LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE:
AI Devices Installation Operator
(QUALIFICATION PACK: Ref. Id. TEL/Q6102)
SECTOR: Telecom

Grades IX and X

PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION
Shyamla Hills, Bhopal – 462 002, M.P., India
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Jul, 2023

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PSS Central Institute of Vocational Education, NCERT, Shyamla Hills, 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 *Samagra Shiksha*. The main purpose of the competency 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 **AI Devices Installation Operator**. 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.

Dinesh Prasad Saklani
Director
National Council of Educational Research & Training

PREFACE

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

In order to fulfill the growing aspirations of our youth and the demand of skilled human resource, the Ministry of Education (MoE), 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 fulfill the needs of the society and the world of work. In order to honor its commitment to the nation, the PSSSCIVE has initiated the work on developing learning outcome based curricula with the involvement of faculty members and leading experts in respective fields. It is being done through the concerted efforts of leading academicians, professionals, policy makers, partner institutions, Vocational Education and Training experts, industry representatives, and teachers. The expert group through a series of consultations, working group meetings and use of reference materials develops a National Curriculum. Currently, the Institute is working on developing curricula and course-ware 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 Ministry of Education and NCERT for the financial support and cooperation in realising the objective of providing learning outcome based modular curricula and course-ware to the States and other stakeholders under the PAB (Project Approval Board) approved project of *Samagra Shiksa* of Ministry of Education.

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 course-ware. We hope that this document will prove useful in turning out more competent Indian workforce for the 21st Century.

DEEPAK PALIWAL
Joint Director
PSS Central Institute of Vocational Education

ACKNOWLEDGMENT

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 Electronics Sector Skill Council of Indian (ESSCI) for their academic support and cooperation.

We are grateful to the expert contributors and Deepak D. Shudhalwar, Professor (CSE), PSSCIVE, for their earnest effort and contributions in the development of this learning outcome based curriculum. Their contributions are dully acknowledged.

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

We are also grateful to the Course Coordinator Deepak D. Shudhalwar, Professor (CSE), Head, ICT Centre, Department of Engineering and Technology, PSSCIVE, for bringing out this curriculum in the final form.

PSSCIVE Team

CONTENTS

Sn.	Title			Page No.
	Foreword			4
	Preface			5
	Acknowledgment			6
1	Course Overview			8
2	Scheme of Units and Assessment			9
3	Teaching/ Training Activities			11
4	Assessment and Certification			12
5	Unit Content	**Grade IX**		14
		Part A	**Employability Skills**	14
		Unit 1	Communication Skills – I	14
		Unit 2	Self-management Skills – I	16
		Unit 3	Information and Communication Technology Skills – I	17
		Unit 4	Entrepreneurial Skills – I	18
		Unit 5	Green Skills – I	19
		Part B	**Vocational Skills**	20
		Unit 1	Overview of AI Device Installation Operator	20
		Unit 2	Introduction to AI and IoT Devices	21
		Unit 3	Basic Electronics and Hardware Components	21
		Unit 4	Installation and Configuration of AI Devices	22
		Unit 5	Networking and Cloud Integration	22
		Grade IX		23
		Part A	**Employability Skills**	23
		Unit 1	Communication Skills – II	23
		Unit 2	Self-management Skills – II	24
		Unit 3	Information and Communication Technology Skills – II	25
		Unit 4	Entrepreneurial Skills – II	26
		Unit 5	Green Skills – II	27
		Part B	**Vocational Skills**	28
		Unit 1	Troubleshooting and Maintenance of AI Devices	28
		Unit 2	Programming AI Devices (Basic Coding)	28
		Unit 3	Safety, Ethical Use, and Industry Standards	29
		Unit 4	Practical Assessment and Real-World Applications	29
		Unit 5	Occupational Health & Safety	29
6	Organization of Filed Visits			30
7	List of Equipment and Materials			30
8	Teacher's Qualification			32
9	List of Contributors			34

1. COURSE OVERVIEW

COURSE TITLE: AI Devices Installation Operator

The telecom industry is at the forefront of technological innovation, and artificial intelligence (AI) is playing a major role in this transformation. AI is being used to improve network performance, automate customer service tasks, and develop new products and services. AI can be used to analyze data from network sensors to identify potential problems before they occur. This allows telecom providers to take proactive steps to fix problems and prevent outages.

AI Devices Installation Operator is responsible for collecting and analyzing the data from the customers for installation of AI devices, their usage and application in the customer business scenario. They are also responsible for installing the devices and then verifying the efficiency and application of the installed devices as per customer expectations.

