LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE:
Field Technician Other Home Appliances

(QUALIFICATION PACK: Ref. Id. ELE/Q3104)

SECTOR: Electronics

Grades XI and XII

PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION
Shyamla Hills, Bhopal – 462 002, M.P., India
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Electronics Sector

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PSS Central Institute of Vocational Education, NCERT, Shyamla Hills, Bhopal

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 Education, 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 **Electronics – Field Technician Other Home Appliances**. 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.

Dinesh Prasad Saklani
Director
National Council of Educational Research & 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 fulfill the growing aspirations of our youth and the demand of skilled human resource, the Ministry of Education (MoE), 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 fulfill the needs of the society and the world of work. In order to honor 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 course-ware 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 MoE and NCERT for the financial support and cooperation in realising the objective of providing learning outcome based modular curricula and course-ware to the States and other stakeholders under the PAB (Project Approval Board) approved project of *Samagra Shiksha* of MoE.

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 course-ware. We hope that this document will prove useful in turning out more competent Indian workforce for the 21st Century.

Deepak Paliwal
Joint Director
PSS Central Institute of Vocational Education

ACKNOWLEDGMENT

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 Education (MoE), Government of India for the financial support to the project for development of 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, MoE, RMSA Cell at the National Council of Educational Research and Training (NCERT), National Skill Development Agency (NSDA) and National Skill Development Corporation (NSDC) and Electronics Sector Skill Council of Indian (ESSCI) for their academic support and cooperation.

We are grateful to the expert contributors and Deepak D. Shudhalwar, Professor (CSE), PSSCIVE, for their earnest effort and contributions in the development of this learning outcome based curriculum. Their contributions are dully acknowledged.

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

We are also grateful to the Course Coordinator Deepak D. Shudhalwar, Professor (CSE), Head, ICT and Computer Centre, Department of Engineering and Technology, PSSCIVE, for bringing out this curriculum in the final form.

PSSCIVE Team

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1. COURSE OVERVIEW

COURSE TITLE: Field Technician Other Home Appliances

Field Technician Other Home Appliances, is a technician who is responsible to provide after sales support in terms of Installation, Repair, Maintenance and Replacement of dysfunctional part of the the Home Appliances such as Water Purifier, Mixer, Grinder, Juicer, Microwave Oven and similar other appliances.

The technician has an expertise in Fundamentals of Electrical and Electronics Engineering with exposure to install these appliances at the customer site. This technician can also provide the guidance to the customer for purchasing these appliances as per the requirement or site conditon of the custormer. They provide after sales support and resolve the problems occuring in these appliaces. They do the regular maintenance and servicing of these applianecs. They interacts with customers to diagnose the problem and possible causes. Once the problem and causes have been identified, the individual rectifies minor problems blems or replaces faulty modules for failed parts or recommends factory repairs for bigger faults.

The technician must be willing to work in the field and travel through the day from one customer's premise to another. Punctuality, amenable behaviour, patience, good interpersonal relationship building, trustworthiness, integrity, and critical thinking are important attributes for this job.

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

- ✓ Apply effective oral and written communication skills to interact with 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;
- ✓ Demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection;
- ✓ Describe the duties and responsibilites of Technician;
- ✓ Describe and basics of Electrical and Electronics;
- ✓ Demonstrate the basics skills of Electrical and Electronics;
- ✓ Use hand tools, power tools, equipment and measuring instruments;
- ✓ Describe the pre-installation tasks of home appliances;
- ✓ Connect and operate appliances – Water Purifier, Mixer, Grinder, Juicer, Microwave Oven;
- ✓ Repair or Replace the dysfunctional part of appliances – Water Purifier, Mixer, Grinder, Juicer, Microwave Oven;
- ✓ Check the functionality of appliances after repair or replacement of dysfunctional part;
- ✓ Demonstrate various practices to be followed to maintain health and safety at work;
- ✓ Work effectively and safely at the workplace.

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

COURSE LEVEL: This course can be taken up at Intermediate level in Grade XI and Grade XII.

COURSE DURATION: **Total : 600 hours**

Grade 11 : 300 hours

Grade 12 : 300 hours

2. SCHEME OF UNITS AND ASSESSMENT

This course is a planned sequence of instructions consisting of Units meant for developing employ-ability and vocational competencies of students of Grade XI and XII opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for **Grade XI** is as follows :

GRADE XI			
	Units	**No. of Hours for Theory and Practical 300**	**Max. Marks for Theory & Practical 100**
Part A	**Employability Skills**		
Unit 1	Communication Skills – III	20	**10**
Unit 2	Self-management Skills – III	15	
Unit 3	Basic ICT Skills – III	20	
Unit 4	Entrepreneurial Skills – III	20	
Unit 5	Green Skills – III	15	
	Total Hours	**90**	**10**
Part B	**Vocational Skills**		
Unit 1	Fundamentals of Electrical and Electronics	50	**40**
Unit 2	Installation of the Water Purifier	40	
Unit 3	Repair and Maintenance of Water Purifier	30	
Unit 4	Work effectively at the workplace	30	
	Total Hours	**150**	**40**
Part C	On the Job Training and Field Visits (3x5)	**60**	**10**
Part D	**Project/ Practical Work**		
	Practical File/ Student Portfolio		10
	Practical Work		10
	Written Test		10
	Viva Voce		10
	Total		**40**
	Total Hours	**300**	**100**

The unit-wise distribution of hours and marks for **Grade XII** is as follows:

