GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

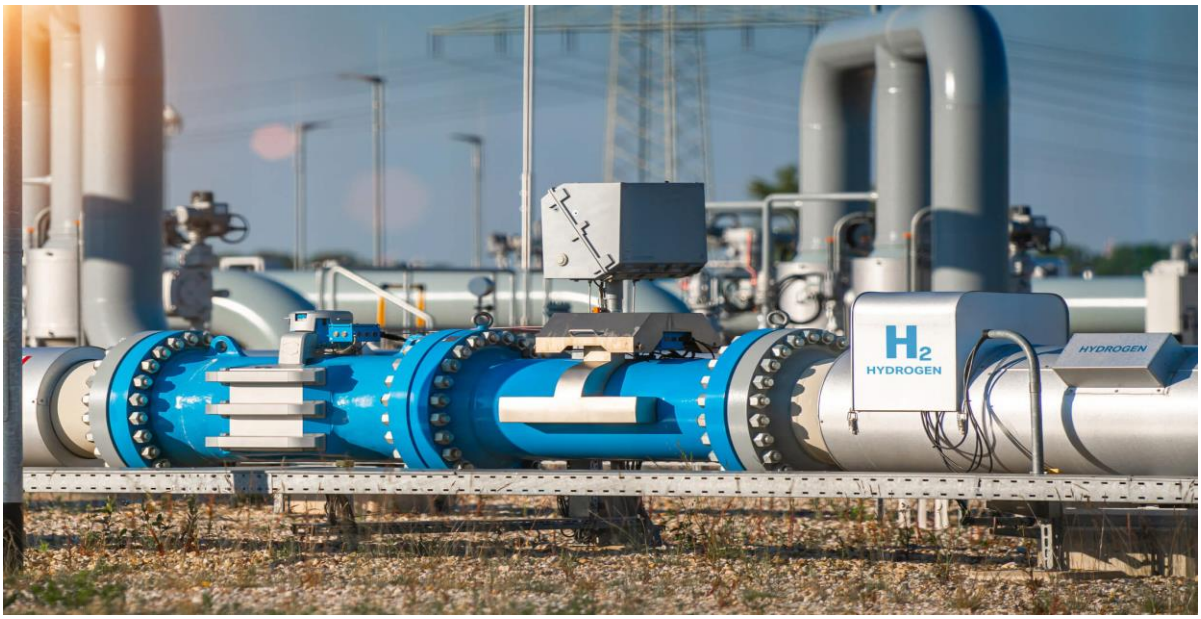
COMPETENCY BASED CURRICULUM

GREEN HYDROGEN PRODUCTION TECHNICIAN

(Duration: One Year)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 3.5



SECTOR – ENVIRONMENTAL SCIENCE

Directorate General of Training

GREEN HYDROGEN PRODUCTION TECHNICIAN

(Engineering Trade)

(Designed in 2024)

Version: 1.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL – 3.5

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE

EN-81, Sector-V, Salt Lake City,
Kolkata – 700 091

www.cstaricalcutta.gov.in

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1. COURSE INFORMATION

During the one-year duration of Green Hydrogen Production Technician trade a candidate is trained on professional Skill, professional Knowledge and Employability Skill related to job role. In addition to this a candidate is entrusted to undertake project work and extracurricular activities to build up confidence. The broad components covered under Professional Skill subject are as below: -

During the course the trainee learns about skills to work in the field of green hydrogen production. Green hydrogen, produced through electrolysis powered by renewable energy sources, is a crucial component of the transition towards a sustainable and carbon-neutral energy future. This course covers various aspects of green hydrogen production, including theoretical principles, practical applications, safety procedures, and industry best practices. He gets the idea of Project construction, system Installation and Operations & Maintenance related job roles for Green Hydrogen Plant. This course is designed to enable theoretical and practical training on Green Hydrogen Plant. The candidate shall learn about testing, installation and facility integration of electrolyzer, repairs, troubleshooting, upkeep and maintenance of electrical control systems, protection systems, and other auxiliary equipment and associated tools in green hydrogen generation facilities. candidate will be responsible for the continuous supply of renewable power for its integration with the electrolyzers and the other process equipment for generating Green Hydrogen. This role works closely with the power supply project, testing, plant engineering, process operation, control & operation across the green hydrogen generation plant.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with variants and Apprenticeship Training Scheme (ATS) are two pioneer schemes of DGT for strengthening vocational training.

CTS courses are delivered nationwide through network of ITIs. The course 'Green Hydrogen Production Technician' is of one-year duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory and Trade Practical) imparts professional skills and knowledge, while Core area (Employability Skills) imparts requisite core skill, knowledge and life skills. After passing out of the training program, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Candidates broadly need to demonstrate that they are able to:

- Read and interpret technical parameters/documents, plan and organize work processes, identify necessary materials and tools;
- Perform tasks with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge & employability skills while performing jobs.
- Document the technical parameters related to the task undertaken.

2.2 PROGRESSION PATHWAYS

- Can join industry as green hydrogen production Assistant and will progress further as technician, Senior Technician, Supervisor and can rise up to the level of Manager.
- Can become Entrepreneur in the related field.
- Can join Apprenticeship Programs in different types of industries leading to a National Apprenticeship Certificate (NAC).
- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming an instructor in ITIs.
- Can join Advanced Diploma (Vocational) courses under DGT as applicable.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of one year: -

S No.	Course Element	Notional Training Hours
1	Professional Skill (Trade Practical)	840
2	Professional Knowledge (Trade Theory)	240
3	Employability Skills	120
	Total	**1200**

In addition, every year 150 hours of mandatory on the job training (OJT) in the industry, if nearby industry is not available then group project will be mandatory.

On the Job Training (OJT)/ Group Project	150
Optional courses (10th/ 12th class certificate along with ITI certification or add on short term courses)	240

Trainees of One-year or two-year trade can also opt for optional courses of up to 240 hours in each year for 10^{th}/12^{th} class certificate along with ITI certification, or, add on short term courses.

