# LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

## JOB ROLE: Lineman Distribution

**(QUALIFICATION PACK: Ref. Id. PSS/ Q 0102)**

## SECTOR: Power

## Classes 11 and 12

**PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION**

**(a constituent unit of NCERT, under MHRD, Government of India)**

**Shyamla Hills, Bhopal- 462 002, M.P., India**

**http://www.psscive.ac.in**

# Gandhiji's Talisman

*I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test:*

*Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it? Will it restore him to a control over his own life and destiny? In other words, will it lead to Swaraj for the hungry and spiritually starving millions?*

*Then you will find your doubts and your self melting away.*

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**Power- Lineman Distribution**

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# FOREWORD

The Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE) a constituent of the National Council of Educational Research and Training (NCERT) is spearheading the efforts of developing learning outcome based curricula and courseware aimed at integrating both vocational and general qualifications to open pathways of career progression for students. It is a part of Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education (CSSVSHSE) launched by the Ministry of Human Resource Development, Government of India in 2012. The PSS Central Institute of Vocational Education (PSSCIVE) is developing curricula under the project approved by the Project Approval Board (PAB) of *Rashtriya Madhyamik Shiksha Abhiyan* (RMSA). The main purpose of the competency based curricula is to bring about the improvement in teaching-learning process and working competences through learning outcomes embedded in the vocational subject.

It is a matter of great pleasure to introduce this learning outcome based curriculum as part of the vocational training packages for the job role of **Lineman Distribution**. The curriculum has been developed for the secondary students of vocational education and is aligned to the National Occupation Standards (NOSs) of a job role identified and approved under the National Skill Qualification Framework (NSQF).

The curriculum aims to provide children with employability and vocational skills to support occupational mobility and lifelong learning. It will help them to acquire specific occupational skills that meet employers' immediate needs. The teaching process is to be performed through the interactive sessions in classrooms, practical activities in laboratories and workshops, projects, field visits, and professional experiences.

The curriculum has been developed and reviewed by a group of experts and their contributions are greatly acknowledged. The utility of the curriculum will be adjudged by the qualitative improvement that it brings about in teaching-learning. The feedback and suggestions on the content by the teachers and other stakeholders will be of immense value to us in bringing about further improvement in this document.

Hrushikesh Senapaty
*Director*
*National Council of Education Research and Training*

# PREFACE

India today stands poised at a very exciting juncture in its saga. The potential for achieving inclusive growth are immense and the possibilities are equally exciting. The world is looking at us to deliver sustainable growth and progress. To meet the growing expectations, India will largely depend upon its young workforce. The much-discussed demographic dividend will bring sustaining benefits only if this young workforce is skilled and its potential is channelized in the right direction.

In order to fulfil the growing aspirations of our youth and the demand of skilled human resource, the Ministry of Human Resource Development (MHRD), Government of India introduced the revised Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education that aims to provide for the diversification of educational opportunities so as to enhance individual employability, reduce the mismatch between demand and supply of skilled manpower and provide an alternative for those pursuing higher education. For spearheading the scheme, the PSS Central Institute of Vocational Education (PSSCIVE) was entrusted the responsibility to develop learning outcome based curricula, student workbooks, teacher handbooks and e-learning materials for the job roles in various sectors, with growth potential for employment.

The PSSCIVE firmly believes that the vocationalisation of education in the nation need to be established on a strong footing of philosophical, cultural and sociological traditions and it should aptly address the needs and aspirations of the students besides meeting the skill demands of the industry. The curriculum, therefore, aims at developing the desired professional, managerial and communication skills to fulfil the needs of the society and the world of work. In order to honour its commitment to the nation, the PSSSCIVE has initiated the work on developing learning outcome based curricula with the involvement of faculty members and leading experts in respective fields. It is being done through the concerted efforts of leading academicians, professionals, policy makers, partner institutions, Vocational Education and Training experts, industry representatives, and teachers. The expert group through a series of consultations, working group meetings and use of reference materials develops a National Curriculum. Currently, the Institute is working on developing curricula and courseware for over 100 job roles in various sectors.

We extend our gratitude to all the contributors for selflessly sharing their precious knowledge, acclaimed expertise, and valuable time and positively responding to our request for development of curriculum. We are grateful to MHRD and NCERT for the financial support and cooperation in realising the objective of providing learning outcome based modular curricula and courseware to the States and other stakeholders under the PAB (Project Approval Board) approved project of *Rashtriya Madhyamik Shiskha Abhiyan* (RMSA) of MHRD.

Finally, for transforming the proposed curriculum design into a vibrant reality of implementation, all the institutions involved in the delivery system shall have to come together with a firm commitment and they should secure optimal community support. The success of this curriculum depends upon its effective implementation and it is expected that the managers of vocational education and training system, including subject teachers will make efforts to create better facilities, develop linkages with the world of work and foster a conducive environment as per the content of the curriculum document.

The PSSCIVE, Bhopal remains committed in bringing about reforms in the vocational education and training system through the learner-centric curricula and courseware. We hope that this document will prove useful in turning out more competent Indian workforce for the 21st Century.

RAJESH P. KHAMBAYAT
*Joint Director*
*PSS Central Institute of Vocational Education*

# ACKNOWLEDGEMENTS

On behalf of the team at the PSS Central Institute of Vocational Education (PSSCIVE) we are grateful to the members of the Project Approval Board (PAB) *of Rashtriya Madhyamik Shiksha Abhiyan* (RMSA) and the officials of the Ministry of Human Resource Development (MHRD), Government of India for the financial support to the project for development of learning outcome based curricula.

We are grateful to the Director, NCERT for his support and guidance. We also acknowledge the contributions of our colleagues at the Technical Support Group of RMSA, MHRD, RMSA Cell at the National Council of Educational Research and Training (NCERT), National Skill Development Agency (NSDA), National Skill Development Corporation (NSDC) and Power sector Skill Council of India (ASCI) for their academic support and cooperation.

We are grateful to the expert contributors and reviewers for their earnest effort and contributions in the development of this learning outcome based curriculum. Their names are acknowledged in the list of contributors and reviewers.

The contributions made by Vinay Swarup Mehrotra, Professor and Head, Curriculum Development and Evaluation Centre (CDEC) and Vipin Kumar Jain, Associate Professor and Head, Programme Planning and Monitoring Cell (PPMC), Dr. Dipak Shudhalwar, Associate Professor (CSE) and Head, Computer Centre, PSSCIVE in development of the curriculum for the employability skills are duly acknowledged.

We are also grateful to the Course Coordinator Prof. Saurabh Prakash, Professor & Head, Department of Engineering & Technology for development of the curriculum.

The contribution of Mr. Gaurav Kathel, Consultant is duly acknowledged.

**PSSCIVE Team**

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# 1. COURSE OVERVIEW

**COURSE TITLE: Power: Lineman Distribution**

**A** incumbent in this job will replace and maintain steel, wood, laminate and concrete poles, structures and other related hardware. They install, maintain and repair overhead and underground power lines and cables, and other associated equipment such as insulators, conductors, lightning arrestors, switches, metering systems, transformers and lighting systems. They attend to customer breakdown complaints and requests, releasing and restoring connections. They also attend to street lighting maintenance.

