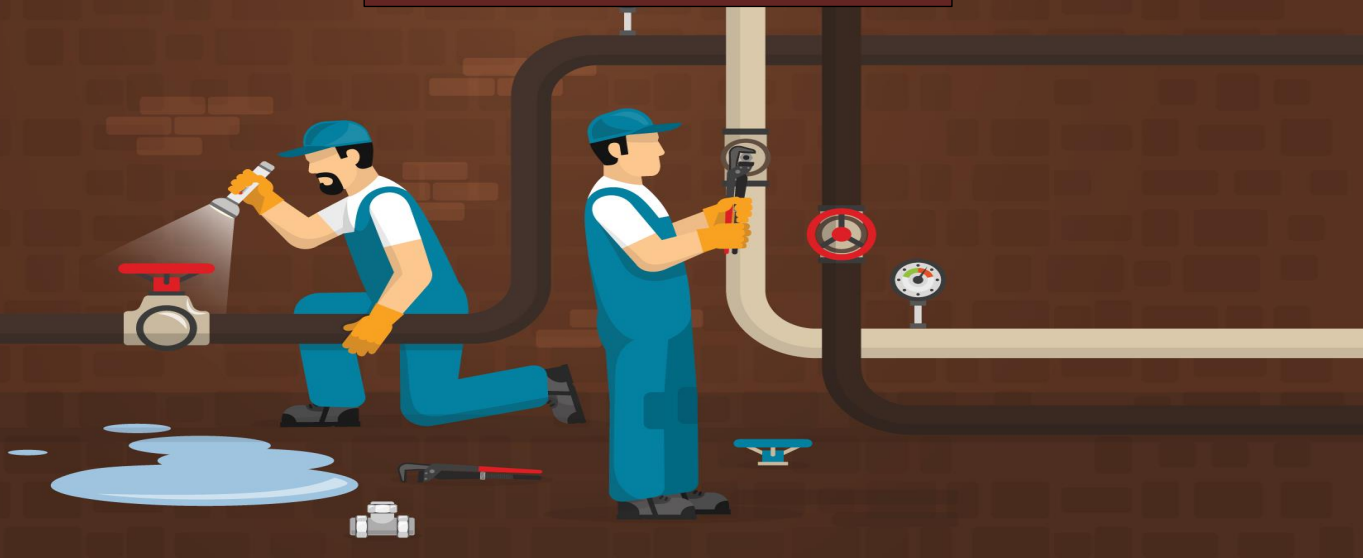


LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE: PLUMBER-GENERAL

(QUALIFICATION PACK: Ref. Id. PSC/Q0104)

SECTOR: PLUMBING
Grades 11 and 12

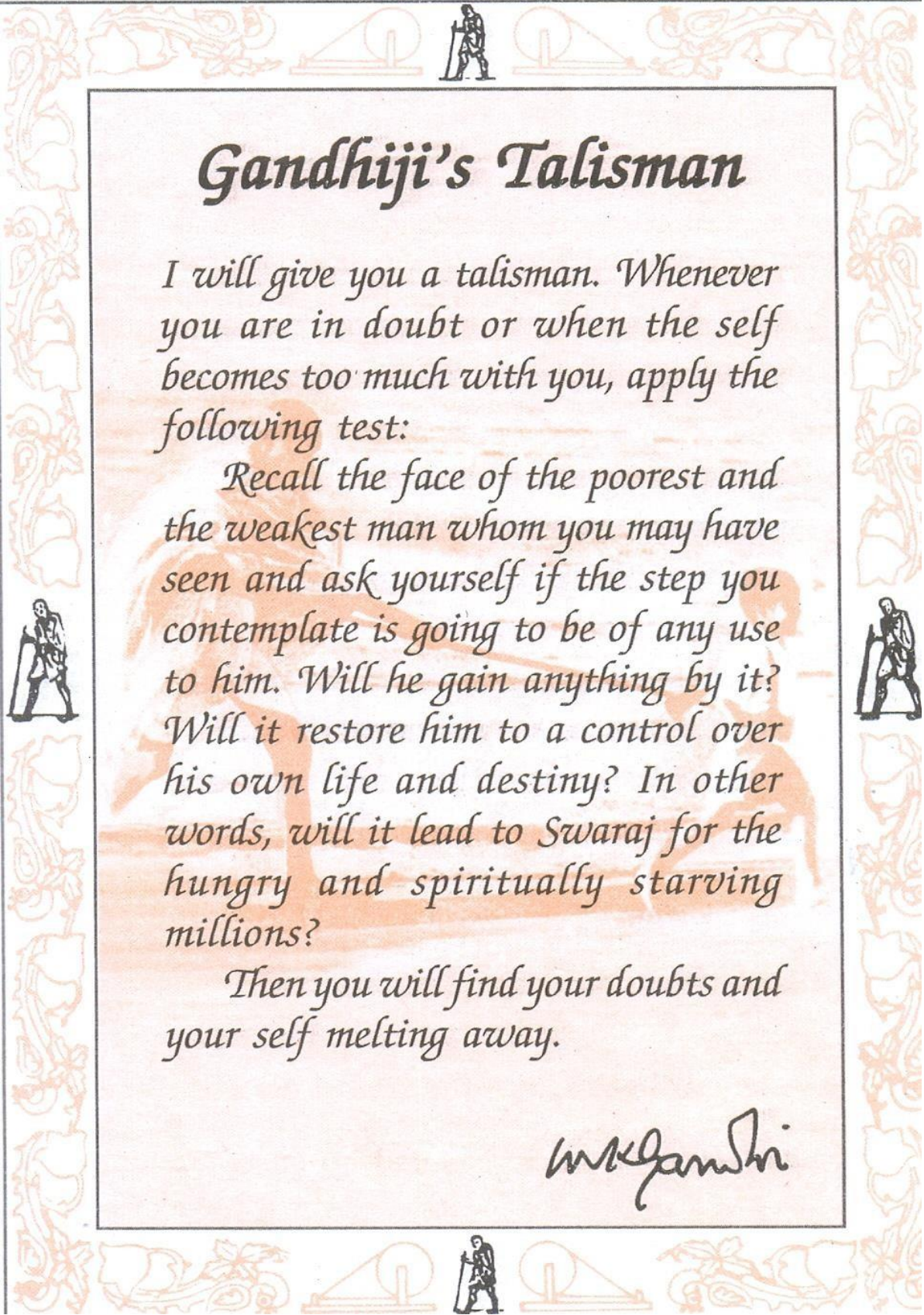


PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION

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

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

<http://www.psscive.ac.in>



Gandhiji's Talisman

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

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

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

M.K. Gandhi

LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

Job Role: Plumber-General

(QUALIFICATION PACK: Ref. Id. PSC/Q0104)

