

# LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE: ADVANCE PLUMBING TECHNICIAN

(QUALIFICATION PACK: Ref. Id. QF-1023)

SECTOR: PLUMBING  
Grades 11 and 12



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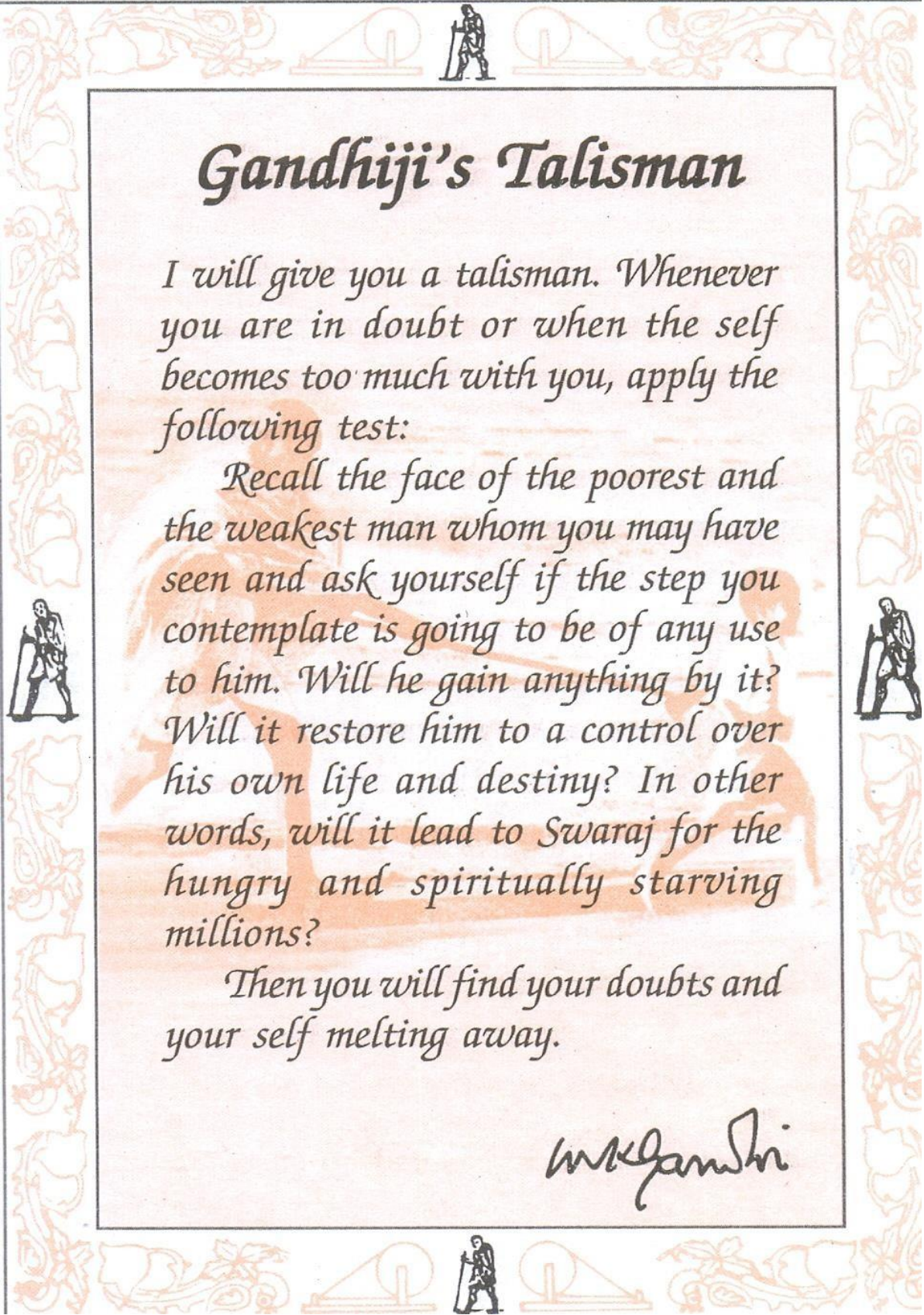
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NCERT

**PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION**

(a constituent unit of NCERT, under Ministry of Education, Government of India)

**Shyamla Hills, Bhopal-462002, M.P., India**

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## 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.*

*M.K. Gandhi*

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**Advance Plumbing Technician,  
March, 2023**

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



**PATRONS**

Prof. Dinesh Prasad Saklani, Ph.D.,  
Director,  
National Council of Educational Research  
and Training (NCERT),  
New Delhi

Dr. Deepka Paliwal, Ph.D.,  
Joint Director  
PSS Central Institute of Vocational Education,  
Bhopal

**COURSE COORDINATOR**

Prof. Saurabh Prakash  
Professor and Head  
Engineering and Technology Department,  
PSS Central Institute of Vocational Education  
Bhopal

# FOREWARD

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. The curriculum has been developed for the vocational education programme introduced under the Centrally Sponsored Scheme of *Samagra Shiksha* of the *Ministry of Education* (erstwhile, *Ministry of Human Resource Development*) and is aligned to the National Skill Qualifications Framework (NSQF). The curricula for vocational courses are being developed under the project approved by the Project Approval Board (PAB) of '*Samagra Shiksha*', which is an overarching programme for the school education sector extending from pre-school to Grade 12.

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 Advance Plumbing Technician. The curriculum has been developed for the secondary students of grades 11 and 12 and is aligned to the National Occupation Standards (NOSs) for the job role. 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 skill needs. The teaching-learning is to be done through interactive sessions in classrooms, practical activities in laboratories or workshops, projects, field visits, etc. and professional experience is to be provided through on-the-job training.

The curriculum has been developed and reviewed by a group of experts and their contributions are duly 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 Education Research and Training*

# PREFACE

India today stands poised at a very exciting juncture in its saga. The potential for achieving inclusive growth is 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. In order to fulfil the growing aspirations of our youth and the demand for a skilled human resource, the Ministry of Education (erstwhile, Ministry of Human Resource Development (MHRD), Government of India introduced the revised Centrally Sponsored Scheme of Vocationalisation of School 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 with the responsibility to develop learning outcome- based curricula, student textbooks and e-learning material for job roles in various sectors.

The PSSCIVE firmly believes that the vocationalisation of education in the nation needs 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 society and the world of work. In order to honour its commitment to the nation, the PSSCIVE is developing learning outcome-based curricula with the involvement of faculty members and leading experts in the field. It is being done through the concerted efforts of leading academicians, professionals, policymakers, partner institutions, Vocational Education and Training (VET) 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. 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.

The success of this curriculum depends upon its effective implementation, and it is expected that the managers of vocational education programme, vocational educators, vocational teachers/trainers, and other stakeholders will make earnest efforts to provide better facilities, develop linkages with the industry or world of work and foster a conducive learning environment for the students for effectively transacting the curriculum and to achieve the learning outcomes as per the content of the curriculum document.

DEEPAK PALIWAL

*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 *Samagra Shiksha* and the officials of the Ministry of Education (MoE), Government of India for the financial support to the project for development of learning outcome-based curricula.

We are grateful to the Director, National Council of Educational Research and Training (NCERT) for his support and guidance. We also acknowledge the contributions of our colleagues at the NCERT, National Council for Vocational Education and Training (NCVET), National Skill Development Corporation (NSDC), Water Management and Plumbing Skill Council (WMPSC) and Sector Skill Council for Management and Entrepreneurship and Professional Skills for their academic support and cooperation in the development of Qualification file and curriculum.

We are grateful to Prof. Saurabh Prakash, Course Coordinator for his untiring efforts and contribution to the development of this learning outcome-based curriculum. The contribution made by Jay Prakash Lall, Dr. Tikendra Verma, Dr. Ravi Kumar Mandava, Dr. Gaurav Dwivedi, Ayushi Seeliya and his team, Industry Partner in the development of the curriculum for domain and non-domain skills is duly acknowledged.

The suggestions and editorial support provided by Dr. Satyendra Thakur, Assistant Professor (Agricultural Engineering), on contractual basis at PSSCIVE, Bhopal are duly appreciated and acknowledged.