**COURSE OUTCOMES:** On completion of the course, student should be able to:

- ☐ Apply effective oral and written communication skills to interact with people and customers;
- ☐ Identify the principal components of a computer system;
- ☐ Demonstrate the basic skills of using computer;
- ☐ Demonstrate self-management skills;
- ☐ Demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities;
- ☐ Demonstrate the ability of laying the electricity distribution line.
- ☐ Change, remove and Install line.
- ☐ Identification and fault rectification in distribution line.
- ☐ Cable connection of distribution line.
- ☐ Skills of Electrical Safety
- ☐ Identifying the important joints locations in field
- ☐ Reading of CAD drawing of distribution line

**COURSE REQUIREMENTS:** The learner should have the basic knowledge of science.

**COURSE LEVEL:** This is a Intermediate level course. On completion of this course, a student can take up diploma and degree level course for a job role in Power sector.

**COURSE DURATION:** **600 hrs**

| | | |
|---|---|---|
| Class 11 | : | 300 hrs |
| Class 12 | : | 300 hrs |
| **Total** | **:** | **600 hrs** |

# 2. SCHEME OF UNITS AND ASSESSMENT

This course is a planned sequence of instructions consisting of Units meant for developing employability and vocational competencies of students of Class 11 and 12 opting for vocational subject along with general education subjects.

The unit-wise distribution of hours and marks for Class 11 is as follows:

| CLASS 11 | | | |
|---|---|---|---|
| | **Units** | **No. of Hours for Theory and Practical 300** | **Max. Marks for Theory and Practical 100** |
| **Part A** | **Employability Skills** | | |
| | Unit 1 : Communication Skills-III | 25 | **10** |
| | Unit 2 : Self-management Skills-III | 25 | |
| | Unit 3 : Information and Communication Technology Skills-III | 20 | |
| | Unit 4 : Entrepreneurial Skills-III | 25 | |
| | Unit 5 : Green Skills-III | 15 | |
| | **Total** | **110** | **10** |
| **Part B** | **Vocational Skills** | | |
| | Unit 1:Basic Electricity-I | 50 | 40 |
| | Unit 2:Handling tools and equipment's | 25 | |
| | Unit 3: Electrical wiring components and accessories | 40 | |
| | Unit 4:Repair and maintenance of Power Distribution lines | 50 | |
| | **Total** | **165** | **40** |
| **Part C** | **Practical Work** | | |
| | Practical Examination | 06 | 15 |
| | Written Test | 01 | 10 |
| | Viva Voce | 03 | 10 |
| | **Total** | **10** | **35** |
| **Part D** | **Project Work/Field Visit** | | |
| | Practical File/Student Portfolio | 10 | 10 |
| | Viva Voce | 05 | 05 |
| | **Total** | **15** | **15** |
| | **Grand Total** | **300** | **100** |

The unit-wise distribution of hours and marks for Class 12 is as follows:

| CLASS 12 | | | |
|---|---|---|---|
| | **Units** | **No. of Hours for Theory and Practical 300** | **Max. Marks for Theory and Practical 100** |
| **Part A** | **Employability Skills** | | |
| | Unit 1 : Communication Skills-IV | 25 | **10** |
| | Unit 2 : Self-management Skills-IV | 25 | |
| | Unit 3 : Information and Communication Technology Skills-IV | 20 | |
| | Unit 4 : Entrepreneurial Skills-IV | 15 | |
| | Unit 5 : Green Skills-IV | 15 | |
| | **Total** | **110** | **10** |
| **Part B** | **Vocational Skills** | | |
| | Unit 1: Basic Electricity-II | 30 | 40 |
| | Unit 2: Observe the Operation and Maintenance of 11/0.433 kV Distribution substation | 50 | |
| | Unit 3: Safety Precautions for electrical work | 25 | |
| | Unit 4: Workplace Management, Safety and Health | 60 | |
| | **Total** | **165** | **40** |
| **Part C** | **Practical Work** | | |
| | Practical Examination | 06 | 15 |
| | Written Test | 01 | 10 |
| | Viva Voce | 03 | 10 |
| | **Total** | **10** | **35** |
| **Part D** | **Project Work/Field Visit** | | |
| | Practical File/Student Portfolio | 10 | 10 |
| | Viva Voce | 05 | 05 |
| | | **15** | **15** |
| | **Total** | **300** | **100** |

# 3. TEACHING/TRAINING ACTIVITIES

The teaching and training activities have to be conducted in classroom, laboratory/ workshops and field visits. Students should be taken to field visits for interaction with experts and to expose them to the various tools, equipment, materials, procedures and operations in the workplace. Special emphasis should be laid on the occupational safety, health and hygiene during the training and field visits.

### CLASSROOM ACTIVITIES

Classroom activities are an integral part of this course and interactive lecture sessions, followed by discussions should be conducted by trained vocational teachers. Vocational teachers should make effective use of a variety of instructional or teaching aids, such as audio-video materials, colour slides, charts, diagrams, models, exhibits, hand-outs, online teaching materials, etc. to transmit knowledge and impart training to the students.

### PRACTICAL WORK IN LABORATORY/WORKSHOP

Practical work may include but not limited to hands-on-training, simulated training, role play, case based studies, exercises, etc. Equipment and supplies should be provided to enhance hands-on learning experience of students. Only trained personnel should teach specialized techniques. A training plan that reflects tools, equipment, materials, skills and activities to be performed by the students should be submitted by the vocational teacher to the Head of the Institution.

### FIELD VISITS/ EDUCATIONAL TOUR

In field visits, children will go outside the classroom to obtain specific information from experts or to make observations of the activities. A checklist of observations to be made by the students during the field visits should be developed by the Vocational Teachers for systematic collection of information by the students on the various aspects. Principals and Teachers should identify the different opportunities for field visits within a short distance from the school and make necessary arrangements for the visits. At least three field visits should be conducted in a year.

# 4. ASSESSMENT AND CERTIFICATION

Upon successful completion of the course by the candidate, the Central/ State Examination Board for Secondary Education and the respective Sector Skill Council will certify the competencies. The National Skills Qualifications Framework (NSQF) is based on outcomes referenced to the National Occupation Standards (NOSs), rather than inputs. The NSQF level descriptors, which are the learning outcomes for each level, include the process, professional knowledge, professional skills, core skills and responsibility. The assessment is to be undertaken to verify that individuals have the knowledge and skills needed to perform a particular job and that the learning programme undertaken has delivered education at a given standard. It should be closely linked to certification so that the individual and the employer could come to know the competencies acquired through the vocational subject or course. The assessment should be reliable, valid, flexible, convenient, cost effective and above all it should be fair and transparent. Standardized assessment tools should be used for assessment of knowledge of students. Necessary arrangements should be made for using technology in assessment of students.

