LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE: ASSISTANT PLUMBER-GENERAL

(QUALIFICATION PACK: Ref. Id. PSC/Q0102)

SECTOR: Plumbing

Classes 9 and 10

PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION

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

http://www.psscive.ac.in

Gandhiji's Talisman

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

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

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

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Sector-WMPSC
Assistant Plumber – General, July, 2022

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FOREWORD

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

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

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

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

PROF. D. P. SAKLANI
Director
National Council of Education Research & Training

PREFACE

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

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

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

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

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

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

DR. 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 Rashtriya Madhyamik Shiksha Abhiyan* (RMSA) and the officials of the Ministry of Human Resource Development (MHRD), Government of India for the financial support to the project for development of curricula.

We are grateful to the Director, NCERT for his support and guidance. We also acknowledge the contributions of our colleagues at the Technical Support Group of RMSA, MHRD, RMSA Cell at the National Council of Educational Research and Training (NCERT), National Skill Development Agency (NSDA) and National Skill Development Corporation (NSDC) and Water Management and Plumbing Skill Council for their academic support and cooperation in the development of curricula.We are grateful to the expert contributors and reviewers for their earnest effort and contributions in the development of this learning outcome-based curriculum. Their names are acknowledged in the list of contributors and reviewers.

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

We are also grateful to the Course Coordinator. **Prof. Saurabh Prakash**, Professor & Head, Department of Engineering & Technology. The contribution of Dr. Satyendra Thakur, Assistant Professor (Agricultural Engineering) is acknowledged. The assistance provided by Shri Vinod K. Soni, Computer Operator Grade-II in layout, design and composing of the material is duly acknowledged.

PSSCIVE Team

CONTENTS

1. COURSE OVERVIEW

COURSE TITLE: Assistant Plumber - General

Assistant Plumber - General is an important job role in installation and repair of plumbing fittings and fixtures. Assistant Plumber - General is responsible for assists the plumber in installation and repair of plumbing fittings and fixtures. The job role holder organises and hands over tools, clears work area, cuts and bends pipes as per the specified dimensions. The individual also supports the plumber with other tasks as per instructions received. 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: This is a beginner level course. On completion of this course, a student can take up an Intermediate level course for a job role in Plumbing sector, such as Plumber - General in Class XI and Class XII.

COURSE DURATION:	**400 hrs**
Class 09 :	200 hrs
Class 10 :	200 hrs
Total	**: 400 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 Class 9 and 10 opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for Class 9 is as follows:

CLASS 9			
	Units	**No. of Hours for Theory and Practical 200**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
	Unit 1 : Communication Skills-1	20	10
	Unit 2 : Self-management Skills-1	10	
	Unit 3 : Information and Communication Technology Skills-1	20	
	Unit 4 : Entrepreneurial Skills-1	15	
	Unit 5 : Green Skills-1	10	
	Total	**75**	**10**
Part B	**Vocational Skills**		
	Unit 1: Introduction to plumbing	15	30
	Unit 2: Tools for plumbing	25	
	Unit 3: Plumbing material and pipes, types and grades of pipe	20	
	Unit 4: Measurements and symbols used in plumbing	15	
	Unit 5 : Plumbing fittings, Joints and valves	20	
	Total	**95**	**30**
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**
Part E	**Continuous and Comprehensive Evaluation (CCE)**		
	Total	**05**	**20**
	Total	**200**	**100**

The unit-wise distribution of hours and marks for Class 10 is as follows:

CLASS 10			
	Units	**No. of Hours for Theory and Practical 200**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
	Unit 1 : Communication Skills– II	20	10
	Unit 2 : Self-management Skills– II	10	
	Unit 3 : Information and Communication Technology Skills– II	20	
	Unit 4 : Entrepreneurial Skills– II	15	
	Unit 5 : Green Skills– II	10	
	Total	**75**	**10**
Part B	**Vocational Skills**		
	Unit 1: Basic building construction	15	30
	Unit 2: PIPES –Cutting, Threading, Joining and Testing of Pipelines	30	
	Unit 3: Plumbing and sanitary fixtures	20	
	Unit 4: Maintaining a healthy, safe and secure work environment	15	
	Unit 5: Optimum utilization of resources	15	
	Total	**95**	**30**
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**
Part E	**Continuous and Comprehensive Evaluation (CCE)**		
	Total	**05**	**10**
	Grand Total	**200**	**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.		No. of Questions			
	Typology of Question	*Very Short Answer (1 mark)*	*Short Answer (2 Marks)*	*Long Answer (3 Marks)*	*Marks*
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	2	1	2	10
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	1	2	2	11
3.	Application – (Use abstract information in concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, private an example, or solve a problem)	0	1	1	05
4.	High Order Thinking Skills – (Analysis & Synthesis – Classify, compare, contrast, or differentiate between different pieces of information; Organize and/ or integrate unique pieces of information from a variety of sources)	0	1	0	02
5.	Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	0	1	0	02
	Total	**3x1=3**	**6x2=12**	**5x3=15**	**30 (14 questions)**

SKILL ASSESSMENT (PRACTICAL)

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

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

examiners will conduct the viva voce.

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

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

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

CONTINUOUS AND COMPREHENSIVE EVALUATION

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

5. UNIT CONTENTS

CLASS 9

Part A: Employability Skills

S.No.	Units	Duration (Hrs)
1.	Communication Skills - I	20
2.	Self-management Skills - I	10
3.	Information and Communication Technology Skills-I	20
4.	Entrepreneurial Skills - I	15
5.	Green Skills - I	10
	Total	**75**

Unit 1: Communication Skills - I			
Learning Outcome	**Theory (08 hrs)**	**Practical (12 hrs)**	**Duration (20 Hrs)**
1. Demonstrate knowledge of various methods of communication	1. Methods of communication - Verbal - Non-verbal - Visual	1. Writing pros and cons of written, verbal and non-verbal communication 2. Listing do's and don'ts for avoiding common body language mistakes	05
2. Identify elements of communication cycle	1. Meaning of communication 2. Importance of communication skills 3. Elements of communication cycle– • sender, • ideas, • encoding, • communication channel, • receiver, • decoding, and • feedback	1. Draw a diagram of communication cycle 2. Role plays on communication process related to the sector/job role	05
3. Identify the factors affecting our perspectives in communication	1. Perspectives in communication 2. Factors affecting perspectives in communication - Visual perception - Language - Past experience - Prejudices - Feelings - Environment	1. Group discussion on factors affecting perspectives in communication 2. Sharing of experiences on factors affecting perspectives 3. Sharing experiences on factors affecting communication at workplace	05
4. Demonstrate the knowledge of basic writing skills	1. Writing skills related to the following: - Phrases - Kinds of sentences - Parts of sentence - Parts of speech - Use of articles - Construction of a paragraph	1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject	05
Total			**20**

Unit 2: Self-management Skills – I			
Learning Outcome	**Theory (07 hrs)**	**Practical (03 hrs)**	**Duration (10 Hrs)**
1. Describe the meaning and importance of self-management	1. Meaning of self-management 2. Positive results of self-management 3. Self-management skills	1. Identification of self-management skills 2. Strength and weakness analysis	05
2. Identify the factors that helps in building self-confidence	1. Factors that help in building self-confidence – social, cultural, and physical factors 2. Self-confidence building tips – getting rid of the negative thoughts, thinking positively, staying happy with small things, staying clean, hygienic and smart, chatting with positive people, etc.	1. Role play exercises on building self-confidence 2. Use of positive metaphors/ words 3. Positive stroking on wakeup and before going bed 4. Helping others and working for community	05
Total			**10**