GRADE XII			
	Units	**No. of Hours for Theory and Practical 300**	**Max. Marks for Theory & Practical 100**
Part A	**Employability Skills**		
Unit 1	Communication Skills – IV	20	**10**
Unit 2	Self-management Skills – IV	15	
Unit 3	Basic ICT Skills – IV	20	
Unit 4	Entrepreneurial Skills – IV	20	
Unit 5	Green Skills – IV	15	
	Total	**90**	**10**
Part B	**Vocational Skills**		
Unit 1	Repair and Maintenance of Mixer/ Grinder	40	**40**
Unit 2	Repair and Maintenance of Juicer	40	
Unit 3	Repair and Maintenance of Microwave Oven	40	
Unit 4	Workplace Health and Safety Practices	30	
	Total	**150**	**40**
Part C	On the Job Training and Field Visits (5x3)	**60**	**10**
Part D	**Project/ Practical Work**		
	Practical File/ Student Portfolio		10
	Practical Work		10
	Written Test		10
	Viva Voce		10
	Total		**40**
	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 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			
	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)	**3**	**2**	**2**	**13**
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	**2**	**3**	**2**	**14**
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**	**2**	**1**	**07**
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**	**2**	**0**	**04**
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	**5x1=5**	**10x2=20**	**5x3=15**	**40 (20 Ques.)**

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

GRADE XI, Part A: Employability Skills

Unit No.	Unit Name	Duration in Hours
Unit 1	Communication Skills – III	20
Unit 2	Self-management Skills – III	15
Unit 3	Basic ICT Skills – III	20
Unit 4	Entrepreneurial Skills – III	20
Unit 5	Green Skills – III	15
	Total	**90**

Unit 1: Communication Skills – III

Sn	Learning Outcome	Theory (08 Hours)	Practical (12 Hours)	20
1	Demonstrate knowledge of communication	• Introduction to communication • Importance of communication • Elements of communication • Perspectives in communication • Effective communication	• Role-play on the communication process • Group discussion on the importance of communication and factors affecting perspectives in communication • Charts preparation on elements of communication • Classroom discussion on the 7Cs (i.e. Clear, Concise, Concrete, Correct, Coherent, Courteous and Complete) for effective communication	03
2	Demonstrate verbal communication	• Verbal communication • Public Speaking	• Role play of a phone conversation • Group activity on delivering a speech and practicing public speaking	02
3	Demonstrate non-verbal communication	• Importance of non-verbal communication, • Types of non-verbal communication, • Visual communication	• Role plays on non-verbal communication • Group exercise and discussion on Do's and Don'ts to avoid body language mistakes • Group activity on methods of communication	02
4	Demonstrate speech using correct pronunciation	• Pronounciation basics, • Speaking poperly, • Phonetics, • Types of sounds	• Group activities on practicing pronunciation	01

5	Apply an assertive communication style	• Important communication styles, • Assertive communication, • Advantages of assertive communication, • Practicing assertive communication	• Group discussion on communication styles, • Group discussion on observing and sharing communication styles	02
6	Demonstrate the knowledge of saying no	• Steps for saying "No" • Connecting words	• Group discussion on how to say 'No'	01
7	Identify and use parts of speech in writing	• Capitalisation, • Punctuation, • Basic parts of speech, • Supporting parts of speech	• Group activity on identifying parts of speech, • Writing a paragraph with punctuation marks, • Group activity on constructing sentences, • Group activity on identifying parts of speech	02
8	Write correct sentences and paragraphs	• Parts of a sentence • Types of object • Types of sentences • Paragraph	• Activity on framing sentences • Activity on active and passive voice • Assignment on writing different types of sentences.	01
9	Communicate with people	• Geetings, • Introducing self and others	• Role-play on formal and informal greetings, • Role-play on introducing someone, • Practice and group discussion on how to greet different people	01
10	Introduce yourself to others and write about oneself	• Talking about self • Filling a form	• Practicing self-introduction and filling up forms • Practicing self-introduction to others	01
11	Develop questioning skill	• Main types of questions, • Forming closed and open ended questions	• Practice exercise on forming questions, • Group activity on framing questions.	01
12	Communicate information about family to others	• Names of relatives, • Relations	• Practice taking about family, • Role-ply on talking about family members	01
13	Describe habits and routines	• Concept of habits and routines	• Group discussion on habits and routines • Group activity on describing routines	01
14	Ask or give	• Asking for directions,	• Role-play on asking and giving	01

	directions to others	• Using landmarks	directions, • Identifying symbols used for giving directions	
			Total Duration in Hours	**20**

Unit 2: Self-management Skills – III				
Sn	**Learning Outcome**	**Theory (07 Hours)**	**Practical (08 Hours)**	**15**
1.	Identify and analyze own strengths and weaknesses	• Understanding self • Techniques for identifying strengths and weaknesses • Difference between interests and abilities	• Activity on writing aims in life • Prepare a worksheet on interests and abilities	02
2.	Demonstrate personal grooming skills	• Guidelines for dressing and grooming • Preparing a personal grooming checklist	• Role-play on dressing and grooming standards • Self-reflection activity on various aspects of personal grooming	02
3.	Maintain personal hygiene	• Importance of personal hygiene • Three steps to personal hygiene • Essential steps of hand washing	• Role-play on personal hygiene • Assignment on personal hygiene	02
4.	Demonstrate the knowledge of working in a team and participating in group activities	• Describe the benefits of teamwork, • Working in a team	• Assignment on working in a team, • Self-reflection on teamwork	02
5	Develop networking skills	• Benefits of networking skills, • Steps to build networking skills	• Group activity on networking in action, • Assignment on networking skills	01
6	Describe the meaning and importance of self-motivation	• Meaning of self-motivation, • Types of motivation, • Steps to building self-motivation	• Activity on staying motivated, • Assignment on reasons hindering motivation	02
7	Set goals	• Meaning of goals and purpose of goal-setting, • Setting SMART goals	• Assignment on setting SMART goals, • Activity on developing long-term and short-term goals using SMART method	02
8	Apply time management strategies and techniques	• Meaning and importance of time management, • Steps for effective time management	• Preparing checklist of daily activities	02
			Total Duration in Hours	**15**