### KNOWLEDGE ASSESSMENT (THEORY)

**Knowledge Assessment** should include two components: one comprising of internal assessment and second an external examination, including theory examination to be conducted by the Board. The assessment tools shall contain components for testing the

knowledge and application of knowledge. The knowledge test can be objective paper based test or short structured questions based on the content of the curriculum.

**WRITTEN TEST**

It allows candidates to demonstrate that they have the knowledge and understanding of a given topic. Theory question paper for the vocational subject should be prepared by the subject experts comprising group of experts of academicians, experts from existing vocational subject experts/teachers, and subject experts from university/colleges or industry. The respective Sector Skill Council should be consulted by the Central/State Board for preparing the panel of experts for question paper setting and conducting the examinations.

The blue print for the question paper may be as follows:

**Duration: 3 hrs** **Max. Mark: 30**

| | | No. of Questions | | | |
|---|---|---|---|---|---|
| **S.No.** | **Typology of Question** | **Very Short Answer (1 mark)** | **Short Answer (2 Marks)** | **Long Answer (3 Marks)** | **Marks** |
| 1. | Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information) | **2** | **1** | **2** | **10** |
| 2. | Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information) | **1** | **2** | **2** | **11** |
| 3. | Application – (Use abstract information in concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, private an example, or solve a problem) | **0** | **1** | **1** | **05** |
| 4. | High Order Thinking Skills – (Analysis & Synthesis – Classify, compare, contrast, or differentiate between different pieces of information; Organize and/ or integrate unique pieces of information from a variety of sources) | **0** | **1** | **0** | **02** |

| | | | | | |
|---|---|---|---|---|---|
| 5. | Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values) | **0** | **1** | **0** | **02** |
| | **Total** | **3x1=3** | **6x2=12** | **5x3=15** | **30**<br>**(14 questions)** |

## SKILL ASSESSMENT (PRACTICAL)

Assessment of skills by the students should be done by the assessors/examiners on the basis of practical demonstration of skills by the candidate, using a competency checklist. The competency checklist should be developed as per the National Occupation Standards (NOSs) given in the Qualification Pack for the Job Role to bring about necessary consistency in the quality of assessment across different sectors and Institutions. The student has to demonstrate competency against the performance criteria defined in the National Occupation Standards and the assessment will indicate that they are 'competent', or are 'not yet competent'. The assessors assessing the skills of the students should possess a current experience in the industry and should have undergone an effective training in assessment principles and practices. The Sector Skill Councils should ensure that the assessors are provided with the training on the assessment of competencies.

Practical examination allows candidates to demonstrate that they have the knowledge and understanding of performing a task. This will include hands-on practical exam and viva voce. For practical, there should be a team of two evaluators – the subject teacher and the expert from the relevant industry certified by the Board or concerned Sector Skill Council. The same team of examiners will conduct the viva voce.

**Project Work** (individual or group project) is a great way to assess the practical skills on a certain time period or timeline. Project work should be given on the basis of the capability of the individual to perform the tasks or activities involved in the project. Projects should be discussed in the class and the teacher should periodically monitor the progress of the project and provide feedback for improvement and innovation. Field visits should be organised as part of the project work. Field visits can be followed by a small-group work/project work. When the class returns from the field visit, each group might be asked to use the information that they have gathered to prepare presentations or reports of their observations. Project work should be assessed on the basis of practical file or student portfolio.

**Student Portfolio** is a compilation of documents that supports the candidate's claim of competence. Documents may include reports, articles, photos of products prepared by students in relation to the unit of competency.

**Viva voce** allows candidates to demonstrate communication skills and content knowledge. Audio or video recording can be done at the time of viva voce. The number of external examiners would be decided as per the existing norms of the Board and these norms should be suitably adopted/adapted as per the specific requirements of the vocational subject. Viva voce should also be conducted to obtain feedback on the student's experiences and learning during the project work/field visits.

### CONTINUOUS AND COMPREHENSIVE EVALUATION

Continuous and Comprehensive Evaluation (CCE) refers to a system of school-based evaluation of students that covers all aspects of student's development. In this scheme, the term `continuous' is meant to emphasize that evaluation of identified aspects of students `growth and development' is a continuous process rather than an event, built into the total teaching-learning process and spread over the entire span of academic session. The second term `comprehensive' means that the scheme attempts to cover both the scholastic and the co-scholastic aspects of students' growth and development. For details, the CCE manual of Central Board of Secondary Education (CBSE) or the guidelines issued by the State Boards on the procedure for CCE should be followed by the Institutions.

# 5. UNIT CONTENTS

## CLASS 11

## Part A: Employability Skills

| S.No. | Units | Duration (Hrs) |
|---|---|---|
| 1. | Communication Skills – III | 25 |
| 2. | Self-management Skills – IIII | 25 |
| 3. | Information and Communication Technology Skills- III | 20 |
| 4. | Entrepreneurial Skills – III | 25 |
| 5. | Green Skills – III | 15 |
| | **Total** | **110** |

### Unit 1: Communication Skill – III

| Learning Outcome | Theory (10 hrs) | Practical (15 hrs) | Duration (25 Hrs) |
|---|---|---|---|
| **1. Demonstrate knowledge of various methods of communication** | 1. Methods of communication<br>2. Verbal<br>3. Non-verbal<br>4. Visual | 1. Writing pros and cons of written, verbal and non-verbal communication<br>2. Listing do's and don'ts for avoiding common body language mistakes | **05** |
| **2. Identify specific communication styles** | 1. Communication styles- assertive, aggressive, passive-aggressive, submissive, etc. | 1. Observing and sharing communication styles of friends, teachers and family members and adapting the best practices<br>2. Role plays on communication styles. | **10** |

| | | | |
|---|---|---|---|
| **3. Demonstrate basic writing skills** | 1. Writing skills to the following:<br>• Sentence<br>• Phrase<br>• Kinds of Sentences<br>• Parts of Sentence<br>• Parts of Speech<br>• Articles<br>• Construction of a Paragraph | 1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject | **10** |
| **Total** | | | **25** |

## Unit 2: Self-management Skills – III

| Learning Outcome | Theory (10 hrs) | Practical (15 hrs) | Duration (25 Hrs) |
|---|---|---|---|
| **1. Demonstrate impressive appearance and grooming** | 1. Describe the importance of dressing appropriately, looking decent and positive body language<br>2. Describe the term grooming<br>3. Prepare a personal grooming checklist<br>4. Describe the techniques of self- exploration | 1. Demonstration of impressive appearance and groomed personality<br>2. Demonstration of the ability to self- explore | **10** |
| **2. Demonstrate team work skills** | 1. Describe the important factors that influence in team building<br>2. Describe factors influencing team work | 1. Group discussion on qualities of a good team<br>2. Group discussion on strategies that are adopted for team building and team work | **10** |
| **3. Apply time management strategies and techniques** | 1 Meaning and importance of time management – setting and prioritizing goals, creating a schedule, making lists of tasks, balancing work | 1. Game on time management<br>2. Checklist preparation<br>3. To-do-list preparation | **05** |

| | | | |
|---|---|---|---|
| | and leisure, using different optimization tools to break large tasks into smaller tasks. | | |
| **Total** | | | **25** |