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# 1. COURSE OVERVIEW

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## COURSE TITLE: Advance Plumbing Technician

Advance Plumbing Technician is an important job role in installation and repair of advance plumbing fittings and fixtures. An Advance Plumbing Technician is responsible for installation, major repair, maintenance and servicing of advance pipes and sanitary fixtures in housing, Industrial, commercial and institutional setups as well as on special work. The person should be able to work independently on the assignment. The person should be comfortable in performing laborious work, should be a good listener, good at taking and following instructions, a good team player and result oriented with positive attitude.

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

- Communicate effectively with the customers;
- Identify the principal components of a computer system.
- Identify and control hazards in the workplace that pose a danger or threat to their safety or health, or that of others.
- Demonstrate self-management skills.
- Demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities.
- Demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection.
- Identify and demonstrate safe use of hand and power tools/equipment used in plumbing;
- Assist in preparing Plumbing drawings (Water system cold, hot, sanitation & drainage.),
- Ability to address the risk and work on systems safety (assist to develop system set up to run properly, efficiently & safely)
- Install and repair (for waste, drainage, and venting systems)
- Install and repair plumbing fixtures (sinks, faucets, sanitary wares, toilets, etc.)
- Installation of Sensor Basin Faucet, study of internal parts such as Solenoid valve, battery box with battery.
- Installation of Advanced Pipes & Fittings in current used in Residential units, practices at par with American & European Standards.
- Ability to create Standard Operating Practices (SOP) to be followed during installation of pipes, Fittings and Faucets.
- Coordinating with the senior and other working team about communicating with colleagues and seniors in order to achieve smooth and hazard free work flow.
- Maintaining a healthy, safe and secure working environment. Work effectively in a team to deliver results at a Plumbing site.

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

**COURSE LEVEL:** On completion of this course, a student can take up a course in the area of Plumbing sector.

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

Grade 11 : 300 hrs

Grade 12 : 300 hrs

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**Total : 600 hrs**

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## 2. SCHEME OF UNITS

This course is a planned sequence of instructions consisting of Units meant for developing employability and vocational competencies of students of Grades 11 and 12 opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for Grade 11 is as follows:

<b>GRADE 11</b>			
	<b>Units</b>	<b>No. of Hours for Theory and Practical 300</b>	<b>Max. Marks for Theory and Practical 100</b>
<b>Part A</b>	<b>Employability Skills</b>		
	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	
	<b>Total</b>	<b>110</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
	Unit 1: Introduction to Advance Plumbing	35	40
	Unit 2: Plumbing fittings and fixtures	45	
	Unit 3: Installation and maintenance of Plumbing	50	
	Unit 4: Health and Safety at workplace	35	
	<b>Total</b>	<b>165</b>	<b>40</b>
<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>
<b>Part D</b>	<b>Project Work/Field Visit</b>		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	<b>Total</b>	<b>15</b>	<b>15</b>
	<b>Grand Total</b>	<b>300</b>	<b>100</b>

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

<b>GRADE 12</b>			
	<b>Units</b>	<b>No. of Hours for Theory and Practical 300</b>	<b>Max. Marks for Theory and Practical 100</b>
<b>Part A</b>	<b>Employability Skills</b>		
	Unit 1: Communication Skills-IV	25	
	Unit 2: Self-management Skills-IV	25	
	Unit 3: Information and Communication Technology Skills-IV	20	

	Unit 4: Entrepreneurial Skills-IV	15	10
	Unit 5: Green Skills-IV	15	
	<b>Total</b>	<b>100</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
	Unit 1: Advance plumbing fittings and fixtures (Sensor based)	60	
	Unit 2: Advance pipes and fittings	50	
	Unit 3: Standard Operating Practices (SOP)	20	
	Unit 4: Working effectively with others	25	40
	<b>Total</b>	<b>165</b>	<b>40</b>
<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>
<b>Part D</b>	<b>Project Work/Field Visit</b>		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	<b>Total</b>	<b>15</b>	<b>15</b>
	<b>Total</b>	<b>300</b>	<b>100</b>

### 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

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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**

S.No.	Typology of Question	No. of Questions			Marks
		Very Short Answer (1 mark)	Short Answer (2 Marks)	Long Answer (3 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, provide 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
<b>Total</b>		<b>3x1=3</b>	<b>6x2=12</b>	<b>5x3=15</b>	<b>30</b> <b>(14 questions)</b>

### 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 11

#### Part A: Employability Skills

S.No.	Units	Duration (Hrs)
1.	Communication Skills - III	25
2.	Self-management Skills - III	25
3.	Information and Communication Technology Skills- III	20
4.	Entrepreneurial Skills - III	25
5.	Green Skills - III	15
<b>Total</b>		<b>110</b>

<b>Unit 1: Communication Skill - III</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 Hrs)</b>
<b>1. Demonstrate knowledge of communication</b>	1. Introduction to communication process 2. Importance of communication 3. Elements of communication 4. Perspectives in communication 5. Effective communication	1. Role play on the communication process 2. Group discussion on the importance of communication and factors affecting perspectives in communication 3. Charts preparation on elements of communication 4. Classroom discussion on the 7Cs (i.e. Clear, Concise, Concrete, Correct, Coherent, Courteous and Complete) for effective communication	<b>03</b>
<b>2. Demonstrate verbal communication</b>	1. Verbal communication 2. Public Speaking	1. Role-play of a phone conversation 2. Group activity on delivering a speech and practicing public speaking	<b>02</b>
<b>3. Demonstrate non-verbal communication</b>	1. Importance of non-verbal communication 2. Types of non-verbal communication 3. Visual communication	1. Role-play on non-verbal communication 2. Group exercise and discussion on Do's and Don'ts to avoid body language mistakes 3. Group activity on methods of communication	<b>02</b>
<b>4. Demonstrate speech using correct pronunciation</b>	1. Pronunciation basics 2. Speaking properly 3. Phonetics 4. Types of sounds	1. Group activities on practicing pronunciation	<b>01</b>
<b>5. Apply an assertive communication style</b>	1. Important communication styles 2. Assertive communication 3. Advantages of assertive communication 4. Practicing assertive	1. Group discussion on communication styles 2. Group discussion on observing and sharing communication styles	<b>03</b>

	communication		
<b>6. Demonstrate the knowledge of saying no</b>	1. Steps for saying 'No' 2. Connecting words	1. Group discussion on how to say 'No'	<b>02</b>
<b>7. Identify and use parts of speech in writing</b>	1. Capitalisation 2. Punctuation 3. Basic parts of speech 4. Supporting parts of speech	1. Group activity on identifying parts of speech 2. Writing a paragraph with punctuation marks 3. Group activity on constructing sentences 4. Group activity on identifying parts of speech	<b>03</b>
<b>8. Write correct sentences and paragraphs</b>	1. Parts of a sentence 2. Types of object 3. Types of sentences 4. Paragraph	1. Activity on framing sentences 2. Activity on active and passive voice 3. Assignment on writing different types of sentences	<b>02</b>
<b>9. Communicate with people</b>	1. Greetings 2. Introducing self and others	1. Role-play on formal and informal greetings 2. Role-play on introducing someone 3. Practice and group discussion on how to greet different people?	<b>02</b>
<b>10. Introduce yourself to others and write about oneself</b>	1. Talking about self 2. Filling a form	1. Practicing self-introduction and filling up forms 2. Practicing self-introduction to others	<b>01</b>
<b>11. Develop questioning skill</b>	1. Main types of questions 2. Forming closed and open-ended questions	1. Practice exercise on forming questions 2. Group activity on framing questions	<b>01</b>
<b>12. Communicate information about family to others</b>	1. Names of relatives 2. Relations	1. Practice talking about family 2. Role-play on talking about family members.	<b>01</b>
<b>13. Describe habits and routines</b>	1. Concept of habits and routines	1. Group discussion on habits and routines 2. Group activity on describing routines	<b>01</b>
<b>14. Ask or give directions to others</b>	1. Asking for directions 2. Using landmarks	1. Role-play on asking and giving directions 2. Identifying symbols used for giving directions	<b>01</b>
<b>Total</b>			<b>25</b>



