberships in National or International body of the training institute and No. of Working Models or Simulation Models made by Core Faculties	2.5	>=3	2	1	0	
	Sub Total	30					
C.	Course						
(1)	Total Classroom (i.e. Theory & Cold Line) part of Total Hot Line Maintenance Courses conducted (in Days)	10	≥ 100	60-99	10-59	<10	
(2)	Total Refresher Courses conducted (in Days)	2.5	≥ 50	30-49	10-29	<10	
(3)	On-Job Training days (in % of total Hot Line Maintenance Courses conducted in Days)	2.5	>=20%	>10%	>0%	0	
(4)	Total Live Line Maintenance Training Days (in % of total Hot Line Maintenance	5	≥ 1%	>0.7%	>0.5%	>0.3%	

	Courses conducted in Days)						
(5)	Average score obtained in Induction Course under CCTV surveillance	10	Average Score entered by institute (on the scale of 1-10)				
	Sub Total	30					
D.	Utilization of Budget (in %)	10	≥ 80	60-79	40-59	< 40	
	Grand Total	100					

(5) The institute seeking for fresh recognition shall furnish the above-mentioned required information for evaluation for last financial year. The institute seeking for renewal of recognition shall furnish the above-mentioned required information for evaluation for last three financial years. In case of non-furnishing of information against any parameter or its part by the institute, zero score will be awarded against that parameter.

(6) The overall grading for the renewal of recognition of training institute shall be given on the basis of computation of the final score based on yearly scores for a three-year period prior to the expiry of the validity of the certificate. The weightages for the three years' shall be 0.5, 0.3 and 0.2 respectively.

(Example: If the validity of the recognition certificate is expiring on 30th June 2023, then three years under consideration will be 2022-23(Y1), 2021-22(Y2) & 2020-21(Y3) having weightage of 0.5, 0.3 & 0.2 respectively)

(7) In case of fresh recognition, if the score obtained on evaluation by the training institute is at least 60, then the training institute shall be recognized for duration of 3 years. The institute shall give an undertaking that curriculum mentioned in these CEA guidelines shall be followed by the training institute **for at least next 3 years**.

(8) The effective date of the Recognition of the New Training Institute shall be from the date of issuing letter to the training institute communicating the recognition.

(9) The training institute seeking for renewal of recognition shall be graded and recognized thereof for the period as under:

Score Obtained	Grading	Rating	Period of Recognition
> 79	A	Excellent	5 years
70-79	B	Very Good	4 years
60-69	C	Good	3 years
< 60	—	Not qualified	—

(10) Based on the recommendations of the team, the observations/recognition of the institute shall be communicated to the head of organization/ training institute.

- (11) CEA Officer(s) may visit the institute any time after granting the recognition to review the action taken on CEA's observations and the progress of improvement in the Standard of the training institute. In case the deficiency with regard to the information submitted to the CEA in Form-A and any non-compliance of the observations made by CEA, the recognition of the training institute may be withdrawn by the Authority after issuing the notice to training institute for removal of the deficiency or for the compliance of the observation within 60 days and by giving the opportunity for the training institute to be heard before the CEA.
- (12) In case the training institute has applied for renewal of certificate of recognition within the stipulated time under these guidelines and submitted the requisite fee for recognition after the necessary scrutiny of the application by CEA and the physical assessment of the institute by CEA officer(s) has not been done before expiry of certificate of recognition, then the renewal of training institute shall be done from the next day after expiry of the validity period of the certificate of recognition.
- (13) The recognized training institutes shall update the data annually electronically or through-the online portal (NSWS).
- (14) CEA team may visit the institute any time after granting the recognition to review the action taken on CEA observations and the progress of improvement in the Standard of the institute.
- (15) The existing Training institute willing to change its category already recognized (i. e, from Category I to Category -II or Category-III or vice versa) shall have to apply again in Form-A, as applicable for Fresh application and the application of the institute shall be processed as Fresh application.

14. Cancellation of Recognition

- (1) The recognition of any training institute shall stand cancelled automatically due to the following reasons: -
 - (i) Change in the ownership of the institute by sale or transfer of the institute.
 - (ii) Change / shift in the location of the institute.
- (2) In case of cancellation of recognition due to any reasons as stated above, the institute may apply for its recognition as in the case of a fresh recognition.

15. Regular updation of Syllabus:

- (1) The curriculum given in the guidelines shall be updated by the same sub-committee constituted for finalization of these guidelines vide office order no. 13/2/2023-HRD/1445-66 dated 31.05.2023. The expert committee constituted vide office order no. 13/2/2022-HRD/933-944 dated 27.7.2022 shall review the recommendations of the sub-committees and finalize the same for approval of the Authority.
- (2) The periodicity for updation of syllabus shall be at least once in three years. However, in case of need, the syllabus may be revised at any time.

CHAPTER-III

SYLLABUS FOR DISTRIBUTION & HOT-LINE TRAINING

16. STRUCTURE FOR CURRICULUM FOR OPERATION & MAINTENANCE OF ELECTRICAL INSTALLATIONS OF DISTRIBUTION SYSTEMS (33 kV and below)

(1) A committee of experts has been set up to **upgrade the syllabus periodically**. After deliberations with the representative of CPSUs, few state and private utilities, the modified curriculum has been broadly defined so that it caters to the specific O&M need of the organization.

The mandatory courses, content, methodology and duration for Distribution is outlined below.

(2) Types of Courses

(i) Induction Course (mandatory)

a) Common Courses for all the trainees shall include the following

- a. Safety Management
 - Overview of Safety Management
 - Causes and factors of accident
 - Statutory requirement
 - Firefighting equipment and Fire prevention
 - First Aid
 - Safety in Material Movement, erection and commissioning of Distribution lines
- b. Values and Work culture, Conflict Management, Team Building
- c. Relevant regulations and relevant sections of Electricity Act (EA) (including Schedule-I of Regulation 21, CEA (Measures Relating to Safety & Electric Supply) Regulations, 2023).
- d. Necessary permissions/Clearances
- e. IT Applications and Cyber Security Awareness/overview
- f. Disaster management
- g. Electrical Vehicle-Charging
- h. Batteries Storage
- i. Renewable Energy overview
- j. Contracts and Materials Management
- k. Project Management: Financing and Execution
- l. Sustainability: Society, Environment & Economy (SSEE) , Mission LIFE- brief presentation and video shows
- m. Resource Management: Reliability & Adequacy
- n. Stores Management
- o. Best Earthing Practices to be implemented for different Electrical Installations.

- b) **Basic courses** for Engineers, Diploma holders and ITI personnel engaged in O&M work of the electrical installations in Distribution Electricity is given hereunder at section 16, 17 & 18.

a. Class Room Training- Visuals/Media Usage for imparting training along with Models and Computer Based Training (CBT) packages to understand the Fundamentals separately for Post based curriculum

b. **Visits**-sites for understanding layout, identification of equipment, Manufacturing Units separately for Post based curriculum.

c. **Practicals**, separately for Post based curriculum

(i) **Operations**-through Simulators and Observer in control room for better understanding

(ii) **Maintenance**-

Practical /working with Engineers. It shall be ensured that the Degree/Diploma holder is rotated so that trainees observe and understand each activities such as

- Preventive maintenance/ Schedule of maintenance
- Trouble Shooting and repair
- Drawings and tracing the equipment's,
- Manuals,
- Familiarizes with tools required for maintenance
- Safety Aspects
- Team work with Diploma holders/ITI

(iii) **On job Training**

- Drawings and tracing the wires/cables
- Preventive maintenance
- Analyzes fault
- calibrations
- Quality of work done
- Team work with Diploma holders/ITI
- Process for permits and clearances
- Mix of degree, diploma and ITI for building team work, improved communication and understanding.
- Awareness regarding Mock drill exercises considering various emergency situations may be added

c) **Total Minimum Duration for Induction Training**

(This includes Classroom Training, Simulator and On-Job Training/ Practical)

	Total Duration (in weeks)	Duration (in weeks)		
		Classroom	Simulator	On-Job/Practicals
Engineers	6	3	1	2
Supervisor	4	2	1	1
Technician	2	1	1	

d) Refresher Course-

- Requirement basis/Need basis (Recommended by the immediate superior/ Employee itself).
- New technologies as and when adopted/implemented by the Power Utility.
- Higher training for experienced employees
- Revenue Management & Loss reduction technique in Distribution system.
- Advance Technology including Smart meters and Net Metering, Gross Metering
- Smart Grid Concepts in Distribution system and Automation
- Distribution Management with SCADA & Communication system.
- Grid Discipline and effective energy management
- Distribution network planning for UG Cable system, AB cables, Ring Main system,
- Development of Micro grid and Macro grid.
- Peak Load management including Energy Efficiency, Feeder separation, and Rostering etc.
- Power quality and Reliability, Reliability Indices
- Integration of Renewables such as Solar, wind etc., Battery storage and EV charging system
- Various Regulations of CEA and appropriate SERC
- Consumers care and Grievances
- Cyber Security aspects
- Surge Impedance Loading
- Insulation Coordination
- HVDC
- Energy efficiency
- Mission LIFE
- Predictive maintenance
- Distribution Asset management

- (3) As per clause 8 (3) of CEA Safety Regulation, 2023 the technicians assisting Engineers or Supervisors and do not have requisite qualification as mentioned in this regulation, shall have to undergo the training either from Power Sector Skill Council or from training institute recognised by the Authority. The same is reproduced as under:

“The Technicians to assist Engineers or Supervisors shall possess a certificate in appropriate trade, preferably with a two years course from an Industrial Training Institute recognised by the Central Government or State Government and should have successfully undergone the type of training as specified in guidelines as per sub regulation (4), within two years from the date of engagement or appointment:

Provided that the existing employees, as on the date of notification of these regulations, who are extending technical assistance to Engineers or Supervisors and do not have requisite qualification as mentioned in this regulation, shall have to undergo the training either from Power Sector Skill Council or from training institute recognised by the Authority for carrying out trade specific course as per the guidelines issued by the Authority and get certificate as mentioned above within two years from the date of notification of these regulations.”

The details of these courses are available on the site of power skill council. These courses are revised from time to time with the approval of National Council for Vocational Education

Training (NCVET). The latest information regarding these courses can be seen at PSSC websites (psscindia.org)."

