

LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

Job Role: Plumber (General)-II

(QUALIFICATION PACK: Ref. Id. PSC/Q0110)

SECTOR: Plumber

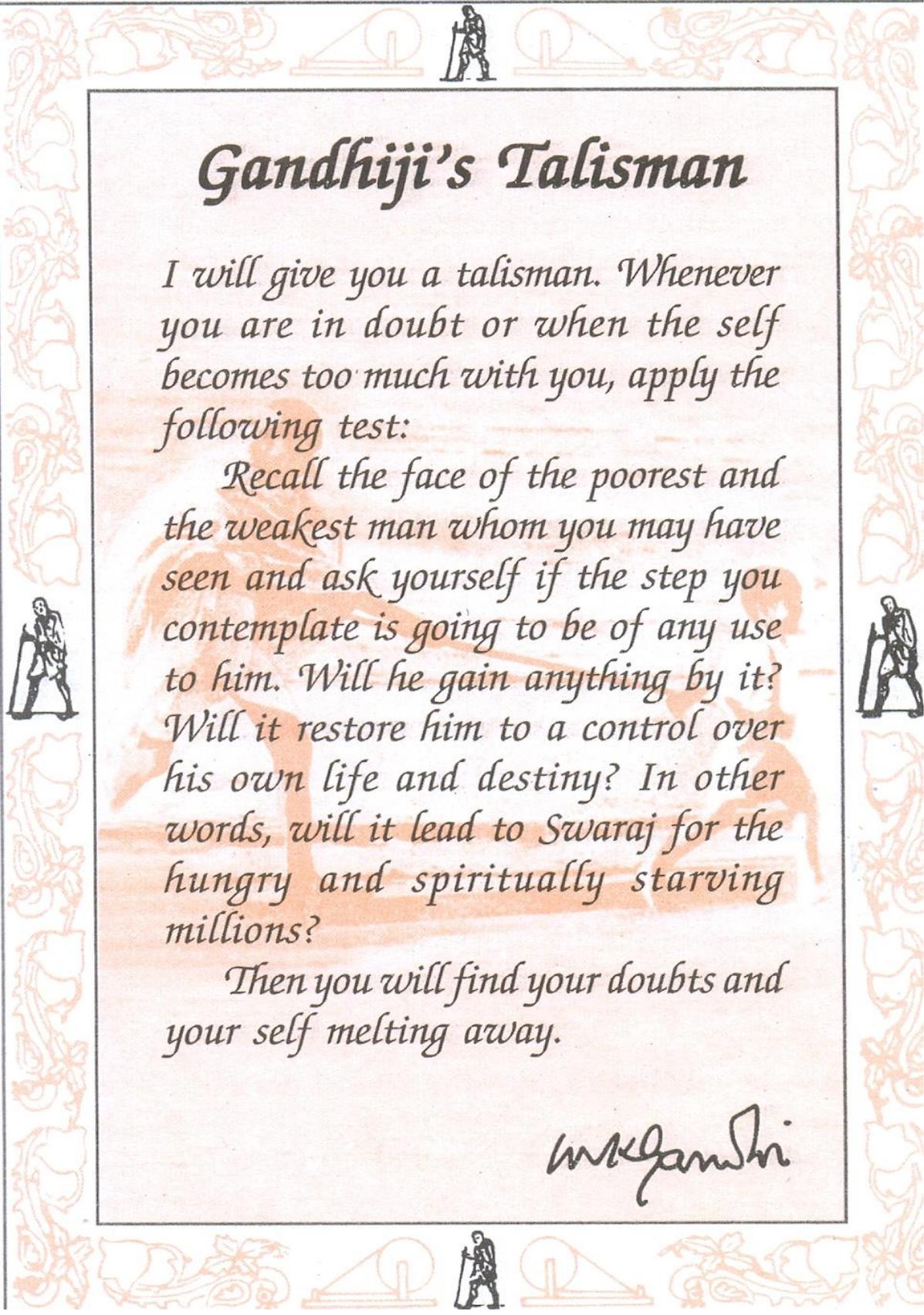
Classes 11 and 12



PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION

Shyamla Hills, Bhopal- 462 013, 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