<b>Unit 2: Self-management Skills – III</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 Hrs)</b>
<b>1. Identify and analyse own strengths and weaknesses</b>	1. Understanding self 2. Techniques for identifying strengths and weaknesses 3. Difference between interests and abilities	1. Activity on writing aims in life 2. Preparing a worksheet on interests and abilities	<b>03</b>
<b>2. Demonstrate personal grooming skills</b>	1. Guidelines for dressing and grooming 2. Preparing a personal grooming checklist	1. Role-play on dressing and grooming standards 2. Self-reflection activity on various aspects of personal grooming	<b>04</b>
<b>3. Maintaining personal hygiene</b>	1. Importance of personal hygiene 2. Three steps to personal hygiene 3. Essential steps of hand washing	1. Role-play on personal hygiene 2. Assignment on personal hygiene	<b>03</b>
<b>4. Demonstrate the knowledge of working in a team and participating in group activities</b>	1. Describe the benefits of teamwork 2. Working in a team	1. Assignment on working in a team 2. Self-reflection on teamwork	<b>03</b>
<b>5. Develop networking skills</b>	1. Benefits of networking skills 2. Steps to build networking skills	1. Group activity on networking in action 2. Assignment on networking skills	<b>03</b>
<b>6. Describe the meaning and importance of self-motivation</b>	1. Meaning of self-motivation 2. Types of motivation 3. Steps to building self-motivation	1. Activity on staying motivated 2. Assignment on reasons hindering motivation	<b>03</b>
<b>7. Set goals</b>	1. Meaning of goals and purpose of goal-setting 2. Setting SMART goals	1. Assignment on setting SMART goals 2. Activity on developing long-term and short-term goals using SMART method	<b>03</b>
<b>8. Apply time management strategies and techniques</b>	1. Meaning and importance of time management 2. Steps for effective time management	1. Preparing a checklist of daily activities	<b>03</b>
<b>Total</b>			<b>25</b>

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

<b>Learning Outcome</b>	<b>Theory (08 hrs)</b>	<b>Practical (12 hrs)</b>	<b>Duration (20 Hrs)</b>
<b>1. Create a document on the word processor</b>	<ol style="list-style-type: none"> <li>1. Introduction to ICT</li> <li>2. Advantages of using a word processor.</li> <li>3. Work with Libre Office Writer</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration and practice of the following: <ul style="list-style-type: none"> <li>• Creating a new document</li> <li>• Typing text</li> <li>• Saving the text</li> <li>• Opening and saving file on Microsoft Word/Libre Office Writer</li> </ul> </li> </ol>	<b>02</b>
<b>2. Identify icons on the toolbar</b>	<ol style="list-style-type: none"> <li>1. Status bar</li> <li>2. Menu bar</li> <li>3. Icons on the Menu bar</li> <li>4. Multiple ways to perform a function</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on using basic user interface of LibreOffice writer</li> <li>2. Group activity on working with Microsoft Word</li> </ol>	<b>02</b>
<b>3. Save, close, open and print document</b>	<ol style="list-style-type: none"> <li>1. Save a word document</li> <li>2. Close a word document</li> <li>3. Open an existing document</li> <li>4. Print</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on performing the functions for saving, closing and printing documents in LibreOffice Writer</li> <li>2. Group activity on performing the functions for saving, closing and printing documents in Microsoft Word</li> </ol>	<b>02</b>
<b>4. Format text in a word document</b>	<ol style="list-style-type: none"> <li>1. Change style and size of text</li> <li>2. Align text</li> <li>3. Cut, Copy, Paste</li> <li>4. Find and replace</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on formatting text in LibreOffice Writer</li> <li>2. Group activity on formatting text in Microsoft Word</li> </ol>	<b>02</b>
<b>5. Check spelling and grammar in a word document</b>	<ol style="list-style-type: none"> <li>1. Use of spell checker</li> <li>2. Autocorrect</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on checking spellings and grammar using LibreOffice Writer</li> <li>2. Group activity on checking spellings and grammar using Microsoft Word</li> </ol>	<b>02</b>

<b>6. Insert lists, tables, pictures, and shapes in a word document</b>	<ol style="list-style-type: none"> <li>1. Insert bullet list</li> <li>2. Number list</li> <li>3. Tables</li> <li>4. Pictures</li> <li>5. Shapes</li> </ol>	<ol style="list-style-type: none"> <li>1. Practical exercise of inserting lists and tables using LibreOffice Writer</li> </ol>	<b>03</b>
<b>7. Insert header, footer and page number in a word document</b>	<ol style="list-style-type: none"> <li>1. Insert header</li> <li>2. Insert footer</li> <li>3. Insert page number</li> <li>4. Page count</li> </ol>	<ol style="list-style-type: none"> <li>1. Practical exercise of inserting header, footer and page numbers in LibreOffice Writer</li> <li>2. Practical exercise of inserting header, footer and page numbers in Microsoft Word</li> </ol>	<b>03</b>
<b>8. Make changes by using the track change option in a word document</b>	<ol style="list-style-type: none"> <li>1. Tracking option</li> <li>2. Manage option</li> <li>3. Compare documents</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on performing track changes in LibreOffice Writer</li> <li>2. Group activity on performing track changes in Microsoft Word</li> </ol>	<b>04</b>
<b>Total</b>			<b>20</b>

### Unit 4: Entrepreneurial Skills - III

<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 Hrs)</b>
<b>1. Differentiate between different kinds of businesses</b>	<ol style="list-style-type: none"> <li>1. Introduction to entrepreneurship</li> <li>2. Types of business activities</li> </ol>	<ol style="list-style-type: none"> <li>1. Role-play on different kinds of businesses around us</li> </ol>	<b>03</b>
<b>2. Describe the significance of entrepreneurial values</b>	<ol style="list-style-type: none"> <li>1. Meaning of value</li> <li>2. Values of an Entrepreneur</li> <li>3. Case study on qualities of an entrepreneur</li> </ol>	<ol style="list-style-type: none"> <li>1. Role-play on qualities of an entrepreneur</li> </ol>	<b>03</b>
<b>3. Demonstrate the attitudinal changes required to become an entrepreneur</b>	<ol style="list-style-type: none"> <li>1. Difference between the attitude of entrepreneur and employee</li> </ol>	<ol style="list-style-type: none"> <li>1. Interviewing employees and entrepreneurs</li> </ol>	<b>03</b>
<b>4. Develop thinking skills like an entrepreneur</b>	<ol style="list-style-type: none"> <li>1. Problems of entrepreneurs</li> <li>2. Problem-solving</li> <li>3. Ways to think like an entrepreneur</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on identifying and solving problems</li> </ol>	<b>04</b>
<b>5. Generate business ideas</b>	<ol style="list-style-type: none"> <li>1. The business cycle</li> <li>2. Principles of idea creation</li> </ol>	<ol style="list-style-type: none"> <li>1. Brainstorming on generating a business ideas</li> </ol>	

	3. Generating a business idea 4. Case studies		04
<b>6. Describe customer needs and the importance of conducting a customer survey</b>	1. Understanding customer needs 2. Conducting a customer survey	1. Group activity to conduct a customer survey	04
<b>7. Create a business plan</b>	1. Importance of business planning 2. Preparing a business plan 3. Principles to follow for growing a business 4. Case studies	1. Group activity on developing a business plan	04
<b>Total</b>			<b>25</b>

<b>Unit 5: Green Skills - III</b>			
<b>Learning Outcome</b>	<b>Theory (07 hrs)</b>	<b>Practical (08 hrs)</b>	<b>Duration (15 Hrs)</b>
<b>1. Describe the importance of the main sector of the green economy</b>	1. Meaning of ecosystem, food chain and sustainable development 2. Main sectors of the green economy- E-waste management, green transportation, renewal energy, green construction, and water management	1. Group discussion on sectors of green economy 2. Poster making on various sectors for promoting green economy	06
<b>2. Describe the main recommendations of policies for the green economy</b>	1. Policies for a green economy	1. Group discussion on initiatives for promoting the green economy 2. Writing an essay or a short note on the important initiatives for promoting green economy	03
<b>3. Describe the major green sectors/ areas and the role of various stakeholders in</b>	1. Stakeholders in the green economy	1. Group discussion on the role of stakeholders in the green	03

the green economy		economy 2. Making solar bulbs	
<b>4. Identify the role of government and private agencies in the green economy</b>	1. Role of the government in promoting a green economy 2. Role of private agencies in promoting green economy	1. Group discussion on the role of Government and Private Agencies in promoting a green economy 2. Poster making on green sectors	<b>03</b>
<b>Total</b>			<b>15</b>

