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# GREEN INSIGHTS

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## GREEN SKILL DEVELOPMENT : Building a Future Ready Workforce



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ENVIS Resource Partner on:

**Environment Literacy - Eco-labelling and Eco-friendly Products**

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## FORWORD

“Skilling is building a better India. If we have to move India towards development then skill development should be our mission”- Prime Minister on August 15, 2014.

Economic growth is dependent on growth of industry and its citizens. Citizens can be productive by getting access to relevant skills and opportunities around them. To increase the success growth through demand and supply chain, upgrading skills is important from a nation's as well as from an individual's perspective.

A large proportion of youth drops out before they complete secondary education. As per the 12th Plan (2012-17) 47% of students drop out before they complete secondary education. As a result, when they enter the job market, they have very low level of skills and they work at low wages. There is a need to provide them an opportunity of improving their skill levels through re-skilling and up-skilling. There is also a need for recognition of prior learning specially for those who have joined the job market in early stage and have experience but no certificate and also those who have skills passed on from generation to generation, mainly the artisans and handicraft workers.

Improved training and skill development is critical for providing decent employment opportunities to the growing youth population and is necessary to sustain the high growth momentum. The Government of India has recognized the need for Skill Development firstly with the

11th Five Year Plan providing a framework to address the situation. The first National skill Development Policy was framed in 2009 and subsequently a National Skill Development Mission was launched in 2010.

An initiative for skill development in the environment and forest sector has been taken up by the Ministry of Environment, Forests & Climate Change (MoEF&CC) to enable youth to get gainful employment and/or self-employment, utilising the vast network and expertise of ENVIS Hubs/Resource Partners. It is called the Green Skill Development Programme (GSDP) and was launched in 2017. Green skills are needed to adapt processes, services and products to climate change and the environmental regulations and requirements related to it. These skills are required in areas such as such as Renewable energy, Wastewater treatment, Climate resilient cities, Green construction, Solid waste management, green industries, bamboo crafts etc.

Consumer Education and Research Centre being a Resource Partner under ENVIS Project initiated two training programmes under GSDP in 2018-19. These courses have been designed for Graduates who have displayed a keen interest in technology and desire to gain the knowledge on global practices of Product Testing Laboratories. In 2019-20 CERC-ENVIS RP has organized two courses and this issue covers the details of these training courses and how these courses have moulded the students and prepared for their future endeavors.

# Skills Development in a Global Context

International Literacy Day is celebrated every year on September 8th. In 2018, International Literacy Day (ILD) was celebrated across the world with the theme "Literacy and skills development". Literacy challenges persist and at the same time the demands for skills required for work is evolving despite progress made.

World Bank says that one third of the working age population in low and middle income countries lack the basic skills required to get quality jobs, leaving them unable to achieve their full productive potential and limiting economic investment and growth. According to World Bank calculations, more than two billion working-age adults are not equipped with the most essential literacy skills required by employers. Among young adults under the age of 25, the number is about 420 million worldwide. Unskilled workers are forced into unemployment or are stuck in unstable low-wage jobs that offer little career mobility or growth. As they age, they become increasingly vulnerable to job losses and labor market shocks. The results are devastating on a national level as well. Low skills reduce labour force productivity and make investment less attractive, decreasing the transfer of technology and "know-how" from high-income countries. The private sector cannot flourish in a country that doesn't have a skilled workforce to sustain it.

Low skills perpetuate poverty and inequality. Skills development can reduce unemployment, raise income and improve standards of living. Helping young people develop skills makes economic sense.

In June 2009, International Labour Organisation (ILO) adopted Global Jobs Pact with an objective to address the social impact of the global crisis on employment and proposes job-centred policies for countries to adapt according to their national needs. In September 2009, G20 Leaders welcomed the ILO's Global Jobs Pact and agreed on the importance of building an employment-oriented framework for future economic growth. They acknowledged the role of skills development in that framework, stating that "each of our countries will need, through its own national policies, to strengthen the ability of our workers to adapt to changing market demands and to benefit from innovation and investments in new technologies, clean energy, environment, health and infrastructure."



All G20 countries have identified skills development as a strategic objective. The Organization for Economic Cooperation and Development (OECD) has produced several major reports on vocational education and training and on school-to-work transitions. The OECD Skills Strategy provides a strategic approach to skills policies to promote better skills, better jobs and better lives. The OECD Skills Outlook 2019 focuses on the strategies to reskill and upskill throughout the careers of the employee to keep up with changes in the labour market. In rapidly digitalising world, skills make the difference between staying ahead and falling behind. Through the "***I am the Future of Work***" campaign, the OECD wants to help governments and stakeholders build a more inclusive world of work. Globalisation, digitalisation and other mega-trends have made changes that are radically affecting working lives.