SECTOR: Plumbing

Classes 11 and 12



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**LEARNING OUTCOME BASED
VOCATIONAL CURRICULUM**

**Plumber-General,
February, 2023**

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<http://www.psscive.ac.in>

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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 Plumber-General. The curriculum has been developed for the secondary students of grades 09 and 10 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 Er. Hemant Wadikar, Dr. Abhay Kumar Jha, Ms. Pooja Sharma, Ms. Gunjan Aneja, Dr. Manoj Arya 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

COURSE TITLE: Plumber – General

Plumber – General is an important job role in installation and repair of plumbing fittings and fixtures. A Plumber- General is responsible for installation, major repair, maintenance and servicing of 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;
- Gain insight into Plumber -General job role and its career progression.
- Do installation of basic sanitary fixtures in housing, commercial and institutional setups.
- Do repairing of basic plumbing systems, repair of pipes and sanitary fixtures in housing, commercial and institutional setups.
- Maintenance and servicing of plumbing systems in housing, commercial and institutional setups.
- 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
Total	: 600 hrs

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:

GRADE 11			
	Units	No. of Hours for Theory and Practical 300	Max. Marks for Theory and Practical 100
Part A	Employability Skills		
	Unit 1: Communication Skills-III	25	10
	Unit 2: Self-management Skills-III	25	
	Unit 3: Information and Communication Technology Skills-III	20	
	Unit 4: Entrepreneurial Skills-III	25	
	Unit 5: Green Skills-III	15	
	Total	110	10
Part B	Vocational Skills		
	Unit 1: Introduction to the sector and the job role	15	40
	Unit 2: Basics of plumbing	30	
	Unit 3: Preparation for plumbing installation and maintenance	30	
	Unit 4: Installation of water supply system	52	
	Unit 5: Installation of drainage system	38	
	Total	165	40
Part C	Practical Work		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	Total	10	35
Part D	Project Work/Field Visit		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	Total	15	15
	Grand Total	300	100

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

GRADE 12			
	Units	No. of Hours for Theory and Practical 300	Max. Marks for Theory and Practical 100
Part A	Employability Skills		
	Unit 1: Communication Skills-IV	25	
	Unit 2: Self-management Skills-IV	25	

	Unit 3: Information and Communication Technology Skills-IV	20	10
	Unit 4: Entrepreneurial Skills-IV	15	
	Unit 5: Green Skills-IV	15	
	Total	100	10
Part B	Vocational Skills		
	Unit 1: Installation of plumbing fixtures	40	40
	Unit 2: Troubleshooting and maintenance for plumbing	35	
	Unit 3: Health and safety	30	
	Unit 4: Working effectively with others	40	
	Unit 5: Optimum utilization of resources	20	
	Total	165	40
Part C	Practical Work		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	Total	10	35
Part D	Project Work/Field Visit		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	Total	15	15
	Total	300	100

3. TEACHING/TRAINING ACTIVITIES

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

CLASSROOM ACTIVITIES

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

PRACTICAL WORK IN LABORATORY/WORKSHOP

Practical work may include but not limited to hands-on-training, simulated training, role play, case

based studies, exercises, etc. Equipment and supplies should be provided to enhance hands-on learning experience of students. Only trained personnel should teach specialized techniques. A training plan that reflects tools, equipment, materials, skills and activities to be performed by the students should be submitted by the vocational teacher to the Head of the Institution.

FIELD VISITS/ EDUCATIONAL TOUR

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

4. ASSESSMENT AND CERTIFICATION

Upon successful completion of the course by the candidate, the central/state examination board for secondary education and the respective sector skill council will certify the competencies.

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

KNOWLEDGE ASSESSMENT (THEORY)

Knowledge Assessment should include two components: one comprising of internal assessment and second an external examination, including theory examination to be conducted by the Board. The assessment tools shall contain components for testing the knowledge and application of knowledge. The knowledge test can be objective paper based test or short structured questions based on the content of the curriculum.

WRITTEN TEST

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

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

Duration: 3 hrs

Max. Mark: 30

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
Total		3x1=3	6x2=12	5x3=15	30 (14 questions)

SKILL ASSESSMENT (PRACTICAL)

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

Practical examination allows candidates to demonstrate that they have the knowledge and

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

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

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

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

CONTINUOUS AND COMPREHENSIVE EVALUATION

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

5. UNIT CONTENTS

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
Total		110

Unit 1: Communication Skill - III			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 Hrs)
1. Demonstrate knowledge of communication	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	03
2. Demonstrate verbal communication	1. Verbal communication 2. Public Speaking	1. Role-play of a phone conversation 2. Group activity on delivering a speech and practicing public speaking	02
3. Demonstrate non-verbal communication	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	02
4. Demonstrate speech using correct pronunciation	1. Pronunciation basics 2. Speaking properly 3. Phonetics 4. Types of sounds	1. Group activities on practicing pronunciation	01
5. Apply an assertive communication style	1. Important communication styles 2. Assertive communication 3. Advantages of assertive communication 4. Practicing assertive communication	1. Group discussion on communication styles 2. Group discussion on observing and sharing communication styles	03

6. Demonstrate the knowledge of saying no	1. Steps for saying 'No' Connecting words	1. Group discussion on how to say 'No'	02
7. Identify and use parts of speech in writing	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	03
8. Write correct sentences and paragraphs	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	02
9. Communicate with people	1. Greetings 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?	02
10. Introduce yourself to others and write about oneself	1. Talking about self 2. Filling a form	1. Practicing self-introduction and filling up forms 2. Practicing self-introduction to others	01
11. Develop questioning skill	1. Main types of questions 2. Forming closed and open-ended questions	1. Practice exercise on forming questions 2. Group activity on framing questions	01
12. Communicate information about family to others	1. Names of relatives 2. Relations	1. Practice talking about family Role-play on talking about family members.	01
13. Describe habits and routines	1. Concept of habits and routines	2. Group discussion on habits and routines Group activity on describing routines	01
14. Ask or give directions to others	1. Asking for directions 2. Using landmarks	1. Role-play on asking and giving directions 2. Identifying symbols used for giving directions	01
Total			25

Unit 2: Self-management Skills – III			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 Hrs)
1. Identify and analyse own strengths and weaknesses	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	03
2. Demonstrate personal grooming skills	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	04
3. Maintaining personal hygiene	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	03
4. Demonstrate the knowledge of working in a team and participating in group activities	1. Describe the benefits of teamwork Working in a team	1. Assignment on working in a team 2. Self-reflection on teamwork	03
5. Develop networking skills	1. Benefits of networking skills Steps to build networking skills	1. Group activity on networking in action 2. Assignment on networking skills	03
6. Describe the meaning and importance of self-motivation	1. Meaning of self-motivation 2. Types of motivation Steps to building self-motivation	1. Activity on staying motivated 2. Assignment on reasons hindering motivation	03
7. Set goals	1. Meaning of goals and purpose of goal-setting Setting SMART goals	1. Assignment on setting SMART goals 2. Activity on developing long-term and short-term goals using SMART method	03
8. Apply time management strategies and techniques	1. Meaning and importance of time management Steps for effective time management	1. Preparing a checklist of daily activities	03
Total			25