## Unit 3: Information and Communication Technology Skills - III

| Learning Outcome | Theory (08 hrs) | Practical (12 hrs) | Duration (20 Hrs) |
|---|---|---|---|
| **1. Create a document on word processor** | 1. Introduction to word processing.<br>2. Software packages for word processing.<br>3. Opening and exiting the word processor.<br>4. Creating a document | 1. Demonstration and practice of the following:<br>• Listing the features of word processing<br>• Listing the software packages for word processing<br>• Opening and exit the word processor<br>• Creating a document | **10** |
| **2. Edit, save and print a document in word processor** | 1. Editing text<br>2. Wrapping and aligning the text<br>3. Font size, type and face.<br>4. Header and Footer<br>5. Auto correct<br>6. Numbering and bullet<br>7. Creating table<br>8. Find and replace<br>9. Page numbering.<br>10. Printing document.<br>11. Saving a document in various formats. | 1. Demonstration and practising the following:<br>• Editing the text<br>• Word wrapping and alignment<br>• Changing font type, size and face<br>• Inserting header and footer<br>• Removing header and footer<br>1. Using autocorrect option<br>2. Insert page numbers and bullet<br>3. Save and print a document | **10** |
| **Total** | | | **20** |

## Unit 4: Entrepreneurial Skills – III

| Learning Outcome | Theory (10 hrs) | Practical (15 hrs) | Duration (25 Hrs) |
|---|---|---|---|
| **1. Describe the significance of entrepreneurial values and attitude** | 1. Values in general and entrepreneurial values<br>2. Entrepreneurial value orientation with respect to innovativeness, independence, | 1. Listing of entrepreneurial values by the students.<br>2. Group work on identification of entrepreneurial values and their roles after listing or reading 2-3 | **10** |

| | | | |
|---|---|---|---|
| | outstanding performance and respect for work | stories of successful entrepreneur<br>3. Exhibiting entrepreneurial values in Ice breaking, rapport building, group work and home assignments | |
| **2. Demonstrate the knowledge of attitudinal changes required to become an entrepreneur** | 1. Attitudes in general and entrepreneurial attitudes<br>2. Using imagination/ intuition<br>3. Tendency to take moderate risk<br>4. Enjoying freedom of expression and action<br>5. Looking for economic opportunities<br>6. Believing that we can change the environment<br>7. Analyzing situation and planning action<br>8. Involving in activity | 1. Preparing a list of factors that influence attitude in general and entrepreneurial attitude<br>2. Demonstrating and identifying own entrepreneurial attitudes during the following micro lab activities like thematic appreciation test<br>3. Preparing a short write-up on "who am I"<br>4. Take up a product and suggest how its features can be improved<br>5. Group activity for suggesting brand names, names of enterprises, etc. | **15** |
| **Total** | | | **25** |

## Unit 5: Green Skills – III

| Learning Outcome | Theory (07 hrs) | Practical (08 hrs) | Duration (15 Hrs) |
|---|---|---|---|
| **1. Describe importance of main sector of green economy** | 1. Main sectors of green economy- E-waste management, green transportation, renewal energy, green construction, water management<br>2. Policy initiatives for greening economy in India | 1. Preparing a poster on any one of the sectors of green economy<br>2. Writing a two-page essay on important initiatives taken in India for promoting green economy | **08** |

| | | | |
|---|---|---|---|
| **2. Describe the major green Sectors/Areas and the role of various stakeholder in green economy** | 1. Stakeholders in green economy<br>2. Role of government and private agencies in greening cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries | 1. Preparing posters on green Sectors/Areas: cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries | **07** |
| **Total** | | | **15** |

# 'Part B: Vocational Skills

| S.No. | Units | Duration (Hrs) |
|---|---|---|
| 1. | Basic Electricity-I | 50 |
| 2. | Handling tools and equipment's | 25 |
| 3. | Electrical wiring components and accessories | 40 |
| 4. | Repair and maintenance of Power Distribution lines | 50 |
| | **Total** | 165 |

## Unit 1: Basic Electricity-I

| Learning outcome | Theory | Practical | Duration |
|---|---|---|---|
| **1. Illustrate basic electricity generation concept** | 1. Origin of electricity<br>2. Importance of electricity<br>3. Generation of electricity | 1. List the sources of electricity<br>2. Draw a sketch to show how electricity is generated | **10** |
| **2. Describe basic units and definition of electricity** | 1. Electricity – concept and definition<br>2. Definition of voltage, current, resistance, capacitance and inductance<br>3. Understanding series and parallel connection.<br>4. Describe the ohm's law<br>5. Understand KVL and KCL by evaluating basic circuits containing resistor | 1. Identification of various electrical symbols.<br>2. Demonstration of ohm's law and do practice<br>3. Voltage and current measurement using multimeter<br>4. Identify conductors, resistors & insulators<br>5. Make a simple circuit with passive components and verify using multimeter | **10** |
| **3. Explain the concept of electrical power** | 1. Difference between power and energy<br>2. Power and energy | 1. Measure voltage and current using multimeter<br>2. Calculate the | **10** |

| | | | |
|---|---|---|---|
| **and energy** | calculation in DC and AC systems<br>3. Concept of power factor<br>4. Single and three phase system<br>5. Transmission of electricity at different voltage levels. | instantaneous power consumption<br>3. Calculate the real and reactive power from the power factor<br>4. Check the residential meter for instantaneous load | |
| **4. Explain the importance of earthing system** | 1. Earthing importance and types<br>2. Lightning arrester<br>3. Tools used for checking earth resistance | 1. Demonstrate the use of earth resistance meter<br>2. Measure the earth resistance | **10** |
| **Total** | | | **50** |

## Unit 2: Handling tools and equipment's

| Learning outcome | Theory | Practical | Duration |
|---|---|---|---|
| **1. Demonstrate electrical Hand Tools safely** | 1. Electrical hand tools – Pliers, screw drivers, connectors, hammers, tester, electrician knife, wire-stripper etc. their specifications-size and numbers<br>2. Various electrical hand tools<br>3. Safety precautions while using tools<br>4. Working of various hand tools and their use<br>5. State Specifications of tools | 1. Draw the sketches of electrical hand tools.<br>2. List out the various electrical hand tools<br>3. Demonstrate safety precautions while using tools<br>4. Select the appropriate hand tools for work<br>5. Perform the various operation using hand-tools safely<br>6. Visit to the market and note the brand of various electrical hand tools | **10** |
| **2. Measure electrical and electronic parameters accurately with precautions** | 1. Electronic Meter<br>2. Ammeter and Voltmeter:<br>3. Details of ammeter & voltmeter parts, working and operation<br>4. Practice safety precautions for different types of meters while using in circuits. | 1. List out various part of electronic meter<br>2. Identify and explain various parts of electronic meter<br>3. Demonstrate the connection to electronic meter, ammeter and voltmeter<br>4. Demonstrate the types and specification of different type of meter<br>5. Draw the wiring diagram of joints | **15** |
| **Total** | | | **25** |