## Part B: Vocational Skills

S. No.	Units	Duration (Hrs.)
1	Unit 1: Introduction to Advance Plumbing	35
2	Unit 2: Plumbing fittings and fixtures	45
3	Unit 3: Installation and maintenance of Plumbing	50
4	Unit 4: Health and Safety at workplace	35
	<b>Total</b>	<b>165</b>

<b>Unit 1: Introduction to Advance Plumbing</b>			
Learning Outcome	Theory 15 (Hrs)	Practical 20 (Hrs)	Duration 35 (Hrs)
<b>1. Explain the advance plumbing system</b>	1. Introduction of the advance plumbing system	1. List out the advance plumbing system	<b>02</b>
<b>2. Describe the role of advance plumbing technician</b>	1. Salient features of advance plumbing technician 2. Job opportunities for advance plumbing technician	1. Enlist the duties of advance plumbing technician	<b>02</b>
<b>3. Identify the symbols and terminologies used in plumbing installation</b>	1. Symbols and terminologies used in plumbing installation	1. Draw the line diagram of symbols used in plumbing products and plumbing installation	<b>03</b>
<b>4. Identify the different types of water lifting devices used in domestic and industrial units</b>	1. Different types of water lifting devices (Reciprocating, centrifugal and Submersible etc.)	1. List out the different types of water lifting devices used in domestic and industrial units	<b>04</b>
<b>5. Describe the capacity of</b>	1. Capacity of pumps (Horse power,	1. Calculate the horse power of	<b>05</b>

pumps required for plumbing	discharge, suction head, delivery head and head loss) 2. Chart of pump capacity	pump sets.	
6. Discuss the Indian standards applicable to plumbing system	1. Indian standards like ISI/BIS applicable to plumbing system	1. Visit the work site and identify Indian standards used in plumbing system. 2. Make a list of Indian standards like ISI/BIS applicable to plumbing system	06
7. Understand and interpret plumbing drawings, Basic building drawing, provide assistance to the architect	1. Basic building drawing 2. Importance of keeping maps/records of plumbing drawing. 3. Design the plumbing system (Supply water, Drainage and sanitation). 4. Provide assistance to the architect (Water system-cold, hot, sanitation & drainage.) and work on System Safety (system set up to run properly, efficiently and safely)	1. Draw the different plumbing systems 2. Make a schematic diagram of plumbing for water flow	07
8. Explain the process of water flow in domestic and industrial setups	1. Water flow system in domestic and industrial setups.	1. List the components of water flow system in domestic and industrial setups.	03
9. Describe the application of various types of plumbing system	1. Application of various types of plumbing system in domestic and industrial setups.	1. Identify and make a list of various types of plumbing system in domestic and industrial setups.	03
<b>Total</b>			<b>35</b>

### Unit 2: Plumbing fittings and fixtures

Learning Outcome	Theory 20 (Hrs)	Practical 25 (Hrs)	Duration 45 (Hrs)
1. Discuss various types of pipes, pipe fittings and supporting material used in plumbing and their characteristic	1. Names and characteristics of various grades of pipes, pipe fittings, fixture supports, fastening hardware, various adhesive material	1. Identify the names, grades of different pipes, pipe fittings, fixture supports. 2. List the name of major manufactures	06

<p><b>and uses</b></p>	<p>(sealants, adhesives, plumber's putty), marking material, cement mortar/concrete, applications and uses.</p>	<p>plumbing fittings and fixtures. 3. Identify the fastening hardware, various adhesive material (sealants, adhesives, plumber's putty), marking material, cement mortar/concrete used in plumbing.</p>	
<p><b>2. Explain the basic and advance plumbing tools and equipment's</b></p>	<p>1. Basic and advance Plumbing tools (sink auger, hydro-jetting machine, flex shaft drain cleaning machine, soldering torch drain, inspection camera, PEX plumbing tools and metal detector) 2. Lifting/load shifting equipment's including ladders, height scaffolding, elevated work platforms, hand trolleys, hoist and jacks used at plumbing installation sites.</p>	<p>1. Identify and list of basic and advance plumbing tools. 2. Operation and handling of different plumbing tools</p>	<p><b>10</b></p>
<p><b>3. Describe the Soil-Waste-Rainwater (SWR) Pipes &amp; fittings</b></p>	<p>1. Define the SWR 2. Role of SWR in plumbing system 3. Different types of pipe fittings- Ring Fit &amp; Seal fit etc. 4. Brief the joining/installation methods</p>	<p>1. List the use of SWR in a plumbing system 2. Make a list of different types of pipe fittings- ring fit &amp; seal fit etc 3. Draw the line diagram of any two pipe fittings 4. Demonstrate the installation process of any one pipe fittings</p>	<p><b>12</b></p>
<p><b>4. Explain the importance of handling advance plumbing tools and equipments</b></p>	<p>1. Deburring tool and Infrared thermometer and its application. 2. Gas (Any Hydro-carbon-based) leak detector instrument 3. Use of sink auger in the plumbing system. 4. PVC pipe cutter and</p>	<p>1. Draw and label the deburring tool, infrared thermometer and leak detector instrument. 2. List out the different types of sink auger. 3. Measure the</p>	<p><b>09</b></p>

	<p>advance laser distance meter.</p> <p>5. Tankless hot water heater.</p>	<p>distance by advance laser distance meter.</p> <p>4. List out the components of tankless hot water heater.</p>	
<b>5. Describe the installation of Water Meter.</b>	<p>1. Types of water meter and their application in domestic and industrial units</p> <p>2. Installation procedure of water meter.</p>	<p>1. List out the types of water meters used in domestic and industrial units.</p> <p>2. Draw the line diagram of water meter and label it.</p> <p>3. Note the reading of water meter and calculate the water consumption.</p>	<b>08</b>
<b>Total</b>			<b>45</b>

### Unit 3: Installation and maintenance of Plumbing

Learning Outcome	Theory 20 (Hrs)	Practical 30 (Hrs)	Duration 50 (Hrs)
<b>1. Discuss the importance of plumbing drawings</b>	<p>1. Why plumbing drawings?</p> <p>2. Plumbing Layout.</p> <p>3. Measurements from plumbing drawing and plans.</p>	<p>1. Extract the information from job specifications, layouts and measurements from plumbing drawing and plans.</p> <p>2. Calculate the quantity, dimensions and type of pipes, pipe fittings, devices and materials required from plumbing drawings/specifications.</p>	<b>08</b>
<b>2. Explain the planning of work schedule and work-related information.</b>	<p>1. Importance of the planning of work schedule and work-related information.</p>	<p>1. Prepare a work plan as per specified timelines.</p>	<b>03</b>
<b>3. Demonstrate the installation of sanitary waste, drainage and venting</b>	<p>1. UPVC, CPVC, SWR, installation of Pipe and fittings Vs old process of laying or joining, Cast Iron or</p>	<p>1. List the types of PVC pipes.</p> <p>2. Visit to the site and make the list of plumbing</p>	<b>12</b>



<p>systems.</p>	<p>SW pipes Cutting or Joining, etc.</p> <ol style="list-style-type: none"> <li>Installation of sanitary waste, drainage, and venting systems.</li> <li>Importance of Grouting and its application in plumbing system.</li> </ol>	<p>system.</p> <ol style="list-style-type: none"> <li>Draw the diagram of any two plumbing systems – sanitary waste, drainage, etc.</li> <li>List the process and various components of sanitary waste, drainage and venting system.</li> <li>Steps for grouting.</li> </ol>	
<p><b>4. Repair and maintenance of sanitary waste, drainage and venting systems.</b></p>	<ol style="list-style-type: none"> <li>Repair and maintenance of sanitary waste, drainage, and venting systems.</li> </ol>	<ol style="list-style-type: none"> <li>Write the procedure of repair and maintenance of:                     <ul style="list-style-type: none"> <li>-</li> <li>A. Sanitary waste,</li> <li>B. Drainage,</li> <li>C. Venting system.</li> </ul> </li> </ol>	<p><b>06</b></p>
<p><b>5. Demonstrate the installation of plumbing fixtures</b></p>	<ol style="list-style-type: none"> <li>Installation of plumbing fixtures: sinks, faucets, sanitary wares &amp; toilets</li> <li>Detecting water leaks in the pipe distribution network, identifying such leaks, repairs and following SOP before concealing UPVC Pipes inside wall.</li> <li>Installation of water tank alarm (battery and power operated).</li> </ol>	<ol style="list-style-type: none"> <li>Make a list of the types of plumbing fixtures: sinks, faucets, sanitary wares &amp; toilets.</li> <li>Draw the line diagram of plumbing fixtures: sinks, faucets, sanitary wares &amp; toilets used in a plumbing system.</li> <li>Check the water leak at your home or school.</li> <li>Draw the pipe distribution network.</li> <li>Enlist the concealing process of UPVC pipes inside the wall.</li> <li>Draw the line diagram of water tank alarm system.</li> </ol>	<p><b>12</b></p>
<p><b>6. Repair and maintenance of plumbing fixtures</b></p>	<ol style="list-style-type: none"> <li>Identification of Faults</li> <li>Repair and maintenance of</li> </ol>	<ol style="list-style-type: none"> <li>List out the faults in different plumbing fixtures.</li> <li>Write the</li> </ol>	<p><b>09</b></p>