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Plumbing- Plumber (General) II**

June, 2017

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Published by:

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



PATRON

Prof. H.K. Senapathy, Ph.D.,
Director, National Council of Educational
Research and Training (NCERT),
New Delhi

Prof. Rajesh Khambayat, Ph.D
Joint Director
PSS Central Institute of Vocational Education,
Bhopal

COURSE COORDINATOR

Prof. Saurabh Prakash.
Head
Engineering and Technology Department,
PSSCIVE,
Bhopal

FOREWORD

The Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE) a constituent of the National Council of Educational Research and Training (NCERT) is spearheading the efforts of developing learning outcome based curricula and courseware aimed at integrating both vocational and general qualifications to open pathways of career progression for students. It is a part of Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education (CSSVSHSE) launched by the Ministry of 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 **Plumber (General)-II**. The curriculum has been developed for the secondary students of vocational education and is aligned to the National Occupation Standards (NOSs) of a job role identified and approved under the National Skill Qualification Framework (NSQF).

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

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

Hrushikesh Senapaty
Director
National Council of Education Research and Training

PREFACE

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

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

The PSSCIVE firmly believes that the vocationalisation of education in the nation need to be established on a strong footing of philosophical, cultural and sociological traditions and it should aptly address the needs and aspirations of the students besides meeting the skill demands of the industry. The curriculum, therefore, aims at developing the desired professional, managerial and communication skills to fulfil the needs of the society and the world of work. In order to honour its commitment to the nation, the PSSCIVE 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 Shiksha Abhiyan* (RMSA) of MHRD.

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

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

RAJESH P. KHAMBAYAT

Joint Director

PSS Central Institute of Vocational Education

ACKNOWLEDGEMENTS

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

Dr. Subrat Roy, Professor, Department of Vocational Education and Entrepreneurship Development, National Institute of Technical Teachers Training and Research (NITTTR), Shyamla Hills, Bhopal, Madhya Pradesh, India for reviewing this curriculum.

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

The contribution of Mr. Avinash Kumar Singh, Consultant is acknowledged.

The assistance provided by Mr Akhilesh Kashiv, Computer Operator Grade III in typing and composing of the material is duly acknowledged.

PSSCIVE Team

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1. COURSE OVERVIEW

COURSE TITLE: Plumbing - Plumber (General)-II

Plumber (General)-II 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: This is a course for class XI and XII. On completion of this course, a student can take up a higher level course in the area of Plumber sector.

COURSE DURATION:	600 hrs
Class 11 :	300 hrs
Class 12 :	300 hrs
<hr/>	
Total	: 600 hrs
<hr/>	

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 11 and 12 opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for Class 11 is as follows:

CLASS 11			
	Units	No. of Hours for Theory and Practical 300	Max. Marks for Theory and Practical 100
Part A	Employability Skills		
	Unit 1 : Communication Skills-III	25	10
	Unit 2 : Self-management Skills-III	25	
	Unit 3 : Information and Communication Technology Skills-III	20	
	Unit 4 : Entrepreneurial Skills-III	25	
	Unit 5 : Green Skills-III	15	
	Total	110	10
Part B	Vocational Skills		
	Unit 1 : Installation of basic sanitary fittings and fixture	35	40
	Unit 2: Tools for plumbing	25	
	Unit 3: Use of power tools and machine at site	35	
	Unit 4: Perform various plumbing related operations/procedure	35	
	Unit 5: Repair of basic fittings and fixture	35	
	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