17. CURRICULUM FOR ENGINEERS ENGAGED IN THE OPERATION AND MAINTENANCE OF DISTRIBUTION SYSTEM(33 kV and below)

A. Classroom

1.0 Common Course

- (i) Safety Management
- (ii) Overview of Safety Management
- (iii) Causes and factors of accident
- (iv) Statutory requirement
- (v) First Aid including resuscitation (artificial respiration)
- (vi) Values and Work culture
- (vii) Necessary permissions/Clearances
- (viii) Firefighting equipment and Fire prevention
- (ix) Disaster management
- (x) IT Applications and Cyber Security Awareness/overview
- (xi) Electrical Vehicle-Charging
- (xii) Batteries Storage
- (xiii) Renewable Energy overview
- (xiv) Contracts and Materials Management
- (xv) **Regulations:**
 - Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022-Regulations
 - CEA(Installation and Operation of Meters) Regulation – as latest amended
 - Overview of Sub-Transmission & Distribution system (state specific)
 - Overview of various standards/regulations used in distribution system
- (xvi) **Other Government of India Initiative:**
 - MISSION LIFE- brief presentation and video shows
 - **Energy efficiency**

2.0 Basic Course

A. Distribution System – Sub-stations & Lines

- (i) Supports-towers/ poles: (Voltage level wise separately)
 - Types of Tower/Poles used and selection criteria
 - Surveying and erection
 - Right of Way (ROW) criteria
- (ii) Line conductor/ cables
 - Selection criteria for conductor /ABC / Covered conductor/UG cable etc
 - Conductor stringing, jointing/ binding, sagging & tensioning, clipping & jumpering
 - Earthing arrangements
 - **Cable** – types, selection, cable trenches, cable routing and laying, cable jointing and junction box
 - Earth wire/ neutral wire, guarding, etc.
 - Laying of Service lines
 - Laying of UG cables

(iii) Erection /O&M of Lines

- Selection and fixing of control devices, viz. Gang Operating Switches, fuses, isolators and earthing switches, lightning arrestors, and distribution box, etc.
- O&M of service lines.
- Street Lighting – design and layout methods.
- Statutory clearances,
- Line/ cable maintenance including hot line maintenance – line patrolling, inspection, periodicity, work permit, line clear and authorization, erection of temporary earth and restoration of supply, maintenance T&P and safety devices, thermo vision scanning, hot spots, etc in lines at all voltage
- Cable fault location techniques.

(iv) Distribution Transformer (DT)

- Selection criteria for Distribution transformer (capacity/ core/winding/oil type /dry type etc)
- Distribution Transformer Erection, testing commissioning operation and maintenance
- Statutory clearances for installation of DT
- Selection of mounting armament of DT (Pole/ H frame/Plinth etc)
- O&M techniques for DT
- Health monitoring of critical distribution transformers/ DT metering

(v) Electric Sub-Stations:

- Augmentation of existing Sub-station / creation of new Sub-station
- Availability of in-feed lines from nearby EHV SS
- Selection of installed capacity, Optimum capacity loading
- Type of Sub-station, Air Insulated /Gas Insulated Sub-station (AIS/GIS)
- Site selection, layout and civil Engineering requirements.
- Bus bar arrangement, sub-station equipment, viz. transformers, circuit breakers, etc.
- Parallel operation of Transformers, neutral switching, Interlocking
- Operational logic for closing and opening of Circuit Breaker (CB), Isolator and Earth switch in Lines, Interlocking
- Auxiliary systems, viz. DG set, battery system and firefighting system, etc.
- Control panel, meters, indicators and recorders and relays, (SCADA compatability), Standby power sources of DG set, Inverter and RoofTop solar , neutral isolation arrangement in Change over system
- Erection, testing and commissioning of equipment's/systems
- Earthing of sub-stations equipment's and soil testing
- Transformer oil and its testing
- Reactive power management at Sub-station /requirement of capacitors etc
- Operation and maintenance of all equipment's, protective relays and auxiliaries.
- Sub-station Automation /SCADA (Supervisory Control And Data Acquisition)

B. High Voltage Distribution System (HVDS)

- (i) Overview of High Voltage Distribution System (HVDS) - advantages /disadvantages
- (ii) Applications, proper site selection for Load centre
- (iii) Comparison with conventional system with DTs

C. Releasing of New Connection

- (i) Type of connections, selection of voltage level as per load, selection of 1-Ph or 3-Ph supply, checking of Wirings, and Earthing
- (ii) Calculation of contracted demand, service line, clearances required for releasing of new connections, demand charges etc.
- (iii) Installation of meters including smart meter (1-Ph /3 Ph –prepaid),
- (iv) Importance and installations of ELCB/RCCB , Mandatory provisions of Regulations
- (v) Bulk power supply system/ dedicated power supply

D. Metering Requirements:

- (i) Overview of Central Electricity Authority (Installation and Operation of meters) Regulations 2006 and its amendments.
- (ii) Type of metering i.e. DT metering, feeder metering and Consumer metering.
- (iii) Selection of Meters (1-Ph or 3- Ph , whole current/ CT-PT operated , smart per paid / simple pre-paid etc)
- (iv) Over view of Advanced Metering Infrastructure (AMI) -Smart Metering system
- (v) Concept of AMISP / Totex model in installation of smart meters ,
- (vi) Major provision of Standard Bidding Document (SBD) for Advanced Metering Infrastructure Service Provider (AMISP) – study of SLA for AMISP
- (vii) Testing and sealing of meters, use of Common Meter Reading Instrument (CMRI)
- (viii) Familiarity with MDM system, metering protocols.
- (ix) Analysis and detection of meter tampering, identification of high loss areas etc
- (x) Role of advanced metering system / smart meters in controlling commercial losses.
- (xi) Net Metering /Gross metering

E. Modern protection system:

- (i) Numerical and Microprocessor based Relays- basic principles, characteristics, over current and earth fault protections, Differential protection and distance Protection, Testing of Numerical relays
- (ii) microprocessor based over current and earth fault relays , directional relays impedance relays and reactance relays
- (iii) AI based Numerical Protection(ANN) , Fuzzy logic , application of AI to power system protection, Application of ANN to overcurrent protection , transmission line protection, ANN based directional relays, Application to ANN to power transformer protection and generator protection,
- (iv) Modern Trends in Protective Relaying- Gas insulated substation switch gear, Frequency Relays and Load shedding, Field Programming Gate Array (FPGA) Relays, Adaptive protection, integrated protection and control, Relay reliability.

F. Concept of Losses and Loss Reduction Measures:

- (i) Concept of Aggregate Technical & Commercial (AT&C) losses and its measurement philosophy
- (ii) Segregation of losses Technical, Commercial, Billing & collection efficiency, voltage wise segregation of losses
- (iii) Measures required for reducing the technical & commercial losses upto a defined level
- (iv) Commercial loss reduction measures/ improving billing & collection efficiency
- (v) Understanding losses from social perspective, community engagement, and suitable organization structure at different loss levels.
- (vi) Reactive power management.
- (vii) Energy Auditing and Accounting as per BEE Regulation
- (viii) Analysis of smart metering data for reduction of losses

G. Reliability Issues, Quality of Power Supply

- (i) Reliability and quality of power supply and reliability indices.- SAIFI, SAIDI, CAIFI, MAIFI etc
- (ii) Overview of the Electricity Supply Codes and Standards of performance of Regulatory Commissions.
- (iii) Causes and cures for breakdowns, tripping and voltage and frequency fluctuation.
- (iv) Possible measures for improving quality of power supply
- (v) Requirement of distribution management system (DMS) for improving the reliability of power supply - requirement of ring main system, possibility of N-1 condition at 33 KV level
- (vi) Common mode of failures of lines / distribution transformers, action to be taken for repairing / restoration of lines within the limit specified in regulations
- (vii) Effect of short circuits and breaker operation, Open and short circuit failures, Active and passive failures. Methods of restoration.
- (viii) Cost and worth of reliability / cost benefit analysis

H. IT Intervention / New Technologies: Smart Distribution

- (i) **SCADA** (MCC, BCC, RTU, FPI etc.)
 - Selection of SCADA /RT-DAS
 - Main component of SCADA/RT-DAS
 - Communication & Protocols
 - Automation-substation/distribution
- (ii) Smart Grid in Distribution Management system (with OMS, DMS, Consumer complaint, FPI on Lines) and RMUs
- (iii) GIS mapping and Consumer indexing, inventory control, keeping track of equipment's failure rate, quick fault location, energy accountability etc
- (iv) Demand Side Management
- (v) Distributed Energy Resources /Solar Roof top system /Net Metering /gross metering/virtual metering
- (vi) Dynamic modelling of AC and DC micro grids and control
- (vii) Outage Management system(OMS)
- (viii) Consumer care Centers

I. Other Important Topics

- (i) Separation of rural and agriculture power supply- Feeder segregation – physical /virtual
- (ii) Fixation of responsibility at various levels in Discoms
- (iii) Power Purchase optimization
- (iv) Disaster Management – actions to be taken at the time of any Disaster for restoration of power supply as soon as possible , institutional set-up for disaster Management, study of warning system
- (v) Cyber security and its mitigation in distribution system

B. Visits

- (1) Field Visit to Lines at all Voltage levels, and HVDS System along with demonstration of earthing, Visit to Sub-Station along with Distribution Transformers and capacitor banks
- (2) Visit to Transformer repair workshop and energy meters testing lab
- (3) Field visit to indoor and outdoor SS and GIS SS
- (4) Field visit to Distribution Transformer manufacturing unit
- (5) Field visit to SCADA center
- (6) Filed visit to smart metering MDM center
- (7) Field visits to Renewable Energy- Wind Power, Solar Power Plant, Mini Hydel, Biomass, Municipal waste, Industrial waste, etc.