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course through formative assessment and at the end of the training programme through summative assessment as notified by the DGT from time to time.

a) The **Continuous Assessment** (Internal) during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute has to maintain an individual trainee portfolio as detailed in assessment guideline. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in.

b) The final assessment will be in the form of summative assessment. The All India Trade Test for awarding NTC will be conducted by Controller of examinations, DGT as per the guidelines.

The pattern and marking structure is being notified by DGT from time to time. **The learning outcome and assessment criteria will be the basis for setting question papers for final assessment. The examiner during final examination will also check** the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one-year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking the assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising some of the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work
- Computer based multiple choice question examination
- Practical Examination

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted for formative assessment:

Performance Level	Evidence
(a) Marks in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	● Demonstration of good skills and accuracy in the field of work/ assignments. ● A fairly good level of neatness and consistency to accomplish job activities. ● Occasional support in completing the task/ job.
(b)Marks in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices	● Good skill levels and accuracy in the field of work/ assignments. ● A good level of neatness and consistency to accomplish job activities. ● Little support in completing the task/job.
©Marks in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	● High skill levels and accuracy in the field of work/ assignments. ● A high level of neatness and consistency to accomplish job activities. ● Minimal or no support in completing the task/ job.

3. JOB ROLE

Green Hydrogen Production Technician: The Job holder is tasked with Performing installation, and integration of electrolyzers as well as performing repairs, troubleshooting, and maintenance of electrical control systems, protection systems, and related auxiliary equipment and tools within the green hydrogen production facility. Ensuring a consistent supply of renewable power for integration with electrolyzers and other process equipment to generate Green Hydrogen is also a key responsibility of this role. Additionally, the technician collaborates closely with power supply projects, testing, plant engineering, process operation, and control & operation teams across the green hydrogen generation plant.

In essence the job holder will perform the following key functions with a Green Hydrogen production unit

- Provide support in Installation along with Operation and maintenance of equipment/sub system used in green hydrogen production processes, such as electrolyzers and purification systems.
- Monitoring and optimizing production processes to ensure efficiency, safety, and quality standards are met.
- Performing troubleshooting and preventive maintenance tasks on equipment.
- Following safety protocols and procedures to prevent accidents and ensure a safe working environment.
- Collaborating with other team members to achieve production targets and implement process improvements.

Chemical Processing Plant Controllers, Other; include plant controllers who operate and monitor chemical plants and adjust and maintain, processing units and equipment which distil, filter, separate, heat or refine chemicals not elsewhere classified.

Reference NCO-2015:

a) 3133.9900 - Chemical Processing Plant Controllers, Other

Reference NOS:

a) SGJ/N9431
b) SGJ/N9432
c) SGJ/N9433
d) SGJ/N9434
e) SGJ/N9435
f) SGJ/N9436
g) SGJ/N9437
h) SGJ/N9438
i) SGJ/N9439
j) SGJ/N9440

4. GENERAL INFORMATION

Name of the Trade	**GREEN HYDROGEN PRODUCTION TECHNICIAN**
NCO – 2015	3133.9900
NOS Covered	SGJ/N9431, SGJ/N9432, SGJ/N9433, SGJ/N9434, SGJ/N9435, SGJ/N9436, SGJ/N9437, SGJ/N9438, SGJ/N9439, SGJ/N9440
NSQF Level	Level-3.5
Duration of Craftsmen Training	One Year (1200 Hrs. + 150 hours OJT/Group Project)
Entry Qualification	Passed 10th class examination with Science and Mathematics or its equivalent.
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	LD, LC, DW, AA, DEAF, LV, HH
Unit Strength (No. of Student)	20 (There is no separate provision of supernumerary seats)
Space Norms	120 Sq. m
Power Norms	3.5 KW
Instructors Qualification for:	
(i) Green Hydrogen Production Technician Trade	B.Voc/Degree in Electrical/ Mechanical/ Chemical/ Instrumentation and Control Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. (including certified courses on Hydrogen Technology) OR 03 years Diploma in Electrical/ Mechanical/ Chemical/ Instrumentation and Control Engineering from AICTE/ recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. (including certified courses on Hydrogen Technology) OR NTC/NAC passed in the Trade of "Green Hydrogen Production Technician" With three years' experience in the relevant field. (Including certificate courses on Hydrogen Technology) **Essential Qualification:** Relevant National Craft Instructor Certificate (NCIC) in any of the

	variants under DGT. *NOTE: Out of two Instructors required for the unit of 2(1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications. However, both of them must possess NCIC in any of its variants.*
(ii) Workshop Calculation & Science	B.Voc/Degree in Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. OR 03 years Diploma in Engineering from AICTE/ recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. OR NTC/ NAC in any one of the engineering trades with three years' experience. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade. OR NCIC in RoDA or any of its variants under DGT.
(iii) Engineering Drawing	B.Voc/Degree in Engineering from AICTE /UGC recognized Engineering College/ university with one-year experience in therelevant field. OR 03 years Diploma in Engineering from AICTE/ recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. OR NTC/ NAC in any one of the Engineering trades with three years experience. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade. OR NCIC in RoDA / D'man (Mech /civil) or any of its variants underDGT.
(ii) Employability Skill	MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above) **OR** Existing Social Studies Instructors in ITIs with short term ToT

	Course in Employability Skills.
(iii) Minimum Age for Instructor	21 Years
List of Tools and Equipment	As per Annexure – I

5. LEARNING OUTCOME

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

5.1 LEARNING OUTCOMES

1. Interpret basic concepts of Green Hydrogen Production. (NOS: SGJ/N9439)
2. Incorporate Health and safety measures for installing and operating green hydrogen system. (NOS: SGJ/N9431)
3. Identify layout and components of green Hydrogen plant. (NOS: SGJ/N9432)
4. Integrate renewable electric power sources for Green Hydrogen Production. (NOS: SGJ/N9433)
5. Install Electrolyzer for Green Hydrogen production plant. (NOS: SGJ/N9434)
6. Acquire basic understanding of other process of Hydrogen Production viz., Biomass gasification, compressed biogas reforming etc. (NOS: SGJ/N9435)
7. Install feed water system for Green Hydrogen Production. (NOS: SGJ/N9436)
8. Perform Conditioning and Compression of Hydrogen in Green Hydrogen Plant. (NOS: SGJ/N9437)
9. Identify different methods of Hydrogen storage and transportation. (NOS: SGJ/N9438)
10. Prepare checklist for Commissioning of Green Hydrogen Plant. (NOS: SGJ/N9440)
11. Read and apply engineering drawing for different application in the field of work. (NOS: CSC/N9401)
12. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9402)