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

CLASS 12			
	Units	No. of Hours for Theory and	Max. Marks for Theory and

		Practical 300	Practical 100
Part A	Employability Skills		
	Unit 1 : Communication Skills-IV	25	10
	Unit 2 : Self-management Skills-IV	25	
	Unit 3 : Information and Communication Technology Skills-IV	20	
	Unit 4 : Entrepreneurial Skills-IV	15	
	Unit 5 : Green Skills-IV	15	
	Total	100	10
Part B	Vocational Skills		
	Unit 1 : Installation and repair of advanced sanitary fixture	40	40
	Unit 2: Functioning and maintenance of taps, valves, faucets and control devices	40	
	Unit 3 : Techniques related to cutting, bending and joining of fixtures and fittings	30	
	Unit 4 : Defects in the plumbing system	25	
	Unit 5 : Working and operation of special tools	10	
	Unit 6: Work effectively in a team to deliver desired results at the workplace	10	
	Unit 7: Plan and organize work to meet expected outcomes	10	
	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, private an	0	1	1	05

	example, or solve a problem)				
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 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 various methods of communication	1. Methods of communication 2. Verbal 3. Non-verbal 4. 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 specific	1. Communication	1. Observing and sharing	

communication styles	styles- assertive, aggressive, passive-aggressive, submissive, etc.	communication styles of friends, teachers and family members and adapting the best practices 2. Role plays on communication styles.	10
3. Demonstrate basic writing skills	1. Writing skills to the following: <ul style="list-style-type: none"> • 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	10
Total			25

Unit 2: Self-management Skills – III

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

techniques	management – setting and prioritizing goals, creating a schedule, making lists of tasks, balancing work and leisure, using different optimization tools to break large tasks into smaller tasks.		05
Total			25

Unit 3: Information and Communication Technology Skills - III

Learning Outcome	Theory (08 hrs)	Practical (12 hrs)	Duration (20 Hrs)
1. Create a document on word processor	<ol style="list-style-type: none"> 1. Introduction to word processing. 2. Software packages for word processing. 3. Opening and exiting the word processor. 4. Creating a document 	<ol style="list-style-type: none"> 1. Demonstration and practice of the following: <ul style="list-style-type: none"> • Listing the features of word processing • Listing the software packages for word processing • Opening and exit the word processor • Creating a document 	10
2. Edit, save and print a document in word processor	<ol style="list-style-type: none"> 1. Editing text 2. Wrapping and aligning the text 3. Font size, type and face. 4. Header and Footer 5. Auto correct 6. Numbering and bullet 7. Creating table 8. Find and replace 9. Page numbering. 10. Printing document. 11. Saving a document in various formats. 	<ol style="list-style-type: none"> 1. Demonstration and practising the following: <ul style="list-style-type: none"> • Editing the text • Word wrapping and alignment • Changing font type, size and face • Inserting header and footer • Removing header and footer 1. Using autocorrect option 2. Insert page numbers and bullet 3. Save and print a document 	10
Total			20

Unit 4: Entrepreneurial Skills - III

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 Hrs)
1. Describe the significance of entrepreneurial values and attitude	<ol style="list-style-type: none"> 1. Values in general and entrepreneurial values 2. Entrepreneurial value orientation with respect to innovativeness, independence, outstanding performance and respect for work 	<ol style="list-style-type: none"> 1. Listing of entrepreneurial values by the students. 2. Group work on identification of entrepreneurial values and their roles after listing or reading 2-3 stories of successful entrepreneur 3. Exhibiting entrepreneurial values in Ice breaking, rapport building, group work and home assignments 	10
2. Demonstrate the knowledge of attitudinal changes required to become an entrepreneur	<ol style="list-style-type: none"> 1. Attitudes in general and entrepreneurial attitudes 2. Using imagination/ intuition 3. Tendency to take moderate risk 4. Enjoying freedom of expression and action 5. Looking for economic opportunities 6. Believing that we can change the environment 7. Analyzing situation and planning action 8. Involving in activity 	<ol style="list-style-type: none"> 1. Preparing a list of factors that influence attitude in general and entrepreneurial attitude 2. Demonstrating and identifying own entrepreneurial attitudes during the following micro lab activities like thematic appreciation test 3. Preparing a short write-up on "who am I" 4. Take up a product and suggest how its features can be improved 5. Group activity for suggesting brand names, names of enterprises, etc. 	15
Total			25