C. Practicals

(1) Simulator:

- (i) Simulation of substation at 66/33KV, 66/11KV, 33/11KV and lines associated
- (ii) Simulation of different types of faults on System elements at voltage levels
- (iii) Relay coordination simulation
- (iv) Simulation of distribution transformer
- (v) Simulation of load flow (66KV, 33 KV , 5-bus system and at 11KV)
- (vi) Simulation of power cable parameters
- (vii) Simulation of three phase line auto reclose
- (viii) GIS based Voltage regulation calculations
- (ix) SCADA simulator
- (x) Trial tripping of relays on fault simulation under various protection schemes

(2) Overhead and Underground network Demo

- (i) Main components of OH & HVDS network
- (ii) Overhead conductors and their types
- (iii) Insulators and their common types used in our network
- (iv) Construction of double pole structure
- (v) All voltage level cables used in distribution network
- (vi) Earthing of transformer and other equipment

(3) Introduction and usage of power tools

- (i) Box Spanner Battery Operated
- (ii) Cable Lug Punching Tool Battery Operated
- (iii) Cable Cutting Tool Battery Operated
- (iv) Demolition Hammer for digging concrete surface
- (v) Telescopic Tree Pruner Battery operated complete set with one additional battery
- (vi) Infrared sensor Android based device for Thermo scanning

(4) Testing of Power / Distribution Transformer

- (i) Transformer Oil testing and oil filtration
- (ii) Measurement of earth resistance
- (iii) Measurement of Load of transformer on L.T. Side
- (iv) Testing of Circuit Breaker
- (v) Testing of metering Equipment
- (vi) Testing of energy meters
- (vii) Testing of Relays
- (viii) Testing of Differential relay
- (ix) Testing of Energy Meters by Accucheck
- (x) M.R.I. of energy meter
- (xi) Measurement of cell voltage and specific gravity of Battery set

(5) Operation (working with Engineer)

- (i) Operation of RMU
- (ii) Operational tactics & tips for trouble shooting
- (iii) Meter installation and removal practice, meters testing
- (iv) Power Factor Improvement Reactive Power Management & Capacitors bank formation, protection

D. Maintenance

(1) Know your Instruments

- (i) Hi-pot test of cable to be carried out
- (ii) Contact Resistance measurement of breaker
- (iii) How to use a Megger for IR measurement
- (iv) Uses of live line detector/ discharge rod/ multi meter/ Clamp on meter
- (v) Use of primary injection kit on breaker

(2) Maintenance and Breakdown Management

- (i) Sub Transmission System
- (ii) Distribution System

E. On-Job Training

(1) O&M Division / Distribution Center:

- (i) Smart meter working /smart Meter installation procedure
- (ii) Pre /post monsoon maintenance of lines
- (iii) Overview of Revenue collection and disconnection
- (iv) Distribution transformer maintenance
- (v) Replacement of failed Distribution transformer
- (vi) Works under line breakdown
- (vii) Overview of New Service connection
- (viii) Distribution Center- Meter Reading Diary, consumers Ledger, Registers R1, R2, R3, R-15, CAC, CRA, DCB, CCB, Temp connection register, fuse of call register, meter history register etc.

(2) Sub-Transmission maintenance Division:

- (i) Taking readings through MRI, Load Survey and downloading in computer
- (ii) Study of Magnetic Resonance Imaging (MRI) Reports, checking for temper
- (iii) Preparation of energy audit reports

- (iv) maintenance schedule of power transformer
- (v) Testing of power transformer
- (vi) Testing of CT/PT and combined units
- (vii) Testing of Meters at all voltage levels
- (viii) Relay connection and setting
- (ix) Control Panel wiring

(3) Additional Courses – As per requirement of organization -

- (i) Electrical vehicles- charging infrastructure
- (ii) Underground distribution transformer /Substations
- (iii) Installation of RMUs /FRTUs/other IT solution like ERP,

Refresher Course-: Requirement basis/Need basis (Recommended by the immediate superior/
Employee itself).

18. CURRICULUM FOR SUPERVISORS ASSISTING ENGINEERS ENGAGED IN THE OPERATION AND MAINTENANCE OF DISTRIBUTION SYSTEM(33 kV and below)

Induction Course (Mandatory)

A. Classroom

1.0 Common Course

- (i) Safety Management
- (ii) Overview of Safety Management
- (iii) Causes and factors of accident
- (iv) Statutory requirement
- (v) First Aid including resuscitation (artificial respiration)
- (vi) Values and Work culture
- (vii) Necessary permissions/Clearances
- (viii) Firefighting equipment and Fire prevention
- (ix) Disaster management
- (x) IT Applications and Cyber Security Awareness/overview
- (xi) Electrical Vehicle-Charging
- (xii) Batteries Storage
- (xiii) Renewable overview
- (xiv) Contracts and Materials Management
- (xv) **Regulations:**
 - Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022-Regulations
 - CEA(Installation and Operation of Meters) Regulation – as latest amended
 - Overview of Sub-Transmission & Distribution system (state specific)
 - Overview of various standards/regulations used in distribution system
- (xvi) **Other Government of India Initiative:**
 - MISSION LIFE- brief presentation and video shows
 - **Energy efficiency**

2.0 Basic Course

A. Sub-Transmission & Distribution System – Sub-stations & Lines

- (i) Supports-towers/ poles: (Voltage level wise separately)
 - Types of Tower/Poles used and selection criteria
 - Surveying and erection
 - ROW criteria
- (ii) Line conductor/ cables
 - Selection criteria for conductor /ABC / Covered conductor/UG cable etc
 - Conductor stringing, jointing/ binding, sagging & tensioning, clipping & jumpering
 - Earthing arrangements
 - **Cable** – types, selection, cable trenches, cable routing and laying, cable jointing and junction box
 - Earth wire/ neutral wire, guarding, etc.
 - Laying of Service lines
 - Laying of UG cables

(iii) Erection /O&M of Lines

- Selection and fixing of control devices, viz. Gang Operating Switches, fuses, isolators and earthing switches, lightning arrestors, and distribution box, etc.
- O&M of service lines.
- Street Lighting – design and layout methods.
- Statutory clearances,
- Line/ cable maintenance including hot line maintenance – line patrolling, inspection, periodicity, work permit, line clear and authorization, erection of temporary earth and restoration of supply, maintenance T&P and safety devices, thermo vision scanning, hot spots, etc in lines at all voltage
- Cable fault location techniques.

(iv) Distribution Transformer

- Selection criteria for Distribution transformer (capacity/ core/winding/oil type /dry type etc)
- Distribution Transformer Erection, testing commissioning operation and maintenance
- Statutory clearances for installation of DT
- Selection of mounting armament of DT (Pole/ H frame/Plinth etc)
- O&M techniques for DT
- Health monitoring of critical distribution transformers/ DT metering

(v) Electric Sub-Stations:

- Augmentation of existing Sub-station / creation of new Sub-station
- Availability of in-feed lines from nearby EHV SS
- Selection of installed capacity, indeed capacity, Optimum capacity loading
- Type of Sub-station (AIS/GIS), Air Insulated /Gas Insulated Sub-station
- Site selection, layout and civil Engineering requirements.
- Bus bar arrangement, sub-station equipment, viz. transformers, circuit breakers, etc.
- Parallel operation of Transformers, neutral switching, Interlocking
- Operational logic for closing and opening of CB, Isolator and Earth switch in Lines, Interlocking
- Auxiliary systems, viz. DG set, battery system and firefighting system, Standby power sources of DG set Inverter and RoofTop solar, neutral isolation arrangement in Change over system
- Control panel, meters, indicators and recorders and relays, etc. (SCADA compatability)
- Erection, testing and commissioning of equipment's/systems
- Earthing of sub-stations equipment's and soil testing
- Transformer oil and its testing
- Reactive power management at Sub-station /requirement of capacitors etc
- Operation and maintenance of all equipment's, protective relays and auxiliaries.
- Sub-station Automation /SCADA

B. High Voltage Distribution System (HVDS)

- (i) Overview of High Voltage Distribution System (HVDS) - advantages /disadvantages
- (ii) Applications, proper site selection for Load centre
- (iii) Comparison with conventional system with DTs

C. Releasing of New Connection

- (i) Type of connections, selection of voltage level as per load, selection of 1-Ph or 3 Ph supply, checking of Wirings, and Earthing
- (ii) Checking of Wirings, and Earthing, Neutral Looping etc in Independent and Multi storied Residential and commercial premises.
- (iii) Calculation of contracted demand, service line, clearances required for releasing of new connections, demand charges etc
- (iv) Installation of meters including smart meter (1-Ph /3 Ph –prepaid),
- (v) Importance and installations of ELCB/RCCB , Mandatory provisions of Regulations
- (vi) Bulk power supply system/ dedicated power supply

D. Metering Requirements:

- (i) Overview of Central Electricity Authority (Installation and Operation of meters) Regulations 2006 and its amendments.
- (ii) Type of metering i.e. DT metering, feeder metering and Consumer metering.
- (iii) Selection of Meters (1-Ph or 3- Ph , whole current/ CT-PT operated , smart per paid / simple pre-paid etc)
- (iv) Over view of Advanced Metering Infrastructure (AMI) -Smart Metering system
- (v) Concept of AMISP / Totex model in installation of smart meters ,
- (vi) Major provision of Standard Bidding Document (SBD) for AMISP – study of SLA for AMISP
- (vii) Testing and sealing of meters, use of CMRI
- (viii) Familiarity with MDM system, metering protocols.
- (ix) Analysis and detection of meter tampering, identification of high loss areas etc
- (x) Role of advanced metering system / smart meters in controlling commercial losses.
- (xi) Net Metering /Gross metering

E. Modern protection system:

- (i) Numerical and Microprocessor based Relays- basic principles, characteristics, over current and earth fault protections, Differential protection and distance Protection, Testing of Numerical relays
- (ii) microprocessor based over current and earth fault relays , directional relays impedance relays and reactance relays
- (iii) AI based Numerical Protection- ANN , Fuzzy logic , application of AI to power system protection, Application of ANN to overcurrent protection , transmission line protection, ANN based directional relays, Application to ANN to power transformer protection and generator protection,
- (iv) Modern Trends in Protective Relaying- Gas insulated substation switch gear, Frequency Relays and Load shedding, Field Programming Gate Array (FPGA) Relays, Adaptive protection, integrated protection and control, Relay reliability.