Unit 3: Information and Communication Technology Skills – I			
Learning Outcome	**Theory (06 hrs)**	**Practical (14 hrs)**	**Duration (20 Hrs)**
1. Describe the role of Information and Communication Technology (ICT) in day-to-day life and workplace	1. Introduction to ICT 2. Role and importance of ICT in personal life and at workplace 3. ICT in our daily life (examples) 4. ICT tools - Mobile, tab, radio, TV, email, etc.	1. Discussion on the role and importance of ICT in personal life and at workplace. 2. Preparing posters /collages for showing the role of ICT at workplace	04
2. Identify components of basic computer system and their functions	1. Computer system- Central Processing Unit (CPU), memory, motherboard, storage devices 2. Hardware and software of a computer system 3. Role and functions of Random Access Memory (RAM) and Read Only Memory (ROM) 4. Role and functions of Central Processing Unit 5. Procedure for starting and shutting down a computer	1. Connecting the cables and peripherals to the Central Processing Unit 2. Starting and shutting down a computer 3. Group discussion on the various aspects of hardware and software	07
3. Demonstrate use of various	1. Peripherals devices and their uses – mouse,	1. Identification of various parts and	05

components and peripherals of computer system	keyboard, scanner, webcam, etc. of a computer system	peripherals of a computer 2. Demonstration and practice on the use of mouse 3. Demonstration and practice on the use of keyboard 4. Demonstration of the uses of printers, webcams, scanner and other peripheral devices 5. Drawing diagram of computer system and labelling it	
4. Demonstrate basic computer skills	1. Primary operations on a computer system – input, process, storage, output, communication networking, etc.	1. Identification of the various input and output units and explanation of their purposes	04
Total			**20**

Unit 4: Entrepreneurial Skills - I			
Learning Outcome	**Theory (06 hrs)**	**Practical (09 hrs)**	**Duration (15 Hrs)**
1. Identify various types of business activities	1. Types of businesses – service, manufacturing, hybrid 2. Types of businesses found in our community 3. Business activities around us	1. Prepare posters of business activities found in cities/villages, using pictures 2. Discuss the various types of activities, generally adopted by small businesses in a local community 3. Best out of waste 4. Costing of the product made out of waste 5. Selling of items made from waste materials 6. Prepare list of businesses that provides goods and services in exchange for money	09

2. Demonstrate the knowledge of distinguishing characteristics of entrepreneurship	1. Meaning of entrepreneurship development 2. Distinguishing characteristics of entrepreneurship 3. Role and rewards of entrepreneurship	1. Prepare charts showing advantages of entrepreneurship over wages 2. Group discussions on role and features of entrepreneurship 3. Lectures/presentations by entrepreneurs on their experiences and success stories 4. Identify core skills of successful entrepreneur	06
Total			**15**

Unit 5: Green Skills - I			
Learning Outcome	**Theory (07 hrs)**	**Practical (03 hrs)**	**Duration (10 Hrs)**
1. Demonstrated the knowledge of the factors influencing natural resource conservation	1. Introduction to environment, 2. Relationship between society and environment, ecosystem and factors causing imbalance 3. Natural resource conservation 4. Environment protection and conservation	1. Group discussion on hazards of deteriorating environment 2. Prepare posters showing environment conservation 3. Discussion on various factors that influence our environment	05
2. Describe the importance of green economy and green skills	1. Definition of green economy 2. Importance of green economy	1. Discussion on the benefits of green skills and importance of green economy 2. Prepare a Poster showing the importance of green economy with the help of newspaper/ magazine cuttings	05
Total			**10**

Part B: Vocational Skills

S. No.	**Units**	**Duration (Hrs.)**
1	Introduction to plumbing	15
2	Tools for plumbing	25
3	Plumbing material and pipes, types and grades of pipe	20
4	Measurements and symbols used in plumbing	15
5	Plumbing fittings, Joints and valves	20
	Total	**95**

Unit–1: Introduction to Plumbing			
Learning Outcome	**Theory**	**Practical**	**Duration *(15Hrs)***
1. Overview of plumbing industry, scope of employment in this sector	1. Importance of plumbing 2. Job opportunities in plumbing	1. List the jobs related to water and plumbing sector	05
2. Responsibilities of an assistant plumber general	1. Responsibilities of assistant plumber general	1. List the responsibilities of assistant plumber general	05
3. Identifying the plumbing components	1. Meaning of plumbing 2. Sketches 3. Application and Uses	1. Visit to school building and see plumbing items 2. List the plumbing items in a school building	05
Total			**15**