Unit 3: Information and Communication Technology Skills - III			
Learning Outcome	Theory (08 hrs)	Practical (12 hrs)	Duration (20 Hrs)
1. Create a document on the word processor	<ol style="list-style-type: none"> 1. Introduction to ICT 2. Advantages of using a word processor. 3. Work with Libre Office Writer 	<ol style="list-style-type: none"> 1. Demonstration and practice of the following: <ul style="list-style-type: none"> • Creating a new document • Typing text • Saving the text • Opening and saving file on Microsoft Word/Libre Office Writer. 	02
2. Identify icons on the toolbar	<ol style="list-style-type: none"> 1. Status bar 2. Menu bar 3. Icons on the Menu bar 4. Multiple ways to perform a function 	<ol style="list-style-type: none"> 1. Group activity on using basic user interface of LibreOffice writer 2. Group activity on working with Microsoft Word 	02
3. Save, close, open and print document	<ol style="list-style-type: none"> 1. Save a word document 2. Close a word document 3. Open an existing document 4. Print 	<ol style="list-style-type: none"> 1. Group activity on performing the functions for saving, closing and printing documents in LibreOffice Writer 2. Group activity on performing the functions for saving, closing and printing documents in Microsoft Word 	02
4. Format text in a word document	<ol style="list-style-type: none"> 1. Change style and size of text 2. Align text 3. Cut, Copy, Paste 4. Find and replace 	<ol style="list-style-type: none"> 1. Group activity on formatting text in LibreOffice Writer 2. Group activity on formatting text in Microsoft Word 	02
5. Check spelling and grammar in a word document	<ol style="list-style-type: none"> 1. Use of spell checker 2. Autocorrect 	<ol style="list-style-type: none"> 1. Group activity on checking spellings and grammar using LibreOffice Writer 2. Group activity on checking spellings and grammar using Microsoft Word 	02
6. Insert lists, tables, pictures, and shapes in a word document	<ol style="list-style-type: none"> 1. Insert bullet list 2. Number list 3. Tables 4. Pictures 5. Shapes 	<ol style="list-style-type: none"> 1. Practical exercise of inserting lists and tables using LibreOffice Writer 	03

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

Unit 4: Entrepreneurial Skills - III

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

7. Create a business plan	<ol style="list-style-type: none"> 1. Importance of business planning 2. Preparing a business plan 3. Principles to follow for growing a business 4. Case studies 	<ol style="list-style-type: none"> 1. Group activity on developing a business plan 	04
Total			25

Unit 5: Green Skills - III			
Learning Outcome	Theory (07 hrs)	Practical (08 hrs)	Duration (15 Hrs)
1. Describe the importance of the main sector of the green economy	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Group discussion on sectors of green economy 2. Poster making on various sectors for promoting green economy 	06
2. Describe the main recommendations of policies for the green economy	<ol style="list-style-type: none"> 1. Policies for a green economy 	<ol style="list-style-type: none"> 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
3. Describe the major green sectors/ areas and the role of various stakeholders in the green economy	<ol style="list-style-type: none"> 1. Stakeholders in the green economy 	<ol style="list-style-type: none"> 1. Group discussion on the role of stakeholders in the green economy 2. Making solar bulbs 	03
4. Identify the role of government and private agencies in the green economy	<ol style="list-style-type: none"> 1. Role of the government in promoting a green economy 2. Role of private agencies in promoting green economy 	<ol style="list-style-type: none"> 1. Group discussion on the role of Government and Private Agencies in promoting a green economy 2. Poster making on green sectors 	03
Total			15

PART B: VOCATIONAL SKILLS

S. No.	Units	Duration (Hrs.)
1	Unit 1: Introduction to the sector and the job role	15
2	Unit 2: Basics of plumbing	30
3	Unit 3: Preparation for plumbing installation and maintenance	30
4	Unit 4: Installation of water supply system	52
5	Unit 5: Installation of drainage system	38
	Total	165

Unit 1 : Introduction to the sector and the job role

Learning Outcome	Theory 06 (Hrs)	Practical 08(Hrs)	Duration 15 (Hrs)
1. Understand the importance of the plumbing industry	1. Plumbing industry and its importance. 2. Role of water management and plumbing skill council	1. List the plumbing industry Identify and list the name of different logo of plumbing industry products	03
2. Employment potential in plumbing industry	1. Job opportunities and demand in the field of plumbing industries	1. List out the different types of job in plumbing sector	03
3. Understand the responsibilities of plumber general	1. Duties and responsibilities of plumber general	1. List the responsibilities of plumber general	02
4. Explain the process of water flow in domestic household and commercial setups	1. Water flow system in domestic building Water flow system in commercial setups	1. List the components of water flow system in domestic building List the components used in water flow system for commercial setups	03
5. Describe the application of various types of plumbing system in residential and commercial setups	1. Application of various types of plumbing system in residential. 2. Application of various types of plumbing system in commercial setups.	1. Identify and make a list of various types of plumbing system in residential. 2. Identify and make a list of various types of plumbing system in commercial setups.	04
Total			15

Unit 2: Basics of Plumbing

Learning Outcome	Theory 12 (Hrs)	Practical 18 (Hrs)	Duration 30 (Hrs)
1. Symbols and terminology used in plumbing	1. Symbols and terminology used in plumbing installation	1. Draw the symbols used in plumbing products and plumbing	03

installation		installation	
2. Standards applicable to piping installation	1. Indian standards like ISI/BIS applicable to piping installation	1. Make a list of Indian standards like ISI/BIS applicable to piping installation	03
3. Importance of accuracy in measurement and calculation of plumbing work	1. Techniques of accuracy in measurement and calculation of plumbing work	1. Measures the plumbing work 2. Calculate the cost of material used in plumbing work 3. Calculate the total cost of labour and material	07
4. Pipes, pipe fittings and supporting material used in plumbing and their characteristic and uses	1. State the names, grades, characteristics and applications of different pipes, pipe fittings, fixture supports, fastening hardware and materials such as sealants, adhesives, plumber's putty, marking material and cement used in plumbing 2. Supporting material like used in plumbing and their characteristic and uses	1. Identify the names, grades of different pipes, pipe fittings, fixture supports. 2. Identify the fastening hardware and materials such as sealants, adhesives, plumber's putty, marking material and cement used in plumbing	06
5. Plumbing tools and equipment's, lifting /load shifting equipment's	1. Plumbing tools 2. Lifting/load shifting equipment's including ladders, height scaffolding, elevated work platforms, hand trolleys, hoist and jacks used at plumbing installation sites.	1. Identify and list of plumbing tools. 2. Identify and list of Lifting/load shifting equipment's including ladders, height scaffolding, elevated work platforms, hand trolleys, hoist and jacks used at plumbing installation sites.	06
6. Explain the importance of water properties	1. Importance of water properties, pressure and flow rate. 2. Capillary action and thermal expansion in plumbing	1. List the water properties for plumbing system 2. Measure the pH of water. 3. Read the water pressure with the help of water pressure gauge	05
Total			30