| Unit 3: Electrical wiring components and accessories | | | |
|---|---|---|---|
| **Learning outcome** | **Theory** | **Practical** | **Duration** |
| **1. Identify and select the wiring materials and components** | 1. Wiring material<br>2. Application of wiring material<br>3. Electrical wiring accessories and their specifications<br>4. Material for PVC casing capping wiring<br>5. Material for PVC & MS conduit pipe wiring: Material for concealed wiring<br>6. CDP, ICTP, starters, distribution board | 1. Identify various wiring materials and different types of wires and their specification<br>2. List various wiring materials<br>3. Identify various wiring materials<br>4. Connect the accessories with the wires<br>5. Connect the different types of components with wires in a junction box | **10** |
| **2. Draw Wiring Circuits & fix wiring accessories on board.** | 1. Fix wiring accessories on board by screws<br>2. Series and parallel connections of lamp | 1. Fixing wiring accessories on board<br>2. circuit diagram of simple wiring<br>3. Draw circuit diagram of wiring<br>4. Check the connection of one lamp by one switch<br>5. Check the connection of lamps by one switch (series)<br>6. Check the connection of lamps by two switch (parallel)<br>7. Demonstrate and identify different types of wires and cables | **15** |
| **3. Describe the various types of cable joints** | 1. Need and importance of underground cable jointing procedure<br>2. Types of joints and their uses<br>3. Types of wires and cables<br>4. Specification of wires and cables,<br>5. Precautions while using various types of cables | 1. List out material and tools required for underground cable jointing<br>2. Demonstrate the skinning of the plastic covering of the cable<br>3. Prepare underground cable jointing, with crimping lug jointing etc.<br>4. Prepare a straight joint of 7/20 PVC wire<br>5. Prepare a "T" joint of 7/20 PVC wire<br>6. Prepare a Britannia joint of Bare copper conductor (overhead | **15** |

| | | | |
|---|---|---|---|
| | | line) | |
| **Total** | | | **40** |

| **Unit 4: Repair and maintenance of Power Distribution lines** | | | |
|---|---|---|---|
| **Learning outcome** | **Theory** | **Practical** | **Duration** |
| **1. Prepare for repair and maintenance of power distribution lines** | 1. Components of Distribution line<br>2. Tools to be used for repair and maintenance<br>3. Distribution line standards<br>4. identify various types of circuits<br>5. Distribution line assessment and inspection for maintenance and operations<br>6. Specific terminology used in Distribution Line work Terminology<br>7. Different types of material and accessories used in power Distribution<br>8. Permission for work permit | 1. Perform load checks to identify imbalanced and overloaded circuits<br>2. Trimming trees near poles<br>3. Conduct site inspection for emergency cases<br>4. Identify tools, equipment and instruments required<br>5. Handling of tools<br>6. Planning of repair procedure<br>7. Switching of the transformer<br>8. Visit to the repairing site and fault observation<br>9. List the procedure to obtain the work permit | **10** |
| **2. Operation/repair of Distribution line components** | 1. Troubleshooting and repair methods<br>2. Fault indication<br>3. Overhead distribution system apparatus<br>4. Overhead distribution system standards<br>5. Access points in distribution system<br>6. Ground distribution system apparatus<br>7. Causes of conductor damage<br>8. Aeolian vibration, sway oscillation, galloping, unbalanced loading<br>9. Over loading<br>10. Classification of conductor and insulator damage including fretting, abrasion, fatigue breaks, tensile breaks | 1. Identify which distribution line need repair<br>2. Identify the reasons for the fault<br>3. Find the section where fault has occurred<br>4. Observe the wire assembly<br>5. Observe the distribution line repairing process<br>6. Check if lines are properly aligned by tightening appropriate nuts and bolts<br>7. Ensure proper clearance of lowest conductor from ground<br>8. Ensure the insulators are of suitable capacity<br>9. Select and use test equipment such as tong | **20** |

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|---|---|---|---|
| | | testers/clip-on meter, meggers and voltmeters to verify fault and integrity<br>10. Isolate fault, damage or hazard<br>11. Repair conductor by splicing, jointing, using armor rods, line guards, vibration dampers<br>12. Restore the power to the customer | |
| **3. Maintenance of Distribution lines and components** | 1. Identify defects and take appropriate actions<br>2. Follow the laid down procedures observing safety<br>3. Follow maintenance schedule (annual, regular and preventive) | 1. Observe the restoration of the system to normal operating status by using switching procedures<br>2. Leave the work area in a safe and tidy condition<br>3. On completion of the repair and maintenance activities check for the unwanted things left on the site<br>4. Report the unsolved problems to the relevant authority<br>5. Monitor the problem and keep the supervisor informed about progress or any delays | **10** |
| **4. Operate different tools** | 1. Operation of different tools<br>2. Conductors<br>3. Insulators | 1. Use safety helmet, safety glove, safety shoe, climbing harness, lanyard and tool belt (when climbing), earth rod (discharge rod), Zola, safety rope<br>2. Observe or demonstrate the operation of different tools like gas cylinder, blower, clamping tools, cable jointing kit etc<br>3. Identify and observe the different types of conductors base on sizes, current carrying capacity,<br>4. Identify and observe the different types of Insulators such as Pin, Disc, shackle, Guy etc. | **10** |

| | | | |
|---|---|---|---|
| **Total** | | | **50** |

# CLASS 12

## Part A - Employability Skills

| S.No. | Units | Duration (Hrs) |
|---|---|---|
| 1. | Communication Skills – IV | 25 |
| 2. | Self-management Skills – IV | 25 |
| 3. | Information and Communication Technology Skills-IV | 20 |
| 4. | Entrepreneurial Skills – IV | 25 |
| 5. | Green Skills – IV | 15 |
| | **Total** | **110** |

### Unit 1: Communication Skills – IV

| Learning Outcome | Theory (10 hrs) | Practical (15 hrs) | Total Duration (25 Hrs) |
|---|---|---|---|
| **1. Describe the steps to active listening skills** | 1. Importance of active listening at workplace<br>2. Steps to active listening | 1. Demonstration of the key aspects of becoming active listener<br>2. Preparing posters of steps for active listening | **10** |
| **2. Demonstrate basic writing skills** | 2. Writing skills to the following:<br>• Sentence<br>• Phrase<br>• Kinds of Sentences<br>• Parts of Sentence<br>• Parts of Speech<br>• Articles<br>• Construction of a Paragraph | 1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject | **15** |
| **Total** | | | **25** |