The individual needs to have the ability to upgrade skills with changing technologies, work in a team, multitask and track multiple projects simultaneously with full dedication and willingness. The individual should have generic communication and leadership skills, attention to details, excellent problem-solving capabilities, strong quantitative abilities and good interpersonal skills.

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

- ✓ Apply effective oral and written communication skills to interact with customers;
- ✓ Identify the principal components of a computer system;
- ✓ Demonstrate the basic skills of using computer;
- ✓ Demonstrate self-management skills;
- ✓ Demonstrate the ability to provide a self-analysis in context of entrepreneurial skills;
- ✓ Demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection;
- ✓ Demonstrate to establish the connectivity of AI devices;
- ✓ Demonstrate to use the various testing tools;
- ✓ Demonstrate the steps for installing AI devices at customer premises;
- ✓ Perform post installation activities to establish AI connectivity;
- ✓ Test the AI devices for real-time data optimization as per requirements and specifications;
- ✓ Monitor and improvise the network performance;
- ✓ Test the sensors and actuators;
- ✓ Install and use the smart devices;
- ✓ Carry out predictive maintenance using AI devices;
- ✓ Optimize resources, work efficiently and adhere to safety standards;
- ✓ Record warning notifications and diagnosis of equipment provided by predictive analytics software and analyse these to perform maintenance;
- ✓ Troubleshoot and fix the faults on site;
- ✓ Run tests and system health checks;
- ✓ Record data in various formats to generate required diagnostic and other reports;
- ✓ Interact effectively with others while being sensitive of gender and persons with disabilities;
- ✓ Maintain a safe, healthy and secure work environment

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

COURSE LEVEL: This course can be taken up at Intermediate level in Grade 9 and 10.

COURSE DURATION: **Total : 400 hours**
Class 11 : 200 hours
Class 12 : 200 hours

2. SCHEME OF UNITS AND ASSESSMENT

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

Grade IX			
	Units	**No. of Hours for Theory and Practical 200**	**Max. Marks for Theory & Practical 100**
Part A	**Employability Skills**		
Unit 1	Communication Skills – I	15	**10**
Unit 2	Self-management Skills – I	10	
Unit 3	Information and Communication Technology Skills – I	15	
Unit 4	Entrepreneurial Skills – I	10	
Unit 5	Green Skills – I	10	
	Total	**60**	**10**
Part B	**Vocational Skills**		
Unit 1	Overview of AI Device Installation Operator	20	**40**
Unit 2	Introduction to AI and IoT Devices	30	
Unit 3	Basic Electronics and Hardware Components	30	
Unit 4	Installation and Configuration of AI Devices	20	
Unit 5	Networking and Cloud Integration	20	
	Total	**120**	**40**
Part C	**Project/ Practical Work**		
	Practical File/ Student Portfolio	**05**	05
	Practical Work		10
	Written Test		10
	Viva Voce		10
	Total		**35**
Part D	**Field Visits (3x5)**	**15**	**15**
	Total	**200**	**100**

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

Grade X			
	Units	**No. of Hours for Theory and Practical 200**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
Unit 1	Communication Skills – II	15	**10**
Unit 2	Self-management Skills – II	10	
Unit 3	Basic ICT Skills – II	15	
Unit 4	Entrepreneurial Skills – II	10	
Unit 5	Green Skills – II	10	
	Total	**60**	**10**
Part B	**Vocational Skills**		
Unit 1	Troubleshooting and Maintenance of AI Devices	30	**40**
Unit 2	Programming AI Devices (Basic Coding)	30	
Unit 3	Safety, Ethical Use, and Industry Standards	20	
Unit 4	Practical Assessment and Real-World Applications	20	
Unit 5	Occupational Health & Safety	20	
	Total	**120**	**40**
Part C	**Project/ Practical Work**		
	Practical File/ Student Portfolio	**05**	05
	Practical Work		10
	Written Test		10
	Viva Voce		10
	Total		**35**
Part D	**Field Visits (3x5)**	**15**	**15**
	Total	**200**	**100**

3. TEACHING/ TRAINING ACTIVITIES

The teaching and training activities have to be conducted in classroom, laboratory/ workshops and field visits. Students should be taken to field visits for interaction with experts and to expose them to the various tools, equipment, materials, procedures and operations in the workplace.

Special emphasis should be laid on the occupational safety, health and hygiene during the training and field visits.