	<p>plumbing fixtures: sinks, faucets, sanitary wares, toilets, etc.</p> <p>3. Cleaning (scale formation) of overhead tank, faucet, and others plumbing fittings.</p>	<p>procedure of repair and maintenance of plumbing fixtures.</p> <p>3. Demonstrate the cleaning process of overhead tank, faucet, and others plumbing fittings.</p>	
<b>Total</b>			<b>50</b>

### Unit 4: Health and Safety at workplace

Learning Outcome	Theory 15 (Hrs)	Practical 20 (Hrs)	Duration 35 (Hrs)
<b>1. Discuss the safety and health-related problems while incorrect handling of tools and equipment's</b>	<p>1. Safety and health-related problems faced in domestic and industrial units.</p> <p>2. Potential injuries and health problems associated with incorrect handling of tools and equipment.</p>	<p>1. List out the various health and safety precautions to be considered during plumbing work.</p> <p>2. Demonstrate the process of providing cardio pulmonary resuscitation (CPR).</p>	<b>05</b>
<b>2. Enlist the various types of hazards</b>	<p>1. Various types of hazards (such as physical, mechanical, fire, chemical and electrical) during plumbing installation and maintenance along with precautions and remedials.</p>	<p>1. List out the various types of hazards (such as physical, mechanical, fire, chemical and electrical).</p>	<b>03</b>
<b>3. Explain the importance of various types of personal protective equipment (PPE).</b>	<p>1. Importance of various types of PPE</p>	<p>1. Make a sketch of various types of PPE.</p>	<b>02</b>
<b>4. Explain the various types of safety signs and their significance in the work place.</b>	<p>1. Various types of safety signs and their significance in the work place.</p>	<p>1. Draw the sketch of various types of safety signs and their significance in the work place.</p>	<b>05</b>
<b>5. Enlist the fire extinguisher techniques</b>	<p>1. Different techniques that employ various methods (such as using extinguishers, water hose, sprinklers, sand bucket, wet blanket,</p>	<p>1. List out the various items used for fire protection.</p>	<b>05</b>

	etc.) and materials such as water, powder, foam, CO <sub>2</sub> .		
<b>6. Describe various rescue techniques during a fire hazard or electrocution.</b>	1. Rescue techniques during a fire hazard or electrocution.	1. Dramatize workplace emergency and evacuation procedures using role plays.	<b>05</b>
<b>7. Discuss various appropriate basic first aid treatment relevant to the condition</b>	1. Basic first aid treatment relevant to the condition e.g. shock, electrical shock, bleeding, minor burns, poisoning, eye injuries etc.	1. Perform various appropriate first aid treatment for various conditions such as bleeding, burns, choking, electric shock and poisoning and injury. 2. Dramatize, using role play, safe methods of freeing a person from electrocution.	<b>08</b>
<b>8. List the Awareness on occupation safety and health (OSH) related to the job</b>	1. OSH and practices to be observed as a precaution.	1. Write the precautions of OSH during plumbing work.	<b>02</b>
<b>Total</b>			<b>35</b>

## GRADE 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
	<b>Total</b>	<b>110</b>

<b>Unit 1: Communication Skills - IV</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 Hrs)</b>
<b>1. Demonstrate active listening skills</b>	1. Active listening - listening skill, stages of active listening 2. Overcoming barriers to active listening	1. Group discussion on factors affecting active listening 2. Poster making on steps for active listening 3. Role-play on negative effects of not listening actively	<b>10</b>
<b>2. Identify the parts of speech</b>	1. Parts of speech – using capitals, punctuation, basic parts of speech, Supporting parts of speech	1. Group practice on identifying parts of speech 2. Group practice on constructing sentences	<b>10</b>
<b>3. Write sentences</b>	1. Writing skills to practice the following: <ul style="list-style-type: none"> <li>• Simple sentence</li> <li>• Complex sentence</li> <li>• Types of object</li> </ul> 2. Identify the types of sentences <ul style="list-style-type: none"> <li>• Active and Passive sentences</li> <li>• Statement/</li> <li>• Declarative sentence</li> <li>• Question/</li> <li>• Interrogative sentence</li> <li>- Emotion/ Reaction or Exclamatory sentence</li> <li>- Order or Imperative sentence</li> </ul> 3. Paragraph writing	1. Group activity on writing sentences and paragraphs 2. Group activity on practicing writing sentences in active or passive voice 3. Group activity on writing different types of sentences (i.e., declarative, exclamatory, interrogative and imperative)	<b>05</b>
<b>Total</b>			<b>25</b>

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

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 Hrs)
<b>1. Describe the various factors influencing motivation and positive attitude</b>	<ol style="list-style-type: none"> <li>Motivation and positive attitude</li> <li>Intrinsic and extrinsic motivation</li> <li>Positive attitude – ways to maintain positive attitude</li> <li>Stress and stress management - ways to manage stress</li> </ol>	<ol style="list-style-type: none"> <li>Role-play on avoiding stressful situations Activity on listing negative situations and ways to turn it positive</li> </ol>	<b>10</b>
<b>2. Describe how to become result oriented</b>	<ol style="list-style-type: none"> <li>How to become result oriented?</li> <li>Goal setting – examples of result-oriented goals</li> </ol>	<ol style="list-style-type: none"> <li>Group activity on listing aim in life</li> </ol>	<b>05</b>
<b>3. Describe the importance of self-awareness and the basic personality traits, types and disorders</b>	<ol style="list-style-type: none"> <li>Steps towards self-awareness</li> <li>Personality and basic personality traits</li> <li>Common personality disorders-                             <ul style="list-style-type: none"> <li>Suspicious</li> <li>Emotional and impulsive</li> <li>Anxious</li> </ul> </li> <li>Steps to overcome personality disorders</li> </ol>	<ol style="list-style-type: none"> <li>Group discussion on self-awareness</li> <li>Group discussion on common personality disorders</li> <li>Brainstorming steps to overcome personality disorder</li> </ol>	<b>10</b>
<b>Total</b>			<b>25</b>

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

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 Hrs)
<b>1. Identify the components of a spreadsheet application</b>	<ol style="list-style-type: none"> <li>Getting started with spreadsheet - types of a spreadsheet, steps to start LibreOffice Calc., components of a worksheet</li> </ol>	<ol style="list-style-type: none"> <li>Group activity on identifying components of spreadsheet in LibreOffice Calc</li> </ol>	<b>02</b>
<b>2. Perform basic operations in a spreadsheet</b>	<ol style="list-style-type: none"> <li>Opening workbook and entering data – types of data, steps to enter data, editing and deleting data in a cell</li> <li>Selecting multiple cells</li> </ol>	<ol style="list-style-type: none"> <li>Group activity on working with data on LibreOffice Calc</li> </ol>	<b>03</b>