### Unit 2: Self-management Skills – IV

| Learning Outcome | Theory (10 hrs) | Practical (15 hrs) | Total Duration |
|---|---|---|---|

| | | | |
|---|---|---|---|
| | | | **(25 Hrs)** |
| **1. Describe the various factors influencing self-motivation** | 1. Finding and listing motives (needs and desires);<br>**2.** Finding sources of motivation and inspiration (music, books, activities);expansive thoughts; living fully in the present moment; dreaming big | 1. Group discussion on identifying needs and desire<br>2. Discussion on sources of motivation and inspiration | **10** |
| **2. Describe the basic personality traits, types and disorders** | 1. Describe the meaning of personality<br>2. Describe how personality influence others<br>3. Describe basic personality traits<br>4. Describe common personality disorders-paranoid, antisocial, schizoid, borderline, narcissistic, avoidant, dependent and obsessive | 1. Demonstrate the knowledge of different personality types | **15** |
| **Total** | | | **25** |

## Unit 3: Information and Communication Technology Skills - IV

| Learning Outcome | Theory (10 hrs) | Practical (15 hrs) | Total Duration (25 Hrs) |
|---|---|---|---|
| **1. Perform tabulation using spreadsheet application** | 1. Introduction to spreadsheet application<br>2. Spreadsheet applications<br>3. Creating a new worksheet<br>4. Opening workbook and entering text<br>5. Resizing fonts and styles<br>6. Copying and moving<br>7. Filter and sorting<br>8. Formulas and | 1. Demonstration and practice on the following:<br>• Introduction to the spreadsheet application<br>• Listing the spreadsheet applications<br>• Creating a new worksheet<br>• Opening the workbook and enter text<br>• Resizing fonts and styles<br>• Copying and move the cell data<br>• Sorting and Filter the | **10** |

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| | functions<br>9. Password protection.<br>10. Printing a spreadsheet.<br>11. Saving a spreadsheet in various formats. | data<br>• Applying elementary formulas and functions<br>• Protecting the spreadsheet with password<br>• Printing a spreadsheet<br>• Saving the spreadsheet in various formats. | |
| **2. Prepare presentation using presentation application** | 1. Introduction to presentation<br>2. Software packages for presentation<br>3. Creating a new presentation<br>4. Adding a slide<br>5. Deleting a slide<br>6. Entering and editing text<br>7. Formatting text<br>8. Inserting clipart and images<br>9. Slide layout<br>10. Saving a presentation<br>11. Printing a presentation document. | 1. Demonstration and practice on the following:<br>• Listing the software packages for presentation<br>• Explaining the features of presentation<br>• Creating a new presentation<br>• Adding a slide to presentation.<br>• Deleting a slide<br>• Entering and edit text<br>• Formatting text<br>• Inserting clipart and images<br>• Sliding layout<br>• Saving a presentation<br>• Printing a presentation document | **15** |
| **Total** | | | **25** |

## Unit 4: Entrepreneurial Skills – IV

| Learning Outcome | Theory (10 hrs) | Practical (15 hrs) | Total Duration (25 Hrs) |
|---|---|---|---|
| **1. Identify the general and entrepreneurial behavioural competencies** | 1. Barriers to becoming entrepreneur<br>2. Behavioural and entrepreneurial competencies – adaptability/decisiveness, initiative/perseverance, interpersonal skills, organizational skills, stress management, valuing service and diversity | 1. Administering self- rating questionnaire and score responses on each of the competencies<br>2. Collect small story/ anecdote of prominent successful entrepreneurs<br>3. Identify entrepreneurial competencies reflected in each story and connect it to the definition of behavioural competencies<br>4. Preparation of competencies profile of students | **10** |

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| **2. Demonstrate the knowledge of self-assessment of behavioural competencies** | 1. Entrepreneurial competencies in particular: self - confidence, initiative, seeing and acting on opportunities, concern forquality, goal setting and risk taking, problem solving and creativity, systematic planning and efficiency, information seeking, persistence, influencing and negotiating, team building | 1. Games and exercises on changing entrepreneurial behaviour and development of competencies for enhancing self-confidence, problem solving, goal setting, information seeking, team building and creativity | **15** |
| **Total** | | | **25** |

## Unit 5: Green Skills – IV

| Learning Outcome | Theory (05 hrs) | Practical (10 hrs) | Total Duration (15 Hrs) |
|---|---|---|---|
| **1. Identify the role and importance of green jobs in different sectors** | 1. Role of green jobs in toxin-free homes,<br>2. Green organic gardening, public transport and energy conservation,<br>3. Green jobs in water conservation<br>4. Green jobs in solar and wind power, waste reduction, reuse and recycling of wastes,<br>5. Green jobs in green tourism<br>6. Green jobs in building and construction<br>7. Green jobs in appropriate technology<br>8. Role of green jobs in Improving energy and raw materials use<br>9. Role of green jobs in limiting greenhouse gas emissions<br>10. Role of green jobs minimizing waste and | 1. Listing of green jobs and preparation of posters on green job profiles<br>2. Prepare posters on green jobs. | **15** |

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|---|---|---|---|
| | pollution<br>11. Role of green jobs in protecting and restoring ecosystems<br>12. Role of green jobs in support adaptation to the effects of climate change | | |
| **Total** | | | **15** |

# Part B–Vocational Skills

| S.No. | Units | Duration (Hrs) |
|---|---|---|
| 1. | Basic Electricity-II | 30 |
| 2. | Observe the Operation and Maintenance of 11/0.433 kV Distribution substation | 50 |
| 3. | Safety Precautions for electrical work | 25 |
| 4. | Workplace Management, Safety and Health | 60 |
| | **Total** | **165** |

## Unit 1: Basic Electricity-II

| Learning outcome | Theory | Practical | Duration |
|---|---|---|---|
| **1. Describe basic electrical quantity** | 1. SI units Basic electrical quantity – current, voltage, resistance, load, energy power, work<br>2. Constant current source<br>3. Constant voltage source<br>4. Measuring instruments for electrical quantities<br>5. Importance and use of various electrical quantity | 1. Make list of the basic electrical quantity<br>2. List out and name the basic units of electrical quantity Identify and draw the symbols for each electrical quantity<br>3. Define the various electrical quantity<br>4. List out and name the measuring instruments required to measure the various electrical quantity | **10** |
| **2. Identify electronic components** | 1. Electronic components Types of components – active and passive components<br>2. Active components – current source, voltage source<br>3. Passive components – register, capacitor, inductor | 1. Identification of electronic components<br>2. Prepare a list the types of components<br>3. Identify the various types of register, capacitor and inductor<br>4. Identify electronic components in circuit<br>5. Identify the passive | **10** |

