NSQC QUALIFICATION FILE
Approved in 22nd NSQC Meeting, 19th December 2018

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Name and address of submitting body:

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List of documents submitted in support of the Qualification File
1. Curriculum with training plan (Annexure I)
2. Documentary Evidence of Need (Annexure II)

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SUMMARY

1	**Qualification Title**	Certificate Course on ETP/STP/CETP Operation and Maintenance
P2	**Qualification Code, if any**	-
3	**NCO code and occupation**	-
4	**Nature and purpose of the qualification (Please specify whether qualification is short term or long term)**	**Nature of Qualification:** Certificate Course on ETP/STP/CETP Operation and Maintenance **Purpose of the Qualification**: This training programme will enhance the skills of the participants by providing monitoring & field training exposure which in turn can be utilised in monitoring of Effluent Treatment Plant (ETP)/ Sewage Treatment Plant (STP)/ Common Effluent Treatment Plant CETP) at industries, Municipal corporation and common effluent treatment plants/STPs. **Short Term**
5	**Body/bodies which will award the qualification**	Ministry of Environment Forest & Climate Change (MoEF&CC)
6	**Body which will accredit providers to offer courses leading to the qualification**	Ministry of Environment Forest & Climate Change (MoEF&CC)
7	**Whether accreditation/affiliation norms are already in place or not , if applicable (if yes, attach a copy)**	Training programmes would be undertaken as part of the Green Skill Development Programme (GSDP) under the ENVIS Scheme. The courses would be run by the ENVIS Hubs (hosted by the respective State Government /UT Administration) and ENVIS Resource Partners (RPs)- (hosted by environment-related governmental and non-governmental organizations/ institutes of professional excellence) and other institutes. The assessment of the training programmes would be a regular exercise as part of the Memorandum of Cooperation signed with ENVIS Hubs and RPs and Memorandum of Understanding (MoU) between the ENVIS Hubs/RPs and other GSDP Partners. The courses would also be run by the

		Autonomous Bodies/Institutes under the Ministry for which no MoC is required.	
8	**Occupation(s) to which the qualification gives access**	Sanitary Inspector/ ETP/STP/CETP Operator/Master Trainer, etc.	
9	**Job description of the occupation**	To operate, monitor, maintain, and trouble-shoot the ETP/STP/CETP and its processes.	
10	**Licensing requirements**	NA	
11	**Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)**	-	
12	**Level of the qualification in the NSQF**	**Level 6**	
13	**Anticipated volume of training/learning required to complete the qualification**	300 hours (Theory – 100 hours Practical -190 hours Examination - 10 hrs Written & Practical)	
14	**Indicative list of training tools required to deliver this qualification**	Pumps/Motors/Blowers/Gearbox, Valves, Sludge Pump, Aerators, Sludge dewatering equipments.	
15	**Entry requirements and/or recommendations and minimum age**	Qualification: Science Graduate Minimum Age: 21 yrs.	
16	**Progression from the qualification (Please show Professional and academic progression)**	ETP/CETP/STP Supervisor	
17	**Arrangements for the Recognition of Prior learning (RPL)**	There is no arrangement of RPL as of now	
18	**International comparability where known (research evidence to be provided)**	Similar Course is being offered in other developing and developed countries.	
19	**Date of planned review of the qualification.**	March 2020	
20	**Formal structure of the qualification Mandatory components**		
	Title of component and identification code/NOSs/Learning outcomes	**Estimated size (learning hours)**	**Level**
	1. Introduction to Industrial Wastewater (Theory)	**12 hrs**	**6**

	2. Introduction to Operation of Effluent Treatment Plant (Theory) 3. Introduction to Plants Equipment (Theory) 4. Introduction of Laboratory (Theory) 5. Introduction to Occupational Health & Safety (Theory) 6. Guidelines for Record keeping (Theory) 7. Introduction to Troubleshooting of Effluent Treatment Plants (Theory) 8. Introduction of Advanced Water treatment technology (Theory) 9. Cleaner production/Waste Minimisation (Theory) 10. Training at ETP/EPT for Plant Performance Monitoring (Practical) 11. Standard Operating Procedures (Practical) 12. Operation and Maintenance of ETP Equipment (Practical) 13. Sludge Management and Chemical Management (Practical) 14. Laboratory Testing (Practical)	**12 hrs** **12 hrs** **12 hrs** **12 hrs** **12 hrs** **12 hrs** **4 hrs** **24 hrs** **24 hrs** **58 hrs** **60 hrs** **24 hrs**	**6** **6** **6** **6** **6** **6** **6** **6** **6** **6** **6** **6**
I **Ii** **iii**	**Course duration:** 3 months **Onsite Field Training/Practical** **Examination** (Written & Practical)	100 Hrs 190 Hrs 10 Hrs	
	Sub Total (A)	**300**	**Level 6**
	Optional components		
	Title of component and identification code/NOSs/ Learning outcomes	**Estimated size (learning hours)**	**Level**
	N/A		