	<ol style="list-style-type: none"> <li>3. Saving the spreadsheet in various formats</li> <li>4. Closing the spreadsheet</li> <li>5. Opening the spreadsheet</li> <li>6. Printing the spreadsheet</li> </ol>		
<p><b>3. Demonstrate the knowledge of working with data and formatting text</b></p>	<ol style="list-style-type: none"> <li>1. Using a spreadsheet for 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</li> <li>2. Need to format cell and content</li> <li>3. Changing text style and font size</li> <li>4. Align text in a cell</li> <li>5. Highlight text</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on formatting a spreadsheet in LibreOffice Calc</li> <li>2. Group activity on performing basic calculations in LibreOffice Calc.</li> </ol>	<b>02</b>
<p><b>4. Demonstrate the knowledge of using advanced features in spreadsheet</b></p>	<ol style="list-style-type: none"> <li>1. Sorting data</li> <li>2. Filtering data</li> <li>3. Protecting spreadsheet with password</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on sorting data in LibreOffice Calc</li> </ol>	<b>03</b>
<p><b>5. Make use of the software used for making slide presentations</b></p>	<ol style="list-style-type: none"> <li>1. Presentation software available</li> <li>2. Steps to start LibreOffice Impress</li> <li>3. Adding text to a presentation</li> </ol>	<ol style="list-style-type: none"> <li>1. Group practice on working with LibreOffice Impress tools</li> </ol>	<b>02</b>
<p><b>6. Demonstrate the knowledge to open, close and save slide presentations</b></p>	<ol style="list-style-type: none"> <li>1. Open, Close, Save and Print a slide presentation</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on saving, closing and opening a presentation in LibreOffice Impress</li> </ol>	<b>01</b>
<p><b>7. Demonstrate the operations related to slides and texts in the presentation</b></p>	<ol style="list-style-type: none"> <li>1. 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</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on working with font styles in LibreOffice Impress</li> </ol>	<b>04</b>

<b>8. Demonstrate the use of advanced features in a presentation</b>	<ol style="list-style-type: none"> <li>1. Advanced features used in a presentation</li> <li>2. Inserting shapes in the presentation</li> <li>3. Inserting clipart and images in a presentation</li> <li>4. Changing slide layout</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on changing slide layout on LibreOffice Impress</li> </ol>	<b>03</b>
<b>Total</b>			<b>20</b>

### Unit 4: Entrepreneurial Skills - IV

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 Hrs)
<b>1. Describe the concept of entrepreneurship and the types and roles and functions entrepreneur</b>	<ol style="list-style-type: none"> <li>1. Entrepreneurship and entrepreneur</li> <li>2. Characteristics of entrepreneurship</li> <li>3. Entrepreneurship-art and science</li> <li>4. Qualities of a successful entrepreneur</li> <li>5. Types of entrepreneurs</li> <li>6. Roles and functions of an entrepreneur</li> <li>7. What motivates an entrepreneur</li> <li>8. Identifying opportunities and risk-taking</li> <li>9. Startups</li> </ol>	<ol style="list-style-type: none"> <li>1. Group discussion on the topic "An entrepreneur is not born but created".</li> <li>2. Conducting a classroom quiz on various aspects of entrepreneurship.</li> <li>3. Chart preparation on types of entrepreneurs</li> <li>4. Brainstorming activity on What motivates an entrepreneur</li> </ol>	<b>10</b>
<b>2. Identify the barriers to entrepreneurship</b>	<ol style="list-style-type: none"> <li>1. Barriers to entrepreneurship</li> <li>2. Environmental barriers</li> <li>3. No or faulty business plan</li> <li>4. Personal barriers</li> </ol>	<ol style="list-style-type: none"> <li>1. Group discussion about "What we fear about entrepreneurship"</li> <li>2. Activity on taking an interview of an entrepreneur.</li> </ol>	<b>05</b>
<b>3. Identify the attitude that make an entrepreneur successful</b>	<ol style="list-style-type: none"> <li>1. Entrepreneurial attitude</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on identifying entrepreneurial attitude.</li> </ol>	<b>05</b>
<b>4. Demonstrate the knowledge of entrepreneurial attitude and competencies</b>	<ol style="list-style-type: none"> <li>1. Entrepreneurial competencies</li> <li>2. Decisiveness</li> <li>3. Initiative</li> <li>4. Interpersonal skills- positive attitude,</li> </ol>	<ol style="list-style-type: none"> <li>1. Playing games, such as "Who am I".</li> <li>2. Brainstorming a business ideas</li> <li>3. Group practice on "Best out of Waste"</li> </ol>	<b>05</b>

	<p>stress management</p> <p>5. Perseverance</p> <p>6. Organisational skills-time management, goal setting, efficiency, managing quality.</p>	<p>4. Group discussion on the topic of "Let's grow together"</p> <p>5. Group activity on listing stress and methods to deal with it like Yoga, deep breathing exercises, etc.</p> <p>6. Group activity on time management</p>	
<b>Total</b>			<b>25</b>

### Unit 5: Green Skills - V

Learning Outcome	Theory (05 hrs)	Practical (10 hrs)	Duration (15 Hrs)
<b>1. Identify the benefits of the green jobs</b>	<p>1. Green jobs</p> <p>2. Benefits of green jobs</p> <p>3. Green jobs in different sectors:</p> <ul style="list-style-type: none"> <li>• Agriculture</li> <li>• Transportation</li> <li>• Water conservation</li> <li>• Solar and wind energy</li> <li>• Eco-tourism</li> <li>• Building and construction</li> <li>• Solid waste management</li> <li>• Appropriate technology</li> </ul>	<p>1. Group discussion on the importance of green job</p> <p>2. Chart preparation on green jobs in different sectors</p>	<b>08</b>
<b>2. State the importance of green jobs</b>	<p>1. Importance of green jobs in</p> <ul style="list-style-type: none"> <li>• Limiting greenhouse gas emissions</li> <li>• Minimising waste and pollution</li> <li>• Protecting and restoring ecosystems</li> <li>• Adapting to the effects of climate change</li> </ul>	<p>1. Preparing posters on green jobs</p> <p>2. Group activity on tree plantation</p> <p>3. Brainstorming different ways of minimising waste and pollution</p>	<b>07</b>
<b>Total</b>			<b>15</b>



## PART B: VOCATIONAL SKILLS

S.No.	Units	Duration (Hrs.)
1	Unit 1: Advance plumbing fittings and fixtures (Sensor based)	60
2	Unit 2: Advance pipes and fittings	50
3	Unit 3: Standard Operating Practices (SOP)	20
4	Unit 4: Working effectively with others	25
	<b>Total</b>	<b>165</b>

<b>Unit 1: Installation of plumbing fixtures</b>			
Learning Outcome	Theory 24 (Hrs)	Practical 36 (Hrs)	Duration 60 (Hrs)
<b>1. Explain various sensors used in plumbing system</b>	1. Introduction to sensors used in plumbing system and its application.	1. Identify the sensors used in plumbing system.	<b>03</b>
<b>2. Understand the internal parts of sensor based plumbing system</b>	1. Solenoid valve, battery box, battery and its application. 2. Installation and replacement of battery in sensor-based faucet.	1. Draw the line diagram of solenoid valve, battery box, battery and label it. 2. List out the use of Solenoid valve, battery box and battery .	<b>06</b>
<b>3. Understand the concept of sensor-based faucets and their types.</b>	1. Concept of sensor-based faucet and their types.	1. List out the various types of sensor-based faucets.	<b>02</b>
<b>4. Explain the selection criteria for sensor-based faucet.</b>	1. Selection criteria of the sensor-based faucet.	1. Enlist the selection criteria of sensor-based faucet.	<b>03</b>
<b>5. Installation of sensor-based faucet.</b>	1. Installation procedure of sensor-based faucet.	1. Visit the work site and identify the components of sensor-based faucet. 2. List the components of sensor-based faucet.	<b>10</b>