CLASSROOM ACTIVITIES

Classroom activities are an integral part of this course and interactive lecture sessions, followed by discussions should be conducted by trained vocational teachers. Vocational teachers should make effective use of a variety of instructional 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**

SN	Typology of Question	No. of Very Short Answer Q. (1 mark)	No. of Short Answer Q. (2 Marks)	No. of Long Answer Q. (3 Marks)	Marks
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	**2**	**1**	**2**	**10**
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	**1**	**2**	**2**	**11**
3.	Application – (Use abstract information in concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, private an example, or solve a problem)	**0**	**1**	**1**	**05**
4.	High Order Thinking Skills – (Analysis & Synthesis – Classify, compare, contrast, or differentiate between different pieces of information; Organize and/ or integrate unique pieces of information from a variety of sources)	**0**	**1**	**0**	**02**
5.	Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	**0**	**1**	**0**	**02**
	Total	**3x1=3**	**6x2=12**	**5x3=15**	**30 (14 Q.)**

SKILL ASSESSMENT (PRACTICAL)

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

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

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

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

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

CONTINUOUS AND COMPREHENSIVE EVALUATION

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

5. UNIT CONTENTS

Grade IX Part A: Employability Skills

Unit No.	Unit Name	Duration in Hours
Unit 1	Communication Skills – I	15
Unit 2	Self-management Skills – I	10
Unit 3	Information and Communication Technology Skills – I	15
Unit 4	Entrepreneurial Skills – I	10
Unit 5	Green Skills – I	10
	Total	**60**

Unit 1: Communication Skills – I				
Sn	**Learning Outcome**	**Theory (05 Hours)**	**Practical (10 Hours)**	**15**
1	Demonstrate the knowledge of importance, elements and perspective in communication	• Introduction to communication process • Importance of communication • Elements of communication • Perspective in communication • Effective communication	• Role play on the communication process • Group discussion on the importance of communication and factors affecting perspectives in communication • Charts preparation on elements of communication • Asking students to write statements exemplify the use of 7Cs (i.e. Clear, Concise, Concrete, Correct, Coherent, Courteous and Complete) for effective communication	02
2	Demonstrate the knowledge of verbal communication	• Verbal communication • Types of verbal communication • Advantages & disadvantages • Public speaking	• Role play of a phone conversation • Chat prepartion on types of verbal communication • Group discussion on advantages and disadvantages of verbal communication • Delivering a speech and practicing public speaking by using 3P's.	02
3	Demonstrate the knowledge of non-verbal communication	• Non-verbal communication • Importance of non-verbal communication • Types of non-verbal communication • Visual communication	• Role plays on non-verbal communication • Group discussion demonstration of Do's and Don'ts to avoid body language mistakes • Group discussion on three methods of communication	01

4	Demonstrate the knowledge of basic writing skills	• Writing skills: Parts of speech • Using capitals • Punctuations • Basic parts of speech	• Reading paragraphs and sentences and identifying parts of speech • Constructing and writing sentences by using parts of speech • Identifying nouns by guessing the name, place, animal, and thing.	02
5	Describe the parts and types of sentences	Writing skills: Sentences • Parts of a sentence • Types of objects • Types of sentences – active and passive • Types of sentences, according to their purpose • Paragraphs	• Framing and writing sentences using direct & indirect objects • Writing paragraph using active and passive voice • Writing different types of sentences (i.e. declarative, exclamatory, interrogative and imperative)	01
6	Demonstrate the knowledge of pronunciation basics	• Pronounciation basics • Speaking correctly • Phonetics • Types of sounds	• Practicing words and identifying vowels, diphthongs and consonants • Practicing the pronunciation of words	01
7	Demonstrate how to greet and introduce self	• Greetings and Introductions • Greetings • Types of greetings • Introducing yourself and others	• Role-play on Formal and informal greetings, • Role-play on introducing someone, • Practice and discussion on how to greet different people.	01
8	Answer questions that others ask about you	• Talking about self • Filling a form	• Practicing introducing yourself • Practicing filling of forms • Role-play on Self Introduction	01
9	Asking questions according to a situation	• Asking questions • Need for asking questions • Method for asking questions	• Framing and writing questions (using Who, Where, When, What, Why and How) • Framing and writing questions (based on purpose) • Discussing and guessing the personality using framed questions	02
10	Use the correct question words to ask open-ended and close-ended questions	• Asking questions • Types of questions • Framing questions	• Framing and writing open-ended and close-ended questions. • Group practice on framing questions • Identifying open-ended and closed-ended questions.	02
			Total Duration in Hours	**15**

