

WEST BENGAL COUNCIL OF HIGHER SECONDARY EDUCATION
SYLLABUS FOR CLASSES XI AND XII
JOB ROLE: PLUMBER – GENERAL

COURSE OVERVIEW:

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

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

- Communicate effectively with the customers;
- Identify the principal components of a computer system.
- Identify and control hazards in the workplace that pose a danger or threat to their safety or health, or that of others.
- Demonstrate self-management skills.
- Demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities.
- Demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection.
- Identify and demonstrate safe use of hand and power tools/equipment used in plumbing;
- Gain insight into Plumber -General job role and its career progression.
- Do installation of basic sanitary fixtures in housing, commercial and institutional setups.
- Do repairing of basic plumbing systems, repair of pipes and sanitary fixtures in housing, commercial and institutional setups.
- Maintenance and servicing of plumbing systems in housing, commercial and institutional setups.
- Coordinating with the senior and other working team about communicating with colleagues and seniors in order to achieve smooth and hazard free work flow.
- Maintaining a healthy, safe and secure working environment. Work effectively in a team to deliver results at a Plumbing site.

COURSE STRUCTURE

JOB ROLE: PLUMBER-GENERAL SECTOR: PLUMBING										
Class	Semester	Contact Hours						Marks		
		Employability Skills	Domain Theory	Domain Practical	Practical Exam/Written Test/ Viva	Project (Practical File/Student Portfolio/ Viva Voce)	Total	Theory		Practical
XI	I	70	31	44	-	-	145	25	Sum of Sem I & Sem II = 50	NIL
	II	40	34	56	10	15	155	25		50
XII	III	70	31	44	-	-	145	25	Sum of Sem III & Sem IV = 50	NIL
	IV	40	35	55	10	15	155	25		50

JOB ROLE: PLUMBER – GENERAL**Class XI [Total Theory Marks: 25]****Class XI SEMESTER I TOPICS: (MCQ) MARKS: 25 [1 MARK PER QUESTION]**

SL No.	Topic	Tuition Hours	Marks Allotted
	Part A: Employability Skills	70	
1	Unit 1: Communication Skill	25	2
2	Unit 2: Self-management Skill	25	2
3	Unit 3: ICT Skill	20	2
	Part B: Vocational Skills	75	
4	Unit 1: Introduction to the sector and the job role	15	4
5	Unit 2: Basics of Plumbing	30	8
6	Unit 3: Preparation for plumbing installation and maintenance	30	7
Total		145	25

Class XI SEMESTER II TOPICS: [Short Answer Question, Descriptive Question] MARKS: 25

SL No.	Topic & Sub-Topics	Tuition Hours	Short Answer Type Question (8 Marks)	Descriptive Type Question (17 Marks)	Total
	Part A: Employability Skills	40			
1	Unit 4: Entrepreneurial Skill	25	1	2	
2	Unit 5: Green Skill	15	1	2	
	Part B: Vocational Skills	90			
3	Unit 4: Installation of water supply system	52	3	9	14
4	Unit 5: Installation of drainage system	38	3	7	10
	Part C: Practical Work	10			
5	Practical Examination	06			
6	Written Test	01			
7	Viva Voce	03			
	Part D: Project Work/ Field Visit	15			
8	Practical File / Student Portfolio	10			
9	Viva Voce	05			
Total		155	8	17	30

JOB ROLE: PLUMBER – GENERAL**Class XII [Total Theory Marks: 25]****Class XII SEMESTER III TOPICS: (MCQ) MARKS: 25 [1 MARK PER QUESTION]**

SL No.	Topic	Tuition Hours	Marks allotted
	Part A: Employability Skills	70	
1	Unit 1: Communication Skill	25	2
2	Unit 2: Self-management Skill	25	2
3	Unit 3: ICT Skill	20	2
	Part B: Vocational Skills	75	
4	Unit 1: Installation of plumbing fixtures	40	10
5	Unit 2: Troubleshooting and maintenance for plumbing	35	9
	Total	145	25

Class XII SEMESTER IV TOPICS: [Short Answer Question, Descriptive Question] MARKS: 25

SL No.	Topic & Sub-Topics	Tuition Hours	Short Answer Type Question (8 Marks)	Descriptive Type Question (17 Marks)	Total
	Part A: Employability Skills	40			
1	Unit 4: Entrepreneurial Skill	25	1	2	3
2	Unit 5: Green Skill	15	1	2	3
	Part B: Vocational Skills	90			
3	Unit 3: Health and safety	30	2	4	6
4	Unit 4: Working effectively with others	40	3	5	8
5	Unit 5: Optimum utilization of resources	20	1	4	5
	Part C: Practical Work	10			
6	Practical Examination	06			
7	Written Test	01			
8	Viva Voce	03			
	Part D: Project Work/ Field Visit	15			
9	Practical File / Student Portfolio	10			
10	Viva Voce	05			
	Total	155	8	17	25