Total (A+B)	**300 hours**	**Level 6**

SECTION 1
ASSESSMENT

21	**Body/Bodies which will carry out assessment:** The assessments will be carried out by the evaluators of Environment Protection Training and Research Institute (EPTRI), Hyderabad Gujarat Cleaner Production Centre (GCPC), Gujarat/ National Environmental Engineering Research Institute (NEERI), Nagpur/ Chhattisgarh Environment Conservation Board (CECB), Raipur. These evaluators would be chosen from the panel of experts who are not part of the trainers. Based on the evaluation, certificates will be issued.
22	**How will RPL assessment be managed and who will carry it out?** No RPL in this programme.
23	**Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.** The assessment will be done through theory, practical and viva exams at the end of the course. Moreover, students will be assessed regularly through questionnaires on every module in the classroom. For practical examination, the trainers as well as course supervisors will constantly keep a vigil on the trainees. Any errors committed by the trainees will be corrected immediately; learning by doing technique will be adopted for practical assessment. In theory, a final examination will be conducted at the end of the course, in which 50% scoring will be considered to be as qualifying marks. The Assessments will be conducted through English/Hindi/Regional language Questionnaires.

24. Assessment evidences

Title of Component:

Outcomes to be assessed/NOSs to be assessed	Assessment criteria for the outcome
Knowledge of Industrial Wastewater and its treatment technologies. Different types of ETP's and the operation and maintenance. Treatment processes, Sludge management and Chemical Management.	Group Discussion, Question answer session, Questionnaires, Practical Examination
Means of assessment 1 - A Record of the answer sheets of the trainees. - Records of Assignments completed by the trainees.	
Means of assessment 2 - A Record of the answer sheets of the trainees. - Records of the marks obtained in viva-voce.	
Pass/Fail The final examination (both the written and practical) will be conducted at the end of the course, in which 50% scoring will be considered to be as qualifying marks.	

SECTION 2
25. EVIDENCE OF LEVEL

OPTION A

Title/Name of qualification/component: Certificate Course on ETP/STP/ CETP Operation and Maintenance Level: 6			
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
Process	In-depth knowledge and practical exposure of STP/ETP/CETP plant operations in Industries, opportunity to meet and interact with experts, employment for the skilled youth.	Trainee gains wide range of specialized technical skill, clarity of knowledge and practice in his/her area of study.	6
Professional knowledge	Practical and theoretical knowledge in the field of ETP/STP/CETP plants operation, troubleshooting of ETP, Sludge Management, Chemical Management and technical know-how on ETP/CETP/STP technologies	Trainee gains factual and theoretical knowledge in broad contexts in the area of ETP/STP/CETP plants operations and maintenance (O&M), types of treatment alternatives available, characteristics of wastewaters to be treated, requirements of treated wastewater quality, different unit processes and unit operations, techniques of wastewater sampling and analysis etc. They would also be trained on rules and regulations to implement the laws to protect the environment.	6
Professional skill	Development of critical skills to generate solutions to specific problems in a field of	The trainee acquires the required cognitive and practical skills as a solution provider to	6

Title/Name of qualification/component: Certificate Course on ETP/STP/ CETP Operation and Maintenance Level: 6			
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
	ETP/CETP/STP and Monitoring.	industries. They also learn preventive and corrective maintenance or the treatment machinery, knowledge of repairs to and replacement of various parts of equipment, record keeping, report preparation, aspects of safety in treatment plants etc.	
Core skill	Development of skills in the use of methods, tools and instruments for ETP/STP/CETP plants O&M; skills in mathematical calculation, instrument handling, data collecting, organizing information and logical communication.	Trainee develops the core skill sets required to carry out data collection, analysis as well as statistical validation and interpretation of the datasets.	6
Responsibility	Responsibility for own work and learning and train other youth of the country. Development of skills as a trouble shooter.	The trainee becomes responsible for his/her own work and is responsible for development of group as Master Trainer in this field.	6

SECTION 3
EVIDENCE OF NEED

26 **What evidence is there that the qualification is needed? What is the estimated uptake of this qualification and what is the basis of this estimate?**