The European Commission has embarked on a New Skills for New Jobs Initiative. The "***Skills Agenda for Europe***" adopted by the Commission on 10th June 2016, launched 10 actions to make the right training, skills and support available to people in the European Union. Its focus was on equipping Europeans with the right skills in order to

increase Europe's workforce employability and to respond to changes in labour market requirements. So that they are equipped for good-quality jobs and can fulfill their potential as confident, active citizens. The European Commission in January 2020 has invited the Social Partners to update the Skills Agenda for Europe. There is a need to provide workers and managers with the right skills required by the green and social transition, also in the framework of the new European Green Deal.

India adopted an ambitious National Skills Development Policy in 2009. The Government of India launched "**Skill India Mission**" in 2015 with objective to train 400 million workers by 2022. The mission aims at vocational training and certification of Indian youth for a better livelihood and respect in the society. The statement of mission states to rapidly scale up skill development efforts in India, by creating an end to end, outcome focused, implementation framework, which aligns demands of the employers for the well trained skilled workforce with aspirations of Indian citizens for sustainable livelihoods.

The Ministry of Environment, Forest and Climate Change (MoEF&CC) launched the **Green Skill Development Programme** (GSDP) in 2017 for skill development in the environment and forest sector to enable youth to get gainful employment and/or self-employment. There are around 66 ENVIS (Environment Information System – A project by MoEF&CC) Centres on different thematic mandates conducting different skilling programmes that cover diverse fields such as pollution monitoring (air/water/soil), Sewage Treatment Plant, Effluent Treatment Plants and Common Effluent Treating Plants (STP/ETP/CETP) operation, waste management, forest management, water budgeting, auditing, conservation of river dolphins, wildlife management, para taxonomy, including Peoples' Biodiversity Register (PBRs), mangroves conservation, bamboo management and livelihood generation.

Emerging technology is reshaping the world of work. Automation is revolutionizing business models, tools, tasks and delivery modes. The challenges of upskilling and reskilling could be imminent for many individuals, businesses and governments. The '**future of skills**' receives considerable attention from governments around the world.

In August 2018, Deloitte conducted the European Workforce Survey, reaching out to more than 15,000 people across ten European countries to know about the impact of new technologies on their work, how they perceive their own preparedness for automation and technological change and which policy measures they

expect from governments and others. They concludes with suggestions that both the EU and national governments should aim to close the skills gap and increase digital skills significantly through a wide range of initiatives, one of the most important being vocational education and training.

A 2019 report from McKinsey indicates that nearly 40% of organizations in the United States alone are facing a dearth of skilled people, not enough even to fill entry level jobs. This is an early indicator of a massive industrywide skilling challenge. Moreover, the skills gap comes in different forms—it is either in terms of the newer generation (especially the millennials) struggling to find suitable work or mid-career individuals who are unemployed due to layoffs. Based on their research and experience, they have identified five principles that should be the foundation of workforce-development programs for funders, participants and employers.

Research done by Accenture in 2017 has found that 74% of business and IT leaders from 31 countries say their organization is entering areas that have yet to be defined. At the same time, 95% of thought leaders, business executives, NGOs, and influencers in education across Asia, Europe and America believe they need new skills to work and stay relevant.

There is a rising need for organizations to focus on continuous skills development and embed learning into the organization's culture. This will empower employees to take learning into their own hands and be responsible for their own career paths by building confidence in skilling themselves in in-demand technologies and being open to further skilling requirements.

Ultimately, each country's prosperity depends on how many of its people are in work and how productive they are, which in turn rests on the skills they have and how effectively those skills are used. Skills are a foundation of decent work.

Source:

<https://bit.ly/3gEmwuZ>  
<https://bit.ly/2AtktJt>  
<https://bit.ly/3cksT2Z>  
<https://bit.ly/3dqsEoA>  
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# A Report on Course: Laboratory Assistant for Food Testing Laboratory with Eco-friendly Practices

## Dr. Dolly Jani

Training In-charge and Senior Manager  
Food Laboratory, Consumer Education & Research Centre

Training to food laboratory technicians is a pre-requisite for ensuring quality and safety in analytical environment. Consumer Education and Research Centre (CERC), with the support of Ministry of Environment, Forests & Climate Change, launched a training programme on “Laboratory Assistant for Food Testing Laboratory with Eco-friendly Practices” under Green Skill Development Programme in 2018-19 to meet the growing needs of skilled manpower for industries and testing laboratories.

Market condition needs and assessment show that it is time consuming and difficult, especially for MSMEs to invest in training such technicians. At the same time the number of food processing units is growing rapidly so is the need for trained professionals. This training is aimed to train the science graduates to meet the growing demand of industries.

The CERC-ENVIS Resource Partner Consumer Education and Research Centre designed and developed this course to ensure widespread and effective delivery of training to food businesses with emphasis on green laboratory practices. This course has been designed for Science Graduates who have displayed a keen interest in technology and desire to gain the knowledge on global practices of food product testing laboratories and research institutes.

The first batch of the GSDP course was successfully conducted in 2018-19. The trainees either got jobs or went for higher studies. Second Batch of this course started from 7th January 2020 and completed successfully on 6th March 2020.