Unit 2: Self-management Skills – I				
Sn	**Learning Outcome**	**Theory (07 Hours)**	**Practical (03 Hours)**	**10**
1.	Describe the meaning and importance of self-management	• Introduction to self managemen t and its components • Self-awareness • Self-confidence • Self-motivation • Positive thinking • Self-control • Problem solving • Personal hygiene and grooming, • Team work • Time management • Goal setting	• Group discussion on self-management skills • Performing activities to know how much aware are you about yourself. • Chart preparation on components of self-management	01
2.	Identify strength and weakness analysis	• Identifying strength and weakness • Knowing yourself • Strength and weakness analysis • Difference between interests and abilities	• Group discussion on aim and goal in life • Perform a strength and weakness analysis • Group discussion on interests and abilities	01
3.	Build self-confidence	• Self–confidence, • Qualities of self-confident people, • Building self-confidence	• Role play on building self-confidence • Performing activities on building confidence through positive words	02
4.	Build the concept on positive thinking	• Posittive thninking, • Posittive thninking and its importance, • How to keep your things positive	• Storytelling, • Role-play on following the class rules • Practicing saying positive words • Making a list of steps involved in self-reflection) on how you will follow positive attitude practices • Home activity on helping others,	02
5	Describe the concept and aspects of personal hygiene	• Personal hygiene • Three steps of personal hygiene - Care, Wash, Avoid • Essential steps of handwashing	• Role-play on following personal hygiene steps • Discussion and follow up on personal hygiene practices	02
6	Follow the guidelines for dressing and personal grooming	• Grooming • Grooming and its importance, • Guidelines for dressing and personal grooming – clothes, hair, face	• Role play on dressing and grooming standards • Self-reflection on dressing and grooming well	02
			Total Duration in Hours	**10**

Unit 3: Information and Communication Technology Skills – I				
Sn	**Learning Outcome**	**Theory (05 Hours)**	**Practical (10 Hours)**	**15**
1.	Explain the role of ICT in day-to-day life and the workplace	• Introduction to Information and Communication Technology, • ICT at workplace • ICT at home	• Group discussion on past, present, and future use of ICT • Preparations of posters on applications of ICT	02
2.	Differentiate between the ICT tools and use of mobile apps	• ICT tools – • Smartphones, • Tablets, • TV and Radio	• Performing activities to get familiar with mobile devices	01
3.	Differentiate between smartphones and tablets	• ICT tools – smartphone and tablet, • Mobile device layout • Basic features of a mobile device • Home screen of mobile device • Basic gestures used	• Performing activities to get familiar with the mobile device – use and applications of mobile devices	01
4.	Describe the parts of computer and computer peripherals	• Parts of a computer, • Input devices, • Output devices, • Peripherals devices and their functions, • Central Processing Unit (CPU), • Random Access Memory (RAM) and Read Only Memory (ROM), • Motherboard, • Ports and connectons.	• Chart preparation on components of a computer • Group activity on connecting devices to a computer	02
5.	Demonstrate basic computer operations	• Basic computer operations, • Computer hardware and software, • Starting a computer, • Log in and log out, • Shutting down computer, • Using keyboard and mouse	• Group activity on use of computer • Group practice on using the keyboard	02
6.	Perform basic file operations	• Performing Basic file operations, • File and folders – creating afile and using text editor	• Group practice on creating a file	01
7.	Demonstrate the knowledge of internet and networking	• Communication and Networking -Internet browsing • Use of internet • Connecting to internet • Types of connection • Bandwidth • Internet browser	• Group discussion on the uses of internet	01
8.	Perform internet browsing	• World Wide Web • Web pages • Web browsers	• Group practice on web browsing	01

9.	Apply the knowledge of communication networking	• Introduction to Email • Working of Email • Email address • Advantages of Email	• Group discussion on using Email and its advantages	01
10.	Create an Email account	• Creating an Email account • Steps to open an Email account on Gmail	• Group practice on creating and opening an Email account	01
11.	Write an Email	• Writing an Email • Attaching a file to an Email • Managing folders in Email account	• Group practice on receiving and replying to an email message	01
12.	Reply an Email	• Receiving Email, • Replying to an Email • Forwarding Email • Deleting Email	• Group practice on receiving and replying to an Email.	01
			Total Duration in Hours	**15**