Unit 3: Information and Communication Technology Skills – III				
Sn	**Learning Outcome**	**Theory (08 Hours)**	**Practical (12 Hours)**	**20**
1.	Create a document on the word processor	• Introduction to ICT, • Advantages of using a word processor, • Work with LibreOffice Writer	• Demonstration and practice of the following: • Creating a new document • Typing text • Saving the text • Opening and saving file in Microsoft word/Libre Office Writer	02
2.	Identify icons on the toolbar	• Status bar, • Menu bar, • Icons on the Menu bar, • Multiple ways to perform a function	• Group activity on using basic user interface of LibreOffice writer • Group activity on working with Microsoft Word	02
3.	Save, close, open and print document	• Save a document, • Close a document, • Open an existing document, • Print a document	• Group activity on perform ing the functions for saving, closing and printing documents in LibreOffice Writer, • Group activity on perform ing the functions to save, close and print documents	02
4.	Format text in a document	• Change style and size of text • Align text, • Cut, Copy, Paste, • Find and replace	• Group activity on formatting text in LibreOffice Writer, • Group activity on formatting text in Microsoft Word	02
5.	Check spelling and grammar in a word document	• Use of spell checker, • Autocorrect	• Group activity on checking spellings and grammer using LibreOffice Writer • Group activity on checking spellings and grammer using Microsoft Word	02
6.	Insert lists, tables, pictures, and shapes in a word document	• Insert bullet list, • Number list, • Tables, • Pictures, • Shapes	• Practical exercise of inserting lists and tables using LibreOffice Writer	03
7.	Insert header, footer and page number in a word document	• Insert header, • Insert footer, • Insert page number, • Page count	• Practical exercise of inserting header, footer and page numbers in LibreOffice Writer • Practical exercise of inserting header, footer and page numbers in Microsoft Word	03
8.	Make changes by using the track change option in a	• Tracking option • Manage option • Compare documents	• Group activity on performing track changes in LibreOffice Writer	04

	word document		• Group activity on performing track changes in Microsoft Word	
			Total Duration in Hours	**20**

Unit 4: Entrepreneurial Skills – III				
Sn	**Learning Outcome**	**Theory (07 Hours)**	**Practical (13 Hours)**	**20**
1.	Differentiate between different kinds of businesses	• Introduction to entrepreneurship • Types of business activities	• Role play on different kind of business around us	02
2.	Describe the significance of entrepreneurial values	• Meaning of value, • Values of an Entrepreneur, • Case study on qualities of an entrepreneur	• Role play on qualities of an Entrepreneur	02
3.	Demonstrate the attitudinal changes required to become an entrepreneur	• Difference between the attitude of entrepreneur and employee	• Interviewing employees and entrepreneurs	02
4.	Develop thinking skills like an entrepreneur	• Problems of entrepreneurs • Problem-solving, • Ways to think like an entrepreneur	• Group activity on identifying and solving problems	03
5.	Generate business ideas	• The business cycle, • Principles of idea creation, • Generating a business idea, • Case studies	• Brainstorming on generating a business ideas	03
6.	Describe customer needs and importance of conducting a customer survey	• Understanding customer needs • Conducting a customer survey	• Group activity to conduct a customer survey	04
7.	Create a business plan	• Importance of business planning, • Preparing a business plan, • Principles to follow for growing a business, • Case studies	• Group activity on developing a business plan	04
			Total Duration in Hours	**20**

Unit 5: Green Skills – III				
Sn	**Learning Outcome**	**Theory (07 Hours)**	**Practical (08 Hours)**	**15**
1.	Describe the importance of the main sector of the green economy	• Meaning of ecosystem, food chain and sustainable development • Main sectors of the green	• Group discussion on sectors of green economy, • Poster making on various sectors for promoting green economy	06

		economy- E-waste management, green transportation, renewal energy, green construction, and water management		
2.	Describe the main recommendations of policies for the green economy	• Policies for a green economy	• Group discussion on initiatives for promoting the green economy, • Writing an essay or a short note on the important initiatives for promoting green economy.	03
3.	Describe the major green sector/area and the role of various stakeholders in the green economy	• Stakeholders in the green economy	• Group discussion on the role of stakeholders in green economy • Preparation of posters on green sectors and their stakeholders • Making solar bulbs.	03
4.	Identify the role of government and private agencies in the green economy	• Role of the government in promoting a green economy, • Role of private agencies in promoting green economy	• Group discussion on the role of Government and Private Agencies in promoting a green economy. • Posters making on green sectors.	03
			Total Duration in Hours	**15**

GRADE XI, Part B: Vocational Skills

Unit No.	Unit Name	Duration in Hours
Unit 1	Fundamentals of Electrical and Electronics	50
Unit 2	Installation of the Water Purifier	40
Unit 3	Repair and Maintenance of Water Purifier	30
Unit 4	Work effectively at the workplace	30
	Total Duration	**150**

Unit 1: Fundamentals of Electrical and Electronics				
Sn	**Learning Outcome**	**Theory (20 Hours)**	**Practical (30 Hours)**	**50**
1.	Describe the duties and responsibilites of Field Technician Other Home Appliances	• Size and scope of electronic industry and its sub-sectors, • Role and responsibilities of Field Technician Other Home Appliances. • Employment opportunities for a Field Technician Other Home Appliances.	• List various home appliances, • Group acticity to demonstrate and operate different types of appliances such as Water Purifies, Mixer, Grinder, Juicer, Microwave Oven • List the job opportunities for a Field Technician Other Home Appliances.	05