During the training, basic introduction and hands-on training was provided for various analytical techniques used in food laboratories. Introduction to – nutritional aspects, food safety standards and laboratory accreditation system – is given. Trainees are imparted knowledge regarding Good Laboratory Practices (GLP), sampling procedures, documentation; operation, calibration & maintenance of laboratory equipments. Information regarding eco-friendly laboratory, waste

management and laboratory safety measures are also given through the course. The expected outcomes of the programme are:

- To create a Green skilled personnel who can establish eco-friendly food laboratory methods.
- To be proficient in Eco-friendly Good Laboratory Practices
- To be well versed with sample preparation, operation and maintenance of laboratory equipments
- To gain basic knowledge of Food Regulatory Standards and Laboratory Accreditation
- To acquire knowledge about Laboratory waste disposal as per sustainability criteria.

Since the training programme was designed to suit fresh graduates, the course covers introductory level of food science concepts, laboratory techniques and other analytical procedures. So, it made it simpler and easier to understand. Those with a higher qualification and/or experience were obviously quicker to learn and understand. However, it was ensured that all of them were able to gain from the training to a reasonable extent. This was ascertained by follow up laboratory exercises and assessment at the end of training. Most of the trainees expected to enhance their laboratory skills for better employment opportunities. Efforts were also made for career counseling and placement of candidates also.

## Selection of Candidates

An advertisement is given in local newspaper and social media. Also released in <http://www.gsdp-envis.gov.in/>. Fifty three candidates applied for the course. Based on pan-India screening 15 candidates were finalized after written test and personal interview. All the trainees were Science graduates with chemistry/microbiology/botany/biotechnology/food technology. Candidates were either fresh or with experience.

## Commencement of Training

An inaugural ceremony was organized at the campus of CERC. The Chief Guest was Shri. B.C. Raval, President, Indian Salt Manufacturers Association (ISMA). Shri Praful Amin, Chairman, CERC and Shri Uday Mawani, CEO and Project Coordinator ENVIS also graced the occasion. Other dignitaries were Shri Atul Soni Laboratory Head Ahmedabad Municipal Corporation, Shri Mahesh Pandya, Paryavaran Mitra, and Shri Rakesh Shah, Director, Anand Environmental Consultants Pvt. Ltd.



The aim of this course was to impart requisite knowledge and skills, through classroom activity as well as hands-on training in CERC's in-house laboratory, supported by relevant industry visits. The faculty consisted of CERC's qualified and experienced laboratory personnel as well as a galaxy of visiting experts.

The whole training programme was conducted at in-house laboratory headed by Dr. Dolly A. Jani (Training In-charge). The faculty was efficiently strengthened by laboratory demonstrator- Ms. Kanaklata Goswami. The two months training was supplemented with two field visits to - Gujarat Pollution Control Board's Laboratory and Ahmedabad Municipal Corporation's Public Health Laboratory.



## Training Manual

A Training Manual was prepared in order to train the personnel that can be designated as Technical Assistants in the food manufacturing and quality assurance sector. This manual details the requirements on safety and quality control to be practiced by personnel engaged in the food laboratory. It is based on the requirements of Food Safety Standards Regulations, 2011 along with the industry best practices. It has been designed according to the flow of operation in the food industry for ease of understanding of the laboratory staff. This comprehensive manual is supplemented with standard operating procedures specific to the food laboratory for facilitating the trainers.

The manual is structured to provide essential information in a standardized, logical and systematic manner while adhering to effective teaching and learning strategies. It is composed of three sections. Initial Chapters-(1-14) elaborate on principles and methods of Good Food Laboratory Practices; Chapter-15 introduces and elucidates the safety requirements in a chemical laboratory; and Chapter-16 explains the environment friendly practices for laboratories and their criteria. Each section has a specific training module which is customized to meet the specific needs of the trainees.

## Course Module

The course comprised of four weeks each of classroom lectures and practical training. The concluding sessions entailed a week of assessment and related exercises. Thus a total of nine weeks or approximately two months course schedule was lined out. The main components of the training curriculum were as mentioned below:

1. Introduction of Food, Nutritional Aspects and Safety Standards.
2. Introduction of Laboratory Accreditation
3. Eco Friendly Maintenance of Laboratory Practice
4. Eco Friendly Laboratory Waste Management
5. Introduction of Basic Laboratory Safety Equipment and their functions
6. Exercises and Assessment

**Lectures/ Practical** - The training was systematically carried out according to the topics lined out in the course module. Each student was provided with a training kit consists of - Training Manual, general stationery items, laboratory protection gear such as aprons, safety goggles, gloves and napkins etc. The lectures and practical sessions were continually held for nine weeks as per the descriptions in the Training Manual. Various aspects of food testing and good laboratory practices were covered in details via this training.