Unit 5: Green Skills - III

Learning Outcome	Theory (07 hrs)	Practical (08 hrs)	Duration (15 Hrs)
1. Describe importance of main sector of green economy	<ol style="list-style-type: none"> 1. Main sectors of green economy- E-waste management, green transportation, renewal energy, green construction, water management 2. Policy initiatives for 	<ol style="list-style-type: none"> 1. Preparing a poster on any one of the sectors of green economy 2. Writing a two-page essay on important initiatives taken in India for promoting green economy 	08

	greening economy in India		
2. Describe the major green Sectors/Areas and the role of various stakeholder in green economy	<ol style="list-style-type: none"> 1. Stakeholders in green economy 2. Role of government and private agencies in greening cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries 	<ol style="list-style-type: none"> 1. Preparing posters on green Sectors/Areas: cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries 	07
Total			15

Part B: Vocational Skills

S. No.	Units	Duration (Hrs.)
1	Unit 1 : Installation of basic sanitary fittings and fixture	35
2	Unit 2: Tools for plumbing	55
3	Unit 3: Use of power tools and machine at site	30
4	Unit 4: Perform various plumbing related operations/procedure	25
5	Unit 5: Repair of basic fittings and fixture	20
	Total	165

Unit – 1 : Installation of basic sanitary fittings and fixtures

Learning Outcome	Theory	Practical	Duration (35Hrs)
1. Identifying the basic sanitary fittings	<ol style="list-style-type: none"> 1. Basic plumbing work 2. Types of exiting plumbing fixture 3. Application and Uses of sanitary fixtures and fittings 	<ol style="list-style-type: none"> 1. List the plumbing items fitted in a school building 2. Visit to the market and identify various sanitary fixtures and fittings available 3. Reading of instruction 	35

		manual for installation	
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Unit – 2 : Tools for Plumbing

Learning Outcome	Theory	Practical	Duration (55Hrs)
1. Identify the tools to be used	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Identify the tools 2. Draw the figure of tools 3. Do the market survey and find out the manufacturer and cost of the each tools 	48
2. Handling of tools	<ol style="list-style-type: none"> 1. Method of handling the tools 2. Precautions to be taken while handling the tools 	<ol style="list-style-type: none"> 1. Do practice of safe handling of tools 	7

Unit – 3 : Use of power tools and machine at site

Learning Outcome	Theory	Practical	Duration (30 Hrs)
1. Identify the plumbing tools and machine used	<ol style="list-style-type: none"> 1. Plumbing tools and machine and its importance 2. Method/technique of application of plumbing tools and machine 3. Safety Precautions to be used during 	<ol style="list-style-type: none"> 1. List and identify the plumbing materials 2. Technique and method of tools application 3. Demonstrate application process with safety measures 	15

	application		
2. Selection of appropriate tools and machine to be used at site	<ol style="list-style-type: none"> 1. Identify the job to be performed at site. 2. Various tools used for application of material 3. Various machine used for application of material 3. Selection criteria of appropriate tools and machine for the job 4. Selection of raw material 5. Calculate the cost of material and tools to be used. 6. Calculate the cost of labour 	<ol style="list-style-type: none"> 1. Select the tools and material 2. Identifying the defect 3. Identify and demonstrate various appropriate tools for application of material 4. Apply the tool and material 5. Test the installed fittings 6. Note the cost of material, specification of the product 	15