Unit 4: Entrepreneurial Skills – I				
Sn	**Learning Outcome**	**Theory (05 Hours)**	**Practical (05 Hours)**	**10**
1.	Describe the concept of Entrepreneurship	• Concept of Entrepreneurship and Enterprise	• Group activity on guessing the Entrepreneur	01
2.	Describe the role of entrepreneurship	• Role of Entrepreneurship • Economic development • Social development • Improved standard of living • Optimal use of resources • More benefits at lower prices products and services at competitive prices	• Group discussion on "A world without entrepreneurship" • Role play on roles of entrepreneurship	02
3.	Describe the qualities of a successful entrepreneur	• Qualities of a successful entrepreneur • Patience • Positive attitude • Hardworking • Confident • Open to trial and error • Creative and innovative	• Role play on appearing for interview • Group activity on inteeractions with entrepreneurs	02
4.	State the characteristics of entrepreneurship	• Dstinguishing characteristics of entrepreneurship and wage employment • Characteristics of entrepreneurship • Wage employment • Benefits of entrepreneurship	• Group activity on identifying characteristics of enterprise • Discussion on advantages of entrepreneurship over wage employment	02
5.	Identify the type of business activity	• Types of business activities • Product business	• Group activity on identifying different types of products and	01

		• Service business • Hybrid business	services	
6.	Differentiate between the product, service, and hybrid businesses	• Product, Service, and Hybrid Businesses • Types of product-based business • Manufacturing businesses • Trade businesses	• Poster making on business activities around us	01
7.	Describe the entrepreneurship development process	• Enterpreneurship development process • Steps of starting a business – idea generation, getting money and material, understanding customer needs, improving product/ service	• Group activity on Make-and-Sell business	01
			Total Duration in Hours	**10**

Unit 5: Green Skills – I				
Sn	**Learning Outcome**	**Theory (07 Hours)**	**Practical (03 Hours)**	**10**
1.	Demonstrate the knowledge of society and environment	• Society and Environment • Natural resources • Renewable and Non-renewable resources • Types of pollutions • Climate change • Harmful radiation • Natural disaster • Saving the environment, • Reduce, reuse and recycle • Actions for saving environment	• Group activity on listing the factors influencing the environment • Group activity on listing the steps one can take to save the environment	05
2.	Describe the meaning and importance of conserving natural resources	• Conserving natural resources, • Soil conservation, • Water conservation, • Energy conservation, • Food conservation, • Forest conservation	• Group discussion on conserving natural resources	02
3.	Describe the meaning and scope of sustainable development and green economy	• Sustainable Development • Sustainable Development Goals (SDGs) • Components of green economy – Renewable energy, green building, well managed • Skill development for the green economy, Green growth, Green economy, Green skills, Green projects	• Group discussion on importance of green skills • Poster making on importance of green economy	03
			Total Duration in Hours	**10**

Grade IX Part B: Vocational Skills

Unit No.	Unit Name	Duration in Hours
Unit 1	Overview of AI Devices and AI Devices Installation Operator	20
Unit 2	Introduction to AI and IoT Devices	30
Unit 3	Basic Electronics and Hardware Components	30
Unit 4	Installation and Configuration of AI Devices	20
Unit 5	Networking and Cloud Integration	20
	Total Duration	**120**

Unit 1: Overview of AI Devices Installation Operator				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (10 Hours)**	**20**
1.	Describe the size and scope of the Telecom industry and its various sub-sectors.	• Size and scope of the Telecom industry and its various sub-sectors	• List the various subsectors of telecom industry, • Visit the telecom industry and observe the software, hardware, tools and equipment	08
2.	Describe the Role and Responsibilities of AI Devices Installation Technician	• Process workflow in organization, • Role and scope of an AI Devices Installation Technician in the process, • Organisational policies on workplace ethics, • Sites, quality standards, personnel management and public relations. • AI Devices Installation Operations,	• List the Role, Responsibilities, and Challenges for an AI Devices Installation Technician. • Draw a diagram of process workflow in organization indicating the importance of AI Devices Technician, • Prepare the chart showing the scope of work for an AI Devices Installation Technician, • List the various daily, weekly, monthly operations/activities that take place at the site under an AI Devices Installation Technician.	12
			Total Duration in Hours	**20**