6. ASSESSMENT CRITERIA

LEARNING OUTCOME	ASSESSMENT CRITERIA
1. Interpret Basic concepts of Green Hydrogen Production.	Demonstrate with chart and perform an activity for matching the process and source of production as applicable for different colour codes of hydrogen.
	Identify Natural sources of Hydrogen, which source has maximum % of hydrogen, from which source Hydrogen extracted using known techniques.
	Draw a flow diagram of green hydrogen production, conversion and use across the energy system.
	Identify signs and symbols of electrical Accessories.
2. Incorporate Health and safety measures for installing and operating green hydrogen system.	Demonstrate how to administer first aid.
	Explain the usage of personal protective equipment for ensuring safety during installation and O&M work.
	Demonstrate the use of fire extinguishers, fire detection and alarm system.
	Comply with all applicable statutory requirements along with safety regulations in terms of fire protection.
	Demonstrate how to follow necessary and adequate safety measures including personal protective equipment.
	Demonstrate good housekeeping and infection control & prevention practices.
3. Identify layout and components of green Hydrogen plant.	Illustrate the schematic of green hydrogen production plant.
	Demonstrate Deoxy unit, drying & cooling system and purging system.
	Demonstrate key components of the plant and outline their functions through plant schematic.
	Interpret the Plant Layout including various equipment and material used in a green hydrogen production facility.
	Identify signs, notices and/or cautions at project site.
4. Integrate Renewable Electric Power Sources for Green Hydrogen Production.	Verify the characteristics of series, parallel and its combination circuit.
	Analyze the effect of the short and open in series and parallel circuits
	Prepare pipe earthing and measure earth resistance by earth tester / megger.
	Prepare plate earthing and measure earth resistance by earth tester /

	megger.
	Test earth leakage by ELCB and relay. Measure Ground Continuity, Impulse Voltage, Reverse current and Partial Discharge.
	Practice on various analog and digital measuring Instruments.
5. Install Electrolyzer for Green Hydrogen Production plant.	Illustrate the chemical reactions that occur during electrolysis.
	Show major components of an Electrolyser and how that operates.
	Illustrate different types of electrolyzer and their key specifications and technical parameters.
	Outline differences in PEM, AE, AEM and SOEC Electrolyzer and illustrate their schematics.
	Identify and select the tools and equipment to perform the installation of electrolyzer as per concerned technical sheets.
6. Acquire basic understanding of other process of Hydrogen Production viz., Biomass gasification, compressed biogas reforming etc.	Handle different tools, equipment as per concerned standard and industry practices.
	Implement the procedure for electrolyzer stack assembly and operations.
	Identify mechanical/ electrical systems for system installation, troubleshooting and commissioning work.
	Perform assembling, testing, maintenance and troubleshooting of an electrolyzer.
	Monitor various parameters of electrolysis.
7. Install feed water system for Green Hydrogen Production.	Illustrate the schematic of input water system for electrolyzer and the operation of the system.
	Carry out pre-treatment of water through clariflocculator, aeration etc.
	Carry out various processes for treating the water supply for feedstock purpose.
	Operate the tools and tackles required to set up and operate the feed water system.
	Identify internal parts of hydraulic cylinders, pumps/motors.
	Analyze given sample of water to determine pH using different methods viz. pH paper, Indicators, pH Meter.
8. Perform Conditioning and	Select materials for gaskets and packing - use of locking devices lock

Compression of Hydrogen in Green Hydrogen Plant.	nuts, cotters, split pin, circlips, lock rings
	Install and interconnect major equipment for hydrogen conditioning system along with other balance of plant.
	Follow Basic procedure for gas charging, leak testing and general maintenance of compressor.
	Inspect and check leakage of air, fuel oil and exhaust in the compressor.
	Check temperature and pressure of oil and cooling water, exhaust gas temperature etc.
	Demonstrate the functions of Green hydrogen compression system.
9. Identify different methods of Hydrogen storage and transportation.	Video demonstration of methods of Hydrogen storage.
	Video demonstration of methods of transportation.
	Carry out Gas leak detection and arrest.
10. Prepare checklist for Commissioning of Green Hydrogen Plant.	Identify all instruments, equipment and facilities for inspection, testing and commissioning.
	Prepare process flow chart.
	Perform trial run and pre-commissioning tests
	Perform various activities conforming to the checklists for commissioning of each hydrogen system.
	Prepare the checklist for Green hydrogen system installation, testing and commissioning.
11. Read and apply engineering drawing for different application in the field of work.	Read & interpret the information on drawings and apply in executing practical work.
	Read &analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters.
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
12. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain	Solve different mathematical problems.
	Explain concept of basic science related to the field of study.

basic science in the field of study.	

7. TRADE SYLLABUS

SYLLABUS FOR GREEN HYDROGEN PRODUCTION TECHNICIAN			
ONE YEAR (1200 Hrs.)			
Duration	**Reference Learning outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Professional Skill 50 Hrs.; Professional Knowledge 10 Hrs.	Interpret Basic concepts of Green Hydrogen Production.	1. Demonstrate with chart and perform an activity for matching the process and source of production as applicable for different colour codes of hydrogen. 2. Identify Natural sources of Hydrogen, which source has maximum % of hydrogen, from which source Hydrogen extracted using known techniques. 3. Draw a flow diagram of green hydrogen production, conversion and end use across the energy system. 4. Identify signs and symbols of electrical Accessories.	• Basics of Hydrogen • Physical and Chemical Properties of Hydrogen. • Introduction to Green Hydrogen. • Uses of Green Hydrogen. • Other alternatives available, advantages and disadvantages of each of them vs Green Hydrogen. • Basic concepts of Hydrogen as an energy carrier and discuss the necessity of green hydrogen in sustainable energy transition. • Various technology options for production of hydrogen along with colour code nomenclature of Hydrogen. • Value chain of Green Hydrogen. • Benefits and drawbacks of existing methods of Hydrogen production. • Key aspects and challenges related to production, storage, transportation, distribution of Green Hydrogen.