2.	Describe electric circuits and electrical quantities	• Electricity, • Types of electricity – AC, DC • Potential and Potential difference, • Electric Circuit • Open and Closed Circuit, • Series and Parallel Circuits, • Parameters of Electric Circuit – Voltage Current, Resistance • Measuring units of current, voltage and resistance, • Ohm's law, • Kirchhoff's law • Power and Energy • Power Calculation and Energy Consumption, • Measurement of Electrical Parameters	• Read the voltage, current, resistance, power ratings of the appliances. • Identify the live, neutral and earth ports of power socket, • List, identify and name the electrical components, • Identify and construct open and closed circuit, • Identify and construct series and parallel circuit, • List the measurement units of voltage, current, resistance, • Verify the ohm's law by using ohm's experiment, • Verify the Kirchhoff's law by using experiment, • Demonstrate to calculate power and energy, • Identify AC motors, DC motors	15
3.	Describe the components of an electric circuit	• Components of an electric circuit – active and passive components, • Active components – Diode, Transistor, Integrated Circuits, LED, • Passive components – Transformer, Resistor, Capacitor, Inductor, Thermistor, • Electromechanical components – Motor, Printed Circuit Board (PCB), Connector, Switch, Relay, Circuit Breaker, Starter, Timer,	• Identify the components typically used in home appliances, • List the active and passive components and draw their symbols, • Determine the value of resistance by using color code, • Test the continuity of given diode using multimeter • Construct the circuit for forward and reverse bias of the diode and draw its characteristic curve • Determine the input and output voltage of a given transformer, • Demontrate the working of LED, • Demontrate to verify the transistor as a switch, • Demontrate to verify the temperature resistance relationship of thermistor	15
4.	Use tools, equipment and measuring instruments	• Common hands tools – Cutter, Scissors, Screwdriver, Combinatioin Plier, • Electrical power tools – Power drills, Saws, Sanders, Grinders,	• Group activity to use various hand tools, • Demonstrate to test electronic component, • Calculate the current flowing	15

		Wrench, Rotary tubing or pipe cutter, Tubing bender, Tubing cutter • Measuring instruments – Phase Tester, Earth Tester, Watt Meter, Engergy Meter, Multi-meter, Clamp Meter • Measurement of electrical quantities using multi-meter and clamp meter, • Safey practices to use Tools, Equipment and Measuring instruments	through resistance, • Measure the electrical parameters using Multimeter – DC Voltage, DC Current, AC Voltage, AC Current, Resistance • Measure the electrical parameters using Clampmeter – AC current, Temperature, AC voltage, Capacitance, DC voltage, Resistance, DC current, Frequency,	
			Total Duration in Hours	**50**

Unit 2: Installation of Water purifier				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (25 Hours)**	**40**
1.	Describe the basics of water based appliances	• Properties of Water – Universal Solvent, Neutral pH, High Polarity, Lower Density of Ice, • Water Treatment, • Water Treatment Methods, • Water contaminants – Bacteria, Minerals, Particulates, Chemicals • Water treatment agents – Chemicals, Filters, Purifiers, • Water flow diagram and electrical circuit diagram of water purifier, • Water purification process and different layers of filter present within the unit, • Different technologies in water purification	• Group discussion on importance of water and its requirements, • List the properties of water affecting water-based appliances • List the various water treatment methods, • Identify and list the different types of filters, • Demonstrate the water purification process, • Identify and label the parts of given filter.	10
2.	Describe the functioning of Water Purifier	• Water Purifiers, • Features and functionalities of various models, • Types of Water Purifier – RO Water Purifiers, UF Water Purifiers, UV Water Purifiers, Gravity Based Water Purifiers, Activated Carbon Water Purifiers, • Properties of RO Water Purifier,	• Group activity to identify and name the different water purifiers, • Identify the different types of water purifiers, • Identify the various components of water purifier, • A role play activity – customer asked to tell the components of RO Water Purifier and you list all	10

		• Component of RO Water Purifier, • Functioning of RO Water Purifier.	the components of water purifier, • Demonstrate the functioning of water purifier	
3.	Describe the preinstallation process of Water Purifier	• Packaging of purifier unit and accessories. • Unpacking process, • Safety precautions to be taken while installing, • Packaging waste disposal procedures • Other products of the company. • Operation of the water purifier, appropriate settings after plugging in, • Use of various features. • Structural requirements, ventilation, with safety precautions to be taken while installing.	• Demonstrate the process of disposing of the packaging material waste as per the company's norms, • Check that the product specifications and other supporting accessories, • Arrange tools and fitments required for the installation, • Identify the structural requirements for installation of water purifier, • Carry out pre-installations/ masonry/electrical work for of adequate water pressure at the inlet source, • Make necessary markings for placement of water purifier unit. • Mount the filter and fastened the screws securely.	10
4.	Installl RO Water Purifier	• Safety precautions to be taken while installing water purifier, • Manual-based procedure of installing the water purifier • Procedure to fix various accessories and parts accompanied the unit, • Post fixing check up process, • Functioning of water purifier, • Maintenance procedures, • Documentation process of installation of water purifier • Customer acknowledgment form, • Call center number.	• Demonstrate to mount the filter and fastened the screws securely, • Demonstrate to drain the inlet line before connecting it to the water purifier and connect the outlet pipe to the drain, • Demonstrate to connect the purifier to the nearest power supply point, • Illustrate to check the proper functioning of water purifier as per the desired standard, • Demonstrate the regular maintenance of water purifier, • Demonstrate the documentation process and calling on the custtomer care number.	10
			Total Duration in Hours	**40**