DETAIL SYLLABUS
CLASS - XI
SEMESTER – I

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

6. Demonstrate the knowledge of saying no	1. Steps for saying 'No' Connecting words	1. Group discussion on how to say 'No'	02
7. Identify and use parts of speech in writing	1. Capitalisation 2. Punctuation 3. Basic parts of speech 4. Supporting parts of speech	1. Group activity on identifying parts of speech 2. Writing a paragraph with punctuation marks 3. Group activity on constructing sentences 4. Group activity on identifying parts of speech	03
8. Write correct sentences and paragraphs	1. Parts of a sentence 2. Types of object 3. Types of sentences 4. Paragraph	1. Activity on framing sentences 2. Activity on active and passive voice 3. Assignment on writing different types of sentences	02
9. Communicate with people	1. Greetings Introducing self and others	1. Role-play on formal and informal greetings 2. Role-play on introducing someone 3. Practice and group discussion on how to greet different people?	02
10. Introduce yourself to others and write about oneself	1. Talking about self 2. Filling a form	1. Practicing self-introduction and filling up forms 2. Practicing self-introduction to others	01
11. Develop questioning skill	1. Main types of questions 2. Forming closed and open-ended questions	1. Practice exercise on forming questions 2. Group activity on framing questions	01
12. Communicate information about family to others	1. Names of relatives 2. Relations	1. Practice talking about family Role-play on talking about family members.	01
13. Describe habits and routines	1. Concept of habits and routines	1. Group discussion on habits and routines Group activity on describing routines	01
14. Ask or give directions to others	1. Asking for directions 2. Using landmarks	1. Role-play on asking and giving directions 2. Identifying symbols used for giving directions	01
Unit 2: Self-Management Skills – III			
Learning Outcome	Theory 10 (Hrs)	Practical 15 (Hrs)	Duration 25 (Hrs)

1. Identify and analyse own strengths and weaknesses	1. Understanding self 2. Techniques for identifying strengths and weaknesses 3. Difference between interests and abilities	1. Activity on writing aims in life 2. Preparing a worksheet on interests and abilities	03
2. Demonstrate personal grooming skills	1. Guidelines for dressing and grooming 2. Preparing a personal grooming checklist	1. Role-play on dressing and grooming standards 2. Self-reflection activity on various aspects of personal grooming	04
3. Maintaining personal hygiene	1. Importance of personal hygiene 2. Three steps to personal hygiene 3. Essential steps of hand washing	1. Role-play on personal hygiene 2. Assignment on personal hygiene	03
4. Demonstrate the knowledge of working in a team and participating in group activities	1. Describe the benefits of teamwork Working in a team	1. Assignment on working in a team 2. Self-reflection on teamwork	03
5. Develop networking skills	1. Benefits of networking skills 2. Steps to build networking skills	1. Group activity on networking in action 2. Assignment on networking skills	03
6. Describe the meaning and importance of self-motivation	1. Meaning of self-motivation 2. Types of motivation Steps to building self-motivation	1. Activity on staying motivated 2. Assignment on reasons hindering motivation	03
7. Set goals	1. Meaning of goals and purpose of goal-setting Setting SMART goals	1. Assignment on setting SMART goals 2. Activity on developing long-term and short-term goals using SMART method	03
8. Apply time management strategies and techniques	1. Meaning and importance of time management 2. Steps for effective time management	1. Preparing a checklist of daily activities	03
Unit 3: Information and Communication Technology Skills - III			
Learning Outcome	Theory 8 (Hrs)	Practical 12 (Hrs)	Duration 20 (Hrs)
1. Create a document on the word processor	1. Introduction to ICT 2. Advantages of using a word processor. 3. Work with Libre Office Writer	1. Demonstration and practice of the following: ● •Creating a new document ● •Typing text ● •Saving the text ● •Opening and saving file on Microsoft Word/Libre Office Writer	02

2. Identify icons on the toolbar	1. Status bar 2. Menu bar 3. Icons on the Menu bar 4. Multiple ways to perform a function	1. Group activity on using basic user interface of LibreOffice writer 2. Group activity on working with Microsoft Word	02
3. Save, close, open and print document	1. Save a word document 2. Close a word document 3. Open an existing document - Print	1. Group activity on performing the functions for saving, closing and printing documents in LibreOffice Writer 2. Group activity on performing the functions for saving, closing and printing documents in Microsoft Word	02
4. Format text in a word document	1. Change style and size of text 2. Align text 3. Cut, Copy, Paste - Find and replace	1. Group activity on formatting text in LibreOffice Writer 2. Group activity on formatting text in Microsoft Word	02
5. Check spelling and grammar in a word document	1. Use of spell checker 2. Autocorrect	1. Group activity on checking spellings and grammar using LibreOffice Writer 2. Group activity on checking spellings and grammar using Microsoft Word	02
6. Insert lists, tables, pictures, and shapes in a word document	1. Insert bullet list 2. Number list 3. Tables 4. Pictures 5. Shapes	1. Practical exercise of inserting lists and tables using LibreOffice Writer	03
7. Insert header, footer and page number in a word document	1. Insert header 2. Insert footer 3. Insert page number 4. Page count	1. Practical exercise of inserting header, footer and page numbers in LibreOffice Writer 2. Practical exercise of inserting header, footer and page numbers in Microsoft Word	03
8. Make changes by using the track change option in a word document	1. Tracking option 2. Manage option 3. Compare documents	1. Group activity on performing track changes in LibreOffice Writer 2. Group activity on performing track changes in Microsoft Word	04