Unit 2: Introduction to AI and IoT Devices				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (15 Hours)**	**30**
1.	Describe the concpet of AI and IoT	• Concept and overview of AI, • Definition and history of Artificial Intelligence (AI) and Internet of Things (IoT), • Terminlogies in AI and IoT	• Prepare a chart showing the examples of AI devices used in telecom sector, • Demonstrate the use of AI in everyday life (using Google Assistant, Amazon Alexa)	08

2.	Describe the applications of AI-powered devices	• Real-world applications of AI-powered devices (smart homes, healthcare, industries), • Examples of AI devices in Telecom Sector, • Aapplications of AI-powered devices in Telecom sector.	• Identify and name different AI-powered devices (e.g., smart cameras, voice assistants), • Prepare a chart showing few AI devices and its application in real world, • Identify the AI devices used for various operations in industry.	08
3.	Identify and name the various components of AI devices	• Components of AI devices: sensors, microcontrollers, actuators, processors, • Brief overview of components of AI devies.	• Identify and name the varius components of AI devices, • Prepare a chart showing the variuos components of AI Devices with itrs brief overview.	08
4.	Describe Ethical concerns and data privacy in AI-based installations	• Ethics in Telecom industry, • Ethical concerns and data privacy in AI-based installations	• Demonstrate the Ethical concerns and data privacy while installing AI Devices, • Group discussion impact of AI on daily life and future trends.	06
			Total Duration in Hours	**30**

Unit 3: Basic Electronics and Hardware Components				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (15 Hours)**	**30**
1.	Describe the Basics of Electricity	• Basics of electricity, • Voltage, Current, and Resistance, • Basic knowledge of wiring, soldering, and circuit connections.	• Draw the symbols of Voltage, Current, and Resistance, • Demonstrate the experiment to measure Voltage, Current, and Resistance • Demonstrate the soldering with wires and components	06
2.	Describe the hardware components in AI Devices	• Various hardware components in AI devices, • Brief overview of working and assembly of hardware components in AI devices.	• Identify and name hardware component in AI devices, • Illustrate the working of hardware components in AI devices.	08
3.	Describe the Microcontrollers	• Introduction to Raspberry Pi, Arduino, Edge AI devices, • Microcontrollers (Arduino, Raspberry Pi, ESP32)	• Identify and name the varius components of AI devices, • Assemble a simple sensor-based circuit (e.g., motion sensor LED light)	08
4.	Describe the Sensors and Cameras	• Sensors – motion, temperature, voice, light, • Cameras and AI processors – NVIDIA Jetson, Edge TPU	• Identify and name the sensors and camras, • Demonstrate to assemble a simple motion sensor-based circuit, LED light	08
			Total Duration in Hours	**30**

Unit 4: Installation and Configuration of AI Devices				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (10 Hours)**	**20**
1.	Connect AI devices to Wi-Fi and cloud platforms	• Introduction to AI home automation devices (Google Nest, Amazon Alexa) • Device compatibility and connectivity – Wi-Fi, Bluetooth, Zigbee, and Z-Wave	• Identify and name the variuos home automation devices using AI technology, • Match the compatibility and connectivity of AI devices	06
2.	Install AI-enabled security cameras, smart lights, voice assistants	• Steps for installing AI-powered security cameras, • Steps for installing smart lights, • Steps for installing voice assistants.	• Illustrate to install and configure a smart camera, • Illustrate to install and configure smart light, • Illustrate to install and configure voice assistant.	08
3.	Configure AI devices using mobile apps and web interfaces	• Steps for configuring AI devices using mobile apps and web interfaces, • Motion detection and voice control features on an AI device	• Illustrate to configure AI devices using mobile apps and web interfaces, • Illustrate to set up motion detection and voice control features on an AI device	06
			Total Duration in Hours	**20**

Unit 5: Networking and Cloud Integration				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (10 Hours)**	**20**
1.	Describe the basic concepts on networking	• Basics of networking: LAN, WAN, • Network connectivity, • IoT protocols (MQTT, HTTP, CoAP)	• Draw the diagram of LAN, WAN, • List the vaious IoT protocols	06
2.	Describe the concept of Cloud computing	• Concept of Cloud computing, • Cloud services, • Cloud services for AI devices – Google Cloud, AWS, Microsoft Azure	• Draw the diagram of cloud computing, • List the various services of Cloud computing, • List the various services available for AI devices.	06
3.	Connect AI device to a cloud platform	• Process to connect AI device to a cloud platform (e.g., sending sensor data to Google Cloud), • Syncing AI devices with cloud storage and data analytics, • Security concerns and data encryption in AI devices	• Illustrate to connect AI device to a cloud platform, • Demonstrate how IoT-based AI devices communicate over the internet, • Illustrate to Test remote access and control of AI-powered device.	08
			Total Duration in Hours	**20**