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|---|---|---|---|
| | 4. List and name the various active and passive components<br>5. Types and features of passive components I<br>6. Importance and use of electronic components Color codes for passive components | components by visual inspection<br>6. Identify and interpret the coded marking of colors on the registers | |
| **3. Draw and design basic circuits** | 1. Drawing of simple series & parallel circuits and symbols<br>2. Circuit types – series connection, parallel connection, series-parallel connection<br>3. Calculations of value of resistors in resistive circuits | 1. List the types of electrical circuits<br>2. Draw simple series & parallel circuits R<br>3. Reading of circuit diagram and prepare report<br>4. Calculate the value of passive components in series and parallel circuits. | **10** |
| **Total** | | | **30** |

| **Unit 2: Observe the Operation and Maintenance of 11/0.433 kV Distribution substation** | | | |
|---|---|---|---|
| **Learning outcome** | **Theory** | **Practical** | **Duration** |
| **1. Operation of 11/0.433 kV Distribution system** | 1. Government policies and regulations<br>2. Various components of the 11 kV power system<br>3. Components: e.g. transformers, Isolators, CTs, PTs, Circuit breakers, Las, etc.<br>4. Various types of Panels & Sub-station protection systems<br>5. Transformers part and their function<br>6. Specific health and safety precautions which must be taken when carrying out substation installation processes<br>7. Hazards associated with carrying out substation construction and installation | 1. List the job requirements as per the government policies and regulations<br>2. Observe the various components of the power system by visiting the 11 kV substation<br>3. List the materials required for the 11 kV installation<br>4. Observe the substation erection and installation work<br>5. Observe the operation of distribution transformer<br>6. Check the poles set to proper depth, and are properly aligned<br>7. Observe the erection of channel on the pole<br>8. Observe the fixing of lightning arrester<br>9. Check the installation of earth connection as | **25** |

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|---|---|---|---|
| | | per standard procedure<br>10. Observe the lifting of the transformer, to put it on the transformer bed in a safe and efficient manner<br>11. Observe the connection of low voltage cables | |
| **2. Maintenance of 11/0.433 kV Distribution system** | 1. Hazards: e.g. live wires and equipment, heavy objects, insects and reptiles,<br>2. Obstructions and blockages, sharp edges and equipment, etc.<br>3. Maintenance procedures<br>4. Importance of leaving the work area and equipment in a safe and clean<br>5. importance of reporting problems in a timely manner<br>6. calibration schedule of all equipment used in the construction and | 1. Check Oil level and ensure leakages<br>2. Check Oil BDV and acidity at regular intervals as per schedule and standard procedure<br>3. Checking for sludge, dust, dirt ,moisture ion in oil<br>4. Observe the cleaning bushings regularly and inspect for any cracks<br>5. Check, note and rectify dust & dirt deposition, salt or chemical deposition,<br>6. Check neutral grounding and ensure it is maintained as per standard<br>7. Periodically check for any loose connections of the terminations of HV & LV side | **25** |
| **Total** | | | **50** |

| **Unit 3: Safety Precautions for electrical work** | | | |
|---|---|---|---|
| **Learning outcome** | **Theory** | **Practical** | **Duration** |
| **1. Implement safety measures in workshop** | 1. Shop discipline<br>2. Safety precautions Electric<br>3. Explain safety precautions to be observed in electrical jobs or workshops<br>4. Shock – causes of electric shock, | 1. Visit a electrical workshop and observe the safety procedures followed<br>2. Prepare a list of emergency contact numbers<br>3. Demonstrate the procedure for separating a person from contact with live | **10** |

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|---|---|---|---|
| | 5. Artificial respiration | wire<br>4. Demonstrate CPR on a person<br>5. Demonstrate the use of First-aid | |
| **2. Demonstration of fire protection** | 1. Importance of fire extinguishers<br>2. Parts of fire extinguishers<br>3. Causes of fire, types of fire | 1. Identify the types and causes of fire<br>2. Identify the location of fire extinguishers fitted in schools<br>3. Draw the sketch of fire extinguishers uses<br>4. Operate various fire extinguishers<br>5. Watch a video on YouTube demonstrating the use of fire extinguishers | **15** |
| **Total** | | | **25** |

| **Unit 4: Workplace Management, Safety and Health** | | | |
|---|---|---|---|
| **Learning outcome** | **Theory** | **Practical** | **Duration** |
| **1. Describe the importance and need of workplace health & safety** | 1. How to maintain the work area safe and secure<br>2. Understanding safety policy<br>3. Types of fire extinguishers and techniques of using fire extinguishers<br>4. Handling procedure of hazardous chemicals<br>5. Reporting of incidents<br>6. Knowledge of ESD and handling of electronic components<br>7. Emergency procedures to be followed in the event of fire, accidents, etc.<br>8. Assess the involved risks at workplace | 1. Remove rings or any other metal objects before working on the unit<br>2. Demonstrate the use of fire extinguishers A, B, C and ABC<br>3. Demonstrate the use of first aid for electrical shock & burn victims<br>4. Demonstration of fire drills & evacuation procedures<br>5. Identify any hazardous materials or things found in the premises and report<br>6. Follow applicable local electrical codes and standards<br>7. Use methods to avoid the hazards associated with an | **20** |

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|---|---|---|---|
| | 9. Identify health issues at workplace<br>10. Identify the preventive measures to be taken<br>11. Understand the safety guidelines.<br>12. Advantages of safety guideline and follow them.<br>13. Procedure of applying the guidelines of safety | assembly process<br>8. Identification of materials used for safety.<br>9. Demonstrate the use of protective equipments<br>10. Report the history of the hazards hazards associated with the workplace | |
| **2. Describe the importance of personal safety** | 1. Need of personnel safety<br>2. Safety during the construction and installation of earthing and trenching<br>3. Personal protection equipment (PPE) like anti-static bands | 1. Demonstrate the safety procedure for construction and installation of earthing and trenching<br>2. Use the personal protection equipment like anti-static bands | **10** |
| **3. Maintaining good health and posture** | 1. Understanding health policy, posture, exercise & diet<br>2. How to handle hazardous materials, tools and equipment<br>3. Long term value of good posture and use of appropriate handling equipment | 1. Practice of sitting or standing posture for long period of time<br>2. Position and in handling heavy materials<br>3. Practice Yoga<br>4. Handle heavy materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders | **10** |
| **4. Manage workplace asset** | 1. Creating tool list & storage of tools<br>2. Procedure of calibrating measuring instruments<br>3. Managing tool crib library | 1. Identify tools<br>2. Calibrate measuring instruments<br>3. Cleaning of tools<br>4. Return the tools to the store after completion of work | **10** |
| **5. Identify the materials** | 1. Equipments and uses<br>2. Safety harness<br>3. Helmet<br>4. Gloves<br>5. Eye glasses earplugs<br>6. Nose mask etc.<br>7. Applications under | 1. Identification of of equipments like safety harness, helmet, gloves, eye glasses, earplugs, nose mask etc.<br>2. Demonstration of use | **10** |

| | | | |
|---|---|---|---|
| | different working condition | of equipments like safety harness, helmet, gloves, eye glasses, earplugs, nose mask etc. | |
| **Total** | | | **60** |

# 6. ORGANISATION OF FIELD VISITS

In a year, at least 3 field visits/educational tours should be organised for the students to expose them to the activities in the workplace.

Visit a distribution line, power substation, transmission line site, construction site. During the visit, students should obtain the following information from the Assistant engineer, supervisor and lineman of the centre.