F. Concept of Losses and Loss Reduction Measures:

- (i) Concept of AT& C losses and it's measurement philosophy
- (ii) Segregation of losses Technical, Commercial , Billing & collection efficiency , voltage wise segregation of losses
- (iii) Measures required for reducing the technical & commercial losses upto a defined level
- (iv) Commercial loss reduction measures/ improving billing & collection efficiency
- (v) Understanding losses from social perspective, community engagement, and suitable organization structure at different loss levels.
- (vi) Reactive power management.
- (vii) Energy Auditing and Accounting as per BEE Regulation
- (viii) Analysis of smart metering data for reduction of losses

G. Reliability Issues, Quality of Power Supply

- (i) Reliability and quality of power supply and reliability indices.- SAIFI,SAIDI,CAIFI,MAIFI etc
- (ii) Overview of the Electricity Supply Codes and Standards of performance of Regulatory Commissions.
- (iii) Causes and cures for breakdowns, tripping and voltage and frequency fluctuation.
- (iv) Possible measures for improving quality of power supply
- (v) Requirement of distribution management system (DMS) for improving the reliability of power supply - requirement of ring main system , possibility of N-1 condition at 33 KV level
- (vi) Common mode of failures of lines / distribution transformers , action to be taken for repairing / restoration of lines within the limit specified in regulations
- (vii) Effect of short circuits and breaker operation, Open and short circuit failures, Active and passive failures. Methods of restoration.
- (viii) Cost and worth of reliability / cost benefit analysis

H. IT Intervention / New Technologies: Smart Distribution

- (i) **SCADA** (MCC, BCC, RTU, FPI etc.)
 - Selection of SCADA /RT-DAS
 - Main component of SCADA/RT-DAS
 - Communication & Protocols
 - Automation-substation/distribution
- (ii) Smart Grid in Distribution Management system (with OMS, DMS, Consumer complaint, FPI on Lines) and RMUs
- (iii) GIS mapping and Consumer indexing, inventory control, keeping track of equipment's failure rate, quick fault location, energy accountability etc
- (iv) Demand Side Management
- (v) Distributed Energy Resources /Solar Roof top system /Net Metering /gross metering/virtual metering
- (vi) Dynamic modelling of AC and DC micro grids and control
- (vii) Outage Management system(OMS)
- (viii) Consumer care Centers

I. Other Important Topics

- (i) Separation of rural and agriculture power supply- Feeder segregation – physical /virtual

- (ii) Fixation of responsibility at various levels in Discoms
- (iii) Power Purchase optimization
- (iv) Disaster Management – actions to be taken at the time of any Disaster for restoration of power supply as soon as possible , institutional set-up for disaster Management, study of warning system
- (v) Cyber security and its mitigation in distribution system

B. Visits

- (1) Field Visit to Lines at all Voltage levels, and HVDS System along with demonstration of earthing, Visit to Sub-Station along with Distribution Transformers and capacitor banks
- (2) Visit to Transformer repair workshop and energy meters testing lab
- (3) Field visit to indoor and outdoor SS and GIS SS
- (4) Field visit to Distribution Transformer manufacturing unit
- (5) Field visit to SCADA center
- (6) Filed visit to smart metering MDM center
- (7) Field visits to Renewable Energy- Wind Power, Solar Power Plant, Mini Hydel, Biomass, Municipal waste, Industrial waste, etc.

C. Practicals

(1) Simulator:

- (i) Simulation of substation at 66/33KV, 66/11KV, 33/11KV and lines associated
- (ii) Simulation of different types of faults on System elements at voltage levels
- (iii) Relay coordination simulation
- (iv) Simulation of distribution transformer
- (v) Simulation of load flow (66KV, 33 KV , 5-bus system and at 11KV)
- (vi) Simulation of power cable parameters
- (vii) Simulation of three phase line auto reclose
- (viii) GIS based Voltage regulation calculations
- (ix) SCADA simulator
- (x) Trial tripping of relays on fault simulation under various protection schemes

(2) Overhead and Underground network Demo

- (i) Main components of OH & HVDS network
- (ii) Overhead conductors and their types
- (iii) Insulators and their common types used in our network
- (iv) Construction of double pole structure
- (v) All voltage level cables used in distribution network
- (vi) Earthing of transformer and other equipment

(3) Introduction and usage of power tools

- (i) Box Spanner Battery Operated
- (ii) Cable Lug Punching Tool Battery Operated
- (iii) Cable Cutting Tool Battery Operated
- (iv) Demolition Hammer for digging concrete surface
- (v) Telescopic Tree Pruner Battery operated complete set with one additional battery
- (vi) Infrared sensor Android based device for Thermo scanning

(4) Testing of Power / Distribution Transformer

- (i) Transformer Oil testing and oil filtration
- (ii) Measurement of earth resistance
- (iii) Measurement of Load of transformer on L.T. Side

- (iv) Testing of Circuit Breaker
- (v) Testing of metering Equipment
- (vi) Testing of energy meters
- (vii) Testing of Relays
- (viii) Testing of Differential relay
- (ix) Testing of Energy Meters by Accucheck
- (x) M.R.I. of energy meter
- (xi) Measurement of cell voltage and specific gravity of Battery set

(5) Operation (working with Engineer)

- (i) Operation of RMU
- (ii) Operational tactics & tips for trouble shooting
- (iii) Meter installation and removal practice, meters testing
- (iv) Power Factor Improvement Reactive Power Management & Capacitors bank formation, protection

D. Maintenance

(1) Know your Instruments

- (i) Hi-pot test of cable to be carried out
- (ii) Contact Resistance measurement of breaker
- (iii) How to use a Megger for IR measurement
- (iv) Uses of live line detector/ discharge rod/ multi meter/ Clamp on meter
- (v) Use of primary injection kit on breaker

(2) Maintenance and Breakdown Management

- (i) Sub Transmission System
- (ii) Distribution System

E. On-Job Training

(1) O&M Division / Distribution Center:

- (i) Smart meter working /smart Meter installation procedure
- (ii) Pre /post monsoon maintenance of lines
- (iii) Overview of Revenue collection and disconnection
- (iv) Distribution transformer maintenance
- (v) Replacement of failed Distribution transformer
- (vi) Works under line breakdown
- (vii) Overview of New Service connection
- (viii) Distribution Center- Meter Reading Diary, consumers Ledger, Registers R1, R2, R3, R-15, CAC, CRA, DCB, CCB, Temp connection register, fuse of call register, meter history register etc.

(2) Sub-Transmission maintenance Division:

- (i) Taking readings through MRI, Load Survey and downloading in computer
- (ii) Study of MRI Reports, checking for temper
- (iii) Preparation of energy audit reports
- (iv) maintenance schedule of power transformer
- (v) Testing of power transformer
- (vi) Testing of CT/PT and combined units
- (vii) Testing of Meters at all voltage levels

- (viii) Relay connection and setting
- (ix) Control Panel wiring

(3) Additional Courses – As per requirement of organization -

- (i) Electrical vehicles- charging infrastructure
- (ii) Underground distribution transformer /Substations
- (iii) Installation of RMUs /FRTUs/other IT solution like ERP,

Refresher Course-: Requirement basis/Need basis (Recommended by the immediate superior/ Employee itself).

19. CURRICULUM FOR TECHNICIANS FOR ASSISTING SUPERVISORS IN THE OPERATION AND MAINTENANCE OF DISTRIBUTION SYSTEM(33 KV and below)

Induction Course (mandatory)

A. Class room

1.0 Common Courses

- (i) Safety Management
 - Overview of Safety Management
 - Causes and factors of accident
 - Statutory requirement
 - Firefighting equipment and Fire prevention
- (ii) First Aid including resuscitation (artificial respiration)
- (iii) Values and Work culture
- (iv) Relevant regulations and relevant sections of Electricity Act (EA), CEA (Measures Relating to Safety & Electric Supply) Regulations, 2023 and amendments).
- (v) Necessary permissions/Clearances
- (vi) IT Applications and Cyber Security Awareness/overview
- (vii) Disaster management
- (viii) Electrical Vehicle-Charging - introduction
- (ix) Batteries Storage
- (x) Renewable overview
- (xi) **Other Government of India Initiative: MISSION LIFE-** brief presentation and video shows

2.0 Basic Course:

A. Sub-transmission and Distribution Lines:

- (i) Survey for lines at voltage – at all voltages
- (ii) Line Conductors – types, Classification, Conductor stringing, jointing/ binding, sagging & tensioning, clipping & jumpering
- (iii) Earthing arrangements
- (iv) Cable – types, cable trenches, cable routing and laying, cable jointing and junction box
- (v) Earth wire/ neutral wire, guarding, etc.

- (vi) Fixing of control devices, viz. Gang Operating Switches, fuses, isolators and earthing switches, lightning arrestors, and distribution box, etc.
- (vii) Installation of service lines. / meters/smart meters/net meter
- (viii) Street Lighting – design and layout methods.
- (ix) Line/ cable maintenance including hot line maintenance – line patrolling, inspection, periodicity, work permit, line clear and authorization, erection of temporary earth and restoration of supply, maintenance T&P and safety devices, thermo vision scanning, hot spots, etc.