Unit–2: Tools for Plumbing			
Learning Outcome	**Theory**	**Practical**	**Duration *(20Hrs)***
1. Identify the tools to be used	1. Importance of tools 2. Different types of tools used in plumbing 3. Knowledge of tools such as Bench vice, Pipe, vice, Wrenches, Adjustable wrench, Water-pump, plies, Spanners, Ring spanner, Open ended spanner, Combination Spanners, Bi-hexagonal, ring spanner, Chisel, Hammer, Chain wrench Rover jumper, Trowel, Screw driver, Hacksaw, Pipe cutter, Pipe bending, machine Threading dies, File, Pliers, Caulking tools, Drill machine, Drill bit Hangers, Measuring tape, Plumb rule and bob Sprit level, Pipe threader	1. Identify the tools 2. Draw the figure of tools 3. Do the market survey to find out the manufacturer and cost of each tools	10
2. Handling of tools	1. Methods of holding the tools 2. safety precautions to be taken while using the tools 3. Maintaining the plumbing tools and equipment's	1. Do practice of handling of tools using safety measures 2. Demonstrate the procedure of cleaning and maintaining, plumbing resources	10

		and tools.	
3. Maintenance of tools	1. Impact of factors such as temperature, pH (acidity levels), chemical composition, oxidation and ageing on plumbing tools, equipment, products and materials. 2. Processes of prevention and their application used in the plumbing industry.	1. Measuring the temperature of water. 2. Reading the chemical composition of water. 3. List the processes of prevention.	05
Total			**25**

Unit–3: Plumbing Materials and Pipes, types and grades of pipe			
Learning Outcome	**Theory**	**Practical**	**Duration *(20Hrs)***
1. Basic task to facilitate plumbing work	1. Importance of obtaining clarity about the task to be performed and following instruction and standard procedure. 2. Unpacking and checking of material as per manufacturer guideline	1. Demonstrate the process of unpacking of plumbing pipes, fittings fixtures and related materials.	10
2. Identify the plumbing materials used	1. Plumbing material and its importance 2. Method/technique of application of plumbing material Precautions to be used during application. 3. Various tools used for application of material	1. Enlist and identify the plumbing materials 2. Technique of application of the material 3. Demonstrate the application process	05
3. Identify the plumbing pipes	1. Importance and use of plumbing pipes 2. Types and quality of pipes. 3. Grades and characteristics of pipes 4. Cost of the pipes Precaution while handling the pipes	1. Survey the institute building and identify the plumbing pipes used 2. Market survey and make a list of plumbing pipes available. 3. Visit a construction site and see plumbing pipes with their uses at site	05
Total			**20**

Unit 4: Measurements and Symbol used in Plumbing			
Learning Outcome	**Theory**	**Practical**	**Duration (15 Hrs)**
1. Identify the measurement systems used for plumbing	1. Importance of measurement 2. Types of measurement 3. Measurement tools 4. Conversion method	1. Convert different units in MKS to FPS system 2. Read and note down the values in measuring tools 3. Measure the dimensions and record the value of different plumbing materials	05
2. Measure the various quantity to be used in plumbing	1. Technique of measurement with tools 2. Important units of measurement	1. Measure the length 2. Measure the density 3. Measure the Pressure 4. Calculate the quantity of material as per data above recorded	05
3. Identify the various symbols used for plumbing work	1. Importance of symbols 2. Symbols used in plumbing 3. List the types of symbols	1. List the symbols for various plumbing items 2. Draw the symbols in drawing sheet 3. Identify the symbol details from drawing and note what it signifies or indicates	05
Total			**15**