			• Discuss in brief the applications of Green hydrogen in hard to abate sectors including petrochemical, fertilizer & other industry, transport and for power sector. • Various renewable energy sources for large scale production of green hydrogen through electrolysis of water • Discuss key aspects of Green hydrogen economy in Indian context along with Green Hydrogen Policy and Mission of Government of India. • Role and responsibilities of a Green Hydrogen Production Technician.
Professional Skill 140 Hrs.; Professional Knowledge 25 Hrs.	Incorporate Health and safety measures for installing and operating green hydrogen system.	5. Demonstrate how to administer first aid. 6. Demonstrate the usage of personal protective equipment for ensuring safety during installation and O&M work. 7. Demonstrate the use of fire extinguishers, fire detection and alarm system. 8. Comply with all applicable statutory requirements along with safety regulations in terms of fire protection. 9. Demonstrate how to follow necessary and adequate	• Requirements for safe work area at hydrogen generation project site. • importance of Occupational health & Safety standards and regulations for Basic considerations for the safety of hydrogen systems. • Potential causes of emergency such as gas leaks, fire, explosion, bomb threatening, natural calamities etc. • Importance of different detectors and safety tools.

		safety measures including personal protective equipment and precautions to avoid any accident at hydrogen generation site. 10. Demonstrate good housekeeping and infection control & prevention practices.	• Material Safety Data Sheet and labels of chemicals contained in cylinders in order to be aware of their hazards and precautionary measures. • Ideal temperature and humidity level of storage areas used to safely contain gas cylinders. • Personal protective equipment used for the specific purpose. • Hazards associated with hydrogen generation system. • Safety procedures and instructions for working at hydrogen. • Mock testing of firefighting system. • All applicable statutory requirements along with safety regulations in terms of fire protection. • Good housekeeping • infection control guidelines.
Professional Skill 65 Hrs.; Professional Knowledge 10 Hrs.	Identify layout and components of green Hydrogen plant.	11. Illustrate the schematic of green hydrogen production plant. 12. Demonstrate Deoxy unit, drying & cooling system and purging system. 13. Demonstrate key components of the plant and outline their functions through plant schematic.	• Identify key components of the Green Hydrogen plant including electrical, mechanical and civil components. • Basic principles used in the hydrogen generator. • Functions of the key components including of electrolyzer stacks,

		14. Interpret the Plant Layout including various equipment and material used in a green hydrogen production facility. 15. Identify signs, notices and/or cautions at project site. 16. Identify components – Electrolyzer, Rectifier, Inverter, Compressor, pressure gauge, Filter-Regulator- Lubricator (FRL) unit, and Different types of valves and actuators, Storage tanks, desalination unit etc. 17. Dismantle, replace, and assemble components of Electrolyzer, storage tanks, desalination unit. 18. Identify hydraulic components – Pumps, Reservoir, Fluids, Pressure relief valve (PRV), Filters, different types of valves, actuators, and hoses	renewable power supply system, feed water supply and demineralization system, gas separator, transformer and rectifier, gas compression unit, etc. • Discuss the Fundamental principles of main components on which they operate (e.g. electrolyzer stack, gas collector, power source, etc.) • Explain Overall layout of the plant. • Discuss how to read and interpret electrical and other applicable codes, standards and protocols relevant to the plant. • Discuss the relevant material and safety codes, Technology protocols and standards as applicable in Green hydrogen industry.
Professional Skill 120 Hrs.; Professional Knowledge 30 Hrs.	Integrate Renewable Electric Power Sources for Green Hydrogen Production.	19. Verify the characteristics of series, parallel and its combination circuit. 20. Analyze the effect of the short and open in series and parallel circuits 21. Prepare pipe earthing and measure earth resistance by earth tester / megger. 22. Prepare plate earthing and measure earth resistance by earth tester / megger. 23. Test earth leakage by ELCB	• Basic understanding of fundamental concepts related to energy and electricity. • Importance of Earthing Plate earthing and pipe earthing methods. • Earth resistance and earth leakage circuit breaker. • Introduce Renewable Energy. Differentiate between renewable and non-renewable energy sources.

		and relay. Measure Ground Continuity, Impulse Voltage, Reverse current and Partial Discharge. 24. Practice on various analog and digital measuring Instruments. 25. Practice on measuring instruments in single and three phase circuits e.g. multi-meter, Wattmeter, Energy meter, Phase sequence meter and Frequency meter etc. 26. Show how integration of variable renewable energy (VRE) for powering electrolyzer are performed. 27. Demonstration of Solar Panel Maintenance, Cleaning, DC Array Inspection, Precautions While Cleaning.	• Classification of inverters- Stand alone or off-grid inverter, Hybrid inverter, Grid-tie inverter. Wall mount or array mount inverter. • Functions of transformers and rectifiers. • Explain key aspects of Maintaining stability of power supply for the green hydrogen plant, switching of number of electrolyser cells as per availability of electric power.
Professional Skill 120 Hrs.; Professional Knowledge 30 Hrs.	Acquire basic understanding of Electrolysis process and Electrolyzer for Green Hydrogen Production.	28. Illustrate the chemical reactions that occur during electrolysis. 29. Show major components of an Electrolyser and how that operates. 30. Illustrate different types of electrolyzer and their key specifications and technical parameters through Pictures, videos, product data sheet etc. 31. Outline differences in PEM, AE, AEM and SOEC Electrolyzer and illustrate their schematics. 32. Identify and select the tools	• Explain Definition and Principles of Electrolysis • Explain Electrolysis as a Hydrogen Production Method. • Describe Laws of Electrolysis • Give an Overview of Electrochemical Reactions occur during electrolysis. • Introduce different types of Electrolyzers including Polymer Electrolyte Membrane (PEM), Alkaline electrolysis (AE), Solid Oxide Electrolysis (SOEC), Anion Exchange