Grade X Part A: Employability Skills

Unit No.	Unit Name	Duration in Hours
Unit 1	Communication Skills – II	15
Unit 2	Self-management Skills – II	10
Unit 3	Information and Communication Technology Skills – II	15
Unit 4	Entrepreneurial Skills – II	10
Unit 5	Green Skills – II	10
	Total	**60**

Unit 1: Communication Skills – II				
Sn	**Learning Outcome**	**Theory (07 Hours)**	**Practical (08 Hours)**	**15**
1.	Demonstrate the knowledge of various methods of communication	• Methods of communication • Communication process and elements	• Role plays on communication process • Group discussion on the effects of elements of communication cycle.	02
2.	Describe the types of verbal communication	• Verbal communication • Types of verbal communication • Advantages and disadvantages of verbal communication • Mastering verbal communication	• Role play of a telephonic conversation • Chart preparation on types of verbal communication • Group discussion on the advantages and disadvantages of verbal communication • Group activity on delivering a speech and practicing public speaking.	02
3.	Demonstrate the knowledge of non-verbal communication	• Non-verbal communication – Importance of non–verbal communication • Types of non-verbal communication • Visual communication	• Role play on non-verbal communication • Group discussion and practice on how to avoid body language mistakes • Group discussion on three methods of communication	02
4.	Describe the communication cycle and importance of feedback	• Communication cycle and importance of feedback • Feedback • Types of feedback • Importance of feedback	• Role play on providing feedback • Group activity on constructive feedback	02
5.	Identify the barriers to effective communication	• Effective communication • Barriers to effective communication - • Physical barriers	• Role play on barriers to effective communication • Group practice on overcoming the barriers to effective	03

		• Linguistic barrier • Interpersonal barriers • Organizational barriers • Culture barriers • Ways to overcome barriers to effective communication	communication • Chart preparation on barriers to effective communication	
6.	Demonstrate the knowledge of parts of speech	• Writing skills – Parts of speech • Capitalization • Punctuations • Basics of parts of speech • Supporting parts of speech • Article • Conjunctions • Prepositions • Interjections	• Reading paragraph and sentences and identifying parts of speech • Group activity on sentence construction • Identifying nouns by guessing the name, place, animal, or thing	02
7.	Write sentences	• Meaning of sentence • Parts of sentence • Subject • Verb • Object • Types of objects • Types of sentences • Active • Passive • Paragraphs	• Making sentences using direct and indirect objects • Writing a paragraph using active and passive voice • Framing different types of sentences (i.e., declarative, exclamatory, interrogative and imperative)	02
			Total Duration in Hours	**15**

Unit 2: Self-Management Skills – II				
Sn	**Learning Outcome**	**Theory (05 Hours)**	**Practical (05 Hours)**	**10**
1.	Apply stress management techniques	• Stress management • Stress and Stress management techniques • Management technique • Ability to work independently • Emotional intelligence	• Role Play on avoiding stressful situation, • Activity on listing stressful situations and discussing the stress management techniques like yoga, deep breathing exercises	02
2.	Identify strengths and weaknesses of self	• Self-Awareness – Strength and Weakness Analysis • Knowing yourself • Strength and weakness analysis • Techniques for identifying strengths and weaknesses • Difference between interests and abilities	• Group discussion on aim and goal in life • Perform a strength and weakness analysis • Group discussion on interests and abilities	02
3.	Demonstrate the knowledge of self - motivation	• Self-Motivation • Types of motivation • Qualities of self-motivated	• Group discussion on staying motivated • Activity on listing the ways to	02

		people • Building self–motivation	motivate oneself	

4.	Set SMART goals	• Self regulation – Goal setting,
		• Goals and setting SMART Goals
		• How to set SMART Goals,
		  • Specific
		  • Measurable
		  • Achievable
		  • Realistic
		  • Time bound
			• Group activity on setting SMART goals
			• Writing long- term and short-term goals
			• Activity on listing the ways to surely set SMART goals
				02

5.	Demonstrate the knowledge of time management	• Self-Regulation – Time Management
		• Time management and its importance
		• Example and non-example of time management
		• Four steps for effective time management
		  • Organise
		  • Prioritise
		  • Control
		  • Track
		• Tips for practicing the four steps of effective time management
			• Preparing a list of activities to practice time management
			• Discussion on how to manage time to reach school on time
				02