Unit 3: Preparation for plumbing installation and maintenance			
Learning Outcome	Theory 12 (Hrs)	Practical 18 (Hrs)	Duration 30 (Hrs)
1. Discuss the importance of Plumbing drawings	<ol style="list-style-type: none"> 1. Role of plumbing drawings 2. Layout 3. Measurements from drawing and plans associated with the plumbing 	<ol style="list-style-type: none"> 1. Extract the information from job specifications, layouts and measurements from drawings and plans associated with plumbing 2. Calculate the quantity, dimensions and type of pipes, pipe fittings, devices and materials required from design drawings/specifications. 	10
2. Explain the planning of work schedule and work-related information	<ol style="list-style-type: none"> 1. Importance of the planning of work schedule and work-related information 	<ol style="list-style-type: none"> 1. Prepare a work plan as per specified timelines. 	03
3. Describe the importance of safe handling and storage of plumbing material	<ol style="list-style-type: none"> 1. Importance of safe handling and storage of plumbing material 	<ol style="list-style-type: none"> 1. Perform inspection of the tools and equipment to check for their proper functioning. 2. Demonstrate the process of clearing the work area of hazardous substances, debris and waste. 3. Demonstrate correct storage practices for plumbing material. 4. Demonstrate placement of signages and barricades. 	10
4. List measures to avoid air and water contamination, erosion and sedimentation	<ol style="list-style-type: none"> 1. Air and water contamination, erosion and sedimentation 	<ol style="list-style-type: none"> 1. Identify the Air and water contamination, erosion and sedimentation 	02
5. Discuss the role and impact of not following	<ol style="list-style-type: none"> 1. Disadvantages and impact of not following define procedures. 	<ol style="list-style-type: none"> 1. List the disadvantages and impact of not 	02

define procedures.		following define procedures	
6. Outline the process of the reporting and handling hazards at the work place	1. Outline the process of the reporting and handling hazards at the work place	1. Write an application of reporting of handling hazards at the work place.	03
Total			30

Unit 4: Installation of water supply system

Learning Outcome	Theory 20 (Hrs)	Practical 32 (Hrs)	Duration 52 (Hrs)
1. Explain the process of water distribution in municipal, residential, and private setups.	1. Process of water distribution in municipal, residential, and private setups.	1. List the process and various components of a water supply and distribution system. 2. Determine the fitting requirements for specified water supply pipe installations.	03
2. Describe the piping system layouts for various types of water supply systems.	1. State the piping system layouts for various types of water supply systems.	1. List the piping system layouts for various types of water supply systems.	02
3. Describe the various techniques of installing the water piping system in a building.	1. Various techniques of installing the water piping system in a building such as over ground piping, underground piping, piping embedded in concrete, concealed piping, wall mounted piping.	1. List the various techniques of installing the water piping system in a building. 2. Apply appropriate cutting and bending techniques on water supply plumbing pipes. 3. Demonstrate how to join and fix pipes as per defined specifications. 4. Demonstrate the steps involved in the installation of water supply piping, fittings and components in buildings.	10
4. Explain the properties of the different types of supports,	1. Properties of the different types of supports, hangers and restraints used in water	1. Write the properties of the different types of supports, hangers and restraints used in	03

hangers and restraints used in water supply plumbing systems.	supply plumbing systems.	water supply plumbing systems.	
5. Describe the characteristics of metal used in various plumbing materials and the fabrication methods compatible with them.	1. Characteristics of metal used in various plumbing materials and the fabrication methods compatible with them.	1. Identify and list the characteristics of metal used in various plumbing materials and the fabrication methods compatible with them.	02
6. Explain the process of electrolysis and problems associated with the use of dissimilar metals.	1. Process of electrolysis and problems associated with the use of dissimilar metals.	1. Identify the process of electrolysis 2. List the problems associated with the use of dissimilar metals.	03
7. State the impact of accurate marking on the fabrication process work time and finished work quality.	1. Impact of accurate marking on the fabrication process work time and finished work quality.	1. List the advantage of using accurate marking on the fabrication process. 2. Demonstrate the steps involved in marking dimensions for fabrication on the pipes and fittings making allowances for spring-back, distortion and assembly.	04
8. Describe the measuring and marking out processes and allowances for fabrication of pipes	1. Measuring and marking out processes for fabrication of pipes. 2. Allowance to be considered in measurement	1. Measure and mark the fabricated pipe. 2. Measure the allowance.	04
9. List standard measuring procedures such as center-to-center, end-to-center, and end-to-end	1. Standard measuring procedures such as center-to-center, end-to-center, and end-to-end.	1. Measure the dimension such as center-to-center, end-to-center, and end-to-end of a pipe.	03
10. Describe the types, characteristics and the application of different pipe fittings and	1. Type, characteristics and application of different pipe fittings and fixture supports.	1. List the types, characteristics. 2. List the different pipe fittings and fixture supports.	02

fixture supports.			
11. Discuss the various fixing and jointing techniques for water supply piping installations.	1. Various fixing and jointing techniques for water supply piping installations.	1. Identify the various fixing and jointing for water supply piping installations.	02
12. Explain the principles underlying various fit-off processes.	1. Principles underlying various fit-off processes.	1. Do the practices of underlying various fit-off processes. 2. Perform the inspection of the water supply installation system to ensure proper alignment, size, support and functioning.	04
13. State the importance of ensuring alignment and balance in piping installations	1. Importance of ensuring alignment and balance in piping installations.	1. Do the practices of alignment and balance in piping installations.	02
14. Describe the test procedures to check proper functioning of the pipework installed.	1. Test procedures to check proper functioning of the pipework installed.	1. Do the testing to check proper functioning of the pipework installed.	02
15. Describe the checks and procedures to be conducted before commissioning	1. Checks and procedures to be conducted before commissioning.	1. Make a list of checks and procedures to be conducted before commissioning. 2. Evaluate faults and their causes in dysfunctional piping. 3. Demonstrate the rectification of common faults found in dysfunctional piping.	04
16. Explain the importance of reporting any difficulties as soon as they arise.	1. Importance of reporting any difficulties as soon as they arise.	1. Perform post installation activities such as clearing the work area, disposal of waste and cleaning and storage of tools and equipment.	02
Total			52