Part B: Vocational Skills			
Unit 1: Introduction to the sector and the job role			
Learning Outcome	Theory 07 (Hrs)	Practical 08(Hrs)	Duration 15 (Hrs)
1. Understand the importance of the plumbing industry	1. Plumbing industry and its importance. 2. Role of water management and plumbing skill council	1. List the plumbing industry Identify and list the name of different logo of plumbing industry products	03
2. Employment potential in plumbing industry	1. Job opportunities and demand in the field of plumbing industries	1. List out the different types of job in plumbing sector	03
3. Understand the responsibilities of plumber general	1. Duties and responsibilities of plumber general	1. List the responsibilities of plumber general	02
4. Explain the process of water flow in domestic household and commercial setups	1. Water flow system in domestic building Water flow system in commercial setups	1. List the components of water flow system in domestic building List the components used in water flow system for commercial setups	03
5. Describe the application of various types of plumbing system in residential and commercial setups	1. Application of various types of plumbing system in residential. 2. Application of various types of plumbing system in commercial setups.	1. Identify and make a list of various types of plumbing system in residential. 2. Identify and make a list of various types of plumbing system in commercial setups.	04
Unit 2: Basics of Plumbing			
Learning Outcome	Theory 12 (Hrs)	Practical 18 (Hrs)	Duration 30 (Hrs)
1. Symbols and terminology used in Plumbing installation	1. Symbols and terminology used in plumbing installation	1. Draw the symbols used in plumbing products and Plumbing installation	03
2. Standards applicable to piping installation	1. Indian standards like ISI/BIS applicable to piping installation	1. Make a list of Indian standards like ISI/BIS applicable to piping installation	03
3. Importance of accuracy in measurement and calculation of plumbing work	1. Techniques of accuracy in measurement and calculation of plumbing work	1. Measures the plumbing work 2. Calculate the cost of material used in plumbing work 3. Calculate the total cost of labour and material	07
4. Pipes, pipe fittings and supporting material used	1. State the names, grades, characteristics and applications of different	1. Identify the names, grades of different pipes,	06

in plumbing and their characteristic and uses	pipes, pipe fittings, fixture supports, fastening hardware and materials such as sealants, adhesives, plumber's putty, marking material and cement used in plumbing 2. Supporting material like used in plumbing and their characteristic and uses	pipe fittings, fixture supports. 2. Identify the fastening hardware and materials such as sealants, adhesives, plumber's putty, marking material and cement used in plumbing	
5. Plumbing tools and equipment's, lifting /load shifting equipment's	1. Plumbing tools 2. Lifting/load shifting equipment's including ladders, height scaffolding, elevated work platforms, hand trolleys, hoist and jacks used at plumbing installation sites.	1. Identify and list of plumbing tools. 2. Identify and list of Lifting/load shifting equipment's including ladders, height scaffolding, elevated work platforms, hand trolleys, hoist and jacks used at plumbing installation sites.	06
6. Explain the importance of water properties	1. Importance of water properties, pressure and flow rate. 2. Capillary action and thermal expansion in plumbing	1. List the water properties for plumbing system 2. Measure the pH of water. 3. Read the water pressure with the help of water pressure gauge	05
Unit 3: Preparation for plumbing installation and maintenance			
Learning Outcome	Theory 12 (Hrs)	Practical 18(Hrs)	Duration 30 (Hrs)
1. Discuss the importance Plumbing drawings	1. Role of plumbing drawings 2. Layout 3. Measurements from drawing and plans associated with the plumbing	1. Extract the information from job specifications, layouts and measurements from drawings and plans associated with plumbing 2. Calculate the quantity, dimensions and type of pipes, pipe fittings, devices and materials required from design drawings/specifications.	10
2. Explain the planning of work schedule and work-related information	1. Importance of the planning of work schedule and work-related information	1. Prepare a work plan as per specified timelines.	03
3. Describe the importance of safe handling and storage of plumbing material	1. Importance of safe handling and storage of plumbing material	1. Perform inspection of the tools and equipment to check for their proper functioning. 2. Demonstrate the process of clearing the	10

		work area of hazardous substances, debris and waste. 3. Demonstrate correct storage practices for plumbing material. 4. Demonstrate placement of signages and barricades.	
4. List measures to avoid air and water contamination, erosion and sedimentation	1. Air and water contamination, erosion and sedimentation	1. Identify the Air and water contamination, erosion and sedimentation	02
5. Discuss the role and impact of not following define procedures.	1. Disadvantages and impact of not following define procedures.	1. List the disadvantages and impact of not following define procedure	02
6. Outline the process of the reporting and handling hazards at the work place	1. Outline the process of the reporting and handling hazards at the work place	1. Write an application of reporting of handling hazards at the work place.	03