Unit 4: Perform various plumbing related operations/ procedure

Learning Outcome	Theory	Practical	Duration (25Hrs)
1. Identify the building components to be used for plumbing	<ol style="list-style-type: none"> 1. Building components and its importance 2. Selection of appropriate material and fixture to be used 3. Plumbing activities at all important place 	<ol style="list-style-type: none"> 1. Identify the building components 2. Identify the defects 3. Calculate the materials quantity using measuring tools 4. Measure the dimensions and record 	03
2. Measure the various quantity to be used in plumbing	<ol style="list-style-type: none"> 1. Technique of measurement with tools 2. Important units of measurement 	<ol style="list-style-type: none"> 1. Measure the length 2. Measure the density 3. Measure the Pressure 4. Calculate the quantity of material as per data above recorded 	03
3. Prepare the material as per job requirement	<ol style="list-style-type: none"> 1. Material and its type to be used 2. Types of material 3. Method of calculation of quantity of material 4. Tools to be used for work 5. Procedure of application of appropriate material 	<ol style="list-style-type: none"> 1. Calculate the material to be used 2. Select the material 3. Calculate the quantity of material 4. Select the tools to be used for work 5. Assemble the job as per requirement 6. Application of tools 	03

	<ol style="list-style-type: none"> Application of tools for proper activities like cutting, bending, fixing etc. Safety methods 	<p>for proper activities like cutting, bending, fixing etc.</p> <ol style="list-style-type: none"> Enlist safety measures to be taken 	
4. Fix and test bath wares and tap wares	<ol style="list-style-type: none"> Bath ware and tap ware and its role Types of bath ware Types of tap ware Properties of good bath ware and tap ware Technique of installation of the bath ware and tap ware Precaution to be taken during installation 	<ol style="list-style-type: none"> Select the bath ware and tap ware to be used for fixing Identify the location for fixing Draw and mark various points for fixing Reading the instruction manual before installation Technique of installation of the bath ware and tap ware Precaution to be taken during installation Testing of the installed items 	06
5. Testing of installed items using various methods	<ol style="list-style-type: none"> Method of testing-air, water, pressure etc. Precautions to be taken during installation Rectify the defects Reading of manual of item 	<ol style="list-style-type: none"> Testing of installed item-air, water, pressure etc. Precautions to be taken during installation Rectify the defects 	05
6. Do the storage of tools and material properly	<ol style="list-style-type: none"> Method of storage Maintenance of record and stock register Care prior to storage of tools and plumbing materials 	<ol style="list-style-type: none"> Identify the place of storage like almiraha, tool box etc Mark the place for each item and record in stock register Clean the tools and material prior to storage 	05

Unit 5: Repair of basic fitting and fixtures

Learning Outcome	Theory	Practical	Duration (20 Hrs)
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<p>1. Able to identify, plumbing fittings</p>	<ol style="list-style-type: none"> 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. 5. Market cost of the fittings and labour cost of fixing fittings 	<ol style="list-style-type: none"> 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 tightening and fixing of plumbing fittings 	<p>03</p>
<p>2. Able to identify, plumbing joints</p>	<ol style="list-style-type: none"> 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 5. Market cost of the joints and labour cost of fixing joints 	<ol style="list-style-type: none"> 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 and identify the different type of plumbing joints available 5. Practice of fixing of plumbing joints 	<p>03</p>
<p>3. Identify the cause/fault</p>	<ol style="list-style-type: none"> 1. Method of identifying the defects 2. Identify the reason of defects 	<ol style="list-style-type: none"> 1. Check the position of affected components 2. Dis-assemble the component and check the defected parts 	<p>03</p>
<p>4. Establish a sequence of repair activities</p>	<ol style="list-style-type: none"> 1. Method of replacement procedure 	<ol style="list-style-type: none"> 1. List the sequence of repair activities need to be done 	<p>03</p>
<p>5. Locate the component to be replaced/repared</p>	<ol style="list-style-type: none"> 1. Checking procedure of defected components 	<ol style="list-style-type: none"> 1. Identify the location of defective components 	<p>03</p>
<p>6. Cut defective structures</p>	<ol style="list-style-type: none"> 1. Method of cutting 	<ol style="list-style-type: none"> 1. Use appropriate tools for cutting defective components 	<p>01</p>
<p>7. Fix the repaired or new parts</p>	<ol style="list-style-type: none"> 1. Procedure of repairing or replacing with new components 2. Safety precaution 	<ol style="list-style-type: none"> 1. Take necessary action of replacing a new or repair a components 2. Carry out jamming or tightening of fittings 	<p>02</p>

		using appropriate tools and materials	
8. Test the items	1. Testing procedure and type of test to be performed	1. Test the defected part 2. Correct it if not working properly	02