<p><b>6. Discuss the repairing process of sensor-based faucet.</b></p>	<p>1. Repair of sensor-based faucet.</p>	<p>1. Draw the line diagram of sensor-based faucet.</p>	
<p><b>7. Installation of sensor-based urinal.</b></p>	<p>1. Importance of sensor-based urinal. 2. Components of the sensor-based urinal.</p>	<p>1. Visit the work site and identify the components of sensor-based urinal. 2. Make a list of components and procedure of installation of the sensor-based urinal. 3. Draw the line diagram of the sensor-based urinal and label it.</p>	<p><b>10</b></p>
<p><b>8. Discuss the repairing process of sensor-based urinal.</b></p>	<p>1. Repairing process of sensor-based urinal and its application.</p>	<p>1. Enlist the advantage and disadvantages of sensor-based urinal.</p>	<p><b>02</b></p>
<p><b>9. Installation of sensor-based cistern.</b></p>	<p>1. Importance of sensor-based cistern. 2. Components of sensor-based cistern.</p>	<p>1. Visit the work site and identify the components of sensor-based cistern. 2. Make a list of components and procedure of installation of the sensor-based cistern. 3. Draw the line diagram of the sensor-based cistern and label it.</p>	<p><b>10</b></p>
<p><b>10. Discuss the repairing process of sensor-based urinal.</b></p>	<p>1. Sensor-based urinal and its application.</p>	<p>1. Enlist the advantage and disadvantages of sensor-based urinal.</p>	<p><b>02</b></p>
<p><b>11. Understand the working procedure of sensor-based shower.</b></p>	<p>1. Use of sensor-based shower. 2. Components of sensor-based shower. 3. Advantages and disadvantages of the sensor-based shower.</p>	<p>1. Visit the work site and identify the components of sensor-based shower. 2. Make a list of components of sensor-based shower. 3. Enlist the advantage and disadvantages of the sensor-based</p>	<p><b>06</b></p>

		shower.	
<b>12. Installation and repair of the sensor-based shower.</b>	1. Installation procedure and repair of the sensor-based shower.	1. Visit the work site and understand the installation and repair sensor-based shower etc. 2. Draw the line diagram of the sensor-based shower and label it.	<b>06</b>
<b>Total</b>			<b>60</b>

### Unit 2: Advance Pipe Fittings

Learning Outcome	Theory 20 (Hrs)	Practical 30 (Hrs)	Duration 50 (Hrs)
<b>1. Installation of advance pipe fittings</b>	1. Advanced Pipe Fittings used in Residential units at par with American and European Standards.	1. Make a list of advance pipe fittings used in residential units. 2. Draw the line diagram of advance pipes (any two fittings used in residential units) and label it.	<b>05</b>
<b>2. Understand the sewer line for house connections</b>	1. Service connections, Connecting house sewer lines through master chamber to main chamber.	1. Draw the line diagram of house sewer line connecting through chambers to mains. 2. List the components used in the house sewer line connecting through chambers to mains.	<b>05</b>
<b>3. Explain the drinking water connection from municipal pipe line through water meter</b>	1. Drinking water connection from municipal pipe line to overhead / underground storage tank through water meter (with or without).	1. Visit the work site and draw the line diagram of overhead / underground storage tank and label it.	<b>07</b>
<b>4. Discuss the Rainwater Harvesting Filter Column for Bore-well recharging system.</b>	1. Rainwater harvesting filter column for bore-well recharging system.	1. Draw the line diagram of Rainwater Harvesting Filter Column. 2. List the components of	<b>05</b>

		the rainwater harvesting filter column for bore-well recharging system.	
<b>5. Describe the rainwater harvesting filter column for connection to underground storage tank.</b>	1. Rainwater harvesting filter column for connection to underground storage tank.	1. List the components of the rainwater harvesting filter column for connection to the underground storage tank.	<b>03</b>
<b>6. Installation of Water Closet – Floor &amp; Wall Mounting Units.</b>	1. Installation and applications of Water Closet – Floor & Wall Mounting Units.	1. Make a list of different types of Water Closet.	<b>05</b>
<b>7. Understand the installation process of Solar water heater.</b>	1. Installation of Solar water heater. 2. Advantage and disadvantages of Solar water heater.	1. Draw the line diagram of Solar water heater and label it. 2. Enlist the installation process of Solar water heater. 3. List the advantage and disadvantages of Solar water heater.	<b>10</b>
<b>8. Demonstration of Hydro-Pneumatic Water pressure Pumping system.</b>	1. Hydro-Pneumatic Water pressure Pumping system, and its application.	1. Visit the work site and draw the line diagram of hydro-pneumatic water pressure pumping system. 2. List the advantage and disadvantages of hydro-pneumatic water pressure pumping system.	<b>10</b>
<b>Total</b>			<b>50</b>

### Unit 3: Standard Operating Practices (SOP)

Learning Outcome	Theory 08 (Hrs)	Practical 12 (Hrs)	Duration 20 (Hrs)
<b>1. Understand the standard Operating Practices (SOP) to be followed during installation of pipes and</b>	1. Importance of SOP in plumbing work. 2. SOP to be followed during installation of pipes and fittings.	1. Make a list of SOP to be followed during installation of pipes and fittings.	<b>03</b>

fittings.			
<b>2. Create a SOP of Plumbing for various types of cold and hot water pipe systems</b>	<ol style="list-style-type: none"> <li>Application of SOP in Plumbing for various types of cold and hot water pipe system (Cutting, fitting and fixing of UPVC, CPVC, etc. pipes and fitting using cold-welding joint).</li> </ol>	<ol style="list-style-type: none"> <li>Visit the work site and identify various types of cold and hot water pipe system.</li> <li>Draw the line diagram of cold-welding joint and describe it.</li> </ol>	<b>07</b>
<b>3. Describe the Occupation Health and Safety (OHS)</b>	<ol style="list-style-type: none"> <li>Applications of OHS Practices: <ul style="list-style-type: none"> <li>Fire Sprinklers in workplace &amp; installation</li> <li>General introduction of Tools &amp; Equipment.</li> <li>Awareness of OHS related to the job</li> <li>SOP during installation of advanced Water Faucets ( single leaver diverter, concealed flush tank, telephonic mixers, taps, valves, non-return valves, electric water heaters etc).</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>Make a list of various types of OHS Practices.</li> <li>Draw the line diagram of Fire Sprinklers in workplace.</li> <li>List the Tools and Equipment during OHS.</li> <li>Enlist the installation process of faucets (single leaver diverter, concealed flush tank, telephonic mixers, taps, valves, non-return valves, electric water heaters etc).</li> </ol>	<b>08</b>
<b>4. Discuss the SOP during installation of advanced sanitary ware</b>	<ol style="list-style-type: none"> <li>SOP during installation of advanced sanitary ware (Wall Hung EWC, Above Counter Wash Basin, kitchen Sink etc).</li> </ol>	<ol style="list-style-type: none"> <li>Enlist the installation process of advanced sanitary ware (Wall Hung EWC, Above Counter Wash Basin, kitchen Sink etc).</li> </ol>	<b>02</b>
<b>Total</b>			<b>20</b>

### Unit 4: Working Effectively With Others

Learning Outcome	Theory (Hrs)	Practical (Hrs)	Duration 35 (Hrs)
<b>1. List out various components of effective communication in the workplace and its importance.</b>	<ol style="list-style-type: none"> <li>Various components of effective communication.</li> <li>Clarity of work.</li> <li>State the importance of effective</li> </ol>	<ol style="list-style-type: none"> <li>Demonstrate techniques used for ensuring timely receipt of complete information and instructions from</li> </ol>	<b>05</b>

	communication in the workplace.	appropriate sources. 2. Apply practices that improve effectiveness while providing information.	
<b>2. State the importance of using inclusive language</b>	1. Importance of using inclusive language (verbal, non-verbal and written) that is gender, disability and culturally sensitive.	1. Demonstrate the use of inclusive language (verbal, non-verbal and written) that is gender, disability and culturally sensitive. 2. Illustrate the use of appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism.	<b>05</b>
<b>3. Discuss the importance of teamwork and developing effective work culture.</b>	1. Importance of teamwork and developing effective work culture, discipline interpersonal relationship, integrity, attitudinal and behavioural change.	1. Dramatize a situation to show effective teamwork. 2. Dramatize (through role-play) disciplined behaviours at the workplace.	<b>05</b>
<b>4. Discuss the importance and ways of managing interpersonal conflict effectively.</b>	1. Importance and ways of managing interpersonal conflict effectively.	3. Dramatize (through role-play) the process of escalation of grievances and problems.	<b>02</b>
<b>5. Discuss the express and address grievances appropriately and effectively.</b>	1. How to express and address grievances appropriately and effectively?		<b>02</b>
<b>6. Explain the importance of ethics and discipline.</b>	1. Importance of ethics and discipline.		<b>02</b>
<b>7. Discuss the importance of dress code in organisations.</b>	1. Importance of dress code in organisations.	1. Identify the dress code in organisations.	<b>02</b>
<b>8. List the indicators of harassment and</b>	1. Indicators of harassment and discrimination based	1. Recognize the indicators of harassment and	<b>04</b>