Unit 3: Repair and Maintenance of Water purifier				
Sn	**Learning Outcome**	**Theory (12 Hours)**	**Practical (18 Hours)**	**30**
1	Identify the fault in water purifier	• Parameters such as production rate, water chemistry, drain rate, input water pressure/temperature • Different types of water purifiers manufactured by the company, • Features of different models of water purifier.	• Diagnose the fault based on customer interaction and initial inspection • Demonstrate to check the water pressure, • Carry out basic inspection of feed water valve, tank valve, tubing, housing etc. • Demonstrate to identify the fault on part basis inspection.	10
2	Replace dysfunctional part in the water purifier unit	• Functioning of appliance and its various filters. • Components of water purifier – valves or wearing out of membrane or filter • Troubleshooting of water purifier, • Frequently occurring faults such as low/no water production, leaks, bad tasting water.	• Demonstrate to replace the damaged components – valves or wearing out of membrane or filter • Demonstrate to remove and replace the faulty module with a functional one.	10
3	Confirm functionality of the repaired unit	• Reassembly process, • Components/modules of the water purifier, • Other products of the company, • Cleaning procedures and other best practices.	• Demonstrate to reassemble the unit, • Check the functioning of all the units after reassemble, • Demonstrate and confirm functionality of the unit, • Demonstrate the cleaning procedures and other best practices.	10
			Total Duration in Hours	**30**

Unit 4: Work Ethics, Quality, Substaintiality and Safety				
Sn	**Learning Outcome**	**Theory (12 Hours)**	**Practical (18 Hours)**	**30**
1.	Achieve optimum productivity and quality	• Importance of cleanliness, air and water quality in the workplace, • Importance of time management to meet daily target, • Importance of Quality in delivery of work,	• Group activity to keep work area clean and tidy, • Prepare a to do list and demonstrate to complete work effectively in time to meet daily target, • Check the quality of work with the expected standards,	08

		• Organization's policies and procedures and work ethics	• Group activity to comply with organization's policies and procedures	
2.	Explain the importance of implementing health and safety procedures	• Organisation safety and health policy, • Appropriate Personal Protective Equipment (PPE) • ESD precautions, • Types of accident injury or hazard	• Group acticity to observe and follow organisation safety guidelines, • Demonstrate the use of proper personal protective equipment (PPE) for safety • Demonstrate to observe ESD precautions, • Identify and report any accident injury or hazard	08
3.	Demonstrate the process of organizing waste management and recycling	• Recyclable/non-recyclable and hazardous wastes, • Different waste categories – dry, wet, recyclable, non-recyclable and single use plastic items, • Different colours of dustbins to dispose waste, • Waste management and waste disposal procedures, • Methods of recycling as well as repairing and reusing electronic components, • Effect of greening of jobs	• Identify and segregate recyclable/non-recyclable and hazardous wastes, • Group activity to dispose waste as per the procedures, • Demonstrate to use appropriate colours of dustbins to dispose waste, • Group activity to recyclie, repair and reuse electronic components, • Participate in waste management and waste disposal workshops organised at workplace	08
4.	Explain the importance of conserving resources	• Efficient utilisation of material and water, • Prevalent energy efficient devices, • Common electrical problems, • Cleaning of tools, machines and equipment • Common practices of conserving electricity	• Group activity to demonstrate efficient utilisation of resources, material and water, • Make the list of equivalent energy efficient devices, • Perform routine cleaning of tools, machines and equipment • Demonstrate the common practices of conserving electricity.	06
			Total Duration in Hours	**30**

GRADE XII, Part A: Employability Skills

Unit No.	Unit Name	Duration (Hrs.)
Unit 1	Communication Skills – IV	20
Unit 2	Self-management Skills – IV	15
Unit 3	Basic ICT Skills – IV	20
Unit 4	Entrepreneurial Skills – IV	20
Unit 5	Green Skills – IV	15
	Total Hours	**90**

Unit 1: Communication Skills – IV				
Sn	**Learning Outcome**	**Theory (08 Hours)**	**Practical (12 Hours)**	**20**
1.	Demonstrate active listening skills	• Active listening -listening skill, stages of active listening, • Overcoming barriers to active listening	• Group discussion on the factors affecting active listening, • Preparing posters of steps for active listening, • Role-play on negative effects of not listening actively	07
2.	Identify the parts of speech	• Parts of speech – using capitals, punctuation, basic parts of speech, supporting parts of speech	• Group practice on identifying parts of speech • Group practice on constructing sentences	07

3.	Write sentences	• Writing skills to practice the following:
		  • Simple sentence
		  • Complex sentence
		  • Types of object
		• Identify the types of sentences
		  • Active and Passive sentences
		  • Statement/Declarative sentence
		  • Question/Interrogative sentence
		  • Emotion/Reaction or Exclamatory sentence
		  • Order or Imperative sentence
			• Group activity on writing sentences and paragraphs,
			• Group activity on practicing writing sentences in active or passive voice,
			• Group activity on writing different types of sentences (i.e., declarative, exclamatory, interrogative and imperative)
				06

			Total Duration in Hours	**20**

Unit 2: Self-management Skills – IV				
Sn	**Learning Outcome**	**Theory (07 Hours)**	**Practical (08 Hours)**	**15**
1.	Describe the various factors influencing motivation and positive attitude	• Motivation and positive attitude • Intrinsic and extrinsic motivation • Positive attitude – ways to maintain positive attitude • Stress and stress management - ways to manage stress	• Role Play on avoiding stressful situation, • Activity on listing negative situations and ways to turn it positive	06
2.	Describe how to become result oriented	• How to become result oriented, • Goal setting – examples of result-oriented goals	• Pair and share activities on the aim of life	03

3.	Describe the importance of self-awareness and the basic personality traits, types and disorders	• Steps towards self-awareness
		• Personality and basic personality traits
		• Common personality disorders-
		  • Suspicious
		  • Emotional and impulsive
		  • Anxious
		• Steps to overcome personality disorders
			• Group discussion on self awareness
			• Group discussion on common personality disorders
			• Brainstorming steps to overcome personality disorder
				06