### Hands on Training at the Food Laboratory at the Consumer Education Research

**Field Visit I: February 19<sup>th</sup> 2020.** A study tour was arranged to Sophistication Analytical and Research Laboratory (SARL) of Gujarat Pollution Control Board (GPCB) at Gandhinagar. The students were benefitted from getting a closer look and hands on experience of the world class facility for environmental and scientific analysis with NABL accreditation. The state of the art environmental laboratory is equipped with advanced scientific instruments and essential supplementary facilities that would help all stakeholders in analysis of wide range of environmental samples. The highlights of the visit were:

- Exposure to analysis of environmental samples like water (ground, surface, sea, waste) sludge, soil, industrial, domestic effluents, agriculture and food samples;
- Well experienced and adequate scientific staff;
- Demonstration of the working on sophisticated instruments:
  - High Resolution Gas Chromatograph – High Resolution Mass Spectroscopy (HRGC-HRMS)
  - X-Ray Diffractometer (XRD)
  - High Performance Liquid Chromatography and Triple Quadra pole Mass Spectroscopy (LCMS/MS)
  - Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)
  - Gas Chromatograph with Nitrogen Phosphorous Detector (GC-NPD) and Flame Photometric Detector (GC-FPD)
  - Volatile Organic Compound (VOC) Analyzer-Bench Type
  - Gas Chromatograph with ECD, FPD and FID
  - High Performance Liquid Chromatography (HPLC)
  - UV-Visible Spectrophotometer
  - Spectrofluorometer



### GSDP Trainees at GPCB, Gandhinagar

**Field Visit II: February 28<sup>th</sup> 2020:** A study tour was also arranged to Public Health Laboratory of Ahmedabad Municipal Corporation with state of the art food testing facilities. This is an NABL accredited laboratory in chemical and biological scope of activities. It is presently headed by Dr. Hiren Mandlia and supported by Technical Officer Mr. Vimal Shah and qualified Food Analyst Ms. Isha Desai.

The training at AMC Laboratory included hands on training for test parameters to check purity and quality of oils and fats. The trainees were also benefitted to know about the working process of the sophisticated equipments on the premises. They were explained the process of sample receipt, coding, testing and reporting procedures as per NABL guidelines. The students were also given a demonstration of the tests for adulteration in common food items.

The trainees were required to submit their field visit reports after each study tour.

**Seminar/presentations:** External faculty/ experts were invited to take up sessions on

- Introduction to NABL, its importance and requirements;
- Role of Bureau of Indian Standards
- Entrepreneurship: How to start your own laboratory

- Finance and banking: How to get loan and different schemes of government for entrepreneurs.
- Misleading Advertisements: How to make aware of false claims
- Cleaner and Greener Production
- Carbon Footprint and Environmental Audits

### Evaluation and Assessment

Trainees were assessed and evaluated on the basis of a written test and a practical examination. They were also graded for their respective field reports, journals and performance in the viva-voce.

### Valedictory Function

To conclude the two- month training programme a valedictory function was organized at Ahmedabad Management Association on 6th March 2020. The chief guest of the day was Shri K.B. Vaghela, Head of the Laboratory, Gujarat Pollution Control Board, Gandhinagar. The guest of honour was Smt. Dipika Chauhan, Dy. Commissioner, Food & Drug Control Administration, Government of Gujarat. Presidential speech was delivered by CERC's Chairman Trustee Shri Praful Amin. The ten trainees were finally awarded with certificates jointly given by Ministry of Environment, Forests and Climate Change, and CERC upon successful completion of their training programme.



## Placement Activity:

A placement brochure was prepared with the detailed bio-data of all the trainees and it was circulated to prospective employers such as Testing Laboratories, Food Industries and Research Institutions etc.

## Success Stories:

- One Trainee placed successfully with Food Laboratory of CERC
- One Trainee placed with Indian Red Cross Society
- One trainee got placed at GNFC as QC Chemist
- Three trainees opted for higher education.



GSDP Trainees at Municipal Corporation's Public Health Laboratory

## Testimonials

After the training at CERC for 2 months, I feel well equipped to be a lab assistant at the Food Testing Laboratories. It was very interesting to know different aspects of food testing. I am very thankful to CERC- ENVIS team, for giving me this opportunity. It will definitely help me in building my career

-Hetu Patel

During the training, we were taken to visit well equipped laboratories of AMC and GCPC. Wherein we got an opportunity to understand the working principles of many sophisticated analytical instruments. Expert lectures from external faculties on NABL Accreditation, CRM, Environmental issues; financial aid for startups etc was very informative and useful. This was a once in a lifetime opportunity of which I am very thankful.

-Imrankhan Pathan

Here, I got an opportunity to enhance my knowledge on food adulteration, FSSAI regulation and Acts. We also got introduced to some of the instruments like HPLC, GC, ELISA, and Spectroscopy etc. I am thankful to CERC for providing me with this opportunity.

-Neha Ojha



# A Report on Course: Laboratory Technicians/ Technical Assistants for Energy Efficiency, Star Labeling and other Electrical Testing for Environmental Criteria.