Basis	In case of other Awarding Bodies (Institutes under Central Ministries and states departments)
Need of the qualification	In the face of ever-growing demand, wastewater is gaining momentum as a reliable alternative source of water, shifting the paradigm of wastewater management from 'treatment and disposal' to 'reuse, recycle and resource recovery'. In this sense, wastewater is no longer seen as a problem in need of a solution, rather it is part of the solution to challenges that societies are facing today[1]. Under the Water (Prevention and Control of Pollution) Act, 1974, every industry has to provide adequate treatment of its effluents before disposal, irrespective of whether it is in stream, land, sewerage system or sea. However, most of the STPs/CETPs/ETPs are operationally inefficient due to the paucity of skilled manpower. This has also been highlighted by Central Pollution Control Board Zonal Office-Bhopal in their report titled "Performance Evaluation of Sewage Treatment Plants in Central Zone". The present course will provide the technical and qualitative skills necessary for enhancing the efficiency in the operation and maintenance of STPs/CETPs/ETPs for providing wastewater that is cost-efficient and sustainable source of energy, nutrients and other useful by-products.
Industry Relevance	The curriculum/course syllabus has been jointly prepared by the Scientists/Experts in the EPTRI, Hyderabad, GCPC, Gujarat, NEERI, Nagpur and CECB, Raipur. These are the pioneer institutions in STP/ETP/CETP sectors.
Usage of the	The course has been designed under GSDP for

[1] United Nations Water Development Report, 2017

	qualification	the first time.
	Estimated uptake	An uptake of 25 students is envisaged at each location.
27	**Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences** **NA**	
28	**What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Give justification for presenting a duplicate qualification** National Qualifications Register was searched to assess if there was any similar qualification and no overlap was found with the existing qualifications.	
29	**What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated? Specify the review process here.** Feedback would be taken from experts, students and teachers regarding the course content, structure and timeline of the programme. Feedback will also be taken from the Centres conducting the course. Changes suggested will be assessed by the Ministry before incorporating them in the curriculum. Next review will be done in March 2020.	

SECTION 4
EVIDENCE OF PROGRESSION

30	**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?** ***Show the career map here to reflect the clear progression*** **Sanitary Inspector/ ETP/STP/CETP Operator/Master Trainer -On the Job Training - ETP/CETP/STP Supervisor**

Annexure-I

Curriculum with training plan
Certificate Course on ETP/CETP/STP Operation and Maintenance

Course Duration: 300 Hrs (Theory – 100 Hrs, Practical -200 Hrs)

Module/Unit No.	Syllabus	No. of hours
	Level – I (Theory) (100 hrs)	
1	INTRODUCTION OF INDUSTRIAL WASTEWATER (Theory) i. Introduction and type of wastewater from different sector and its characteristics ii. Introduction of wastewater parameters considered in Effluent Treatment Plant (pH, BOD, COD, Ammonical Nitrogen, TSS, TDS.etc) iii. Collection and conveyance of wastewater, types of collection systems, wastewater conveyance systems	**12**
2	INTRODUCTION TO OPERATION OF EFFLUENT TREATMENT PLANT (Theory) i. Introduction of Unit Operations ii. Introduction of Unit Processes iii. Introduction of various treatment process (Preliminary Treatment, Primary Treatment, Secondary Treatment, Tertiary Treatment) iv. Introduction of mechanism of Physico-chemical, Biological Treatment, Advanced Oxidation or Tertiary Treatment v. Laws, regulations and Environment Standards vi. Preparation of ETP/ CETP flowchart	**12**
3.	INTRODUCTION OF PLANT'S EQUIPMENT (Theory) i. Introduction of Pumps/Motors/ Blowers/Gearbox	**12**