		and equipment to perform the installation of electrolyzer as per concerned technical sheets and relevant safety and technical standards.	Membranes (AEM). • Different types of Electrolyzers and the status of their technology maturity. • key technical specifications of various Electrolyzer types (PEM, AE AEM, SOEC) including capacity and sizing. • Overview of various electrolyzer along with their key features and comparison. • Explain major components of an Electrolyser. • Explain Suitable tools and equipment required for Installation of electrolyzer, Plant & Machineries conforming to relevant technical sheets, safety and technical standards for proper execution of work. • Inputs / outputs of an Electrolyzer system. • Key O&M requirements for electrolyzer.
Professional Skill 80 Hrs.; Professional Knowledge 25 Hrs.	Install Electrolyzer for Green Hydrogen Production plant.	33. Handle different tools, equipment as per concerned standard and industry practices. 34. Implement the procedure for electrolyzer stack assembly and operations. 35. Identify mechanical/ electrical systems for system	• Read and interpret drawings, Mechanical and electrical diagrams, Plant specifications. • Key selection parameters of electrolysis including density, pressure, operating temperature, hydrogen purity, Volume

		installation, troubleshooting and commissioning work. 36. Perform assembling, testing, maintenance and troubleshooting of an electrolyzer. 37. Monitor various parameters of electrolysis. 38. Demonstrate how to support in performing process controls functions in conjunction with overall project engineering and other functional teams. 39. Perform stack assembling, testing, operation, maintaining and troubleshooting of an electrolyzer. 40. Perform start up, shutdown, and operate the production processes.	and weight. • Tools and tackles used in installing Electrolyzer and fuel cell. • Use of lifting equipment. • Pipes and pipe fitting- commonly used pipes. Pipe schedule and standard sizes. Pipe bending methods. • Guidelines and relevant engineering codes and standards for installation, commissioning and maintenance of the electrolyzer. • Use of bending fixture, pipe threads- Std. Pipe threads Die and Tap, pipe vices. • Use of tools such as pipe cutters, pipe wrenches, pipe dies, and tap, pipe bending machine etc. • Assembly/Installation of Parts and Components of Electrolyzer. • Step by step process for assembly/Installation of Electrolyzer Bipolar plate, separator(membrane),Porous Transport layer, electrodes etc. • Stack assembling, testing, operation, maintaining and troubleshooting of an electrolyzer.

			• Importance of Manifold and sealing. • Maintaining the log book for daily operation of electrolyzer. • Start up, shutdown, and operate the production processes.
Professional Skill 75 Hrs.; Professional Knowledge 15 Hrs.	Install feed water system for Green Hydrogen Production.	41. Illustrate the schematic of input water system for electrolyzer and the operation of the system. 42. Carry out pre-treatment of water through clariflocculator, aeration etc. 43. Carry out various processes for treating the water supply for feedstock purpose. 44. Operate the tools and tackles required to set up and operate the feed water system. 45. Identify internal parts of hydraulic cylinders, pumps/motors. 46. Analyze given sample of water to determine pH using different methods viz. pH paper, Indicators, pH Meter. 47. Analyze given sample of water to determine Total Hardness by EDTA method. 48. Analyze given sample of Blow Down water to determine caustic alkalinity. 49. Analyze given sample of water to determine Turbidity. 50. Analyze given sample of water	• Basics of water quality. • Different processes of water purification. • Different type of water Impurities. • Importance of High Purity Water in Electrolysis. • Common Impurities and their Impact on Electrolysis. • Water sampling and testing techniques, along with inspection procedures. • Schematic of input water system for electrolyzer. • layout of piping system for supply of water to electrolyzer. • Filters – types, constructional features, and their typical installation locations, cavitation, Hazards & safety precautions in hydraulic systems • Pipes, tubing, Hoses and fittings – Constructional details, Minimum bend radius, routing tips for

		to determine available chlorine. 51. Analyze given sample of water to determine Total Dissolved Solids TDS.	hoses. • Various processes for treating the water supply for feedstock purpose. • Selection of water quality for hydrogen production • Monitoring the quality of water feedstock for input to the electrolyzer. • Meaning of the terms Hardness; Turbidity TDS, TSS, pH, DO, BOD, COD Available Chlorine, Principles adopted in determination of hardness of raw water. • Analysis of feed water, Blow down Water. • Do's and Don'ts in installation of water supply unit and its piping and joints.
Professional Skill 75 Hrs.; Professional Knowledge 15 Hrs.	Perform Conditioning and Compression of Hydrogen in Green Hydrogen Plant.	52. Select materials for gaskets and packing - use of locking devices lock nuts, cotters, split pin, circlips, lock rings 53. Install and interconnect major equipment for hydrogen conditioning system along with other balance of plant. 54. Follow Basic procedure for gas charging, leak testing and general maintenance of compressor. 55. Inspect and check leakage of air, fuel oil and exhaust in the compressor.	• Key components/ parameters of compressors including Pressure Valve, indicators, Gas Outlet & Inlets Valves, Tank size and Placement etc. • Hydrogen compression system. • Key balance of plants components. • Installation of compression system • Collection and Handling of Hydrogen and Oxygen Process of conditioning/