DETAIL SYLLABUS
CLASS - XI
SEMESTER – II

Part A: Employability Skills			
Unit 4: Entrepreneurial Skills - III			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Differentiate between different kinds of businesses	1. Introduction to entrepreneurship 2. Types of business activities	1. Role-play on different kinds of businesses	03
2. Describe the significance of entrepreneurial values	1. Meaning of value 2. Values of an Entrepreneur 3. Case study on qualities of an entrepreneur	1. Role-play on qualities of an entrepreneur	03
3. Demonstrate the attitudinal changes required to become an entrepreneur	1. Difference between the attitude of entrepreneur and employee	1. Interviewing employees and entrepreneurs	03
4. Develop thinking skills like an entrepreneur	1. Problems of entrepreneurs 2. Problem-solving 3. Ways to think like an entrepreneur	1. Group activity on identifying and solving problems	04
5. Generate business ideas	1. The business cycle 2. Principles of idea creation 3. Generating a business idea 4. Case studies	1. Group activity to create business ideas	04
6. Describe customer needs and the importance of conducting a customer survey	1. Understanding customer needs 2. Conducting a customer survey	1. Conducting a customer survey	04
7. Create a business plan	1. Importance of business planning 2. Preparing a business plan 3. Principles to follow for growing a business 4. Case studies	1. Activity on developing a business plan	04
Unit 5: Green Skills – III			
Learning Outcome	Theory (7 hrs)	Practical (8 hrs)	Duration (15 hrs)
1. Describe the importance of the main sector of the green economy	1. Meaning of ecosystem, food chain and sustainable development 2. Main sectors of the green economy- E- waste management, green transportation, renewal energy, green construction, and water management	1. Discussion on sectors of green economy 2. Preparing posters on various sectors for promoting green economy 3. Writing an essay or a short note on the important initiatives for promoting green economy.	06

2. Describe the main recommendations of policies for the green economy	1. Policies for a green economy	1. Discussion on initiatives for promoting the green economy	03
3. Describe the major green sectors/ areas and the role of various stakeholders in the green economy	1. Stakeholders in the green economy	1. Group discussion on the role of stakeholders in the green economy 2. Preparation of posters on green sectors and their stakeholders 3. Making solar bulbs.	03
4. Identify the role of government and private agencies in the green economy	1. Role of the government in promoting a green economy 2. Role of private agencies in promoting green economy	1. Discussion on the role of Government and Private Agencies in promoting a green economy. 2. Posters on green sectors.	03

Part B: Vocational Skills**Unit 4: Installation of water supply system**

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

4. Explain the properties of the different types of supports, hangers and restraints used in water supply plumbing systems.	1. Properties of the different types of supports, hangers and restraints used in water supply plumbing systems.	1. Write the properties of the different types of supports, hangers and restraints used in water supply plumbing systems	03
5. Describe the characteristics of metal used in various plumbing materials and the fabrication methods compatible with them.	1. Characteristics of metal used in various plumbing materials and the fabrication methods compatible with them.	1. Identify and list the characteristics of metal used in various plumbing materials and the fabrication methods compatible with them.	02
6. Explain the process of electrolysis and problems associated with the use of dissimilar metals.	1. Process of electrolysis and problems associated with the use of dissimilar metals	1. Identify the process of electrolysis 2. List the problems associated with the use of dissimilar metals.	03
7. State the impact of accurate marking on the fabrication process work time and finished work quality.	1. Impact of accurate marking on the fabrication process work time and finished work quality.	1. List the advantage of using accurate marking on the fabrication process. 2. Demonstrate the steps involved in marking dimensions for fabrication on the pipes and fittings making allowances for spring-back, distortion and assembly.	04
8. Describe the measuring and marking out processes and allowances for fabrication of pipes	1. Measuring and marking out processes for fabrication of pipes. 2. Allowance to be consider in measurement	1. Measure and mark the fabricated pipe. 2. Measure the allowance	04
9. List standard measuring procedures such as center-to- center, end-to- center, and end-to-end	1. Standard measuring procedures such as center-to-center, end-to- center, and end-to-end.	1. Measure the dimension such as center-to-center, end-to-center, and end-to-end of a pipe.	03
10. Describe the types, characteristics and the application of different pipe fittings and fixture supports	1. Type, characteristics and application of different pipe fittings and fixture supports	1. List the types, characteristics. 2. List the different pipe fittings and fixture supports.	02
11. Discuss the various fixing and jointing techniques for water supply piping installations.	1. Various fixing and jointing techniques for water supply piping installations.	1. Identify the various fixing and jointing for water supply piping installations.	02
12. Explain the principles underlying various fit-off processes.	1. Principles underlying various fit-off processes	1. Do the practices of underlying various fit-off processes. 2. Perform the inspection of the water supply installation system to	04

		ensure proper alignment, size, support and functioning.	
13.State the importance of ensuring alignment and balance in piping installations	1. Importance of ensuring alignment and balance in piping installations.	1. Do the practices of alignment and balance in piping installations.	02
14. Describe the test procedures to check proper functioning of the pipework installed.	1. Test procedures to check proper functioning of the pipework installed.	1. Do the testing to check proper functioning of the pipework installed.	02
15. Describe the checks and procedures to be conducted before commissioning	1. Checks and procedures to be conducted before commissioning.	1. Make a list of checks and procedures to be conducted before commissioning. 2. Evaluate faults and their causes in dysfunctional piping. 3. Demonstrate the rectification of common faults found in dysfunctional piping.	04
16. Explain the Importance of reporting any difficulties as soon as they arise.	1. Importance of reporting any difficulties as soon as they arise.	1. Perform post installation activities such as clearing the work area, disposal of waste and cleaning and storage of tools and equipment.	02
Unit 5: Installation of drainage system			
Learning Outcome	Theory (14 hrs)	Practical (24 hrs)	Duration (38 hrs)
1. Discuss the Process of wastewater drainage	1. Process of wastewater drainage	1. Apply appropriate techniques to determine the location of various drainage components and the route of the water drainage piping and traps using plumbing project plans.	02
2. Describe the functions of the components of drainage systems.	1. Describe the functions of the components of drainage systems.		02
3. Describe the various types of drainage piping systems and the pipes and fittings used in them	1. Various types of drainage piping systems and the pipes and fittings used in them.	1. Identify the various types of drainage piping systems and the pipes and fittings used in them.	02