			Total Duration in Hours	**15**

Unit 3: Information and Communication Technology Skills – IV				
Sn	**Learning Outcome**	**Theory (06 Hours)**	**Practical (14 Hours)**	**20**
1.	Identify the components of a spreadsheet application	• Getting started with spreadsheet – types of a spreadsheet, components of a worksheet, • Starting LibreOffice Calc • Creating a worksheet	• Group activity on identifying components of spreadsheet in LibreOffice Calc	02
2.	Perform basic operations in a spreadsheet	• Opening workbook and entering data – types of data, steps to enter data, editing and deleting data in a cell • Selecting multiple cells • Saving the spreadsheet in various formats • Closing the spreadsheet • Opening the spreadsheet. • Printing the spreadsheet.	• Group activity on working with data on LibreOffice Calc	03
3.	Demonstrate the	• Using a spreadsheet for	• Group activity on formatting a	02

	knowledge of working with data and formatting text	addition – adding value directly, adding by using cell address, using a mouse to select values in a formula, using sum function, copying and moving formula • Need to format cell and content • Changing text style and font size • Align text in a cell • Highlight text	spreadsheet in LibreOffice Calc • Group activity on performing basic calculations in LibreOffice Calc.	
4.	Demonstrate the knowledge of using advanced features in spreadsheet	• Sorting data, • Filtering data, • Protecting spreadsheet with password	• Group activity on sorting data in LibreOffice Calc	03
5.	Make use of the software used for making slide presentations	• Available presentation software • Stapes to start LibreOffice Impress • Adding text to a presentation	• Group practice on working with LibreOffice Impress tools, • Group practice on creating a presentation in LibreOffice Impress	02
6.	Demonstrate the knowledge to open, close and save slide presentations	• Open, Close, Save and Print a slide presentation	• Group activity on saving, closing and opening a presentation in LibreOffice Impress	01
7.	Demonstrate the operations related to slides and texts in the presentation	• Working with slides and text in a presentation- adding slides to a presentation, deleting slides, adding and formatting text, highlighting text, aligning text, changing text colour	• Group practice on working with font styles and types in LibreOffice Impress	04
8.	Demonstrate the use of advanced features in a presentation	• Advanced features used in a presentation, • Inserting shapes in the presentation, • Inserting clipart and images in a presentation, • Changing slide layout	• Group activity on changing slide layout on LibreOffice Impress	03
			Total Duration in Hours	**20**

Unit 4: Entrepreneurial Skills – IV				
Sn	**Learning Outcome**	**Theory (08 Hours)**	**Practical (12 Hours)**	**20**
1.	Describe the concept of	• Entrepreneurship and entrepreneur	• Group discussion on the topic "An entrepreneur is not born	08

	entrepreneurship and the types and roles and functions entrepreneur	• Characteristics of entrepreneurship • Entrepreneurship-art and science • Qualities of a successful entrepreneur • Types of entrepreneurs • Roles and functions of an entrepreneur • What motivates an entrepreneur • Identifying opportunities and risk-taking • Startups	but created". • Conducting a classroom quiz on various aspects of entrepreneurship. • Chart preparation on types of entrepreneurs • Brainstorming activity on What motivates an entrepreneur	
2.	Identify the barriers to entrepreneurship	• Barriers to entrepreneurship, • Environmental barriers, • No or faulty business plan, • Personal barriers	• Group discussion about "What we fear about entrepreneurship" • Activity on taking an interview of an entrepreneur.	04
3.	Identify the attitude that make entrepreneur successful	• Entrepreneurial attitude	• Group activity on identifying entrepreneurial attitude.	04
4.	Demonstrate the knowledge of entrepreneurial attitude and competencies	• Entrepreneurial competencies • Decisiveness, • Initiative • Interpersonal skills-positive attitude, stress management • Perseverance • Organisational skills- time management, goal setting, efficiency, managing quality.	• Playing games, such as "Who am I". • Brainstorming a business ideas • Group practice on "Best out of Waste" • Group discussion on the topic of "Let's grow together" • Group activity on listing stress and methods to deal with it like Yoga, deep breathing exercise.	04
			Total Duration in Hours	**20**

Unit 5: Green Skills – IV				
Sn	**Learning Outcome**	**Theory (05 Hours)**	**Practical (10 Hours)**	**15**

1.	Identify the benefits of the green jobs	• Green jobs
		• Benefits of green jobs
		• Green jobs in different sectors:
		  • Agriculture
		  • Transportation
		  • Water conservation
		  • Solar and wind energy
			• Group discussion on the importance of green job,
			• Chart preparation on green jobs in different sectors.
				08

		• Eco-tourism • Building and construction • Solid waste management • Appropriate technology		
2	State the importance of green jobs	• Importance of green jobs in • Limiting greenhouse gas emissions, • Minimizing waste and pollution, • Protecting and restoring ecosystems, • Adapting to the effects of climate change	• Preparing posters on green jobs, • Group activity on tree plantation. • Brainstorming different ways of mininmising waste and pollution	07
			Total Duration in Hours	**15**

GRADE XII, Part B: Vocational Skills

Sn	Units	Duration in Hours
Unit 1	Repair and Maintenance of Mixer/ Grinder	40
Unit 2	Repair and Maintenance of Juicer	40
Unit 3	Repair and Maintenance of Microwave Oven	40
Unit 4	Workplace Health and Safety Practices	30
	Total Duration	**150**