CLASS 12

Part A: Employability Skills

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

Unit 1: Communication Skills - IV

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Total Duration (25 Hrs)
1. Describe the steps to active listening skills	1. Importance of active listening at workplace 2. Steps to active listening	1. Demonstration of the key aspects of becoming active listener 2. Preparing posters of steps for active listening	10
2. Demonstrate basic writing skills	2. Writing skills to the following: <ul style="list-style-type: none"> • 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	15
Total			25

Unit 2: Self-management Skills – IV

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Total Duration (25 Hrs)
1. Describe the various factors influencing self-motivation	<ol style="list-style-type: none"> 1. Finding and listing motives (needs and desires); 2. Finding sources of motivation and inspiration (music, books, activities);expansive thoughts; living fully in the present moment; dreaming big 	<ol style="list-style-type: none"> 1. Group discussion on identifying needs and desire 2. Discussion on sources of motivation and inspiration 	10
2. Describe the basic personality traits, types and disorders	<ol style="list-style-type: none"> 1. Describe the meaning of personality 2. Describe how personality influence others 3. Describe basic personality traits 4. Describe common personality disorders- paranoid, antisocial, schizoid, borderline, narcissistic, avoidant, dependent and obsessive 	<ol style="list-style-type: none"> 1. Demonstrate the knowledge of different personality types 	15
Total			25

Unit 3: Information and Communication Technology Skills - IV

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Total Duration (25 Hrs)
1. Perform tabulation using spreadsheet application	<ol style="list-style-type: none"> 1. Introduction to spreadsheet application 2. Spreadsheet applications 3. Creating a new worksheet 4. Opening workbook and entering text 5. Resizing fonts and styles 6. Copying and moving 7. Filter and sorting 	<ol style="list-style-type: none"> 1. Demonstration and practice on the following: <ul style="list-style-type: none"> • Introduction to the spreadsheet application • Listing the spreadsheet applications • Creating a new worksheet • Opening the workbook and enter text • Resizing fonts and styles • Copying and move the cell data 	10

	<ol style="list-style-type: none"> 8. Formulas and functions 9. Password protection. 10. Printing a spreadsheet. 11. Saving a spreadsheet in various formats. 	<ul style="list-style-type: none"> • Sorting and Filter the data • Applying elementary formulas and functions • Protecting the spreadsheet with password • Printing a spreadsheet • Saving the spreadsheet in various formats. 	
2. Prepare presentation using presentation application	<ol style="list-style-type: none"> 1. Introduction to presentation 2. Software packages for presentation 3. Creating a new presentation 4. Adding a slide 5. Deleting a slide 6. Entering and editing text 7. Formatting text 8. Inserting clipart and images 9. Slide layout 10. Saving a presentation 11. Printing a presentation document. 	<ol style="list-style-type: none"> 1. Demonstration and practice on the following: <ul style="list-style-type: none"> • Listing the software packages for presentation • Explaining the features of presentation • Creating a new presentation • Adding a slide to presentation. • Deleting a slide • Entering and edit text • Formatting text • Inserting clipart and images • Sliding layout • Saving a presentation • Printing a presentation document 	15
Total			25

Unit 4: Entrepreneurial Skills - IV

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Total Duration (25 Hrs)
1. Identify the general and entrepreneurial behavioural competencies	<ol style="list-style-type: none"> 1. Barriers to becoming entrepreneur 2. Behavioural and entrepreneurial competencies – adaptability/decisiveness, initiative/perseverance, interpersonal skills, organizational skills, stress management, valuing service and diversity 	<ol style="list-style-type: none"> 1. Administering self-rating questionnaire and score responses on each of the competencies 2. Collect small story/ anecdote of prominent successful entrepreneurs 3. Identify entrepreneurial competencies reflected in each story and connect it to the definition of behavioural competencies 4. Preparation of competencies profile of 	10