4. Discuss the type of drainage piping systems and its components used in various types of building.	1. Discuss the type of drainage piping systems and its components used in various types of building.	2. Determine fitting requirements for installing various types of drainage pipes according to given specifications and site requirements. 3. Demonstrate the construction of Chambers to accommodate drainage systems.	04
5. Explain the characteristics and the application of different pipe fittings, fixture supports and fastening hardware.	1. Characteristics and the application of different pipe fittings, fixture supports and fastening hardware.	1. Perform the necessary checks on the area for laying underground, above ground and overhead piping systems.	02
6. Discuss the fit off, fixing and jointing techniques applicable for drainage pipes.	1. Importance of the fit off, fixing and jointing techniques applicable for drainage pipes	1. Perform fitting activities on various types of pipes such as stoneware (SW) pipes, polyvinyl chloride (PVC) pipes, cast iron (CI) pipes, etc.	04
7. Explain the procedure of installing various types of drainage systems such as sewage, silage, storm water, sub-Soil drainage system, drainage for fixtures etc.	1. Method of installation various types of drainage systems such as sewage, sullage, stormwater, sub-soil drainage system, drainage for fixtures, etc.	1. Demonstrate the installation of the various components of drainage system such as various pipes and their fittings, manholes, traps, cleanouts, catch basins, inspection chamber, soak pit etc.	03
8. Identify the trap to be installed as per the type of drainage system.	1. Different types of trap as per the type of drainage system		01
9. List different types of pumps used in sanitary and drainage systems and their applications.	1. Pumps used in sanitary and drainage systems and their applications	1. Identify different types of pumps used in sanitary and drainage systems and their applications. 2. Perform the steps to install different types of pumps used in sanitary and drainage system.	04
10. Discuss the characteristics of the flooring using for installation and levelling of drainage system	Characteristics of the flooring using for installation and levelling of drainage system	1. Show how to install storm water and sub- soil drainage system. 2. Demonstrate the process of installing pipes and related accessories in water and sewage treatment plants.	06

11. Explain the importance of conducting post- installation and pre-commissioning tests and checks	1. Importance of conducting post- installation and pre-commissioning tests and checks	1. Perform the various post installation and pre-commissioning tests and checks.	03
12. Describe the various post installation and pre-commissioning tests and checks	1. Various post installation and pre-commissioning tests and checks.	2. Perform the backfilling of all excavated areas to secure the installation.	03
13. List the signage to be put up at the site after the plumbing task has been completed.	Signage to be put up at the site after the plumbing task has been completed.	1. Make a list of signage	03

DETAIL SYLLABUS
CLASS - XII
SEMESTER – III

Part A: Employability Skills			
Unit 1: Communication Skills - IV			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Demonstrate active listening skills	1. Active listening - listening skill, stages of active listening 2. Overcoming barriers to active listening	1. Demonstration of the factors affecting active listening 2. Preparing posters of steps for active listening 3. Role-play on negative effects of not listening actively	10
2. Identify the parts of speech	1. Parts of speech – using capitals, punctuation, basic parts of speech, supporting parts of speech	1. Group practice on identifying parts of speech 2. Group practice on constructing sentences	10
3. Write sentences	1. Writing skills to the following: ● Simple sentence ● Complex sentence ● Types of object 2. Types of sentences ● Active and Passive sentences ● Statement/ Declarative sentence ● Question/ Interrogative sentence ● Emotion/ Reaction or Exclamatory sentence ● Order or Imperative sentence 3. Paragraph writing	1. Group work on writing sentences and paragraphs 2. Practice writing sentences in the active or passive voice 3. Writing different types of sentence	05
Unit 2: Self-Management Skills – IV			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Describe the various factors influencing motivation and positive attitude	1. Motivation and positive attitude 2. Intrinsic and extrinsic motivation 3. Positive attitude – ways to maintain positive attitude 4. Stress and stress management – ways to manage stress	1. Role-play on avoiding stressful situations 2. Activity on self-reflection	10
2. Describe how to become result oriented	1. How to become result oriented?	1. Pair and share activities on the aim of life	05