1. Connection to the pole
2. Area under substation and its layout
3. Types of power cables
4. Type of connections
5. Methods of connecting and changing the cable
6. Fault identification and rectification of distribution line
7. Area required for the junction box installation
8. Mounting of the control panels
9. Wiring of the control panels
10. Connection of cable with the transformer
11. Types of joints in the cable
12. Procedure of fault checking
13. People and worker engaged

# 7. LIST OF EQUIPMENT AND MATERIALS

The list given below is suggestive and an exhaustive list should be prepared by the vocational teacher. Only basic tools, equipment and accessories should be procured by the Institution so that the routine tasks can be performed by the students regularly for practice and acquiring adequate practical experience.

1. Pliers
2. Screwdrivers and nut drivers
3. Wire strippers
4. Fishing tools
5. Voltmeter
6. Ammeter
7. Labelling machines

8. Power drills and drivers
9. Hammer/drills
10. Circuit Testers
11. Knife
12. Electrical Tape
13. Duct Tape
14. A Tool Pouch
15. Ladders and Step Stools
16. Allen Wrench Set (Hex Set)
17. Wire Crimpers
18. Non-contact Voltage Detector
19. Tester

# 8. VOCATIONAL TEACHER'S/ TRAINER'S QUALIFICATION AND GUIDELINES

Qualification and other requirements for appointment of vocational teachers/trainers on contractual basis should be decided by the State/UT. The suggestive qualifications and minimum competencies for the vocational teacher should be as follows:

| S.No. | Qualification | Minimum Competencies | Age Limit |
|---|---|---|---|
| **1.** | B. Tech in Electrical Engineering from a recognized Institute /University, with at least 1 year work/teaching experience<br>or<br>Diploma in Electrical Engineering with 3 years of work /teaching experience | • Effective communication skills (oral and written)<br>• Basic computing skills | 18-37 years (as on Jan. 01 (year))<br><br>Age relaxation to be provided as per Govt. rules |

Vocational Teachers/Trainers form the backbone of Vocational Education being imparted as an integral part of Rashtriya Madhyamik Shiksha *Abhiyan* (RMSA). They are directly involved in teaching of vocational subjects and also serve as a link between the industry and the schools for arranging industry visits, On-the-Job Training (OJT) and placement.

These guidelines have been prepared with an aim to help and guide the States in engaging quality Vocational Teachers/Trainers in the schools. Various parameters that need to be looked into while engaging the Vocational Teachers/Trainers are mode and procedure of selection of Vocational Teachers/Trainers, Educational Qualifications, Industry Experience, and Certification/Accreditation.

The State may engage Vocational Teachers/Trainers in schools approved under the component of Vocationalisation of Secondary and Higher Secondary Education under RMSA in the following ways:

(i) directly as per the prescribed qualifications and industry experience suggested by the PSS Central Institute of Vocational Education(PSSCIVE), NCERT or the respective Sector Skill Council(SSC)

OR

(ii) Through accredited Vocational Training Providers accredited under the National Quality Assurance Framework (NQAF*) approved by the National Skill Qualification Committee on 21.07.2016. If the State is engaging Vocational Teachers/Trainers through the Vocational Training Provider (VTP), it should ensure that VTP should have been accredited at NQAF Level 2 or higher.

* *The National Quality Assurance Framework (NQAF) provides the benchmarks or quality criteria which the different organisations involved in education and training must meet in order to be accredited by competent bodies to provide government-funded education and training/skills activities. This is applicable to all organizations offering NSQF-compliant qualifications.*

The educational qualifications required for being a Vocational Teacher/Trainer for a particular job role are clearly mentioned in the curriculum for the particular NSQF compliant job role. The State should ensure that teachers / trainers deployed in the schools have relevant technical competencies for the NSQF qualification being delivered. The Vocational Teachers/Trainers preferably should be certified by the concerned Sector Skill Council for the particular Qualification Pack/Job role which he will be teaching. Copies of relevant certificates and/or record of experience of the teacher/trainer in the industry should be kept as record.

To ensure the quality of the Vocational Teachers/Trainers, the State should ensure that a standardized procedure for selection of Vocational Teachers/Trainers is followed. The selection procedure should consist of the following:

(i) Written test for the technical/domain specific knowledge related to the sector;
(ii) Interview for assessing the knowledge, interests and aptitude of trainer through a panel of experts from the field and state representatives; and
(iii) Practical test/mock test in classroom/workshop/laboratory.

In case of appointment through VTPs, the selection may be done based on the above procedure by a committee having representatives of both the State Government and the VTP.

The State should ensure that the Vocational Teachers/ Trainers who are recruited should undergo induction training of 20 days for understanding the scheme, NSQF framework and Vocational Pedagogy before being deployed in the schools.

The State should ensure that the existing trainers undergo in-service training of 5 days every year to make them aware of the relevant and new techniques/approaches in their sector and understand the latest trends and policy reforms in vocational education.

The Head Master/Principal of the school where the scheme is being implemented should facilitate and ensure that the Vocational Teachers/Trainers:

(i) Prepare session plans and deliver sessions which have a clear and relevant purpose and which engage the students;
(ii) Deliver education and training activities to students, based on the curriculum to achieve the learning outcomes;
(iii) Make effective use of learning aids and ICT tools during the classroom sessions;
(iv) Engage students in learning activities, which include a mix of different methodologies, such as project based work, team work, practical and simulation based learning experiences;
(v) Work with the institution's management to organise skill demonstrations, site visits, on-job trainings, and presentations for students in cooperation with industry, enterprises and other workplaces;
(vi) Identify the weaknesses of students and assist them in up-gradation of competency;
(vii) Cater to different learning styles and level of ability of students;
(viii) Assess the learning needs and abilities, when working with students with different abilities
(ix) Identify any additional support the student may need and help to make special arrangements for that support;
(x) Provide placement assistance

Assessment and evaluation of Vocational Teachers/Trainers is very critical for making them aware of their performance and for suggesting corrective actions. The States/UTs should ensure that the performance of the Vocational Teachers/Trainers is appraised annually. Performance based appraisal in relation to certain pre-established criteria and objectives should be done periodically to ensure the quality of the Vocational Teachers/Trainers. Following parameters may be considered during the appraisal process:

1. Participation in guidance and counselling activities conducted at Institutional, District and State level;
2. Adoption of innovative teaching and training methods;
3. Improvement in result of vocational students of Class X or Class XII;
4. Continuous up-gradation of knowledge and skills related to the vocational pedagogy, communication skills and vocational subject;
5. Membership of professional society at District, State, Regional, National and International level;
6. Development of teaching-learning materials in the subject area;
7. Efforts made in developing linkages with the Industry/Establishments;
8. Efforts made towards involving the local community in Vocational Education
9. Publication of papers in National and International Journals;
10. Organisation of activities for promotion of vocational subjects;
11. Involvement in placement of students/student support services.

# 9. LIST OF CONTRIBUTORS

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