		56. Check temperature and pressure of oil and cooling water, exhaust gas temperature etc. 57. Demonstrate the functions of Green hydrogen compression system.	purification of green hydrogen. • Precautions required to compress hydrogen. • Key challenges in compression. • Safety procedures as per industry standard.
Professional Skill 65 Hrs.; Professional Knowledge 10 Hrs.	Identify different methods of Hydrogen storage and transportation.	58. Video demonstration of methods of Hydrogen storage. 59. Video demonstration of methods of transportation. 60. Carry out Gas leak detection and arrest.	• Need for hydrogen storage. • Architecture of Piping arrangement and Basics of Storage layout requirement. • Safety and regulatory standards for storage system. • Selection of hydrogen storage system. • Key challenges in storage • Precautions required to store hydrogen. • Different methods of H2 storage (single vessel/multi cylinder cascade/portable storage/ tube- trailers etc and how these systems are set up. • Type I/II/III/IV cylinders and difference in setting up method. • Depressurization methods of Hydrogen Storage System - Use of Water seal or vent stack

			system. • Periodic/ regular leak testing of Hydrogen Storage Systems • Challenges associated with Hydrogen in storage, handling and transportation. • Gas leak detection • use of Firefighting system, • Use of FRC (Flame Resistant Clothing) in Hydrogen area.
Professional Skill 50 Hrs.; Professional Knowledge 10 Hrs.	Prepare checklist for Commissioning of Green Hydrogen Plant.	61. Identify all instruments, equipment and facilities for inspection, testing and commissioning. 62. Prepare process flow chart. 63. Perform trial run and pre-commissioning tests 64. Perform various activities conforming to the checklists for commissioning of each hydrogen system/ equipment / machinery / piping as per OEM recommendation. 65. Prepare the checklist for Green hydrogen system installation, testing and commissioning. 66. Analyze various Inputs, outputs and key performance metrics for hydrogen generation like purity, pressure, flow and	• Importance and use of checklists for commissioning of each hydrogen system / equipment / machinery / piping as per OEM recommendation. • Green hydrogen system installation, testing and commissioning checklist. • Various Inputs, outputs and key performance metrics for hydrogen generation. • Pre-commissioning tests/ Downstream considerations including hydrogen purity & pressure test, to detect leakage, Compressor Assembly operational and performance test Drying

		temperature etc.	Plant Hydraulic, Safety test and performing trial run.
ENGINEERING DRAWING			
Professional Knowledge ED: 30 Hrs.	Read and apply engineering drawing for different application in the field of work.	**Introduction to Engineering Drawing and Drawing Instruments –** ● Conventions ● Sizes and layout of drawing sheets ● Title Block, its position and content ● Drawing Instrument **Lines- Types and applications in drawing** **Free hand drawing of –** ● Geometrical figures and blocks with dimension ● Transferring measurement from the given object to the free hand sketches. ● Free hand drawing of hand tools and measuring tools. **Drawing of Geometrical figures:** ● Angle, Triangle, Circle, Rectangle, Square, Parallelogram. ● Lettering & Numbering – Single Stroke. **Dimensioning** ● Types of arrowhead ● Leader line with text ● Position of dimensioning (Unidirectional, Aligned) **Symbolic representation –** ● Different symbols used in the related trades. **Concept and reading of Drawing in** ● Concept of axes plane and quadrant ● Concept of Orthographic and Isometric projections ● Method of first angle and third angle projections (definition and difference) Reading of Job drawing related to trades.	
WORKSHOP CALCULATION & SCIENCE			
Professional Knowledge WSC: 30 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations.	**Unit, Fractions** ● Classification of unit system ● Fundamental and Derived units F.P.S, C.G.S, M.K.S and SI units ● Measurement units and conversion ● Factors, HCF, LCM and problems ● Fractions - Addition, substraction, multiplication & division	

	Understand and explain basic science in the field of study.	• Decimal fractions - Addition, subtraction, multiplication & division • Solving problems by using calculator **Square root, Ratio and Proportions, Percentage** • Square and square root • Simple problems using calculator • Applications of Pythagoras theorem and related problems • Ratio and proportion • Ratio and proportion - Direct and indirect proportions • Percentage • Percentage - Changing percentage to decimal and fraction **Material Science** • Types metals, types of ferrous and non-ferrous metals • Physical and mechanical properties of metals • Introduction of iron and cast iron • Difference between iron & steel, alloy steel and carbon steel • Properties and uses of rubber, insulating materials **Mass, Weight, Volume and Density** • Mass, volume, density, weight and specific gravity, **numericals related to sections L, C, O.** • Related problems for mass, volume, density, weight and specific gravity **Speed and Velocity, Work, Power and Energy** • Speed and velocity - Rest, motion, speed, velocity, • difference between speed and velocity, acceleration and retardation • Speed and velocity - Related problems on speed & velocity **Heat & Temperature and Pressure** • Concept of heat and temperature, effects of heat, difference between heat and temperature, boiling point & melting point of different metals and non-metals • Heat &Temperature - Transmission of heat - Conduction, convection and radiation • Co-efficient of linear expansion and related problems with assignments • Concept of pressure - Units of pressure, gauge pressure and

		gauges used for measuring pressure **Basic Electricity** ● Introduction and uses of electricity, electric current AC, DC their comparison, voltage, resistance and their units **Mensuration** ● Area and perimeter of square, rectangle and parallelogram ● Area and perimeter of Triangles ● Area and perimeter of circle, semi-circle, circular ring, sector of circle, hexagon and ellipse ● Surface area and volume of solids - cube, cuboid, cylinder, sphere and hollow cylinder ● Finding the lateral surface area, total surface area and capacity in litres of hexagonal, conical and cylindrical shaped vessels **Trigonometry** ● Measurement of angles ● Trigonometrical ratios Trigonometrical tables
Project work / Industrial visit: - Hydrogen Application viz. Hydrogen Storage, Renewable Power Sources for Green Hydrogen etc. Hybrid Renewable energy plant Report on skills required in the Renewable Energy installation, Water treatment, Pipe and tank Installation for storage. Report on existing National and state level energy policy. Report for setting up a small business in the Green Hydrogen industry Demonstrate how to dispense hydrogen safely from hydrogen dispensing unit. Set up the compression system		

SYLLABUS FOR CORE SKILLS

Employability Skills (Common for all CTS trades) (120 Hrs)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in