Unit 1: Repair and Maintenance of Mixer/ Grinder				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (25 Hours)**	**40**
1	Assemble, dismentable and operate Muixer/ Grinder	• Models and makes of Mixer/ Grinder, • Features of Mixer/ Grinder, • Types of mixers – stand mixer, hand mixer, spiral mixer, dough mixer • Auto Overload Protector (OLP) • Parts of Mixer/ Grinder, • Functioning of various parts of the Mixer/ Grinder, • Safety measures for operating Mixer/ Grinder, • Assembly of Mixer/ Grinder, • Dissassembly of Mixer/ Grinder	• Identify and name the types, make and model of of Mixer/ Grinder, • Identify and list the features of Mixer/ Grinder, • Identify and name the parts of Mixer/ Grinder, • Group activity to operate the Mixer/ Grinder and observe the functioning of each part, • Demonstrate the operation of overload protector button in the Mixer/ Grinder, • Group acticity to dismentle and assemble the Mixer/ Grinder	20
2	Replace	• Cleaning the Mixer/ Grinder	• Demonstrate the cleaning and	20

	dysfunctional part of Muixer/ Grinder	parts – jars, base unit, blades, • Preventive Maintenance of Mixer/ Grinder, • Servicing and repairing different parts of Mixer/ Grinder, • Frequently occurring faults in Mixer/ Grinder and their solutions, • Rapairing the Mixer/ Grinder, • Replacing dysfunctional part of the Mixer/ Grinder, • Functionality after repairing/ replacement of dysfunctional part of Mixer/ Grinder.	servicing of parts of Mixer/ Grinder, • Draw a chart showing the faults and their solutions in Mixer/ Grinder, • Demonstrate to rapair the Mixer/ Grinder, • Demonstrate to replace the dysfunctional part of the Mixer/ Grinder, • Demonstrate to test the functioning of Mixer/ Grinder after repairing/replacement of dysfunctional part.	
			Total Duration in Hours	**40**

Unit 2: Repair and Maintenance of Juicer				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (25 Hours)**	**40**
1	Assemble, dismentable and operate Muixer/ Grinder	• Models and makes of Juicer, • Features of Juicer, • Types of Juicer, • Parts of Juicer, • Functioning of various parts of the Juicer, • Safety measures for operating Juicer, • Assembly of Juicer, • Dissassembly of Juicer.	• Identify and name the types, make and model of of Juicer, • Identify and list the features of Juicer, • Identify and name the parts of Juicer, • Group activity to operate the Juicer and observe the functioning of each part, • Demonstrate the operation of Juicer, • Group acticity to dismentle and assemble the Juicer	20
2	Replace dysfunctional part of Muixer/ Grinder	• Cleaning the parts of Juicer, • Preventive Maintenance of Juicer , • Servicing and repairing different parts of Juicer, • Frequently occurring faults in Juicer and their solutions, • Rapairing the Juicer, • Replacing dysfunctional part of the Juicer. • Functionality after repairing/replacement of dysfunctional part of Juicer,	• Demonstrate the cleaning and servicing of parts of Juicer, • Draw a chart showing the faults and their solutions in Juicer, • Demonstrate to rapair the Juicer, • Demonstrate to replace the dysfunctional part of the Juicer, • Demonstrate to test the functioning of Juicer after repairing/replacement of dysfunctional part.	20
			Total Duration in Hours	**40**

Unit 3: Repair and Maintenance of Microwave Oven				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (25 Hours)**	**40**
1.	Operate Microwave Oven	• Models and makes of Microwave oven, • Features of Microwave oven, • Microwave as source of energy, • Microwave oven composition, • Types of Microwave Oven, • Parts of Microwave Oven, • Working of Microwave Oven • Advantages and Disadvantages of Microwave Oven, • Safety Measures before Using Microwave Oven, • Safety Measure for Cooking in Microwave Oven, • General guidelines for using Microwave Oven	• Identify and name the types, make and model of Microwave Oven, • Identify and list the features of Microwave Oven, • Identify and name the parts of Microwave Oven, • Group activity to operate the Microwave Oven and observe its functioning, • List the advantages and disadvantages of Microwave Oven, • List the Safety Measures before Using Microwave Oven, • Demonstrate the Safety Measure for Cooking in Microwave Oven.	20
2.	Repair and Replace dysfunctional part of of Microwave Oven	• Malfunctioning of Microwave Oven, • User manual, • Assembly of Microwave Oven, • Dissassembly of Microwave Oven, • Preventive Maintenance of Microwave Oven, • Cleaning and Maintenance Procedure, • Documentation • Servicing and repairing different parts of Microwave Oven, • Frequently occurring problems and their causes, • Faults, Symptoms and Solution of dysfunctional Microwave Oven, • Case study of various types of faults and their solution of dysfunctional Microwave Oven, • Repairing/Replacing of dysfunctional Module in Microwave Oven.	• Group acticity to dismentle the Microwave Oven,, • Group acticity to assemble the Microwave Oven,, • Demonstrate the cleaning and servicing of parts of Microwave Oven, • Draw a chart showing the faults and their solutions in Microwave Oven, • Demonstrate to rapair the Microwave Oven, • Demonstrate to replace the dysfunctional part of the Microwave Oven, • Demonstrate to test the functioning of Microwave Oven after repairing or replacement of dysfunctional part.	20
			Total Duration in Hours	**40**