B. Electric Sub-Stations:

- (i) Type, layout
- (ii) Bus bar arrangement, sub-station equipment, viz. transformers, circuit breakers, etc.
- (iii) Auxiliary systems, viz. DG set, battery system and firefighting system, etc.
- (iv) Control panel, meters, indicators and recorders and relays, etc.
- (v) Erection, testing and commissioning of equipment's/systems
- (vi) Earthing of sub-stations equipment's and soil testing
- (vii) Transformer oil and its testing
- (viii) Operation and maintenance of all equipment's, protective relays and auxiliaries.
- (ix) HVDS

C. Metering

- (i) Type of metering, viz. DT metering, feeder metering and Consumer metering.
- (ii) Meter types, their settings and operation, testing and sealing.
- (iii) Smart metering working

D. Working with Technician/Practical's

- (i) Use of Instruments-
 - Megger , tong tester, multimeters, earth tester
 - Transformer Oil testing and oil filtration
 - Measurement of earth resistance
 - Measurement of Load of transformer on L.T. Side
 - Testing of Circuit Breaker
 - Testing of CT PT
 - Installation of energy meters
 - IR Value of Power / Distribution Transformer
 - USE OF SAFETY APPLIANCES – Discharge rod, DO Fuse rod , safety belt ,
 - Conductor winding on Insulator
 - M.R.I. of energy meter
 - Measurement of cell voltage and specific gravity of Battery set
 - Crimping of lugs on conductors
 - Jointing of ACSR/AAC Conductors
 - L.T. Cable jointing

E. Releasing of New Connection

- (i) Type of connections, selection of 1-Ph or 3 Ph supply as per load,
- (ii) Checking of Wirings and Earthing, Neutral Looping etc in Independent and Multi storyed Residential and commercial premises.
- (iii) Installation of meters including smart meter (1-Ph /3 Ph –prepaid),
- (iv) Importance and installations of ELCB/RCCB , Mandatory provisions of Regulations

B. On Job Training for Line Technicians

1.0 O&M Division / Distribution Center

- (i) To conduct readings of different types of energy meters
- (ii) Installation of different types of L.T. energy meters at consumers premises at all voltage levels
- (iii) Laying of service cable from L.T. Pole to consumer meter
- (iv) Pre /post monsoon maintenance of lines
- (v) Revenue collection and disconnection
- (vi) Installation of Distribution transformer
- (vii) Replacement of conductor
- (viii) Distribution transformer maintenance
- (ix) Replacement of failed Distribution transformer
- (x) Works under line breakdown: procedure to take permit and line patrolling
- (xi) Attend consumer complains

2.0 Sub-Transmission maintenance Division

- (i) Taking readings through MRI , Load Survey and downloading in computer
- (ii) Study of MRI Reports , checking for tempering of meters
- (iii) Use of instruments for energy audit
- (iv) maintenance schedule of power transformer
- (v) Testing of power transformer
- (vi) Testing of CT/PT and combined units
- (vii) Testing of Meters at all voltage levels
- (viii) Relay connection and setting
- (ix) Control Panel wiring
- (x) Operating oil filtration plant
- (xi) Transformer oil testing

3.0 Additional Courses – As per requirement of organization -

- (i) Electrical vehicles- charging Details
- (ii) Underground distribution transformer
- (iii) Installation of RMUs /FRTUs/other IT solution like ERP
- (iv) Energy Efficiency initiatives

Refresher Course- Requirement basis/Need basis (Recommended by the immediate superior/Employee itself).

20. CURRICULUM FOR TRAINING ON HOT LINE MAINTENANCE OF DISTRIBUTION SYSTEM (Total duration: 6 Weeks)

Session-1

Introduction to Maintenance of Distribution System (Class Room /Practical Session)

- (i) Introduction to Methods of Preventive Distribution System Maintenance
- (ii) Methods of preventive maintenance of Distribution System
- (iii) Importance of patrolling of lines and procedures
- (iv) Procedure of patrolling of lines and equipment used for patrolling
- (v) Patrolling Norms of 11/33 kV lines and substations
- (vi) Emergency patrolling procedures
- (vii) Need of insulator replacement
- (viii) Various causes of insulator failure
- (ix) Introduction to various T&P required for replacement of suspension insulators
- (x) Purpose/usage of all the T&P required for insulator replacement
- (xi) Demonstration of pole climbing

Session-2

Introduction to Live Line Maintenance of Distribution System (Class Room /Practical Session)

- (i) History & Introduction to LLMT
- (ii) Theory on types of Hot Line Tools
- (iii) Theory on Selection of Hot Line Tools
- (iv) Theory & Practice on Selection & use of PPE
- (v) Theory & Practice on selection of ropes & Knots for Live Line Maintenance
- (vi) Theory on work at height Safely during Live Line Maintenance
- (vii) Theory & Practice on Live Line Maintenance Hardware selection
- (viii) Theory & Practice on Conductors & Binding
- (ix) Theory & Practice on Different Types of Guards used in Live Line Maintenance
- (x) Theory & Practice on care & Maintenance of Live Line Tools
- (xi) Practice on Testing of Live Line Tools
- (xii) Theory & Practice on tying and untying of conductors with insulators
- (xiii) Introduction to safety procedures, Measure and rules to be considered during live Line maintenance work.
- (xiv) Theory & Practice on Safety practices during Live Line Maintenance
- (xv) Theory & Practice on Medical First Aid
- (xvi) Theory & Practice of Fire Fighting in Electrical System

Session-3

Introduction to Insulated Aerial Work Platform and Insulated Rubber Gloves Method

- (i) Introduction to Insulated Platform parts
- (ii) Explanation of Operation of Insulated Aerial Work Platform
- (iii) Introduction to Insulated Rubber Gloves Method & Tools
- (iv) Theory & Practice on Selection of PPEs for Rubber Gloves Method and standards

Session-4

Practical Training Session Phase-I

{Practical Maintenance Training on Experimental Distribution Line (11 kV/33 kV) in uncharged condition (Cold Line Operation on Experimental Line)}

- (i) Practice on use of Insulated Aerial Platform for Live Line Maintenance of Distribution System
- (ii) Explanation & Practice of Replacement of Pin Insulators at 11 kV & LT Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (iii) Explanation & Practice of Replacement of Pin/Suspended Insulators at 33 kV Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (iv) Explanation & Practice of Replacement of Disc Insulators at 11 kV & LT Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (v) Explanation & Practice of Replacement of Disc Insulators at 33 kV Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (vi) Explanation & Practice of Replacement of Pole Hardware and Cross Arms at 11 kV & LT Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (vii) Explanation & Practice of Replacement of Pole Hardware and Cross Arms at 33 kV Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (viii) Explanation & Practice of Repair/ Replacement of Jumpers at 11 kV & LT Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (ix) Explanation & Practice of Repair/Replacement of Jumpers at 33 kV Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (x) Explanation & Practice of Replacement of Disc (Strain) Insulators Hardware at 11 kV & LT Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (xi) Explanation & Practice of Replacement of Disc (Strain) Insulators Hardware at 33 kV Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (xii) Explanation & Practice of Repair of Conductor at 11 kV & LT Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (xiii) Explanation & Practice of Repair of Conductor at 33 kV Experimental Line in uncharged condition (Cold Line) using Rubber Glove & Insulated Aerial Work Platform
- (xiv) Practice of Tree Trimming nearby Experimental Line in uncharged condition (Cold Line) using Insulated Aerial Work Platform
- (xv) Technical Study Visit to Live Line Tools Testing Centre

Session-5

Practical Training Session Phase-II

{Practical Maintenance Training on Experimental Distribution Line(11 kV/33 kV) after charging with 6.6. kV/11 kV & without subjected to commercial load}

- (i) Explanation & Practice of Rectification of Hot-spots at 11 kV & LT Experimental Line in charged condition by 11 kV supply using Rubber Glove & Insulated Aerial Work Platform
- (ii) Explanation & Practice of Rectification of Hot-spots at 33 kV Experimental Line in charged condition by 11 kV supply (Live Line) using Rubber Glove & Insulated Aerial Work Platform
- (iii) Practice of Tree Trimming nearby Experimental Line in charged condition by 11 kV & LT supply (Live Line) using Insulated Aerial Work Platform

- (iv) Practice of Replacement of Pin Insulators at 11 kV & LT Experimental Line in charged condition by 11 kV supply (Live Line) using Rubber Glove & Insulated Arial Work Platform
- (v) Practice of Replacement of Pin/Suspended Insulators at 33 kV Experimental Line in charged condition by 11 kV supply(Live Line) using Rubber Glove & Insulated Arial Work Platform
- (vi) Practice of Replacement of Disc Insulators at 11 kV & LT Experimental Line in charged condition by 11 kV supply using Rubber Glove & Insulated Arial Work Platform
- (vii) Practice of Replacement of Disc Insulators at 33 kV Experimental Line in charged condition by 11 kV supply (Live Line) using Rubber Glove & Insulated Arial Work Platform
- (viii) Practice of Replacement of Pole Hardware and Cross Arms at 11 kV & LT Experimental Line in charged condition by 11 kV supply (Live Line) using Rubber Glove & Insulated Arial Work Platform
- (ix) Practice of Replacement of Pole Hardware and Cross Arms at 33 kV Experimental Line in charged condition by 11 kV supply (Live Line) using Rubber Glove & Insulated Arial Work Platform
- (x) Practice of Repair /Replacement of Jumpers at 11 kV & LT Experimental Line in charged condition by 11 kV supply(Live Line) using Rubber Glove & Insulated Arial Work Platform
- (xi) Practice of Repair /Replacement of Jumpers at 33 kV Experimental Line in charged condition by 11 kV supply (Live Line) using Rubber Glove & Insulated Arial Work Platform
- (xii) Practice of Repair /Replacement of Disc (Strain) Insulators Hardware at 11 kV & LT Experimental Line in charged condition by 11 kV supply (Live Line) using Rubber Glove & Insulated Arial Work Platform
- (xiii) Practice of Repair /Replacement of Disc (Strain) Insulators Hardware at 33 kV Experimental Line in charged condition by 11 kV supply (Live Line) using Rubber Glove & Insulated Arial Work Platform
- (xiv) Practice of Repair of Conductor at 11 kV Experimental Line in charged condition by 11 kV & LT supply(Live Line) using Rubber Glove & Insulated Arial Work Platform
- (xv) Practice of Repair of Conductor at 33 kV Experimental Line in charged condition by 11 kV supply (Live Line) using Rubber Glove & Insulated Arial Work Platform

Session-6

Practical Training Session Phase-III

**{ Hot Line Maintenance Training on DISCOM's Commercial Line (11 kV/33 kV) in fully charged condition & with subjected to commercial load of DISCOM}
(Live Line Operation on Commercial Line of DISCOM)**

- (i) Practice of Rectification of Hot-spots at 11 kV & LT at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Arial Work Platform
- (ii) Practice of Rectification of Hot-spots at 33 kV at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Arial Work Platform
- (iii) Practice of Tree Trimming nearby Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Arial Work Platform
- (iv) Practice of Replacement of Pin Insulators at 11 kV & LT at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Arial Work Platform
- (v) Practice of Replacement of Pin/Suspended Insulators at 33 kV at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Arial Work Platform

- (vi) Practice of Replacement of Disc Insulators at 11 kV & LT at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Aerial Work Platform
- (vii) Practice of Replacement of Disc Insulators at 33 kV at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Aerial Work Platform
- (viii) Practice of Replacement of Pole Hardware and Cross Arms at 11 kV & LT at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Aerial Work Platform
- (ix) Practice of Replacement of Pole Hardware and Cross Arms at 33 kV at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Aerial Work Platform
- (x) Practice of Repair /Replacement of Jumpers at 11 kV & LT at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Aerial Work Platform
- (xi) Practice of Repair /Replacement of Jumpers at 33 kV at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Aerial Work Platform
- (xii) Practice of Repair /Replacement of Disc (Strain) Insulators Hardware at 11 kV & LT at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Aerial Work Platform
- (xiii) Practice of Repair /Replacement of Disc (Strain) Insulators Hardware at 33 kV at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Aerial Work Platform
- (xiv) Practice of Repair Conductor at 11 kV & LT at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Aerial Work Platform
- (xv) Practice of Repair Conductor at 33 kV at Commercial Lines of DISCOM in fully charged condition (Commercial Line Operation) using Rubber Glove & Insulated Aerial Work Platform

Session-7

Evaluation of participants on the basis of following

- (i) Their practical performance during training
- (ii) Adoption of safety practices during Insulator replacement and other activities
- (iii) Interest level during training program
- (iv) Test & Viva-Voce

21. Refresher course for Hot Line Maintenance: To be decided by the concerned power utility as per their needs/requirements and as per the new technologies as and when adopted/implemented by them.