	2. Goal setting – examples of result- oriented goals		
3. Describe the importance of self- awareness and the basic personality traits, types and disorders	1. Steps towards self-awareness 2. Personality and basic personality traits 3. Common personality disorders- ● Suspicious ● Emotional and impulsive ● Anxious 4. Steps to overcome personality disorders	1. Group discussion on self-awareness	10
Unit 3: Information and Communication Technology Skills - IV			
Learning Outcome	Theory (10 hrs)	Practical (10 hrs)	Duration (20 hrs)
1. Identify the components of a spreadsheet application	1. Introduction to spreadsheet application - types of a spreadsheet, creating a new worksheet, components of a worksheet.	1. Group practice on working with LibreOffice	02
2. Perform basic operations in a spreadsheet	1. Opening workbook and entering data – types of data, steps to enter data, editing and deleting data in a cell 2. Selecting multiple cells 3. Saving the spreadsheet in various formats 4. Closing the spreadsheet 5. Opening the spreadsheet. 6. Printing the spreadsheet.	1. Group practice on working with data on LibreOffice Calc.	03
3. Demonstrate the knowledge of working with data and formatting text	1. Using a spreadsheet for addition – adding value directly, adding by using cell address, using a mouse to select values in a formula, using sum function, copying and moving formula 2. Need to format cell and content 3. Changing text style and font size 4. Align text in a cell 5. Highlight text	1. Demonstration of basic calculations in LibreOffice Calc. 2. Group practice on formatting a spreadsheet in LibreOffice Calc.	02
4. Demonstrate the knowledge of using advanced features in spreadsheet	1. Sorting data 2. Filtering data 3. Protecting spreadsheet with password	1. Group practice on sorting data in LibreOffice Calc	03
5. Make use of the software used for making slide presentations	1. Available software presentation	1. Group practice on working with LibreOffice Impress tools	02

	2. Stapes to start LibreOffice Impress 3. Adding text to a presentation		
6. Open, close and save slide presentations	1. Open, Close, Save and Print a slide presentation	1. Practice exercises on steps to save, close, open and save a presentation	01
7. Demonstrate the operations related to slides and texts in the presentation	1. Working with slides and text in a presentation- adding slides to a presentation, deleting slides, adding and formatting text, highlighting text, aligning text, changing text colour	1. Group practice on working with font styles and types in LibreOffice Impress	04
8. Demonstrate the use of advanced features in a presentation	1. Advanced features used in a presentation 2. Inserting shapes in the presentation 3. Inserting clipart and images in a presentation 4. Changing slide layout	1. Group practice on working with slides in LibreOffice Impress	03

Part B: Vocational Skills**Unit 1: Installation of plumbing fixtures**

Learning Outcome	Theory (16 Hrs)	Practical (24 Hrs)	Duration (40 Hrs)
1. Describe the types, characteristics, materials, finishes, uses, limitations, working principle and performance measures of various plumbing related fixtures.	1. Types, characteristics, materials, finishes, uses, limitations, working principle and performance measures of various plumbing related fixtures.	1. Show how to tally the count and quality of fixtures, parts, support material provided in the packing with the manufacturer's list or order form. 2. Select the size, type and quantity of fixture and trim required for specific applications based on specifications. 3. Demonstrate how to mark the position of fixtures and fixture supports in structures based on plumbing plans. 4. Demonstrate the procedure of installing various types of sanitary fixtures, supports, and accessories.	10
2. List the accessories, supports and fasteners required for installing various types of washbasin, sinks, water	1. List the accessories, supports and fasteners required for installing various types of washbasin, sinks, water closet, urinals, bathtubs and showers.	1. Show how to tally the count and quality of fixtures, parts, support material provided in the packing with the	10

closet, urinals, bathtubs and showers.		manufacturer's list or order form. 2. Select the size, type and quantity of fixture and trim required for specific applications based on specifications. 3. Demonstrate how to mark the position of fixtures and fixture supports in structures based on plumbing plans. 4. Demonstrate the procedure of installing various types of sanitary fixtures, supports, and accessories.	
3. List the sensor types of fittings and fixtures.	1. Sensor types of fittings and fixtures.	1. Demonstrate the installation of sensors and batteries of fixtures with sensor-based or touchless fitting and fixtures.	04
4. Explain the basic working principal of sensor faucet and the principles of solenoid ball valves and sensors in touch less system.	1. Basic working principal of sensor faucet and the principles of solenoid ball valves and sensors in touch less system.		03
5. Describe the correct practices for installing plumbing fixtures.	1. Correct practices for installing plumbing fixtures.	1. Apply appropriate techniques to check if all installations are properly sized, supported and functioning	02
6. Explain the importance of traps for the sanitary fittings, both deep seal traps and low seal traps.	1. Importance of traps for the sanitary fittings, both deep seal traps and low seal traps.	1. Demonstrate the traps for the sanitary fittings, both deep seal traps and low seal traps.	03
7. Explain the working and use of conservancy, water carriage and the combination system.	1. Working and use of conservancy, water carriage, and the combination system	1. Draw the image on working and use of conservancy, water carriage and the combination system.	04
8. Discuss alignment and elevation techniques used in plumbing systems.	1. Alignment and elevation techniques used in plumbing systems.	1. Perform alignment and levelling of supports and fixtures installed.	02
9. List the codes, standards and regulations applicable for the installation of plumbing fixtures.	1. Codes, standards and regulations applicable for the installation of plumbing fixtures	1. List the codes, standards and regulations applicable for the installation of plumbing fixtures.	02
Unit 2: Troubleshooting and maintenance for plumbing			
Learning Outcome	Theory (15 Hrs)	Practical (20 Hrs)	Duration (35 Hrs)
1. List the various types of faults (such as leakages,	1. Various types of faults (such as leakages, improper joints,	1. Show how to detect faults in various types of	04