Unit 4: Workplace Health and Safety Practices				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (15 Hours)**	**30**
1.	Deal with workplace hazards	• Worksplace hazards, risks and accidents, • Various warning and safety signs. • Location and people dealing with health and safety in the workplace, • Different ways of preventing accidents at the workplace.	• Identify ad list the workplace hazards, risks and accidents, • Identify and location and people dealing with health and safety in the workplace, • Identify the various warning signs at the workplace, • List the different ways of preventing accidents at the workplace.	08
2	Apply fire safety practices	• Organizational safety procedures for maintaining electrical safety, handling tools and hazardous materials, • Warning signs while accessing sensitive work areas, • importance of good housekeeping, • Importance of maintaining appropriate postures while lifting heavy objects.	• List the types of fire and fire extinguishers, • Prepare a report to inform the relevant authorities about any abnormal situation/behaviour of any equipment/system, • Demonstrate to use a fire extinguisher in case of a fire incident, • Demonstrate to lift heavy objects.	07
3	Follow emergencies, rescue and first-aid procedures	• First aid procedures • Electrocution safely, • Cardiopulmonary Resuscitation (CPR), • Defined emergency procedures such as raising alarm, safe/efficient, evacuation, moving injured people,.	• Demonstrate to apply first aid in case of a minor accident, • Demonstrate the steps to free a person from electrocution safely, • Administer Cardiopulmonary Resuscitation (CPR), • Demonstrate the application of emergency procedures.	08
4	Effective waste management/ recycling practices	• Concept of waste management and methods of disposing hazardous waste, • Process of disposal of hazardous waste, • Electronic waste disposal procedures.	• List the hazardous waste materials, • Demonstrate the procedures of disposal of hazardous waste, • Demonstrate the procedures for disposal of Electronic waste.	07
			Total Duration in Hours	**30**

6. ORGANISATION OF FIELD VISITS and OJT

In a year, at least 3 field visits/educational tours and On-the-Job-Training (OJT) in vacation should be organised for the students to expose them to the activities in the workplace. Visit a service centre of home appliances and observe the following: Location, Site, home appliances, tneir installation, repair and maintenance. Students should achive the following outcomes.

1. Explain the use of appropriate tools, parts, relevant reference sheets, manuals and documents.
2. Disposing the packaging material waste as per the company's norms.
3. Perform basic inspection of the feed water valve, tank valve, tubing, housing etc. to diagnose reasons for low/no water production
4. Identify reasons for leaks in the filter housing due to loose housing, damaged or misaligned Oring, cracks in the housing
5. Detect worn-out auto shut off valve through symptoms such as loud vibrating noise, drain water never shutting off etc.
6. Detect other problems such as clogged filters, storage tank problems, clogged flow resistor, inadequate/excessive water pressure, improper saddle valve mounting etc
7. Detect basic electrical faults such as improper/no earth, defective power cord, connector or internal wiring defect, short/ loose/open contacts, blown fuse
8. Inspect each module of the unit separately if the fault is not identified through basic tests.
9. Communicate effectively at the workplace.
10. Apply health and safety practices at the workplace.

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.

Tools	Equipment	Material
• Phase tester • Screwdriver set • Nut driver set • Combination Plier • Spanner set • Electrical tape • Soldering kit • Drill machine • Measuring tape • Hacksaw, Hammer, Scissor • Tube Bender, Tube cutter • Wire gauge • Drill machine • Allen wrench • Adjustable wrench	• Multimeter, Clamp-meter • Pressure gauge • Brazing torch • Personal Protective Equipment • Temperature meter • Cable Connector • Continuity Tester • Ohm's Law kit • Kirchhoff's Law kit • AC and DC motors • Fire Extinguisher • Vaccum pump • Leak Detector • Manifold Gauge	• Electrical and electronic components: Resistor, capacitor, inductor, various diode, transformer, starter, relay, contractor, Integrated Circuit, Thermistor, Circuit breaker, Wire • Wiring layout • Colour code chart of resistor • Code chart of capacitor • Datasheet of Integrated Circuit • Printed Circuit Board • Raw materials and parts of RO Water Purifier, Mixer/ Grinder/ Juicer, and Microwave Oven

Classroom Aids

Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop

8. TEACHER'S/TRAINER'S QUALIFICATION

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:

Qualification	Minimum Competencies	Age Limit
Bachelor's degree in appropriate branch of Engineering/ Technology **OR** Graduate in Science with Diploma in appropriate branch of Engineering/ Technology ***Desirable:*** Knowledge and skills of Installation, Repair and Maintenance of Home Appliances.	The candidate should have minimum 1 year of work experience. Good communication skills in English and local language.	18-37 years (as on Jan. 01 (year)) Age relaxation to be provided as per Govt. rules

Note – The qualifications for vocational teachers mentioned above is suggestive and not prescriptive. The States/ UTs can make modifications in the qualifications for appointment of vocational teachers/ trainers as per their requirement through a committe appointed by the competent authority in the State/ UT Directorate/ Department of School Education.

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 following ways:

1. 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**
2. 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:

1. Written test for the technical/domain specific knowledge related to the sector;
2. Interview for assessing the knowledge, interests and aptitude of trainer through a panel of experts from the field and state representatives; and
3. 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:

- Prepare session plans and deliver sessions which have a clear and relevant purpose and which engage the students;
- Deliver education and training activities to students, based on the curriculum to achieve the learning outcomes;
- Make effective use of learning aids and ICT tools during the classroom sessions;
- 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;
- 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;
- Identify the weaknesses of students and assist them in up-gradation of competency;
- Cater to different learning styles and level of ability of students;
- Assess the learning needs and abilities, when working with students with different abilities
- Identify any additional support the student may need and help to make special arrangements for that support;
- 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:

- Participation in guidance and counseling activities conducted at Institutional, District and State level;
- Adoption of innovative teaching and training methods;
- Improvement in result of vocational students of Class X or Class XII;

- Continuous up-gradation of knowledge and skills related to the vocational pedagogy, communication skills and vocational subject;
- Membership of professional society at District, State, Regional, National and International level;
- Development of teaching-learning materials in the subject area;
- Efforts made in developing linkages with the Industry/Establishments;
- Efforts made towards involving the local community in Vocational Education
- Publication of papers in National and International Journals;
- Organisation of activities for promotion of vocational subjects;
- Involvement in placement of students/student support services.

9. LIST OF CONTRIBUTORS

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