Unit 5: Plumbing fittings, joints and valves			
Learning Outcome	**Theory**	**Practical**	**Duration (20 Hrs)**
1. Able to identify plumbing fittings	1. Importance and use of plumbing fittings 2. Types and properties of plumbing fittings. 3. Tools required for fixing the plumbing fittings 4. Procedure of fixing the fittings like Elbow, Gasket, Couplings, Union, Reducer, Tee, Nipple, Valve and Trap etc.	1. Identify the different types of plumbing fittings 2. Drawings /sketches of plumbing fittings 3. Reading and interpreting the sketches/basic working drawing 4. Market survey and identify the different type of plumbing fittings 5. Practice of fixing of plumbing fittings	10

2. Able to identify plumbing joints	1. Importance and use of plumbing joints 2. Types and properties of plumbing joints. 3. Tools required for fixing the plumbing joints 4. Procedure of fixing the joints	1. Identify the different types of plumbing joints 2. Drawings /sketches of plumbing joints 3. Reading and interpreting the sketches/basic working drawing 4. Market survey to identify the different type of plumbing materials available to assemble joints 5. Practice of fixing of plumbing joints	10
Total			**20**

CLASS 10

Part A - Employability Skills

S.No.	Units	Duration (Hrs)
1.	Communication Skills – II	20
2.	Self-management Skills - II	10
3.	Information and Communication Technology Skills – II	20
4.	Entrepreneurial Skills – II	15
5.	Green Skills - II	10
	Total	**75**

Unit 1: Communication Skills - II			
Learning Outcome	**Theory (12 hrs)**	**Practical (08 hrs)**	**Duration (20 Hrs)**
1. Demonstrate knowledge of various methods of communication	1. Methods of communication - Verbal - Non-verbal - Visual	1. Writing pros and cons of written, verbal and non-verbal communication 2. Listing do's and don'ts for avoiding common body language mistakes	05
2. Provide descriptive and specific feedback	1. Communication cycle and importance of feedback 2. Meaning and importance of feedback 3. Descriptive feedback - written comments or conversations 4. Specific and non-specific feedback	1. Constructing sentences for providing descriptive and specific feedback	03
3. Apply measures to overcome barriers	1. Barriers to effective communication –	1. Enlisting barriers to effective communication	04

in communication	types and factors 2. Measures to overcome barriers in effective communication	2. Applying measures to overcome barriers in communication	
4. Apply principles of communication	1. Principles of effective communication 2. 7 Cs of effective communication	1. Constructing sentences that convey all facts required by the receiver 2. Expressing in a manner that shows respect to the receiver of the message 3. Exercises and games on applying 7Cs of effective communication	03
5. Demonstrate basic writing skills	2. Writing skills to the following: • Sentence • Phrase • Kinds of Sentences • Parts of Sentence • Parts of Speech • Articles • Construction of a Paragraph	1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject	05
Total			**20**

Unit 2: Self-management Skills - II			
Learning Outcome	**Theory (05 hrs)**	**Practical (05 hrs)**	**Duration (10 Hrs)**
1. Apply stress management techniques	1. Meaning and importance of stress management 2. Stress management techniques – physical exercise, yoga, meditation 3. Enjoying, going to vacations and holidays with family and friends 4. Taking nature walks	1. Exercises on stress management techniques – yoga, meditation, physical exercises 2. Preparing a write-up on an essay on experiences during a holiday trip	06
2. Demonstrate the ability to work independently	1. Importance of the ability to work independently 2. Describe the types of self-awareness 3. Describe the meaning of self-motivation and self-regulation	1. Demonstration on working independently 2. goals 3. Planning of an activity 4. Executing tasks in a specific period, with no help or directives 5. Demonstration on the qualities required for working independently	04
Total			**10**

Unit 3: Information and Communication Technology Skills– II			
Learning Outcome	**Theory (08 hrs)**	**Practical (12 hrs)**	**Duration (20 Hrs)**
1. Distinguish between different operating systems	1. Classes of operating systems 2. Menu, icons and task bar on the desktop 3. File concept, file operations, file organization, directory structures, and file-system structures 4. Creating and managing files and folders	1. Identification of task bar, icons, menu, etc. 2. Demonstration and practicing of creating, renaming and deleting files and folders, saving files in folders and sub-folders, restoring files and folders from recycle bin	17
2. Apply basic skills for care and maintenance of computer	1. Importance and need of care and maintenance of computer - Cleaning computer components - Preparing maintenance schedule - Protecting computer against viruses - Scanning and cleaning viruses and removing SPAM files, temporary files and folders	1. Demonstration of the procedures to be followed for cleaning, care and maintenance of hardware and software	03
Total			**20**