CENTRAL ELECTRICITY AUTHORITY

Application Form-A

(To be filled for Last Financial Year and each page to be signed by Head of the Institute)

Application Form for Statutory Recognition of Training Institutes under Regulation 8 of Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2023 pertaining to personnel engaged in O&M of Distribution Systems

Name of the Training Institute:

Permanent Account Number (PAN) of the Training Institute:

Complete address: _____

Name of the Head of the Training Institute:

Telephone nos. Office: _____ **Residence:** _____

Email address: _____ **Mobile no.** _____

Website of the Institute: _____

Name of the owner of the Training institute:

GENERAL INFORMATION

- 1. Field of training :** Distribution of Electricity/Hot Line Maintenance

2. **Category of Institute : (Tick mark appropriately)**

Category -I : Training for Engineers	
Category –II : Training for Supervisors	
Category –III : Training for ITI qualified / Non-qualified technicians	

3. Training Institute owned by (Tick Appropriately): Central Government/ State Government/ Private/ Others.

4. **Mandatory Requirement :**

Whether all the mandatory conditions given below are met? Yes/NO

Sr No.	Mandatory Conditions	Yes/No
(1)	The training institute shall have a full time Principal/Director and teaching staff.	
(2)	There should be a separate building which shall be solely used for the purpose of training. The building shall either be owned by the institute or on lease. However, in case the building is on lease then the lease period shall be more than the period of recognition.	
(3)	The training institute shall give an undertaking that on recognition for 3 years initially, the institute shall follow the curriculum as per these guidelines	
(4)	(a). For the Training Institutes without Hot Line Training Facilities: The training institute shall have the facilities of providing training on simulator and slide shows & multimedia etc. The training institute shall have institutional tie up for simulator training/labs/workshops, if not having in-house. (b) For Hot Line Training Institute: i. The institute must have (i) Experimental Line with facility to charge with 11 kV for Cold and Live Maintenance Training & Practice (as mentioned in evaluation criteria at A(5)(i)(ii)(iii)) ; and (ii) Specialized Tools to perform Hot Line Maintenance Operations of 11 kV and 33 kV Distribution System complete set as mentioned at Annexure-IV; and (iii) Insulated Device (Insulated Platform mounted on Vehicle) as mentioned at Annexure-V. ii. The Institute shall comply to all safety measures mentioned in Regulation 21 and Schedule-I of CEA Safety Regulations. iii. The Institute shall have their own ambulance facility with basic medical facilities, oxygen cylinder facility , heart monitoring set-up etc. The ambulance shall always be present at the time and place of hotline training. .	

(5)	The training institute shall have CCTV facility at the examination hall for conducting the term end exam. The training institute may have tie up with independent agency for conducting the exam which shall have CCTV facility at the examination hall for conducting the exam.	
(6)	The training institute shall have basic medical facilities and high Speed Internet facilities in its premises.	
(7)	The training institute shall score a least 60% in the evaluation criteria for getting its recognition from the Authority.	
(8)	The budget provision and control of expenditure for training program shall be distinctly and exclusively earmarked for the institute.	

5. Annual Training Capacity of the Institute (Days) :

6. Annual Budget provisions for training during last financial year:

(Rupees in lakh)

Year	Allocated Budget	Budget Utilized	% Budget Utilized
F.Y.			

7. Infrastructure (The information shall be related with the Training Institute):

(1) Details of Classrooms (including seminar/ syndicate rooms/ computer rooms) in the training institute:

No. of Classrooms	Seating Capacity	Whether A-V aids facilities provided	Whether Live streaming capability provided	Remarks
(1)	(2)	(3)	(4)	(5)
		Yes/No	Yes/No	

(2) Laboratories/Workshops including computer labs / Hot Line Experimental Line & Live Line tools for Hot Line Maintenance Practice (for Hot Line Training Institute)

Sl. No.	Type and No. of Laboratory/Workshop/ Hot Line Experimental Line & Hot Line tools

(3) Details of Hostel Facilities in the training institute :

No. of Rooms x Beds*	Hostel Capacity (Total no. of Beds)	No. of days for which Hostel is available Annually	Annual occupancy during the year (Mandays i.e. annual sum of no. of trainees stayed each day)	% Annual occupancy

--	--	--	--	--

*e.g. 24x2 stands 24 twin-bed rooms, and 13x1 for 13 single-bed rooms.

(4) Details of Simulators :

Number and details of each Simulator for training relating to Distribution system to be attached.

(5) Details of Library/ e-library:

e- Library

Yes/No

Details of Books	Nos. (Please mention whether available in Library or E-Library)
Technical books	
Standards-BIS,IEC etc	
CEA Regulations	
SERC regulations	
No. of Journals	

(6) Model Room

Yes/No

If yes, then enclose the number of models and their list.

(7) Multimedia training packages (attach list as per format below):

Sl. No.	Subject	Numbers	Remarks

(8) Whether the training institute has e-integration with other Training Institute within the organization or with other organizations:

Yes/ No

If yes, then attach the list with the details.

(9) Whether the training institute has linkage with the sub-station in respect of organizing and monitoring the on-job training:

Yes/ No

If yes, then furnish the name of the organization where on-job training imparted.

(10) Do you have an officer designated as an On-job Trainer? Yes/No

If yes, then give the name and designation of the officer.

(11) Auditorium/Conference Hall

Yes/No

If yes, then mention Seating capacity

(12) Reprographic Facilities /Resource Centre

Yes/No

If yes, attach the list with details.

(13) Quality of Infrastructure as rated by the applicant/ institute itself as excellent / very good/ good:

(a) Quality of Maintenance: (Excellent / Very Good/ Good)

(b) Quality of Air Conditioners: (Excellent / Very Good/ Good)

(c) Maintenance of cleanliness and hygiene: (Excellent / Very Good/ Good)

(d) Hot Line Experimental Line (11 kV & 33 kV) Hot Line Maintenance Practice (Excellent / Very Good/ Good)

(e) Hot Line/Live Line tools for Hot Line Maintenance Practice (Excellent / Very Good/ Good)

(f) Other facilities (please tick among the following):

- | | |
|-----------------------------------|--------------------------|
| (i) Transport | ☐ |
| (ii) Recreation (Indoor/ Outdoor) | ☐ |
| (iii) Laundry services | ☐ |
| (iv) Mess/ Canteen | ☐ |
| (v) Medical facilities | ☐ |
| (vi) High Speed Internet | ☐ |
| (vii) Gym | ☐ |
| (viii) Others | ☐ |

8. Faculty:

(1) Details of Faculty (Core Faculty + Empaneled Faculty + Guest Faculty) for training shall be furnished by the applicant for the financial year. The list of faculty (Core Faculty / Empaneled Faculty / Guest Faculty) to be submitted in the format given below:

Sl. No.	Name of faculty member	Qualification	Experience	Specialization
A. Core faculty (as defined in the Guidelines)				
1.				
2.				
B. Empaneled faculty (as defined in the Guidelines)				
1.				
2.				
C. Guest faculty / Experts (as defined in the Guidelines)				
1.				
2.				

(2) The details mentioned at para (1) above regarding faculty to be summarized as per the table given below:

	Numbers			Qualification wise(nos.)				No. of Core Faculty trained during the year
Total	Core*	Empaneled*	Guest*	Diploma	Degree	PG	Ph.D.	

* as defined in the guidelines

(3) Experience:

(i) No. of faculty having experience* more than 5 years but less than 10 years:

(ii) No. of faculty having experience* more than 10 years:

* experience in Hot Line Maintenance in case of Hot Line Training Institute.

(4) Details of depth of Knowledge of Core faculty:

S. No.	Area	Details
(1)	Papers Published in conference or seminars by core faculties	1. 2. 3.
(2)	core faculties Empaneled with other institutes	1. 2. 3.
(3)	Membership of National or International body of the training institute	1. 2. 3.
(4)	Working models or simulation models made by core faculties	1. 2. 3.

Training Courses

(1) The courses conducted during the last financial year to be provided in the format given below:

S. No.	Name of course	Modules / topics covered	Duration (From-To)	No. of Trainees	Total Days
	Courses relevant to Power Sector 1. 2. Sub-total				

	Live Line Maintenance Training (for Hot Line Training Institute) 1. 2. Sub-total				
	On-job training at Sub-Station 1. 2. Sub-total				
	Total				

- (2) The no. of courses and the no. of person trained during the last F.Y. to be furnished as per the table given below:

Year	Number of courses	Persons trained	
		Nos.	(Days)
F.Y.			