Unit 5: Installation of drainage system			
Learning Outcome	Theory 14 (Hrs)	Practical 24 (Hrs)	Duration 38 (Hrs)
1. Discuss the process of wastewater drainage	1. Process of wastewater drainage	1. Apply appropriate techniques to determine the location of various drainage components and the route of the water drainage piping and traps using plumbing project plans.	02
2. Describe the functions of the components of drainage systems.	1. Describe the functions of the components of drainage systems.		02
3. Describe the various types of drainage piping systems and the pipes and fittings used in them.	1. Various types of drainage piping systems and the pipes and fittings used in them.	1. Identify the various types of drainage piping systems and the pipes and fittings used in them. 2. Determine fitting requirements for installing various types of drainage pipes according to given specifications and site requirements. 3. Demonstrate the construction of chambers to accommodate drainage systems.	02
4. Discuss the type of drainage piping systems and its components used in various types of building.	1. Discuss the type of drainage piping systems and its components used in various types of building.		04
5. Explain the characteristics and the application of different pipe fittings, fixture supports and fastening hardware.	1. Characteristics and the application of different pipe fittings, fixture supports and fastening hardware.	1. Perform the necessary checks on the area for laying underground, above ground and overhead piping systems.	02
6. Discuss the fit off, fixing and jointing techniques applicable for drainage pipes.	1. Importance of the fit off, fixing and jointing techniques applicable for drainage pipes.	1. Perform fitting activities on various types of pipes such as stoneware (SW) pipes, polyvinyl chloride (PVC) pipes, cast iron (CI) pipes, etc.	04
7. Explain the procedure of installing various types of drainage systems such as sewage, sullage, stormwater, sub-soil drainage	1. Method of installation various types of drainage systems such as sewage, sullage, stormwater, sub-soil drainage system, drainage for fixtures, etc.	1. Demonstrate the installation of the various components of drainage system such as various pipes and their fittings, manholes, traps, cleanouts, catch	03

system, drainage for fixtures, etc.		basins, inspection chamber, soak pit etc.	
8. Identify the trap to be installed as per the type of drainage system.	1. Different types of trap as per the type of drainage system.		01
9. List different types of pumps used in sanitary and drainage systems and their applications.	1. Pumps used in sanitary and drainage systems and their applications.	1. Identify different types of pumps used in sanitary and drainage systems and their applications. 2. Perform the steps to install different types of pumps used in sanitary and drainage system.	04
10. Discuss the characteristics of the flooring using for installation and levelling of drainage system	1. Characteristics of the flooring using for installation and levelling of drainage system	1. Show how to install stormwater and sub-soil drainage system. 2. Demonstrate the process of installing pipes and related accessories in water and sewage treatment plants.	06
11. Explain the importance of conducting post-installation and pre-commissioning tests and checks	1. Importance of conducting post-installation and pre-commissioning tests and checks	1. Perform the various post installation and pre-commissioning tests and checks. 2. Perform the backfilling of all excavated areas to secure the installation.	03
12. Describe the various post installation and pre-commissioning tests and checks.	1. Various post installation and pre-commissioning tests and checks.		03
13. List the signages to be put up at the site after the plumbing task has been completed.	1. Signages to be put up at the site after the plumbing task has been completed.	1. Make a list of signages.	03
Total			38

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
Total		110

Unit 1: Communication Skills - IV

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 Hrs)
1. Demonstrate active listening skills	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	10
2. Identify the parts of speech	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	10
3. Write sentences	1. Writing skills to practice the following: <ul style="list-style-type: none"> • Simple sentence • Complex sentence • Types of object 2. Identify the types of sentences <ul style="list-style-type: none"> • Active and Passive sentences • Statement/ • Declarative sentence 	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)	05

	<ul style="list-style-type: none"> • Question/ • Interrogative sentence - Emotion/ Reaction or Exclamatory sentence - Order or Imperative sentence <p>3. Paragraph writing</p>		
Total			25

Unit 2: Self-management Skills – IV

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 Hrs)
1. Describe the various factors influencing motivation and positive attitude	<ol style="list-style-type: none"> 1. Motivation and positive attitude 2. Intrinsic and extrinsic motivation 3. Positive attitude – ways to maintain positive attitude 4. Stress and stress management - ways to manage stress 	<ol style="list-style-type: none"> 1. Role-play on avoiding stressful situations Activity on listing negative situations and ways to turn it positive 	10
2. Describe how to become result oriented	<ol style="list-style-type: none"> 1. How to become result oriented? 2. Goal setting – examples of result-oriented goals 	<ol style="list-style-type: none"> 1. Group activity on listing aim in life 	05
3. Describe the importance of self-awareness and the basic personality traits, types and disorders	<ol style="list-style-type: none"> 1. Steps towards self-awareness 2. Personality and basic personality traits 3. Common personality disorders- <ul style="list-style-type: none"> • Suspicious • Emotional and impulsive • Anxious 4. Steps to overcome personality disorders 	<ol style="list-style-type: none"> 1. Group discussion on self-awareness 2. Group discussion on common personality disorders 3. Brainstorming steps to overcome personality disorder 	10
Total			25

Unit 3: Information and Communication Technology Skills - IV

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 Hrs)
1. Identify the components of a spreadsheet application	<ol style="list-style-type: none"> Getting started with spreadsheet - types of a spreadsheet, steps to start LibreOffice Calc., components of a worksheet 	<ol style="list-style-type: none"> Group activity on identifying components of spreadsheet in LibreOffice Calc 	02
2. Perform basic operations in a spreadsheet	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> Group activity on working with data on LibreOffice Calc 	03
3. Demonstrate the knowledge of working with data and formatting text	<ol style="list-style-type: none"> 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 Need to format cell and content Changing text style and font size Align text in a cell Highlight text 	<ol style="list-style-type: none"> Group activity on formatting a spreadsheet in LibreOffice Calc Group activity on performing basic calculations in LibreOffice Calc. 	02
4. Demonstrate the knowledge of using advanced features in spreadsheet	<ol style="list-style-type: none"> Sorting data Filtering data Protecting spreadsheet with password 	<ol style="list-style-type: none"> Group activity on sorting data in LibreOffice Calc 	03