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

Unit 5: Green Skills - V

Learning Outcome	Theory (05 hrs)	Practical (10 hrs)	Total Duration (15 Hrs)
1. Identify the role and importance of green jobs in different sectors	1. Role of green jobs in toxin-free homes, 2. Green organic gardening, public transport and energy conservation, 3. Green jobs in water conservation 4. Green jobs in solar and wind power, waste reduction, reuse and	1. Listing of green jobs and preparation of posters on green job profiles 2. Prepare posters on green jobs.	15

	recycling of wastes, 5. Green jobs in green tourism 6. Green jobs in building and construction 7. Green jobs in appropriate technology 8. Role of green jobs in Improving energy and raw materials use 9. Role of green jobs in limiting greenhouse gas emissions 10. Role of green jobs minimizing waste and pollution 11. Role of green jobs in protecting and restoring ecosystems 12. Role of green jobs in support adaptation to the effects of climate change		
Total			15

Part B: Vocational Skills

S. No.	Units	Duration (Hrs.)
1	Unit 1 : Installation and repair of advanced sanitary fixture	40
2	Unit 2: Functioning and maintenance of taps, valves, faucets and control devices	25
3	Unit 3 : Techniques related to cutting, bending and joining of fixtures and fittings	50
4	Unit 4 : Defects in the plumbing system	30
5	Unit 5 : Working and operation of special tools	20
	Total	165

Unit 1: Installation and repair of advance sanitary fixture

Learning Outcome	Theory	Practical	Duration (40 Hrs)
1. Identification of advanced	1. Advanced plumbing fittings and fixtures	1. Identification of advanced plumbing	10

plumbing fittings and fixtures	2. Advantages and uses	<p>fittings and fixtures</p> <p>2. Market survey to find out the availability of advanced fittings</p>	
2. Installation of advanced sanitary fixtures	<p>1. Reading of instruction manual of advanced sanitary fixtures</p> <p>2. Installation method</p> <p>3. Precaution during installation</p> <p>4. Understand the functioning of taps and valves</p>	<p>1. Read and apply the instruction given in fixture manual</p> <p>3. Identify the tools to be used for installation</p> <p>4. Dis-assemble the advanced sanitary fixtures</p> <p>5. Fix the fittings as per the drawing of manual</p>	15
3. Repair of advanced sanitary fixtures	<p>5. Reading of manual of advanced sanitary fixtures</p> <p>6. Identify the faults</p> <p>7. Suggest the method of repairing of faults</p> <p>8. Precaution during installation</p>	<p>1. Reading of fixture instruction manual</p> <p>2. Identify the tools to be used for installation</p> <p>3. Identify the faults</p> <p>4. Suggest the method of repairing of faults</p> <p>5. Safety measures need to be taken during installation</p> <p>6. Repair or replace the fixtures</p>	15

Unit 2: Functioning and maintenance of taps and valve and control devices

Learning Outcome	Theory	Practical	Duration (25 Hrs)
1. Explaining the function of taps and valves	<p>1. Taps and valves and its role</p> <p>2. Material of construction</p> <p>3. Parts of taps and valves</p> <p>4. Advantages of using taps and valves</p>	<p>1. Identification of taps and valves</p> <p>2. Draw the figure of taps and valves</p> <p>3. Identification of parts of taps and valves</p> <p>4. Assembling and de-assembling of taps and valves</p>	05
2. Identify taps and valve	<p>1. Importance of taps and valves</p> <p>2. Components of taps and valves</p> <p>3. Types of taps and valves</p> <p>4. Advantage of using</p>	<p>1. Identify taps and valves</p> <p>2. Draw the taps and valves of Plumbing and sanitary</p>	05