ANNEXURE-I

List of Tools & Equipment			
GREEN HYDROGEN PRODUCTION TECHNICIAN (For batch of 20 Candidates)			
S No.	**Name of the Tools and Equipment**	**Specification**	**Quantity**
A. TRAINEES TOOL KIT			
1.	Measuring Steel Tape	5 meters	21 (20+1) Nos.
2.	Combination Plier Insulated	200 mm	21 (20+1) Nos.
3.	Screw Driver Insulated	4mm X 150 mm, Diamond Head	21 (20+1) Nos.
4.	Screw Driver Insulated	6mm X 150 mm	21 (20+1) Nos.
5.	Electrician screw driver thin stem insulated handle	4mm X 100 mm	21 (20+1) Nos.
6.	Heavy Duty Screw Driver insulated	5mm X 200 mm	21 (20+1) Nos.
7.	Electrician Screw Driver thin stem insulated handle	4mm X 250 mm	21 (20+1) Nos.
8.	Knife Double Bladed Electrician	100 mm	21 (20+1) Nos.
9.	Neon Tester	500 V	21 (20+1) Nos.
10.	Steel Rule Graduated both in Metric and English Unit	300 mm with precision of 1/4th mm	21 (20+1) Nos.
11.	Hammer, cross peen with handle	250 grams	21 (20+1) Nos.
B. SHOP TOOLS & EQUIPMENT			
(i) List of Tools & Accessories			
12.	Hydrogen Sensor	5V, Response <15 sec	05 Nos.
13.	DC Power Supply	12V, DC, 10A	04 Nos.
14.	Powdered KOH (Potassium Hydroxide)		As required
15.	Hydrogen flowmeter	0 - 4 Bar	04 Nos.
16.	Pressure Gauge meter	0-1010 ml/m	04 Nos.
17.	Temperature sensor	5V, -55 to 1250C	04 Nos.
18.	Hydrogen Pressure regulator	0 – 4 Bar, flow of 1 ltr/min, with 2 Ltr tank	04 Nos.
19.	Resistive AC/ DC lamp load		04 Nos.
20.	DC electrical load	5A, 24V DC	04 Nos.
21.	Lead acid battery	7.5Ah, 40Ah	02 Nos. each
22.	Electrical Symbol and Accessories Charts		04 nos.

23.	Pipe vice Cast Iron with hardened jaw open type	100 mm	2 Nos.
24.	Hand Vice	50 mm jaw	2 Nos.
25.	Table Vice	100 mm jaw	2 Nos.
26.	Hacksaw frame (with blade)	Adjustable 300 mm Fixed 150 mm	2 Nos. Each
27.	Pliers long nose insulated	150 mm	4 Nos.
28.	Pliers flat nose insulated	200 mm	4 Nos.
29.	Pliers, round nose insulated	100 mm	4 Nos.
30.	D.E. metric Spanner Double Ended	6 - 32 mm	2 Set
31.	Portable Electric Drill Machine	0-12 mm capacity 750W, 240V withchuck and key	1 No.
32.	Crimping Tool	1.5 sq mm to 16 sq mm16 sq mm to 95 sq mm	1 No. Each
33.	Pliers Side Cutting	150 mm	2 No.
34.	Tool kit Box/bag portable		5 No.
35.	Scissors blade	150 mm	2 No.
36.	Torque wrench	8N-m to 15N-m	1 No.
37.	Pipe Cutter to cut pipes	upto 5 cm. dia	1 No.
38.	Pipe Cutter to cut pipes	above 5 cm dia	1 No.
39.	Try Square	150 mm blade	2 No.
40.	Multi Meter (analog)	0 to 1000 M Ohms, 2V to 500 V,100 microA to 10A DC and AC	1 No
41.	Wire Cutter and Stripper	150 mm	4 Nos.
42.	Earth Plate	60cm X 60cm X 3.15mm CopperPlate 60cm X 60cm X 6mm GI Plate	1 Each
43.	Earth Electrode	Primary Electrode 2100x28x3.25mm Secondary Cu Strip 20x5mm	1 No.
44.	Out Side Micrometer	0 - 25 mm least count 0.01mm	2 Nos.
45.	Tap set	Different size	02 Set Each

46.	Trolley for Transportation of Batteries		02 Nos.
47.	Die for Threading	Different sizes	02 Set
(ii) List of Equipment for Renewable Energy Installation for Green Hydrogen Unit			
48.	Multimeter	Digital 0 to 1000 M Ohms, 2V to 700V,100 micro A to 10A DC and AC	02 Nos.
49.	Megger	Analog - 500 V	01 Nos.
50.	Hydrometer		04 Nos.
51.	Tong Tester / Clamp Meter	0 - 100 A (Digital Type)	01 Nos.
52.	Soldering Iron	25 Watt, 65 Watt and 120 Watt, 230Volt	02 Nos. Each
53.	Temperature controlled Soldering Iron	50 Watt, 230 Volt	02 Nos.
54.	Thermometer Digital	0° C - 150° C	01 No.
55.	Inverter with Battery	1 KVA with 12 V BatteryInput- 12 volt DC, Output- 220 volt AC	01 No.
56.	Weighing balance	Upto 1KG, Accuracy: 0.5 gm	4 Nos.
C: SAFETY AND PROTECTIVE EQUIPMENT			
57.	Rubber gloves		10 Pair
58.	Cotton gloves		05 Pair
59.	Gum boots		02 Pair
60.	Safety Goggles		04 Nos.
61.	Safety Helmet		04 Nos.
62.	First Aid kit		02 Nos.
63.	Fire Extinguisher CO2	2 KG	02 Nos.
64.	Fire Buckets	Standard size	02 Nos.
65.	Boiler suit		02 Nos.
D: SHOP FLOOR FURNITURE AND MATERIALS			
66.	Working Bench	2.5 m x 1.20 m x 0.75 m	04 Nos.
67.	Wiring Board	3 meters x 1 meter with 0.5 meter	01 No.
68.	Instructor's table		01 No.
69.	Instructor's chair		02 Nos.