5. Make use of the software used for making slide presentations	<ol style="list-style-type: none"> 1. Presentation software available 2. Stapes to start LibreOffice Impress 3. Adding text to a presentation 	<ol style="list-style-type: none"> 1. Group practice on working with LibreOffice Impress tools 	<p style="text-align: center;">02</p>
6. Demonstrate the knowledge to open, close and save slide presentations	<ol style="list-style-type: none"> 1. Open, Close, Save and Print a slide presentation 	<ol style="list-style-type: none"> 1. Group activity on saving, closing and opening a presentation in LibreOffice Impress 	<p style="text-align: center;">01</p>
7. Demonstrate the operations related to slides and texts in the presentation	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Group activity on working with font styles in LibreOffice Impress 	<p style="text-align: center;">04</p>
8. Demonstrate the use of advanced features in a presentation	<ol style="list-style-type: none"> 1. Advanced features used in a presentation 2. Inserting shapes in the presentation 3. Inserting clipart and images in a presentation 4. Changing slide layout 	<ol style="list-style-type: none"> 1. Group activity on changing slide layout on LibreOffice Impress 	<p style="text-align: center;">03</p>
<p>Total</p>			<p style="text-align: center;">20</p>

Unit 4: Entrepreneurial Skills - IV

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 Hrs)
1. Describe the concept of entrepreneurship and the types and roles and functions entrepreneur	<ol style="list-style-type: none"> 1. Entrepreneurship and entrepreneur 2. Characteristics of entrepreneurship 3. Entrepreneurship-art and science 4. Qualities of a successful entrepreneur 5. Types of entrepreneurs 6. Roles and functions of 	<ol style="list-style-type: none"> 1. Group discussion on the topic "An entrepreneur is not born but created". 2. Conducting a classroom quiz on various aspects of entrepreneurship. 3. Chart preparation on types of 	<p style="text-align: center;">10</p>

	<p>an entrepreneur</p> <p>7. What motivates an entrepreneur</p> <p>8. Identifying opportunities and risk-taking</p> <p>9. Startups</p>	<p>entrepreneurs</p> <p>4. Brainstorming activity on What motivates an entrepreneur</p>	
2. Identify the barriers to entrepreneurship	<p>1. Barriers to entrepreneurship</p> <p>2. Environmental barriers</p> <p>3. No or faulty business plan</p> <p>4. Personal barriers</p>	<p>1. Group discussion about "What we fear about entrepreneurship"</p> <p>2. Activity on taking an interview of an entrepreneur.</p>	05
3. Identify the attitude that make an entrepreneur successful	<p>1. Entrepreneurial attitude</p>	<p>1. Group activity on identifying entrepreneurial attitude.</p>	05
4. Demonstrate the knowledge of entrepreneurial attitude and competencies	<p>1. Entrepreneurial competencies</p> <p>2. Decisiveness</p> <p>3. Initiative</p> <p>4. Interpersonal skills- positive attitude, stress management</p> <p>5. Perseverance</p> <p>6. Organisational skills- time management, goal setting, efficiency, managing quality.</p>	<p>1. Playing games, such as "Who am I".</p> <p>2. Brainstorming a business ideas</p> <p>3. Group practice on "Best out of Waste"</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>	05
Total			25

Unit 5: Green Skills - V

Learning Outcome	Theory (05 hrs)	Practical (10 hrs)	Duration (15 Hrs)
1. Identify the benefits of the green jobs	<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"> • Agriculture • Transportation • Water conservation • Solar and wind energy 	<p>1. Group discussion on the importance of green job</p> <p>2. Chart preparation on green jobs in different sectors</p>	08

	<ul style="list-style-type: none"> Eco-tourism Building and construction Solid waste management Appropriate technology 		
2. State the importance of green jobs	<p>1. Importance of green jobs in</p> <ul style="list-style-type: none"> Limiting greenhouse gas emissions Minimizing waste and pollution Protecting and restoring ecosystems Adapting to the effects of climate change 	<p>1. Preparing posters on green jobs</p> <p>2. Group activity on tree plantation</p> <p>3. Brainstorming different ways of minimizing waste and pollution</p>	07
Total			15

PART B: VOCATIONAL SKILLS

S.No.	Units	Duration (Hrs.)
1	Unit 1: Installation of plumbing fixtures	40
2	Unit 2: Trouble shooting and maintenance for plumbing	35
3	Unit 3: Health and safety	30
4	Unit 4: Working effectively with others	40
5	Unit 5: Optimum utilization of resources	20
	Total	165

Unit 1: Installation of plumbing fixtures

Learning Outcome	Theory 16 (Hrs)	Practical 24 (Hrs)	Duration 40 (Hrs)
1. Describe the types, characteristics, materials, finishes, uses, limitations, working principle and performance measures of various plumbing related fixtures.	1.Types, characteristics, materials, finishes, uses, limitations, working principle and performance measures of various plumbing related fixtures.	<p>1. Show how to tally the count and quality of fixtures, parts, support material provided in the packing with the manufacturer's list or order form.</p> <p>2. Select the size, type and quantity of fixture and trim required for specific</p>	10

		<p>applications based on specifications.</p> <p>3. Demonstrate how to mark the position of fixtures and fixture supports in structures based on plumbing plans.</p> <p>4. Demonstrate the procedure of installing various types of sanitary fixtures, supports, and accessories.</p>	
<p>2. List the accessories, supports and fasteners required for installing various types of washbasin, sinks, water closet, urinals, bathtubs and showers.</p>	<p>1. List the accessories, supports and fasteners required for installing various types of washbasin, sinks, water closet, urinals, bathtubs and showers.</p>	<p>1. Show how to tally the count and quality of fixtures, parts, support material provided in the packing with the manufacturer's list or order form.</p> <p>2. Select the size, type and quantity of fixture and trim required for specific applications based on specifications.</p> <p>3. Demonstrate how to mark the position of fixtures and fixture supports in structures based on plumbing plans.</p> <p>4. Demonstrate the procedure of installing various types of sanitary fixtures, supports, and accessories.</p>	10
<p>3. List the sensor types of fittings and fixtures.</p>	<p>1. Sensor types of fittings and fixtures.</p>	<p>1. Demonstrate the installation of sensors and batteries of fixtures with sensor-based or touchless fitting and fixtures.</p>	04
<p>4. Explain the basic working principal of sensor faucet and the principles of solenoid ball valves and sensors in touch less system.</p>	<p>1. Basic working principal of sensor faucet and the principles of solenoid ball valves and sensors in touch less system.</p>		03
<p>5. Describe the correct practices</p>	<p>1. Correct practices for installing plumbing</p>	<p>1. Apply appropriate</p>	02

for installing plumbing fixtures.	fixtures.	techniques to check if all installations are properly sized, supported and functioning	
6. Explain the importance of traps for the sanitary fittings, both deep seal traps and low seal traps.	1. Importance of traps for the sanitary fittings, both deep seal traps and low seal traps.	1. Demonstrate the traps for the sanitary fittings, both deep seal traps and low seal traps.	03
7. Explain the working and use of conservancy, water carriage and the combination system.	1. Working and use of conservancy, water carriage, and the combination system.	1. Draw the image on working and use of conservancy, water carriage and the combination system.	04
8. Discuss alignment and elevation techniques used in plumbing systems.	1. Alignment and elevation techniques used in plumbing systems.	1. Perform alignment and levelling of supports and fixtures installed.	02
9. List the codes, standards and regulations applicable for the installation of plumbing fixtures.	1. Codes, standards and regulations applicable for the installation of plumbing fixtures.	1. List the codes, standards and regulations applicable for the installation of plumbing fixtures.	02
Total			40