## Ms. Shweta Mahajan

Training In - Charge and GM Electrical  
(Lighting/Fans/Home Appliances, Motors & Pumps/  
Energy cell) Consumer Education and Research Centre,  
Ahmedabad.

To build a low carbon future and curb climate change, the Indian government has committed to deploying expansive solar and wind energy capacity and adopting an array of ambitious climate actions.

India has made significant progress on energy efficient appliances. Ten home appliances of mass consumption fall under mandatory certification for star labeling. India successfully implemented sustainable LED lights programme and super efficient air conditioning programme through EESL (Energy Efficiency Standards and labeling). Six of India's largest air conditioner manufacturers announced plans to leapfrog from outdated R-410A refrigerant to more climate friendly and lower global warming potential refrigerants such as R-32 and R-290<sup>61</sup>.

Sustainable consumption and production can only be possible with the active support and participation of all stakeholders such as producers, sellers, waste managers and consumers with their consumption and disposal patterns.

In today's context of Green Technology, design, raw material, manufacturing and testing have become closely integrated. Industries can make a big difference in global competitions with skilled workforce. Many open positions in industry require specialized skills that require specific training.

Government is showing increased interest in education for sustainable development (ESD) as the key for behavior change under climate action component. CERC has developed holistic customized training programme of 264 hrs for developing green skills of youth on sustainable

products, lifestyles and sustainable consumer behavior. Technically qualified youth was trained in its NABL accredited, BIS recognized Electrical product testing laboratory on the concepts of star labeling criteria and eco friendly practices adopted by the industry for sustainable future.

The first batch of the GSDP course was successfully conducted in 2018-19. The trainees either got jobs or went for higher studies. Second Batch of this course started from 7<sup>th</sup> January 2020 and completed successfully on 6<sup>th</sup> March 2020.

## Selection of Candidates:

An advertisement is given in local newspaper and social media. Advertisement is also released in <http://www.gsdp-envis.gov.in/>. Large numbers of application were received for this course. Candidates with relevant qualifications were shortlisted and called for written test and personal interviews at CERC-ENVIS Centre. Out station candidates were interviewed on Skype/phone on. A selection committee comprising of subject experts selected candidates by judging their technical and core capabilities.

## Inauguration of the Training programme:

It was held in conference hall at CERC campus on 07/01/20. Shri Dilipbhai Thakkar, Vice president and business head, LA-GAJJAR Machineries Pvt.Ltd was the chief guest and Shri D.L Parmar, controller legal metrology, Director Consumer affairs office was the guest of honor. Presidential speech was delivered by CERC's chairman trustee Shri Prafulbhai Amin and welcome address by CEO & board secretary, Shri Udaybhai Mawani. All invitees encouraged trainees with their inspirational speeches.

The programme was attended by CERC's management, staff members, prominent industry & academic experts and consultants.



### Training:

Training programme was commenced from 7/1/2020 with orientation to various sections of CERC and the state of the art Product testing laboratories. All candidates were given bags with course material (training manual, important formulas useful for testing and calculations for deriving results, methods of analysis & solutions under various test conditions) stationary items, testers and safety helmets.

Training manual was given to each candidate with details on every aspect of testing. It covers introduction of laboratory tools required for preparation of test setup, introduction of instruments and equipments required for performing testing, consumables required during testing, knowledge on calibration of instruments, inspection of test system, primary maintenance and standardized formats for keeping records of every analysis including intermediate checks/cross verifications. It also covers mandatory safety requirements for electrical testing & laboratory operations and quality system for laboratory accreditation with simplified test procedures.

In manual, concepts of star labeling criteria and eco friendly practices adopted by the industry for sustainable future are simplified with methods of identifying eco-friendly star labeled electrical products, details on electrical products covered under energy star labeling criteria by Bureau of Energy efficiency, testing techniques for environmental criteria, green skills for sustainable development with tips & habits to be cultivated to save

energy to contribute towards global challenges of climate change.

All details are explained in a creative way with photographs for ease of understanding.

Another manual on cleaner production and waste minimization was given by Gujarat Cleaner Production Centre, Gandhinagar.

### Training schedule:

'Training Schedule' prepared was given to all the candidates for the month of January and February 2020.

### Internal and external faculty members:

Following Internal and External faculty members/experts have made the training programme interesting and successful with their presentations.

**Internal Faculty:** Ms. Shweta Mahajan

**External Faculty:**

1. Dr. Chetan Upadhyay (Subject experts).
2. Mr. Mihir Vasavada (Subject experts).
3. Mr. Karjan Kulshrestha (Industry Expert).
4. Mr. Lakshman Agalawe (Industry Expert).
5. Mr. G.T. Panchal (Industry Expert).
6. Mr. Govind Zala (Industry Expert-fordemonstrations).



### Major topics covered:

The syllabus is designed keeping in mind the expectations industry has from job seekers. Suggestions were taken from industry experts and subject experts to make it comprehensive, which covers a broad category of competence levels in terms of professional knowledge, professional skills, core skills, responsibility and process.