	and Components of Plumbing and sanitary fixtures	fixtures	
3. Identify type and Components of control devices	<ol style="list-style-type: none"> Control devices and its use Type and components of control devices of plumbing and sanitary fixtures Functioning of control devices Method of use of control device 	<ol style="list-style-type: none"> Make a list of control devices used in plumbing and sanitary fixtures in your area Demonstrate the control devices of Plumbing and sanitary fixtures Assembling and disassembling of Control devices 	05
4. Use and handle control devices	<ol style="list-style-type: none"> Method of assembling and disassembling of control devices of plumbing and sanitary fixtures 	<ol style="list-style-type: none"> Assembling and disassembling of control devices of plumbing and sanitary fixtures 	05
5 .Handle the too used for control devices for plumbing and sanitary fixtures	<ol style="list-style-type: none"> Specification and type of tools used 	<ol style="list-style-type: none"> Demonstration of opening of control devices Making the drawing of control devices fixtures Making a list of safety equipment 	05

Unit 3: Techniques related to cutting, bending and joining of fixtures and fittings

Learning Outcome	Theory	Practical	Duration (50 Hrs)
1. Identify different components of a building structure	<ol style="list-style-type: none"> Components of Building structure, Importance and use of building components in a structure Purpose and utilization of various components of building structure Type and Components of building structure fixtures 	<ol style="list-style-type: none"> Identification of the components of building structure Draw the components of building structure 	20
2. Do the cutting and opening in building structure for fixing plumbing fixtures etc.	<ol style="list-style-type: none"> Method of cutting Tools used for cutting Safety during cutting and opening 	<ol style="list-style-type: none"> From a given sketch/drawing mark out and cut to size Application of tools and equipment for cutting Fill the cut outs on 	20

		building structure 4. Collect the waste material and dispose at proper place	
3. Do the bending and joining of plumbing fittings in building structure	<ol style="list-style-type: none"> 1. Method of bending and joining of plumbing fittings 2. Precautions during process of bending and joining 	<ol style="list-style-type: none"> 1. Do the bending with proper angle and joining of pipe as per requirement 2. Application of tools and equipment for bending and joining 3. Collect the waste material and dispose at proper place 	10

Unit 4: Defects in plumbing system

Learning Outcome	Theory	Practical	Duration (30 Hrs)
1. Identify different types of defects	<ol style="list-style-type: none"> 1. Importance and use of checking the defects 2. Annual maintenance 	<ol style="list-style-type: none"> 1. Identify the reasons of defects in plumbing fixtures 	15
2. Repairing of different types of defect	<ol style="list-style-type: none"> 1. Type of Defects like leakage, low pressure, no supply of water etc. 2. Importance of maintenance 3. Maintenance schedule 4. Precautions during maintenance 	<ol style="list-style-type: none"> 1. Checking of defected part 2. Identify the reason 3. Rectify the defects 4. Replace or repair the defected parts 	15

Unit 5: Working and operation of special tools

Learning Outcome	Theory	Practical	Duration (20 Hrs)
1. Identification of special tools	<ol style="list-style-type: none"> 1. Importance and use of special tools. 2. Knowledge of advanced sanitary fixtures, power and hand tools 3. Method of fixing special sanitary fixtures 	<ol style="list-style-type: none"> 1. Identify the components of special tools 2. Reading of instruction manuals 3. Fix the fixtures as per manual with the help of special tools 	10
2. Handling of special tools	<ol style="list-style-type: none"> 1. Handling of special tools 2. Precautions to be made during handling of special tools 3. Calculate the quantity required 	<ol style="list-style-type: none"> 1. Identify the special tools 2. Select the tool to be used for fixing the work 3. Read operating 	10

	4. Estimate the cost of material and labour required	4. Follow safety precaution prior to installation	
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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

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.
33. Special tools
34. Special fixtures and fittings

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 from a recognized Institute /University, with at least 1 year work/teaching experience Or Diploma in Civil engineering with 2 year work/teaching experience	<ul style="list-style-type: none"> • 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.

9. LIST OF CONTRIBUTORS

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



PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION
Shyamla Hills, Bhopal- 462 013, M.P., India