Unit 2 : Troubleshooting and maintenance for plumbing

Learning Outcome	Theory 15 (Hrs)	Practical 20 (Hrs)	Duration 35 (Hrs)
1. List the various types of faults (such as leakages, improper joints, broken sewer; dripping faucets and water lines, etc.) associated with plumbing systems (such as aerators, septic systems etc.).	1. Various types of faults (such as leakages, improper joints, broken sewer; dripping faucets and water lines, etc.) associated with plumbing systems (such as aerators, septic systems etc.).	1. Show how to detect faults in various types of plumbing systems and fixtures.	04
2. List the testing procedures to be performed to check proper functioning of the fixtures and pipework installed.	1. Testing procedures to be performed to check proper functioning of the fixtures and pipework installed.	1. Demonstrate the procedures involved in repair and rectification of common faults within the pipes, plumbing fixtures, drainage and	08

		water supply systems.	
3. State the remedial and preventive measures for common plumbing problems with respect to fixtures, pipes and fittings.	1. Remedial and preventive measures for common plumbing problems with respect to fixtures, pipes and fittings.	1. List the remedial and preventive measures for common plumbing problems with respect to fixtures, pipes and fittings.	03
4. Discuss correct practices for troubleshooting and maintenance for plumbing fixtures and systems.	1. Correct practices for troubleshooting and maintenance for plumbing fixtures and systems.	1. List the practices for troubleshooting and maintenance for plumbing fixtures and systems.	03
5. Explain the application of mechanical and hydraulic principles for clearing blockages.	1. Application of mechanical and hydraulic principles for clearing blockages.	1. Demonstrate cleaning and clearance related activities after completion of work.	04
6. List the methods of corrosion protection such as coatings and tape.	1. Methods of corrosion protection such as coatings and tape.	1. Demonstrate the methods of corrosion protection such as coatings and tape.	06
7. Discuss common organisational policies related to costing, scheduling, procurement and documentation for plumbing maintenance and repair work.	1. Common organisational policies related to costing, scheduling, procurement and documentation for plumbing maintenance and repair work.	1. Display how to record daily logs in a specified format for activities such as maintenance and installation. 2. Role play a situation on how to guide the customers instruct the customers on proper care and maintenance of plumbing systems.	07
Total			35

Unit 3 : Health and safety

Learning Outcome	Theory 10 (Hrs)	Practical 20 (Hrs)	Duration 30 (Hrs)
1. Differentiate between risks and hazards. (KU4)	1. Differentiate between risks and hazards. (KU4)	1. Perform inspection of a work area in order to identify risks and hazards. (PC1)	02

<p>2. Discuss the specific safety and health related problems faced in domestic, commercial and institutional setups.</p>	<p>1. Specific safety and health related problems faced in domestic, commercial and institutional setups.</p>	<p>1. Apply various health and safety precautions to be taken during plumbing work.</p>	<p>02</p>
<p>3. List the various types of hazards (such as physical, fire, chemical compounds and electrical) that could affect the work process.</p>	<p>1. Various types of hazards (such as physical, fire, chemical compounds and electrical) that could affect the work process.</p>	<p>1. Apply personal and workspace hygiene and sanitation practices.</p>	<p>02</p>
<p>4. List the various hazardous environments and common hazards that can occur during plumbing installation and maintenance along with their precautions and remedial measures.</p>	<p>1. Various hazardous environments and common hazards that can occur during plumbing installation and maintenance along with their precautions and remedial measures.</p>	<p>1. List the various hazardous environments and common hazards that can occur during plumbing installation.</p>	<p>02</p>
<p>5. Discuss the importance of various types of personal protective equipment (PPE).</p>	<p>1. Importance of various types of personal protective equipment (PPE).</p>	<p>1. Make a image of various types of personal protective equipment (PPE).</p>	<p>02</p>
<p>6. Discuss where the general health and safety equipment commonly is kept at the workplace.</p>	<p>1. General health and safety equipment commonly is kept at the workplace.</p>	<p>1. Locate and identify the placewhere the general health and safety equipment commonly is kept at the workplace.</p>	<p>02</p>
<p>7. Explain the various types of safety signs and their significance in the work process.</p>	<p>1. Various types of safety signs and their significance in the work process.</p>	<p>1. Draw the image of various types of safety signs and their significance in the work process.</p>	<p>02</p>
<p>8. Discuss various causes of fire and precautionary activities to prevent the fire accident.</p>	<p>1. Various causes of fire and precautionary activities to prevent the fire accident.</p>	<p>1. Demonstrate the correct use of fire extinguishers</p>	<p>03</p>
<p>9. List the different techniques that employ various methods (such as using extinguishers, water hose, sprinklers, sand</p>	<p>1. List the different techniques that employ various methods (such as using extinguishers, water hose, sprinklers, sand bucket, wet</p>	<p>1. Make a list of different items used for fire protection.</p>	<p>02</p>

bucket, wet blanket, etc.) and materials such as water, powder, foam, CO2, fire extinguishing chemical, sand, blanket, etc. used for extinguishing fire as per the type (as per class A, B, C and D).	blanket, etc.) and materials such as water, powder, foam, CO2, fire extinguishing chemical, sand, blanket, etc. used for extinguishing fire as per the type (as per class A, B, C and D).		
10. Describe rescue techniques applied during a fire hazard or electrocution.	1. Rescue techniques applied during a fire hazard or electrocution.	1. Dramatize workplace emergency and evacuation procedures using role plays.	03
11. Discuss appropriate basic first aid treatment relevant to the condition e.g. shock, electrical shock, bleeding, minor burns, poisoning, eye injuries etc.	1. Basic first aid treatment relevant to the condition e.g. shock, electrical shock, bleeding, minor burns, poisoning, eye injuries etc.	1. Perform 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.	04
12. Discuss potential injuries and health problems associated with incorrect handling of tools and equipment.	1. Potential injuries and health problems associated with incorrect handling of tools and equipment.	1. Demonstrate the process of providing cardio pulmonary resuscitation (CPR).	02
Total			30