- (3) Break up of total training days during the last financial year:

Sl. No.	Type of Course	Persons trained	Days
1.	Theory Course *		
2.	Live Line Maintenance Training (for Hot Line Training Institute)		
3.	On-job Training		

*Online training shall be included in the **Theory Course**

9. Training methodology

- | | | |
|--|--------|-------------------------|
| (i) Classroom lectures | Yes/No | } (Enclose the Details) |
| (ii) Group Discussion Session | Yes/No | |
| (iii) On-job Training | Yes/No | |
| (iv) Case Studies and presentation
By each trainee | Yes/No | |
| (v) Hot Line Maintenance Practice Yes/No
(applicable for Hot Line Training Institute) | | |

10. Instructional capability

- (1) Has the Core faculty been adequately trained in the instructional technique for the F.Y.?
- Yes/No

If yes,

Name of the core faculty member	Training in instructional techniques			
	At Institute (Name)	Period		Days
		From	To	

- (2) Whether the digital handouts related to course content are prepared for each lecture and given to trainees. Yes/No
- (3) Do the digital handouts clearly indicate the objectives of the lesson, various elements into which the lesson has been broken relevant to syllabus. Yes / No
- (4) Is the lecture supported by the objective type questions? Yes/No
- (5) Feedback from trainees on (attach a copy of sample feedback)
- (i) Each faculty Yes/No
 - (ii) Each training module Yes/No
 - (iii) Training need Yes/No
 - (iv) Institute facilities Yes/No

Date:

Signature of head of the Training Institute with Office Stamp/Seal

CENTRAL ELECTRICITY AUTHORITY

Application Form-B

(To be filled for last three financial years each, separately and each page to be signed by Head of the Institute)

Application Form for RENEWAL of Statutory Recognition of Training Institutes under Regulation 8 of Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2023 pertaining to personnel engaged in O&M of Distribution Systems

Name of the Training Institute:

Permanent Account Number (PAN) of the Training Institute:

Complete address: _____

Name of the Head of the Training Institute:

Telephone nos. Office: _____ **Residence:** _____

Email address: _____ **Mobile no.** _____

Website of the Institute: _____

Name of the owner of the Training institute:

GENERAL INFORMATION

1. Year of Recognition of Training Institute (attach the Certificate of Recognition):
.....
2. **Field of training** : Distribution of Electricity/Hot Line Maintenance

3. **Category of Institute : (Tick mark appropriately)**

Category -I : Training for Engineers	
Category -II : Training for Supervisors	
Category –III : Training for ITI qualified / Nonqualified technicians	

4. Training Institute owned by (Tick Appropriately): Central Government/ State Government/ Private/ Others.

5. **Mandatory Requirement :**

Whether all the mandatory conditions given below are met? Yes/No

Sr No	Mandatory Conditions	Yes/No
(1)	The training institute shall have a full time Principal/Director and teaching staff.	
(2)	There should be a separate building which shall be solely used for the purpose of training. The building shall either be owned by the institute or on lease. However, in case the building is on lease then the lease period shall be more than the period of recognition.	
(3)	The training institute shall have at least 2 faculties (core/empaneled/guest) in relevant specialized topics/subjects of the curriculum given in these guidelines.	
(4)	(a). For the Training Institutes without Hot Line Training Facilities: The training institute shall have the facilities of providing training on simulator and slide shows & multimedia etc. The training institute shall have institutional tie up for simulator training/labs/workshops, if not having in-house. (b) For Hot Line Training Institute: i. The institute must have (i) Experimental Line with facility to charge with 11 kV for Cold and Live Maintenance Training & Practice (as mentioned in evaluation criteria at A(5)(i)(ii)(iii)) ; and (ii) Specialized Tools to perform Hot Line Maintenance Operations of 11 kV and 33 kV Distribution System complete set as mentioned at Annexure-IV; and (iii) Insulated Device (Insulated Platform mounted on Vehicle) as mentioned at Annexure-V. ii. The Institute shall comply to all safety measures mentioned in Regulation 21 and Schedule-I of CEA Safety Regulations. iii. The Institute shall have their own ambulance facility with basic medical facilities, oxygen cylinder facility , heart monitoring set-up etc. The ambulance shall always be present at the time and place of hotline training.	
(5)	The training institute shall conduct induction course as per the curriculum given in these guidelines	

(6)	The training institute shall have basic medical facilities or shall have tie up and high speed internet facilities in its premises.	
(7)	The training institute shall have CCTV facility at the examination hall for conducting the term end exam. The training institute may have tie up with independent agency for conducting the exam which shall have CCTV facility at the examination hall for conducting the exam.	
(8)	The training institute shall score a least 60% in the evaluation criteria for getting its recognition from the Authority.	
(9)	The budget provision and control of expenditure for training program shall be distinctly and exclusively earmarked for the institute.	

6. Annual Training Capacity during the financial year (in days)

7. Annual Budget provisions for training:

(Rupees in lakh)

Year	Allocated Budget	Budget Utilized	% Budget Utilized
F.Y.			

8. Infrastructure (The information shall be related with the Training Institute):

(1) Details of Classrooms (including seminar/ syndicate rooms/ computer rooms) in the training institute:

No. of Classroom	Seating Capacity	Whether A-V aids facilities provided	Whether Live streaming capability provided	Remarks
(1)	(2)	(3)	(4)	(5)
		Yes/No	Yes/No	

(2) Laboratories/Workshops including computer labs/ Hot Line Experimental Line & Live Line tools for Hot Line Maintenance Practice (for Hot Line Training Institute)

Sl. No.	Type of laboratory / Workshops/ Hot Line Experimental Line & Hot Line tools

(3) Details of Hostel Facilities in the training institute:

No. of Rooms x Beds*	Hostel Capacity (Total no. of Beds)	No. of days for which Hostel is available Annually	Annual occupancy during the year (Mandays i.e. annual sum of no. of trainees stayed each day)	% Annual occupancy

--	--	--	--	--

*e.g. 24x2 stands 24 twin-bed rooms, and 13x1 for 13 single-bed rooms.

(4) Details of Simulators:

Number and details of Simulators for training relating to Transmission systems to be attached.

(5) Details of Library/ e-library:

e- Library

Yes/No

Details of Books	Nos. (pls mention whether available in Library or E-Library)
Technical books	
Standards-BIS,IEC etc	
CEA Regulations	
SERC regulations	
No. of Journals	

(6) Model Room

Yes/No

If yes, then enclose the number of models and their list.

(7) Multimedia training packages (attach list as per format below):

Sl. No.	Subject	Numbers	Remarks

(8) Whether the training institute has e-integration with other Training Institute within the organization or with other organizations:

Yes/ No

If yes, then attach the list with the details.

(9) Whether the training institute has linkage with the sub-station in respect of organizing and monitoring the on-job training:

Yes/ No

If yes, then furnish the name of the organization where on-job training imparted.

(10) Do you have an officer designated as an On-job Trainer? Yes/No

If yes, then give the name and designation of the officer.

(11) Auditorium/Conference Hall

Yes/No

If yes, then Seating Capacity

(12) Reprographic Facilities /Resource Centre

Yes/No

If yes, attach the list with details.

(13) Quality of Infrastructure as rated by the applicant/ institute itself as excellent / very good/ good:

- (a) Quality of Maintenance: (Excellent / Very Good/ Good)
- (b) Quality of Air Conditioning: (Excellent / Very Good/ Good)
- (c) Maintenance of cleanliness and hygiene: (Excellent / Very Good/ Good)
- (d) Hot Line Experimental Line (11 kV & 33 kV) for Hot Line Maintenance Practice (Excellent / Very Good/ Good)
- (e) Hot Line/Live Line tools for Hot Line Maintenance Practice (Excellent / Very Good/ Good)
- (f) Other facilities (please tick among the following):
 - (i) Transport ☐
 - (ii) Recreation (Indoor/ Outdoor) ☐
 - (iii) Laundry services ☐
 - (iv) Mess/ Canteen ☐
 - (v) Medical facilities ☐
 - (vi) High Speed Internet ☐
 - (vii) Gym ☐
 - (viii) Others ☐

(14) Quality of training imparted

- (i) Overall rating of the institute by the previous trained batches.
- (ii) Overall Test scores achieved by the trainees. (Course Type-wise)
- (iii) Percentage of Course Completion by the trainees. (Course Type-wise)

9. Faculty:

(1) Details of Faculty (Core Faculty + Empaneled Faculty + Guest Faculty) for training shall be furnished by the applicant for the financial year. The list of faculty (Core Faculty / Empaneled Faculty / Guest Faculty) to be submitted in the format given below:

Sl. No.	Name of faculty member	Qualification	Experience	Specialization
A. Core faculty (as defined in the Guidelines)				
1.				
2.				
B. Empaneled faculty (as defined in the Guidelines)				
1.				
2.				
C. Guest faculty / Experts (as defined in the Guidelines)				
1.				
2.				

- (2) The details mentioned at para (1) above regarding faculty to be summarized as per the table given below:

Total	Numbers			Qualification wise(nos.)				No. of Core Faculty trained during the year
	Core*	Empaneled*	Guest*	Diploma	Degree	PG	Ph.D.	

** as defined in the guidelines*

- (3) Experience:

(i) No. of faculty having experience* more than 5 years but less than 10 years:

(ii) No. of faculty having experience* more than 10 years:

** experience in Hot Line Maintenance in case of Hot Line Training Institute.*

- (4) Details of depth of Knowledge of Core faculty

S. No.	Area	Details
(1)	Papers Published in conference or seminars by core faculties	1. 2. 3.
(2)	core faculties Empaneled with other institutes	1. 2. 3.
(3)	Membership of National or International body of the training institute	1. 2. 3.
(4)	Working models or simulation models made by core faculties	1. 2. 3.

10. Training Courses

- (1) The courses conducted during the last three years as per the curriculum mentioned in these guidelines, to be provided in the format given below:

	Name of course	Modules / topics covered	Duration (From-To)	No. of Trainees	Total Days
	Name of Course(Induction/Refresher) 1. 2. Sub-total				

	Training on Simulator 1. 2. Sub-total				
	Live Line Maintenance Training (for Hot Line Training Institute) 1. 2. ----- Sub-total				
	On-job training at sub-station 1. 2. Sub-total				
	Total				

- (2) The no. of courses and the no. of person trained during the financial year to be furnished as per the table given below:

Year	Number of courses	Persons trained	
		Nos.	(Days)
F.Y.			

- (3) Break up of total training days during the financial year:

Sl. No.	Type of Course	No. of Persons trained.	Days
1.	Induction (Theory/Classroom Part)		
2.	Refresher		
3.	Simulator Training/ Live Line Maintenance Training (for Hot Line Training Institute)		
4.	On-job Training		

#Online training shall also be included in theory courses.