Unit 4: Entrepreneurial Skills - II			
Learning Outcome	**Theory (06 hrs)**	**Practical (09 hrs)**	**Duration (15 Hrs)**
1. List the characteristics of successful entrepreneur	1. Entrepreneurship and society 2. Qualities and functions of an entrepreneur 3. Role and importance of an entrepreneur 4. Myth about entrepreneurship 5. Entrepreneurship as a career option	1. Writing a note on entrepreneurship as career option 2. Collecting success stories of first generation and local entrepreneurs 3. Listing the entrepreneurial qualities – analysis of strength and weaknesses 4. Group discussion of self-qualities that students feel are needed to become successful entrepreneur 5. Collect information and related data for a business 6. Make a plan in team for setting up a business	15
Total			**15**

Unit 5: Green Skills - II			
Learning Outcome	**Theory (07 hrs)**	**Practical (03 hrs)**	**Duration (10 Hrs)**
1. Demonstrate the knowledge of importance, problems and solutions related to sustainable development	1. Definition of sustainable development 2. Importance of sustainable development 3. Problems related to sustainable development	1. Identify the problem related to sustainable development in the community 2. Group discussion on the importance of respecting and conserving indigenous knowledge and cultural heritage 3. Discussion on the responsibilities and benefits of environmental citizenship, including the conservation and protection of environmental values 4. Preparing models on rain water harvesting, drip / sprinkler irrigation, vermin-compost, solar energy, solar cooker, etc.	10
Total			**10**

Part B: Vocational Skills

S. No.	Units	Duration (Hrs.)
1	Basic building Construction	15
2	PIPES –Cutting, Threading, Joining and Testing of Pipelines	30
3	Plumbing and sanitary fixtures	20
4	Maintaining a healthy, safe and secure work environment	15
5	Optimum utilization of resources	15
	Total	**95**

Unit 1: Basic building construction			
Learning Outcome	**Theory**	**Practical**	**Duration (15 Hrs)**
1. Identify different components of a building structure	1. Components of Building structure, 2. Importance and use of building components in a structure 3. Purpose and utilization of various components of building structure	1. Identification of the components of building structure 2. Draw the components of building structure	05

2. Do the cutting and opening in building structure for fixing plumbing fixtures etc.	1. Method of cutting 2. Tools used for cutting Safety during cutting and opening	1. Do the marking on structure for cutting 2. Application of tools and equipment for cutting 3. Collect the waste material and dispose at proper place	10
Total			**15**

Unit 2: PIPES – Cutting, Threading, Joining, and Testing of Pipelines			
Learning Outcome	**Theory**	**Practical**	**Duration (30 Hrs)**
1. Do the cuttings of pipeline as per requirement	1. Cutting procedure of pipes	1. Cutting practice of pipes as per dimension	05
2. Do the threading of pipeline as per requirement	1. Threading procedure of pipes	1. Threading practices of pipes	05
3. Do the joining practice of pipes as per requirement	1. Joining procedure of pipes	1. Joining practices of pipes	05
4. Do the bending practice of pipes as per requirement	1. Bending procedure of pipes	1. Bending practices of pipes	05
5. Do the forming, assembling and securing practice of pipes as per requirement	1. Forming, assembling and securing procedure of pipes	1. Forming, assembling and securing practices of pipes	05
6. Do the testing of pipelines after installation	1. Testing procedure of pipes	1. Testing practices of pipes	05
Total			**30**