70.	Trainee Chair		01 for Each Trainee
71.	Trainee table	for two trainee	10 Nos.
72.	Metal Rack	100cm x 150cm x 45cm	04 Nos.
73.	Almirah	2.5 m x 1.20 m x 0.5 m	01 No.
74.	Black board/white board	Minimum 4X6 feet	01 No.
E: TOOLS AND EQUIPMENT FOR GREEN HYDROGEN			
75.	Small size/demonstration units of Electrolyzer with DC Power Supply.		01 No.
76.	Electrodes for Electrolyzer		01 No.
77.	Membrane for Electrolyzer		01 No.
78.	Gas Leakage Detector with audio visual alarm		01 No.
79.	Water Quality Measurement equipment. (Ph, Conductivity, silica,)		01 No.
80.	Hydrogen Storage tanks prototype		01 No.
81.	Hydrogen sensor	5V, fast response less than 15sec	04 Nos.
82.	Powdered KOH (Potassium hydroxide) Powder	500gm	Consumable (As required)
83.	Hydrogen Flow meter	0 – 4Bar	04 Nos.
84.	Pressure gauge meter	0– 1010ml/m or better	04 Nos.
85.	Temperature sensor with meter	5V, minus 55 to 125OC	04 Nos.
86.	Hydrogen Pressure regulator	Pressure of 0 – 4Bar, flow of 1litre/minute flow with the tank of capacity 2L.	04 Nos.
87.	Cooling fan	as per electrolyzer capacity	04 Nos.
88.	Laser Temperature Meter	0 to 200 deg C	04 Nos.
89.	Funnel	Funnel 3 inches 75mm for Laboratory Use	04 Nos.
90.	Beakers of 3 sizes	Glass Beaker 50ml 100ml 250ml	04 Nos. each
91.	Gloves	Electric Shockproof Insulated Hand Rubber	04 Nos.
92.	Weighing balance	Digital type, 1kg with accurate measurement	04 Nos.
93.	Experimentation kit for green hydrogen generation through electrolysis	10 to 50 Watt electrolysis capacity. 1. Membrane electrode assembly 2. Bi polar plate for fluid	1 No.

		distribution 3. Current collector and end plates 4. Connectors for fluid distribution	
94.	Electrolysis Workstation	10-50 watt capacity	1 No.

Note: -

1. *All the tools and equipment are to be procured as per BIS specification.*
2. *Internet facility is desired to be provided in the class room.*

ANNEXURE-II

The DGT sincerely acknowledges contributions of the Industries, State Directorates, Trade Experts, Domain Experts, trainers of ITIs, NSTIs, faculties from universities and all others who contributed in revising the curriculum.

Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

List of Expert Members participated for finalizing the course curriculum of Green Hydrogen Production Technician held at CSTARI Kolkata on 13th June, 2024.

S No.	Name & Designation Sh/Mr./Ms.	Organization	Remarks
1.	Sunil Kumar Gupta, DDG (ER)	CSTARI, Kolkata	Chairman
2.	G.C. Saha, Jt. Director/HoD	CSTARI, Kolkata	Executive Member
3.	Brindaban Das, Dy. Director	CSTARI, Kolkata	Member
4.	Surja Sekhar Shaw, Instructor	Govt. ITI Suri, Birbhum	Member
5.	Rahul Gupta, Instructor	Govt. ITI Suri, Birbhum	Member
6.	Ankit Patel, Tech. Support Engg.	Scientech Technology, Indore, M.P.	Member
7.	Dr. Tapan Bera, Deputy General Manager	Indian Oil, R&D, Faridabad	Member
8.	Amit Kumar Maity, AGM-SAP	Indorama India Pvt Ltd, Haldia	Member

9.	Samar Samanta, AGM- DAP process	Indorama India Pvt Ltd, Haldia	Member
10.	Azhar Husain, Sr. Mgr.	GAIL, Kolkata	Member
11.	Shyamal Thakurata, GM	GAIL, Kolkata	Member
12.	Mithai Lal Rai , TO	NSTI, Haldwani	Member
13.	Kapil Sonkar, SRM	IOCL R&D	Member
14.	Prasenjit Bose, Principal	Govt. ITI Haldia	Member
15.	Kamlesh Prajapati, Technical Director	Technology Exchange Services Private Limited	Member
16.	Dr. Rajat Kumar Panigrahi, Principal, Govt. ITI, Berhampur	Govt. ITI, Berhampur, Ganjam, Odisha	Member
17.	Shankar Nair, Director	AKADEMIKA LAB SOLUTIONS	Member
18.	Snehal Suryawanshi, Senior Manager	NSE	Member
19.	Snehasish Bandyopadhyay, Assistant Director	DGT, New Delhi	Member
20.	Sanjay Kumar, Director	CD Section, DGT, New Delhi	Member
21.	Sunil Kumar, Manager (Electrical)	NHPC LIMITED	Member
22.	Hitesh Mehta, Partner	Advance Electronic Industries	Member
23.	GAURAV PATEL, PROPRIETOR	LEARNING LAB SOLUTIONS	Member
24.	Manish Mishra, Asst. Director	NSTI, Howrah	Member
25.	B. Sharanappa, Asst. Director	CSTARI, Kolkata	Member
26.	M.J. Vijaya Raju, Asst. Director	CSTARI, Kolkata	Member
27.	Murari Barui, Asst. Director	CSTARI, Kolkata	Member
28.	Akhilesh Pandey, Asst. Director	CSTARI, Kolkata	Member
29.	Manish Mishra, Asst. Director	NSTI, Howrah	Member
30.	P.K. Bairagi, TO	CSTARI, Kolkata	Member
31.	B. Biswas, TO	CSTARI, Kolkata	Member
32.	K.V.S. Narayana, TO	CSTARI, Kolkata	Member
33.	B K Nigam, TO	CSTARI, Kolkata	Member
34.	Swapan Sen, TO	CSTARI, Kolkata	Member
35.	Pradip Biswas, Jr. D/man	CSTARI, Kolkata	Member
36.	Hemant Kujur, Jr. D/man	CSTARI, Kolkata	Member

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprentice ship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprentice ship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities


कौशलं बलम्