	ii. Introduction of Units such as Screens (Coarse/Fine Bar screens, Manual/ Mechanically operated), Sump and Pumping Stations including Pumps, Motors and Panels (Centrifugal Horizontal / Vertical Turbine) iii. Introduction of Valves (Sluice gates, non-return, Reflux) iv. Introduction of Pipes/Specials and Pipe Joints v. Introduction of Sludge Sump, Sludge Pump, Secondary Sludge Sump vi. Introduction of Aerators	
4.	INTRODUCTION OF LABORATORY (Theory) i. Definition of sampling, its types and preservation ii. Collection of samples iii. Introduction of Laboratory Equipment iv. Analysis of physical, chemical and biological parameters of wastewater sample	**12**
5.	INTRODUCTION TO OCCUPATIONAL HEALTH &SAFETY (Theory) i. Introduction and Necessity to Occupational Health and Safety ii. Introduction of Hazards associated with ETP Operation iii. Introduction to basic first aid and firefighting iv. How to control fire at workplace v. Do's and Don'ts in ETP Operation for Safety vi. Personnel Protective Equipment (PPE) for ETP Operation & Maintenance vii. Safe Handling of Chemicals such as Chlorine, PAC, $FeSO_4$, $FeCl_3$, Alum, Lime	**12**
6.	GUIDELINES FOR RECORD KEEPING (Theory) i. Recording of Physiochemical Parameter ii. Record keeping of Energy and Chemical Consumption iii. Malfunction Reporting Form iv. Daily Plant Condition Form	**12**

	v. Monthly Scheduled Maintenance Form vi. Log sheet of Effluent Treatment Plant Register	
7.	INTRODUCTION OF TROUBLESHOOTING OF EFFLUENT TREATMENT PLANT (Theory) i. Troubleshooting of Primary Units ii. Troubleshooting of Secondary Units iii. Troubleshooting of Tertiary Units iv. Troubleshooting of Sludge Treatment Units v. Commissioning and Shutdown of Effluent Treatment Plant	**12**
8.	INTRODUCTION OF ADVANCED WASTEWATER TREATMENT TECHNOLOGY (Theory) i. Soil Biotechnology ii. Chemo state technology iii. Membrane Bio – reactor iv. Advance oxidation Process v. Sequential Batch Reactor vi. Recycle and Reuse of Wastewater in Effluent Treatment Plant	**12**
9.	CLEANER PRODUCTION (Theory) / Waste Minimization i. Cleaner Production Concept ii. Cleaner Production Tools iii. Cleaner Production Methodology iv. Cleaner Production Case Study in different industrial sector	**4**
	Level-II (In-Plant Training) (200hrs)	
10	TRAINING OF CANDIDATES AT CETP/ETP FOR PLANT PERFORMANCE MONITORING **(**Practical) i. Introduction of each units of Effluent Treatment Plant ii. Rate of flow/ flow quantity in each Unit iii. Overview of Inletand Outlet Parameter iv. Training for operation and maintenance of Each Unit v. Duties and responsibilities of the treatment plant operator	**24**

11.	STANDARD OPERATING PROCEDURE (SOP) (Practical) i. SOP for monitoring of influent water flow and characteristics ii. SOP for Measurement of Inflow iii. SOP for Measurement of Sludge Level iv. SOP for preparation of Lime Solution v. SOP of Pumps vi. SOP for measurement & Control of various hydraulic level and sludge level vii. SOP for handling, preparation and dosing of chemicals viii. SOP for monitoring of Aeration tanks for optimum treatability ix. SOP for operation and maintenance of sludge drying beds x. SOP for collection, transportation and disposal of sludge from Sludge drying beds, Decanters and cleaning material of wet wells & tanks xi. SOP for collection transportation and disposal of waste (other than sludge) xii. SOP for cleaning of all wet wells, tanks and disposal of waste xiii. SOP for controlling of the bypassing the Inflow to CETP, in case of an emergency situation	**24**
12	OPERATION AND MAINTENANCE OF ETP (EQUIPMENT) (Practical) i. Importance of maintenance and monitoring ii. Operation & Maintenance of Pumps/Motors/ Blowers/Gearbox iii. Operation & Maintenance of Units such as Screens (Coarse / Fine Bar screens, Manual / Mechanically operated), Sumps and Pumping Stations including Pumps, Motors and Panels (Centrifugal Horizontal / Vertical Turbine) iv. Operation &Maintenance of Valves (Sluice gates, non-return, Reflux) v. Operation & Maintenance of Pipes/Specials and Pipe Joints vi. Operation & Maintenance of Sludge Sumps, Sludge Pumps, Secondary Sludge Sumps vii. Operation & Maintenance of Aerators viii. Inspection of plant for hygiene,	**58**

	housekeeping etc	
13	SLUDGE MANAGEMENTAND CHEMICAL MANAGEMENT (Practical) i. Sludge management, handling, storage & disposal methods ii. Chemical management, handling, storage & disposal methods	**60**
14	LABORATORY TESTING (Practical) i. Introduction to wastewater Analysis and sampling method and its procedure ii. Sampling Methods and Preservation of Samples iii. Sampling Location iv. Time Periods for monitoring v. Record keeping at sample analysis.	**24**
15	Examination (Written & Practical)	**10**