<b>discrimination at workplace.</b>	on gender, disability, caste, religion or culture that occurs at workplace.	discrimination based on gender, disability, caste, religion, colour, sexual orientation and culture at workplace.	
<b>9. Explain general organisational norms against harassment and discrimination.</b>	1. General organisational norms and procedures applied to protect against harassment and discrimination.	1. List the general organizational norms.	<b>03</b>
<b>10. Discuss the incidents of harassment and discrimination to appropriate authority</b>	1. Importance of reporting incidents of harassment and discrimination to appropriate authority.	1. Make a report for incidents of harassment and discrimination at work place.	<b>05</b>
<b>Total</b>			<b>35</b>

## 6. ORANISATION 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 Plumbing site and observe the following: Location, Site, Plumbing site, Office building, newly constructed site, building store, Plumbing site. During the visit, students should obtain the following information from the owner or the supervisor of the Plumbing site:

1. Plumbing site activity being taken
2. Residential/Commercial project
3. Technology adopted
4. Type of material used
5. Sale procedure
6. Manpower engaged
7. Total expenditure of project
8. Total annual income
9. Profit/Loss (Annual)
10. Any other information

## 7. LIST OF EQUIPMENT AND MATERIALS

The tools, equipment and materials required for training are as follos:

1. Pipe wrench,
2. Parrot pliers,
3. Slide wrench,
4. Die set complete,
5. Hacksaw
6. pipe vice,

7. Screw drivers set,
8. Double Ended spanner set,
9. Allen Key set,
10. Drill bit set,
11. Drilling Machine,
12. Caulking tools
13. Hammers,
14. Measuring tape, plumb,
15. L-Square,
16. Spirit Level,
17. Hydraulic water pressure Machine,
18. Smoke Generator for testing of pipes and joints,
19. Pressure gauge,
20. Powered pipe threading machine,
21. Taps/faucets,
22. Shower head complete,
23. Sink, Sink auger
24. Flushing tanks,
25. Urinal,
26. Urinal flush,
27. Bidet,
28. Bath tub,
29. Geysers/ Water heater
30. Clamps and Hangers,
31. Advance pipe fittings and fixtures,
32. Fittings and accessories as required.
33. Special tools
34. Advance fixtures and fittings

## 8. VOCATIONAL TEACHERS’/TRAINERS’ QUALIFICATIONS AND GUIDELINES

**Q**ualification 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 Civil Engineering, Agricultural Engineering ,Mechanical Engineering and B.Voc. (Bachelor in Vocation) from a recognized Institute /University, with at least 1 year work/teaching experience Or Diploma in Civil Engineering , Agricultural Engineering and Mechanical Engineering with 2 year work/teaching experience	<ul style="list-style-type: none"> <li>• Effective communication skills (oral and written)</li> <li>• Basic computing skills.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimum 18 Years</li> <li>• Age relaxation to be provided as per Govt. rules.</li> </ul>



These guidelines have been prepared with an aim to help and guide the States in engaging quality Vocational Teachers/Trainers in schools. Various parameters that need to be looked into while engaging the Vocational Teachers/Trainers are the 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:

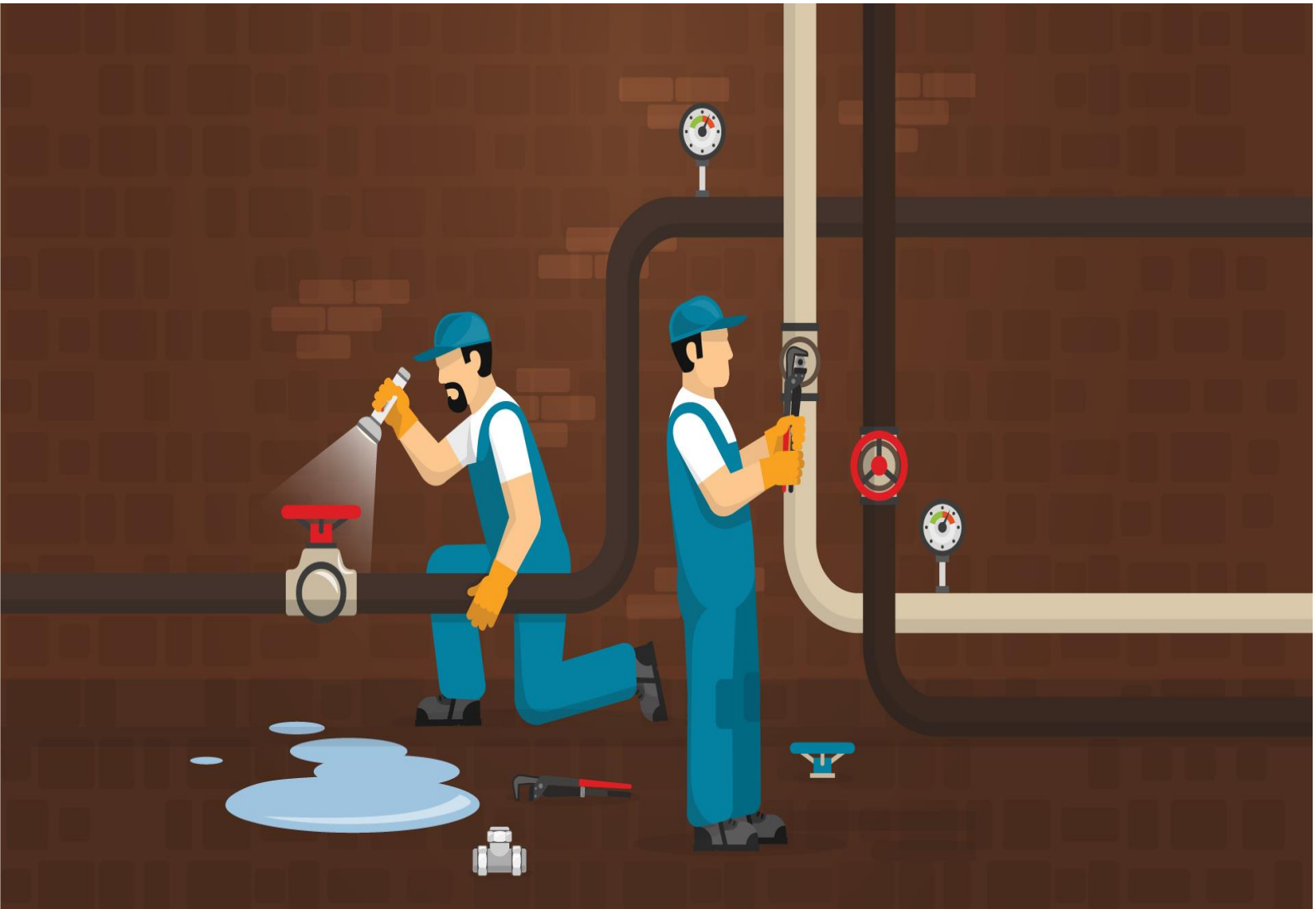
- (i) Prepare session plans and deliver sessions which have a clear and relevant purpose and which engage the students;
- (ii) Deliver education and training activities to students, based on the curriculum to achieve the learning outcomes;
- (iii) Make effective use of learning aids and ICT tools during 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 Grade 10 or Grade 12;
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

1. Jay Prakash Lall, Former Executive Director, AFC India, K-685, Aashiyana kanpur road, Lucknow-226012, India
2. Dr. Tikendra Nath Verma, Assistant Professor, Department of Mechanical Engineering, MANIT, Bhopal- 462003, India
3. Dr. Ravi Kumar Mandava, Assistant Professor, Department of Mechanical Engineering, MANIT, Bhopal- 462003, India
4. Dr. Gaurav Dwivedi, Assistant Professor, Energy Centre, MANIT, Bhopal- 462003, India
5. Ayushi Seeliya, Assistant Professor, Department of Civil Engineering, IES college, Bhopal (M.P.), India
6. Dr. Satyendra Thakur, Assistant Professor, Engineering and Technology Department, PSS Central Institute of Vocational Education, Bhopal (M.P.), India
7. Er. Neeraj Bhandari, Assistant Professor, Engineering and Technology Department, PSS Central Institute of Vocational Education, Bhopal (M.P.), India
8. Manoj Darwai, Assistant Professor, Engineering and Technology Department, PSS Central Institute of Vocational Education, Bhopal (M.P.), India
9. Prof. Saurabh Prakash, Coordinator and Head, Engineering and Technology Department, PSS Central Institute of Vocational Education, Bhopal (M.P.), India



**PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION**  
**Shyamla Hills, Bhopal-462002, M.P., India**