1. Recent trends in electrical machines.
2. Renewable energy for green future (Types & basics).
3. Restructuring of power system for green power.
4. Design aspects of energy efficient induction motors.
5. Process of manufacturing of energy efficient motors for submersible pumps, calculation of losses and finding efficiency.
6. Electrical safety & energy saving with switch gears.
7. Maintenance of switch-gears & power quality solutions.
8. Environmental pollution due to noise created by electrical products, home appliances and accessories.
9. Measurement of noise & methods of reduction of noise.
10. Green practices observed by manufacturers.
11. Products covered under voluntary & mandatory labeling schemes of BEE.
12. Varieties of labels used on appliances as energy saving guides.
13. Sustainable consumption of electrical products.

### Demonstration of tests /practicals on Electrical products and Home appliances: Ms. Shweta Mahajan

Practical training was systematically carried out according to the topics lined out in the course module. Various aspects of product testing including environmental criteria were covered in details as per the descriptions given in the training manual. Trainees benefitted from learning comprehensive testing techniques and hands-on experience on the instruments.



They were given exposure to the tests for Sound level measurement, air flow measurement, energy consumption and derivations for star label with demonstration on electrical products; LED lamps, LED fluorescent tubes, LED night lamps, star rated cooling fans, fan refrigerators, exhaust fans, fresh air fans, refrigerators, hand blenders, mixers/grinders & food processors.

They were given training on power consumed by unsustainable products and power saved with energy efficient & star labeled products with green technology. They were also given hands on experience for testing, analysis and reporting of test results as per NABL guidelines.

Candidates gained clear knowledge on how reduction in carbon foot prints is linked with reduction in power consumption which further causes reduction in demand of power and automatically reduces demand for fossil fuels (coal) which helps in saving the environment. Thus, clear understanding was given on natural philosophy of engineering including mathematical and scientific knowledge constituting the pure theory of engineering operations and philosophy of maintenance and attitude.

### **Demonstrations on testing of Submersible Pump sets by the following:**

Mr. Govind zala (External),  
Mr. Arvind Sotha and Mr Ranadeep Karmakar (Internal)

Candidates were explained about the methodology of interpretation of Indian standards on submersible pump sets with other relevant references of main specification and amendments.

They were introduced to test systems, equipments, instruments & test setup required for performing the tests.

Basic knowledge was given on operation of instruments as per standard operating procedure (SOP) and conducting analysis as per standard operating test procedures (SOTP). They were made well versed with instrumental analysis to obtain quantitative scientific data, spread sheets and graphs. They were given exposure to sequential type tests & D-section of products

Trainees were evaluated for competency on the basis of everyday interactions with them on learning capabilities, ability for working in groups, capacity of performing the tests independently and presentation of conclusion of test results with remarks.



### **Faculty members invited to give exposure to entrepreneurship:**

1. Mr. Chandramauli Pathak
2. Mr. Kashyap Vachcharajani (Expert on finances for startups)

Presentation on consumer complaints and role of CERC was given by the Complaints department and presentation on Misleading Advertisements was given by Education & Research Department.

## Visit to Kirloskar Brothers Ltd, Sanand on 23/1/2020

Candidates received very good exposure to the company which is completely running on solar plant (150Kw) with standby supply from UGVCL. Pump sets manufactured in this unit have sizes ranging from 3inch to 10inch (V3 to V10).



The company uses bi-directional meter. Solar energy is used for running all the automatic machines. When machines do not run, stored energy goes to UGVCL. For running the plant they have used IGBT Inverter (DC-AC). [Inverter ratings are 50KW (2 no) and 30 KW of (1 no)]. Inverter has inbuilt harmonic filters to maintain harmonic losses within +5%. It is automated unit with comparatively low noise.

They have ISO, ISCE certification and Green Co. Award (for adopting solar and LED Lighting). They also have energy conservation awards from last 3 years for achieving excellence in sustainability. (2014-15, 2015-16, 2016-17). They are assembling solar pump sets. For testing of solar pumps, separate solar panel of 15 KW capacities is used.

Trainees learnt the construction of motor supplied with electrical power and motor supplied with solar power.

All trainees were shown CED Department (Cathode Electro Deposition Process). Rotors used in Kirloskar motors are electroplated by cathode electro deposition

process which was very interesting. Rotor is degreased 3 times in ion-phosphate solution. Then it is dipped in distilled water when DC supply is given from cathode to Anode and base coating is done on rotor. For rotors, they have huge vertical storage device manufactured by Kardex Remster.

## Visit to M/S LA-GAJJAR MACHINERIES PVT. LTD. ON 20-1-2020

Visited three different factories of LA-GAJJAR. One for V6 pump sets (Agricultural Application), second for magnet based motors for solar pump sets and third for domestic pump sets (V3 & V4 type). Company follows 5-S system in their manufacturing process. [SORT: when in doubt, move it out, SET in order - place for everything in its place, SHINE: Clean and inspect or inspect through cleaning, STANDARDISE: Make rules, follow these and enforce them, SUSTAIN: Make it as part of daily work and it becomes a habit].