Courses are in line with the Guidelines-

yes/No

11. Training methodology

- | | | |
|---|--------|-------------------------|
| (i) Classroom lectures | Yes/No | } (Enclose the Details) |
| (ii) Group Discussion Session | Yes/No | |
| (iii) On-job Training | Yes/No | |
| (iv) Case Studies and presentation
by each trainee | Yes/No | |
| (v) Hot Line Maintenance Practice
(applicable for Hot Line Training Institute) | Yes/No | |

12. Instructional capability

- (1) Has the Core faculty been adequately trained in the instructional technique in the F.Y? Yes/No

If yes, pls give details:

Name of the core faculty member	Training in instructional techniques			
	At Institute (Name)	Period		Days
		From	To	

- (2) Whether the digital handouts related to course content are prepared for each lecture and given to trainees. Yes/No
- (3) Do the digital handouts clearly indicate the objectives of the lesson, various elements into which the lesson has been broken relevant to syllabus? Yes / No
- (4) Is the lecture supported by the objective type questions? Yes/No
- (5) Feedback from trainees on (attach a copy of sample feedback)
- | | |
|---------------------------|--------|
| (i) Each faculty | Yes/No |
| (ii) Each training module | Yes/No |
| (iii) Training need | Yes/No |
| (iv) Institute facilities | Yes/No |

13. Whether the training institute is following the curriculum provided in the CEA guidelines?

Yes / No

14. Whether the training institute is conducting the term end exam as mentioned in the CEA guidelines? Yes / No

15. Specific details for the Training program to be provided for each program for the F.Y.:

- (1) Average score obtained by the trainees in **Induction Course Term End Exam**.
- (2) Average score obtained by the trainees in **Refresher Training Tern End Exam**

Date:

Signature of head of the Training Institute with Office Stamp/Seal

ANNEXURE-III

Formats/Forms for Record of Induction training of the Engineers/Supervisors/ Technician of the Distribution Systems (To be maintained by the concerned Distribution Utility/Organization)

S. No	Name of the employee	Aadhar No.	Designation Section/ Division	Date of Engagement	Name of the Training Institute	Certificate Date	Certificate No.	Score obtained in Term-End Exam (in %)

Certificate by the Head of the Distribution System

It is certified that all the engineers/supervisors engaged have been trained as per the guidelines issued by Central Electricity Authority in line with the Regulation 8(4) of (Measures relating to Safety and Electric Supply) Regulations, 2023. The records of their assessment has been maintained as per the format mentioned in the Guidelines.

Date

Head of the Distribution system

Certificate by the Training Institute

This is to certify that Shri/Ms. _____ Aadhar no. _____ has successfully completed Training Course in **Distribution** which is in accordance with the Curriculum mentioned in the Guidelines issued by Central Electricity Authority in line with the Regulation 8(4) of the Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2023.

Date

Head of the training Institute.

List of Specialized Tools for Live Line Maintenance of Distribution System

Below is the list of a set of minimum tools required for Live Line Maintenance of 11 kV and 33 kV Distribution System. However List of tools/quantity of tools may increase depending upon specific Hot Line Maintenance Activity. (Reference for list of tools: BOQ Specification No CDC-236/UH/UH/P&D/2022-23 UDHBVN)

Sr. No.	Description of Tools	Unit	Quantity	Remark
1	Truck Mounted Insulated Work Platform: Category- B	Set	1	
2	Cover Blanket with Solid Rubber: Large (Class: IV)	No	6	
3	Cover Blanket with Slotted Rubber: Large (Class: IV)	No	4	
4	Cover Blanket with Slotted Rubber: Small (Class: IV)	No	6	
5	Cover Blanket with Slotted Rubber: Small (Class: II)	No	8	
6	Blanket Button	No	48	
7	Manual Plastic Peg	No	24	
8	Flexible Cover, Type- II and Style- B (Class: II)	No	12	
9	Conductor Cover- 14.6 kV Voltage rating (Phase-to-Phase) and Conductor Size: Ø 25 mm	No	6	
10	Pole Top Cover for Voltage rating of 36.6 kV Phase-to-Phase	No	1	
11	Pole Cover (230 mm), Overall length: 300 mm and Voltage rating of 36.6 kV-Phase-to-Phase	No	2	
12	Pole Cover (230 mm), Overall length: 600 mm and Voltage rating of 36.6 kV-Phase-to-Phase	No	1	
13	Pole Cover (150 mm), Overall length: 300 mm and Voltage rating of 36.6 kV-Phase-to-Phase	No	4	
14	Pole Cover (50 mm), Overall length: 600 mm and Voltage rating of 36.6 kV-Phase-to-Phase	No	2	
15	Locking Device for Pole Covers	No	2	

16	Round Covers (100 mm), Overall length: 300 mm and Voltage rating of 26.4 kV-Phase-to-Phase	No	2	
17	Round Covers (150 mm), Overall length: 300 mm and Voltage rating of 26.4 kV-Phase-to-Phase	No	3	
18	Cover-Up for Cross-Arm Ends for Voltage rating of 36.6 kV Phase-to-Phase	No	4	
19	Cover-Up for Cross-Arm with Post Insulator for Voltage rating of 36.6 kV Phase-to-Phase	No	3	
20	Conductor Cover- 36.6 kV Voltage rating (Phase-to-Phase) and Conductor Size: Ø 25 mm	No	12	
21	Insulated Side Guard- 14.6 kV (730 x 1430 mm)	No	1	
22	Insulated Side Guard- 14.6 kV (740 x 1800 mm)	No	1	
23	Straight Cuff Rubber Gloves- Class II (Size 8)	Pair	8	Size may Change
24	Straight Cuff Rubber Gloves- Class II (Size 8.5)	Pair	8	Size may Change
25	Straight Cuff Rubber Gloves- Class IV (Size 9)	Pair	12	Size may Change
26	Premium Leather Glove Protector (Size 8.5)	Pair	24	Size may Change
27	Premium Leather Glove Protector (Size 9.5)	Pair	18	Size may Change
28	Extra Curved Cuff Rubber Sleeve- Class II, Regular Size	Pair	6	
29	Extra Curved Cuff Rubber Sleeve- Class IV, Regular Size	Pair	4	
30	Sleeve Straps with Buttons	Pair	18	
31	Glove Protector Bag	No	24	
32	Sleeve Protector Bag	No	10	
33	Polypropylene Rope- 1/2"	Bundle	1	
34	Snatch Block with Forged Hook- 1250 lbs	No	2	
35	Snatch Block with Steel Meat Hook- 1250 lbs	No	1	
36	Hand Line Hook	No	1	

37	Live Line Wire Grip- 4.57 to 15.24 mm (5000 lbs)	No	2	
38	Endless Single Ply Nylon Slings- 4'	No	12	
39	Nylon Strap Hoist- 1 Ton	No	1	
40	Nylon Strap Hoist- 2 Ton	No	1	
41	Hoist Link Stick- 15"	No	1	
42	Hoist Link Stick- 18"	No	1	
43	Spiral Link Stick- 32 mm x 0.29 m	No	2	
44	Universal Poles with Two Heads- 8 Feet	No	2	
45	Predictive Maintenance Equipment Hand held Infrared Camera (320X240) Pixels.	No.	1 each	
46	Universal Poles with Two Heads- 10 Feet	No	3	
47	Grip All Clamp Stick- 8 Feet	No	1	
48	Telescopic Stick- 35 Feet	No	1	
49	Sectional Hot Stick	No	4	
50	Hot Stick Tension Puller- 34.5 kV	No	1	
51	Set of Rope Block- 38 m	Set	1	
52	Universal Tools includes Locating Pin, Link Stick Head, Shepherd Hook, Universal Hook, Rotary Prong Tie Stick Head, Flexible Wrench Head, Spiral Disconnect, Pruning Saw Handle, All Angle Plier, Hammer and Aerosol Can Holder	Set	1	
53	Universal Tools includes Pin Holder, Locating Pin, Ratchet Wrench, Chuck Blank, Fuse Puller, Ball Socket Adjuster and Pruning Saw	Set	2	
54	All Angle Cog Wrench Stick- 8 Feet	No	1	
55	Tree Trimmer- Manual	No	1	
56	Tree Trimmer- Hydraulic (Power Source: Truck)	No	1	

57	Live Line Tester (220 V- 36 kV)	No	1	
58	Glove Tester: Pneumatic	No	1	
59	Special Grade Safety Harness for Live Line Work	No	4	
60	Special Grade Safety Lanyard for Live Line Work	No	4	
61	By-pass Clamp	No	6	
62	Temporary Jumper (15 kV), Overall Length: 3.70 m, Rated Current: 200 A, Hot Stick Clamp: 4 to 29 mm	Set	1	
63	Temporary Jumper (15 kV), Overall Length: 3.70 m, Rated Current: 200 A, Rubber Glove Clamp: 4 to 22 mm	Set	1	
64	Insulated Scaffolding Assembly	Set	1	
65	Tools Bucket- Large (12" x 16")	No	6	
66	Moisture Eater Solvent	No	4	
67	Hot Stick Protector Bag	No	12	
68	Rubber Blanket Protector Bag	No	12	
69	Conductor Cover Protector Bag	No	12	
70	Cross Arm Cover Protector Bag	No	6	
71	Pole Cover Protector Bag	No	12	
72	Safety Helmet	No	12	
73	Tarpaulin: Medium	No	2	
74	Complete Hand Tools Set including Spanners, Sockets, Ratchet, Screw Driver, Pliers etc.	Set	1	
75	Traffic Safety Cones with Plastic Chains	Set	1	

Brief specification of “Insulated Aerial Work Platform (mounted on a vehicle) ” for Training of Live Line Maintenance of Distribution Network of 11kV and 33 kV

- (i) Having Insulation for 45 kV in both upper boom and lower boom to achieve maximum safety,
- (ii) Suitable for working height of 17 mtrs $\pm$.5 mtrs & horizontal side reach of 12.5 mtrs. $\pm$.5 mtrs
- (iii) 4 nos. of outriggers for stabilization
- (iv) with swing arm of more than 200 degree with platform rotation of 180 degree enabling linemen to work on both side of electric pole without changing position of truck.
- (v) Articulated and Telescopic to make it compact and installation possible on smaller chassis.
- (vi) Must have standard “ANSI/SIA A92.2–2015 “Vehicle-Mounted Elevating and Rotating Devices” or IEC 61057 Standard for “Insulated Devices for Mounting on a Chassis”.