improper joints, broken sewer; dripping faucets and water lines, etc.) associated with plumbing systems (such as aerators, septic systems etc.).	broken sewer; dripping faucets and water lines, etc.) associated with plumbing systems (such as aerators, septic systems etc.).	plumbing systems and fixtures.	
2. List the testing procedures to be performed to check proper functioning of the fixtures and pipework installed.	1. Testing procedures to be performed to check proper functioning of the fixtures and pipework installed.	1. Demonstrate the procedures involved in repair and rectification of common faults within the pipes, plumbing fixtures, drainage and water supply system	08
3. State the remedial and preventive measures for common plumbing problems with respect to fixtures, pipes and fittings.	1. Remedial and preventive measures for common plumbing problems with respect to fixtures, pipes and fittings.	1. List the remedial and preventive measures for common plumbing problems with respect to fixtures, pipes and fittings.	03
4. Discuss correct practices for troubleshooting and maintenance for plumbing fixtures and systems.	1. Correct practices for troubleshooting and maintenance for plumbing fixtures and systems.	1. List the practices for troubleshooting and maintenance for plumbing fixtures and systems.	03
5. Explain the application of mechanical and hydraulic principles for clearing blockages.	1. Application of mechanical and hydraulic principles for clearing blockages.	1. Demonstrate cleaning and clearance related activities after completion of work.	04
6. List the methods of corrosion protection such as coatings and tape.	1. Methods of corrosion protection such as coatings and tape.	1. Demonstrate the methods of corrosion protection such as coatings and tape.	06
7. Discuss common organizational policies related to costing, scheduling, procurement and documentation for plumbing maintenance and repair work.	1. Common organisational policies related to costing, scheduling, procurement and documentation for plumbing maintenance and repair work	1. Display how to record daily logs in a specified format for activities such as maintenance and installation. 2. Role play a situation on how to guide the customers instruct the customers on proper care and maintenance of plumbing systems	07

DETAIL SYLLABUS
CLASS - XII
SEMESTER – IV

Part A: Employability Skills			
Unit 4: Entrepreneurial Skills-IV			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Describe the concept of entrepreneurship and the types and roles and functions entrepreneur	1. Entrepreneurship and entrepreneur 2. Characteristics of entrepreneurship 3. Entrepreneurship-art and science 4. Qualities of a successful entrepreneur 5. Types of entrepreneurs 6. Roles and functions of an entrepreneur 7. What motivates an entrepreneur 8. Identifying opportunities and risk-taking 9. Startups	1. Group discussion on the topic “An entrepreneur is not born but created”. 2. Quiz on various aspects of entrepreneurship. 3. Chart Preparation on types of Entrepreneur 4. Brainstorming activities on what motivates an entrepreneur	10
2. Identify the barriers to entrepreneurship	1. Barriers to entrepreneurship 2. Environmental barriers 3. No or faulty business plan 4. Personal barriers	1. Group discussion about “What we fear about entrepreneurship” 2. Activity on taking an interview of an entrepreneur.	05
3. Identify the attitude that make an entrepreneur successful	1. Entrepreneurial attitude	1. Group activity on identifying entrepreneurial attitude.	05
4. Demonstrate the knowledge of entrepreneurial attitude and competencies	1. Entrepreneurial competencies 2. Decisiveness, 3. Initiative 4. Interpersonal skills- positive attitude, stress management 5. Perseverance 6. Organisational skills- time management, goal setting, efficiency, managing quality.	1. Playing games such as “Who am I”. 2. Brainstorming a business ideas 3. Group practice on “Best out of Waste” 4. Group discussion on the topic of “Let’s grow together” 5. Group activity on listing stress and methods to deal with it like Yoga, deep breathing exercises, etc. 6. Group activity on time management	05

Unit 5: Green Skills-IV			
Learning Outcome	Theory (05 hrs)	Practical (10 hrs)	Duration (15 hrs)
1. Identify the benefits of the green jobs	1. Green jobs 2. Benefits of green jobs 3. Green jobs in different sectors: ● Agriculture ● Transportation ● Water conservation ● Solar and wind energy ● Eco-tourism ● Building and construction ● Solid waste management ● Appropriate technology	1. Group discussion on the importance of green job. 2. Chart preparation on green jobs in different sectors	08
2. State the importance of green jobs	1. Importance of green jobs in ● Limiting greenhouse gas emissions ● Minimizing waste and pollution ● Protecting and restoring ecosystems ● Adapting to the effects of climate change	1. Preparing posters on green jobs. 2. Group activity on tree plantation 3. Brainstorming different ways of minimizing waste and pollution	07