Trainees learnt the detailed manufacturing process of energy efficient submersible pump sets. They also had interactions with factory officers on quality aspects maintained at factory level.

### Site 1: Visit to factory at Amraiwadi

Trainees gained detailed knowledge on manufacturing process for rotors used in V6 pump sets. They learnt about rotor stamping process, bracing of coil fixture, balancing of rotor (Brass ring application), polishing and finishing (Inner & Outer) with rough file, shot blasting of rotor shaft, powder coated painting process, oven heating at 90 degree Centigrade for drying the coating and final balancing (with drilling management). They also gained knowledge on manufacturing process of stator used in V6 pump sets. They learnt about stamping process for stator (24 slots & 0.5 mm thickness), welding process for stamping [MIG welding (metal Inert Gas)], finishing of stator slots with filing process, buffing and cleaning process of stator body, inserting of slot paper in stator slots, winding of motor (manual process), crimping of winding wires with monoplast, omega and PVC tape. All were shown the assembling of motor body with fitting process of upper & lower housing after insertion of rotor and fitting of bearing with segment (4 segment carbon-Pressure cup, oil seal, upper cap, flange and circlip process).

### Site 2: Solar Panel on Roof top:

Manufacturing of solar based pump sets with Magnet based motor (BLDC - Brush Less DC motors) was explained.

Magnet is imported from TAIWAN for motor PMSM (permanent Magnet synchronous Motor). PV cells are manufactured as per European Standards which gives best Performance at 25+1 degrees Centigrade.

### Site 3: Visit to factory site at Rakhiyal

This factory is manufacturing stators. All candidates were shown the manufacturing process for stators including, filing process, ultrasonic cleaning process to remove burrs and slot paper filling/insertion. Manual winding process was shown with coil filling. Different machineries used in the factory were shown with processes like coil lapping process with starting and running coil machine, slot paper inserting machine, shaping machine, lacing machine, crimping machine, Panel for final testing to check the quality of winding, winding resistance, IR, Surge test etc. Varnish process on winding, Heating in oven at temp of 150 to 175 degrees centigrade C (10 min), cable checking area, Epoxy mixing area, stacking press area, Rotor press area, oil filled area (V4 motor), oil seal process, air leakage tester and Cable fitting.

### Visit to MBH Pumps (Guj) Pvt. Ltd on 24/01/2020

MBH pumps are manufactures of wide varieties of pump sets including domestic and industrial pumps (Monoset, Borewell, Open well & Industrial). During the visit, Candidates were explained about LEAN manufacturing practices adopted by factory. They have 170 pump sets models with five star labeling. They are regularly supplying industrial pump sets to BHEL, Reliance, NTPL and Govt. of Gujarat. Radial pump models of the factory are widely sold in north Gujarat & mixed flow pump set in South Gujarat



Trainees were explained about stampings, spray gun painting, stator press, lamination ring, welding, lathe machine finishing, cable joining in stator area, rotor pressing & brazing, machining, filing, grinding, assembling & testing in rotor area.



### Visit to Sabar engineering pvt.ltd on 11/02/2020

Sabar engineering manufactures three phase squirrel cage induction motors used in air compressors, textile, pharmaceuticals and chemical machineries, cranes & hoists, blowers material handling equipments, geared motors etc. Hence, visit to this factory was a great learning experience to candidates on induction motors with rating of 0.37KW to 22KW.

Trainees were shown FIFO system (First in First out) followed by QC/QA department for selection of all types of raw materials including rubber, paints, varnishes, silicon stampings etc used for manufacturing of energy efficient sustainable motors. They were explained about the operation of automatic milling machine (software programmed) used for preparing key way in rotor and operation of CNC machines used for finishing of all

components of rotor. They learnt the best practices followed for manufacturing of motors such as use of class F insulation system, IP55 protection, use of pre-lubricated bearings, rotor designing with rectangular fins for heat dissipation & circular fins for balancing, use of external bidirectional centrifugal fan conforming to the requirements of IS 6362 & IEC 60031-6 respectively.



### Visit to waterman industries Pvt. Ltd. on 05/03/2020

Waterman Industries is India's first pump manufacturing company to receive ZED MARK (zero defect zero effect) certificate with silver rating. During visit, candidates were shown all sections including purchase, design, quality, store and complete factory premises. They were explained about quality management system of factory [as per ISO 9001- 2015, ISO 14001-2015 and BS OHSAS 18001-2007] and SHEQ policy observed by company on conservation of energy & natural resources, raw material, use of efficient & environment friendly technology, wherever possible and effective waste management.

### Final evaluation

Trainees were assessed for skills acquired by them through written test (100 marks) and practical of 100 marks (75 marks of practical & 25 marks of Viva - Voce). Final evaluation of candidates was made on the basis of assessment criteria for level 6 NSQF qualifications.

Successful candidates were awarded with certificates during valedictory function held at AMA (Ahmedabad management association) hall on 06-03-2020.