Unit 4 : Working effectively with others

Learning Outcome	Theory 12 (Hrs)	Practical 18 (Hrs)	Duration (Hrs)
1. State the importance of effective communication in the workplace.	1. State the importance of effective communication in the workplace	1. Demonstrate techniques used for ensuring timely receipt of complete information and instructions from appropriate sources 2. Apply practices that	02
2. Describe the typical organisational hierarchy and the various categories	1. Typical organisational hierarchy and the various categories of people that		02

of people that one is required to communicate and coordinate with.	one is required to communicate and coordinate with	improve effectiveness while providing information	
3. List various components of effective communication.	1. List various components of effective communication	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	02
4. State the importance of using inclusive language (verbal, non-verbal and written) that is gender, disability and culturally sensitive.	1. State the importance of using inclusive language (verbal, non-verbal and written) that is gender, disability and culturally sensitive		02
5. State the importance of teamwork and developing effective working relationships for professional success.	1. Importance of teamwork and developing effective working relationships for professional success	1. Dramatise a situation to show effective teamwork 2. Dramatize (through role-play) disciplined behaviours at the workplace 3. Dramatize (through role-play) the process of escalation of grievances and problems	03
6. Discuss the importance and ways of managing interpersonal conflict effectively	1. Importance and ways of managing interpersonal conflict effectively		03
7. Discuss how to express and address grievances appropriately and effectively.	1. Discuss how to express and address grievances appropriately and effectively		03
8. State the importance of ethics and discipline for professional success.	1. State the importance of ethics and discipline for professional success.		02
9. Discuss the legislation, standards, policies, and procedures relevant to own employment and performance conditions.	1. Discuss the legislation, standards, policies, and procedures relevant to own employment and performance conditions.	1. List the legislation, standards, policies, and procedures relevant to own employment and performance conditions.	02
10. Discuss importance of dress code in organisations.	1. Discuss importance of dress code in organisations.	1. Identify the dress code in organisations	02

11. Explain the impact of gender, disability, cultural and age-related biases, stereotyping at the workplace and in society.	1. Impact of gender, disability, cultural and age-related biases, stereotyping at the workplace and in society	1. Recognize indicators of harassment and discrimination based on gender, disability, caste, religion, colour, sexual orientation and culture at workplace 2. Demonstrate practices to eliminate personal bias based on gender, disability, caste, religion, colour, sexual orientation and culture from routine transactions	03
12. List the different types of disabilities and the challenges faced by persons with disability (PwD).	1. List the different types of disabilities and the challenges faced by persons with disability (PwD)		03
13. State the laws, acts, provisions and schemes defined for PwD by the Government bodies.	1. State the laws, acts, provisions and schemes defined for PwD by the Government bodies		02
14. Discuss gender, disability and cultural biases, stereotypes and impact on others	1. Discuss gender, disability and cultural biases, stereotypes and impact on others		01
15. Discuss basic gender concepts such as gender power relations, gender roles, access and control, gender sensitivity, gender equity and equality.	1. Discuss basic gender concepts such as gender power relations, gender roles, access and control, gender sensitivity, gender equity and equality		01
16. Discuss the importance of gender sensitivity and equality.	1. Discuss the importance of gender sensitivity and equality		01
17. List the indicators of harassment and discrimination based on gender, disability, caste, religion or culture that occurs at a typical workplace.	List the indicators of harassment and discrimination based on gender, disability, caste, religion or culture that occurs at a typical workplace		02
18. State general organisational norms and procedures applied to protect against harassment and discrimination.	1. State general organisational norms and procedures applied to protect against harassment and discrimination		02
19. Discuss the importance of reporting incidents of harassment and	1. Discuss the importance of reporting incidents of		02

discrimination to appropriate authority.	harassment and discrimination to appropriate authority		
Total			40

Unit 5: Optimum utilisation of resources

Learning Outcome	Theory 10 (Hrs)	Practical 10 (Hrs)	Duration 20 (Hrs)
1. Discuss the practices and impact of inefficient utilization of material and water	1. Discuss the practices and impact of inefficient utilization of material and water	1. Identify ways to optimize usage of water and other materials in various tasks/activities /processes.	02
2. Describe ways of efficiently managing material and water in the process.	1. Describe ways of efficiently managing material and water in the process.	2. Perform inspection to check for spills/leakages at a workplace.	02
3. Explain the basics of electricity.	1.Explain the basics of electricity.	3. Apply various material conservation practices with respect to plumbing work.	02
4. List common electrical and thermal equipment used in a plumbing workplace.	1.List common electrical and thermal equipment used in a plumbing workplace.	4. Perform inspection of the work area for improperly connected electrical equipment.	01
5. Describe the use of prevalent energy efficient devices.	1.Describe the use of prevalent energy efficient devices.	5. Apply appropriate techniques to use energy/electricity in an optimum way.	02
6. List indicators of common electrical problems.	1. List indicators of common electrical problems.	6. Categorize waste into dry, wet, recyclable, non-recyclable and items of single-use plastics.	01
7. Discuss common practices of conserving electricity.	1. Discuss common practices of conserving electricity.	7. Employ effective waste management /recycling practices.	01
8. Explain the importance of checking if the equipment/machine is functioning normally before commencing work and ensuring it is rectified.	1. Explain the importance of checking if the equipment/machine is functioning normally before commencing work and ensuring it is rectified.		02
9. Explain the usage of different colours of dustbins.	1. Explain the usage of different colours of dustbins.		02

10. Differentiate between recyclable and non-recyclable, and hazardous waste generated.	1. Differentiate between recyclable and non-recyclable, and hazardous waste generated.		01
11. Discuss efficient waste management practices.	1. Discuss efficient waste management practices.		01
12. Discuss the common ways employed by organizations, to minimize waste generated from plumbing activities.	1. Discuss the common ways employed by organizations, to minimize waste generated from plumbing activities.		01
13. Discuss common sources of pollution and ways to minimize it	1. Discuss common sources of pollution and ways to minimize it		01
14. Explain the importance of reporting malfunctioning (fumes /sparks /emission /vibration /noise) and lapse in the maintenance of equipment on time.	1. Explain the importance of reporting malfunctioning (fumes /sparks /emission /vibration /noise) and lapse in the maintenance of equipment on time.		01
Total			20

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 follows:

1. Pipe wrench,
2. Parrot pliers,
3. Slide wrench,
4. Die set complete,
5. Hacksaw
6. Pipe vice,
7. Screw drivers set, D
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 Testing 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,
24. Flushing tanks,
25. Urinal,
26. Urinal flush,
27. Bidet,
28. Bath tub,
29. Geyser,
30. Clamps and Hangers,
31. Pipes,
32. Fittings and accessories as required.
33. Special tools
34. Special fixtures and fittings

8. VOCATIONAL TEACHERS'/TRAINERS' QUALIFICATIONS AND GUIDELINES

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

S. No.	Qualification	Minimum Competencies	Age Limit
1.	B.Tech in 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/ Mechanical Engineering with 2 years work/teaching experience	<ul style="list-style-type: none"> • Effective communication skills (oral and written) • Basic computing skills. 	<ul style="list-style-type: none"> • Minimum 18 Years • Age relaxation to be provided as per Govt.rules.

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

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