Part B: Vocational Skills			
Unit 3: Health and safety			
Learning Outcome	Theory 10 Hrs	Practical 20 Hrs	Duration 30 Hrs
1. Differentiate between risks and hazards. (KU4)	1. Differentiate between risks and hazards. (KU4)	1. Perform inspection of a work area in order to identify risks and hazards. (PC1)	02
2. Discuss the specific safety and health related problems faced in domestic, commercial and institutional setups.	1. Specific safety and health related problems faced in domestic, commercial and institutional setups.	1. Apply various health and safety precautions to be taken during plumbing work.	02
3. List the various types of hazards (such as physical, fire, chemical compounds and electrical) that could affect the work process.	1. Various types of hazards (such as physical, fire, chemical compounds and electrical) that could affect the work process.	1. Apply personal and workspace hygiene and sanitation practices.	02
4. List the various hazardous environments and common hazards that	1. Various hazardous environments and common hazards that can occur during plumbing installation and	1. List the various hazardous environments and common hazards that	02

can occur during plumbing installation and maintenance along with their precautions and remedial measures.	maintenance along with their precautions and remedial measures.	can occur during plumbing installation.	
5. Discuss the importance of various types of personal protective equipment (PPE).	1. Importance of various types of personal protective equipment (PPE).	1. Make a image of various types of personal protective equipment (PPE).	02
6. Discuss where the general health and safety equipment commonly is kept at the workplace.	1. General health and safety equipment commonly is kept at the workplace.	1. Locate and identify the place where the general health and safety equipment commonly is kept at the workplace.	02
7. Explain the various types of safety signs and their significance in the work process.	1. Various types of safety signs and their significance in the work process.	1. Draw the image of various types of safety signs and their significance in the work process.	02
8. Discuss various causes of fire and precautionary activities to prevent the fire accident.	1. Various causes of fire and precautionary activities to prevent the fire accident.	1. Demonstrate the correct use of fire extinguishers	03
9. List the different techniques that employ various methods (such as using extinguishers, water hose, sprinklers, sand bucket, wet blanket, etc.) and materials such as water, powder, foam, CO ₂ , fire extinguishing chemical, sand, blanket, etc. used for extinguishing fire as per the type (as per class A, B, C and D).	1. List the different techniques that employ various methods (such as using extinguishers, water hose, sprinklers, and bucket, wet bucket, wet blanket, etc.) and materials such as water, powder, foam, CO ₂ , fire extinguishing chemical, sand, blanket, etc. used for extinguishing fire as per the type (as per class A, B, C and D).	1. Make a list of different items used for fire protection blanket, etc.) and materials such as water, powder foam, CO ₂ , fire extinguishing chemical, sand, blanket, etc. used for extinguishing fire as per the type (as per class A, B, C and D).	04
10. Describe rescue techniques applied during a fire hazard or electrocution.	1. Rescue techniques applied during a fire hazard or electrocution.	1. Dramatize workplace emergency and evacuation procedures using role plays.	03
11. Discuss appropriate basic first aid treatment relevant to the condition e.g. shock, electrical shock, bleeding, minor burns, poisoning, eye injuries etc.	Basic first aid treatment relevant to the condition e.g. shock, electrical shock, bleeding, minor burns, poisoning, eye injuries etc.	1. Perform appropriate first aid treatment for various conditions such as bleeding, burns, choking, electric shock and poisoning and injury 2. Dramatize, using role play, safe methods of	04

		freeing a person from electrocution.	
12. Discuss potential injuries and health problems associated with incorrect handling of tools and equipment.	1. Potential injuries and health problems associated with incorrect handling of tools and equipment.	1. Demonstrate the Process of providing cardiopulmonary resuscitation (CPR)	02
Unit 4: Working effectively with others			
Learning Outcome	Theory (15 Hrs)	Practical (25 Hrs)	Duration (40 Hrs)
1. State the importance of effective communication in the workplace.	1. State the importance of effective communication in the workplace	1. Demonstrate techniques used for ensuring timely receipt of complete information and instructions from appropriate sources 2. Apply practices that improve effectiveness while providing information	02
2. Describe the typical organizational hierarchy and the various categories of people that one is required to communicate and coordinate with.	1. Typical organizational hierarchy and the various categories of people that one is required to communicate and coordinate with		02
3. List various components of effective communication.	1. List various components of effective communication	1. Demonstrate the use of inclusive language (verbal, non-verbal and written) that is gender, disability and culturally sensitive. 2. Illustrate the use of appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism	02
4. State the importance of using inclusive language (verbal, non-verbal and written) that is gender, disability and culturally sensitive.	1. State the importance of using inclusive language (verbal, non-verbal and written) that is gender, disability and culturally sensitive		02
5. State the importance of teamwork and developing effective working relationships for professional success.	1. Importance of teamwork and developing effective working relationships for professional success	1. Dramatise a situation to show effective teamwork 2. Dramatize (through role-play) disciplined behaviours at the workplace 3. Dramatize (through role-play) the process of escalation of grievances and problems	03
6. Discuss the importance and ways of managing interpersonal conflict effectively	1. Importance and ways of managing interpersonal conflict effectively		03
7. Discuss how to express and address grievances appropriately and effectively.	1. Discuss how to express and address grievances appropriately and effectively		03
8. State the importance of ethics and discipline for professional success.	1. State the importance of ethics and discipline for professional success.		02

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

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

12. Discuss the common ways employed by organizations, to minimize waste generated from plumbing activities.	1. Discuss the common ways employed by organizations, to minimize waste generated from plumbing activities.		01
13. Discuss common sources of pollution and ways to minimize it	1. Discuss common sources of pollution and ways to minimize it		01
14. Explain the importance of reporting malfunctioning (fumes/sparks /emission/vibration /noise) and lapse in the maintenance of equipment on time.	1. Explain the importance of reporting malfunctioning (fumes /sparks /emission /vibration /noise) and lapse in the maintenance of equipment on time.		01

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