### Career counseling and placement of candidates:

A placement brochure was prepared with the detailed bio-data of all the trainees and it was circulated to prospective employers such as medium and small scale industries.

Career counseling sessions were held on professionalism and ethics, interpersonal interactions, quality consciousness, accountability and needs of industry for competence levels with professional skills and leadership qualities.

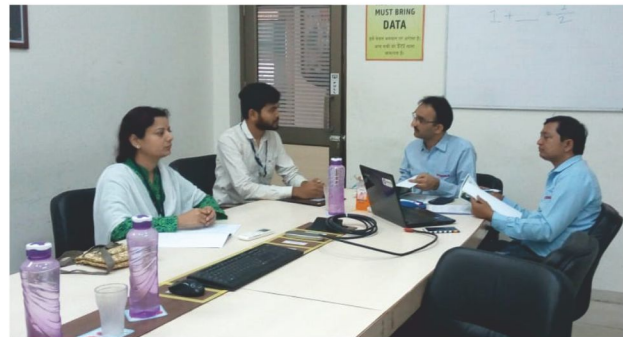
For giving opportunities and experience of company interviews, HR departments of following companies were requested.

1. MBH pumps (Guj) Pvt.Ltd.
2. Bhagvati industries, Ahmedabad
3. LA-GAJJAR machineries Pvt. Ltd. Ahmedabad.
4. Kirloskar Brothers Ltd, Sanand.
5. Service center of L & T, Ahmedabad.
6. Nirma industries, Ahmedabad.
7. Royal electricals, Surat.
8. Angel pumps, Rajkot.
9. Waterman industries Pvt.Ltd, Changodar.

More than 60 member companies under Indian pumps manufacturing association were requested to provide interview opportunities to candidates.

Interviews of candidates were conducted by following companies:

1. Angel pumps, Rajkot on 15/2/20.
2. Kirloskar Brothers Ltd on 4/3/20 at CERC campus.
3. Waterman industries Pvt.Ltd. Ahmedabad on 05/03/20.
4. Service stations of L&T, Ahmedabad on 05/03/20.



### Success Stories:

11 candidates successfully completed the course and awarded with Certificates. Following

#### Nine candidates got job in following companies:

- 1 Trainee Joined as an electrical O&M Engineer in solar power plant at MES, INS Valsura, Jamnagar
- 1 Trainee Placed SKH Y-TEC Pvt. LTD as Operational Engineer Trainee (OET)
- 1 Trainee Placed at Yazaki India Pvt Ltd. as Diploma Engineering Trainee
- 1 Trainee Placed as switch board operator in Lajai 66kv substation at Antique power limited
- 1 trainee employed in Indian Oil Corporation as Technical Apprentice at Gujarat Refinery
- 1 trainee selected by WATAIR consultancy Firm
- 1 trainee placed with Maxxis Rubber Industry Pvt Ltd as Assistant Executive.
- 1 trainee placed with Shreenathji Electricals and Infrastructure, Bhavnagar
- 1 trainee joined his batch mate's startup company named D Solutions Pvt. Ltd

#### Start-up

1 Trainee has started Start up named D Solutions Pvt Ltd

#### Higher Studies

1 Trainee has cleared GATE exam for Master Degree.

## Testimonials

- Through this course I learnt more about BIS standards and performed many test on Pumpsets, Lighting appliances and other home appliances for their eco friendliness.

- Sunil Tareteeya

- Such a good Platform created by MoEF&CC which bridges the reference book knowledge of students to industry requirements for sustainable development. At CERC, I learnt more about submersible pumps, Importance of calibration, safety requirements, design considerations of motor for better efficiency etc. Thank you.

- Vatsalkumar Prajapati

- I got to learn new things such as star labelling, about BIS and BEE, Environmental criteria for energy efficient appliances etc. I had an opportunity to visit a number of industries, wherein i gained practical knowledge and got to know more about industrial processes.

- Pal Dhiraj RamewshwarBhai





CERC-ENVIS RP team, Faculties and CERC Staff along with GSDP trainees  
(2019-2020 Batches)

The Environmental Information System acronymed as ENVIS was implemented by the Ministry of Environment & Forests by end of 6th Five Year Plan as a Plan Scheme for environmental information collection, collation, storage, retrieval and dissemination to policy planners, decision makers, scientists and environmentalists, researchers, academicians and other stakeholders.

The Ministry of Environment and Forests has identified Consumer Education and Research Centre (CERC), Ahmedabad, as one of the Resource Partners to collect and disseminate information on "Environment Literacy - Eco-labelling and Eco-friendly Products". The main objective of this ENVIS Resource Partner is to disseminate information on Eco products, International, and National Eco labeling programmes.

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**Write to us: We value your views and suggestions. Please send your feedback on this issue. We would also like to invite your contributions on the Eco Product and Eco Labelling.**

#### Disclaimer

**The material used in this newsletter does not necessarily represent the views of CERC or ENVIS.**

#### Printing

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