Unit 3: Plumbing and sanitary fixtures			
Learning Outcome	**Theory**	**Practical**	**Duration (20 Hrs)**
1. Identify Plumbing and sanitary fixtures	1. Meaning of plumbing and sanitary fixtures 2. Use of plumbing and sanitary fixtures	1. Identification of the components of Plumbing and sanitary fixtures 2. Draw the Plumbing and sanitary fixtures	05

2. Identify type and Components of plumbing and sanitary fixtures	1. Type and components of plumbing and sanitary fixtures 2. Spacing/ height to be provided among different components of a Plumbing and sanitary fixtures	1. Make a list of Plumbing and sanitary fixtures in your area 2. Collect the drawing of various types of Plumbing and sanitary fixtures	07
3. Handle the tools used for Accessories and its type used for plumbing and sanitary fixtures	1. Specification and type of tools used	2. Demonstration of opening of different Plumbing and sanitary fixtures 3. Making the drawing of different Plumbing and sanitary fixtures 1. Making a list of safety equipment	05
4. Installation of different Plumbing and sanitary fixtures	1. Method of assembling and disassembling Plumbing and sanitary fixtures	2. Demonstrate the assembly of Plumbing and sanitary fixtures	03
Total			**20**

Unit 4: Maintaining a healthy, safe and secure work environment			
Learning Outcome	**Theory**	**Practical**	**Duration (15 Hrs)**
1. Identify different types of hazards	1. Miss handling of power tool 2. Improper use of hand tool 3. Falls 4. Manual handling 5. Ladders	1. Safe handling practices, hand and power tool 2. Making of drawing of power tool	05
2. Follow the safety procedures	1. Safety check 2. Precaution at workshop 3. Reporting of injuries and disease and danger 4. Sign and symbols 5. Personnel protection equipment 6. Emergency services and first Aid	1. Identification of various types of hazard 2. Identification and Handling of personnel protective equipment 3. Handling of firefighting equipment	10
Total			**20**

Unit 5: Optimum utilization of resources			
Learning Outcome	**Theory**	**Practical**	**Duration (15 Hrs)**
1. Practices and impact of inefficient utilization of material and water	1. Procedure of efficient utilization of material and water.	1. List the procedure of efficient utilization of material and water management.	02
2. Ways of efficiently managing material and water in the process	1. Efficient ways of managing material and water in the plumbing process	1. List the efficient ways of managing material and water in the plumbing process.	03
3. Application of Electricals equipment's used in plumbing	1. Explain the basics of electricity. 2. Common electrical and thermal equipment used in a plumbing workplace. 3. Describe the use of prevalent energy efficient devices. 4. List indicators of common electrical problems. 5. Discuss common practices of conserving electricity. 6. Explain the importance of checking if the equipment. Machine is functioning normally before commencing work and ensuring it is rectified	1. List common electrical and thermal equipment used in a plumbing workplace. 2. List indicators of common electrical problems. 3. List the prevalent energy efficient devices used in plumbing. 4. List the common practices of conserving electricity.	05
4. Efficient waste management	1. Usage of different colours of dustbin 2. Recyclable and non-recyclable and hazardous waste 3. Efficient waste management practices 4. Common source of pollution 5. Common ways implied by organization to minimize waste generated from plumbing activities	1. Identify ways to optimize usages of water and other material in various tasks/activities/ process. 2. List the appropriate techniques to use energy/electricity in an optimum way. 3. Categorize waste into dry, wet, recyclable, non-recyclable and items of single-use plastics. 4. Employ effective waste management/recycling practices	05
Total			**15**

6. ORGANISATION OF FIELD VISITS

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

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

1. 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.

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

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

S. No.	Qualification	Minimum Competencies	Age Limit
1.	B.Tech in Civil Engineering/ Agricultural Engineering/ Mechanical Engineering 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	• Effective communication skills (oral and written) • Basic computing skills.	18-37 years (as on Jan. 01 (year)) Age relaxation to be provided as per Govt. rules.

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

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

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

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

OR

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

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

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

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

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

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

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

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

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

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

(ix) Identify any additional support the student may need and help to make special arrangements for that support;
(x) Provide placement assistance

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

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

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