			Total Duration in Hours	**10**

Unit 3: Information And Communication Technology Skills – II				
Sn	**Learning Outcome**	**Theory (05 Hours)**	**Practical (10 Hours)**	**15**
1.	Perform basic computer operations	• Basics computer operations, • Starting a computer - basic functions performed when a computer starts, login and logout, • Shutting down a computer, • Using keyboard, • Using a mouse - Roll over or hover, Point and click, Drag and drop, Double click	• Demonstration on use of computers • Group practice on using the keyboard	07
2.	Perform basic file operations	• Concept of basic file operations • Files and folders • Creating a file • Creating a folder	• Demonstration and practice on creating a file and folder	02
3.	Demonstrate computer care and maintenance	• Importance of care and maintenance of computers • Basic tips for taking care of devices	• Making a chart on care and maintenance of computer	03

		• Cleaning computer devices • Preparing maintenance schedule for computers • Taking backup data • Scanning and cleaning viruses • Removing SPAM files		
4.	Describe the importance of maintaining computer security and privacy	• Computer security and privacy •Reasons for security breach •Threats to computer • Protecting your data	• Group work on preparing a chart of computer security and privacy	03
			Total Duration in Hours	**15**

Unit 4: Entrepreneurial Skills – II				
Sn	**Learning Outcome**	**Theory (05 Hours)**	**Practical (05 Hours)**	**10**

1.	Describe the meaning of entrepreneurship	• Entrepreneurship and society
		• Activities of entrepreneurs:
		  • Fulfil customer needs
		  • Use local materials
		  • Help society
		  • Create job
		  • Share wealth
		  • Lower price product
			• Group work on finding the problems in school campus and turning them into business opportunities	03

2.	Identify the qualities and functions of an entrepreneur	• Qualities and functions of an entrepreneur • Qualities of an entrepreneur	• Activity on self-assessment of entrepreneurial qualities • Brainstorming on solving a problem in their area • Taking an interview of an entrepreneur	02
3.	Describe the myths and realities about entrepreneurship	• Misconceptions and myths about entrepreneurship	• Group activity on identifying everyday heroes • Activity on interviewing the entrepreneurs • Group activity on making items and selling to someone	02
4.	Describe entrepreneurship as a career option	• Entrepreneurship as a career option • Meaning of career • Ways of earning a living • Self-employment • Wage employment • Entrepreneurship career process – Enter, Survive, Grow	• Brainstorming on entrepreneurship as a life option • Group discussion on The power of entrepreneurship	03
			Total Duration in Hours	**10**

Unit 5: Green Skills – II				
Sn	**Learning Outcome**	**Theory (07 Hours)**	**Practical (03 Hours)**	**10**
1.	Demonstrate the knowledge of green skills	• Sustainable development, • Importance of sustainable development, • Problems related to sustainable development, • Sustainable development Goals, • Sustainable development initiatives, • Sustainable process	• Group activity on creating garden in the school or planting tree saplings • Group discussion on "How to prevent wastage"	05

2	Describe the role of self in sustainable development	• Our role in sustainable development
		• Our role towards Sustainable Development
		  • Quality education
		  • Clean water and sanitation
		  • Affordable and clean energy
		  • Decent work and economic growth
		  • Reducing inequalities
		  • Creating sustainable cities and communities
		  • Responsible consumers and producers
		  • Protect life below water
		• Protect life on land
			• Group discussion on conservation and protection of environment
			• Group activity on organising an art project using waste
				05

			Total Duration in Hours	**10**

Grade X Part A: Vocational Skills

Unit No.	Unit Name	Duration in Hours
Unit 1	Troubleshooting and Maintenance of AI Devices	30
Unit 2	Programming AI Devices (Basic Coding)	30
Unit 3	Safety, Ethical Use, and Industry Standards	20
Unit 4	Practical Assessment and Real-World Applications	20
Unit 5	Occupational Health & Safety	20
	Total Duration	**120**

Unit 1: Troubleshooting and Maintenance of AI Devices				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (15 Hours)**	**30**
1	Identify and troubleshoot connectivity issues in AI device	• Common installation errors • Troubleshooting techniques, • Connectivity of AI devices	• Demonstrate to troubleshoot the common instllation errors, • Check the connectivity for proper functioning of device,	08
2	Update firmware and install software patches	• Updating firmware and installing software patches	• Demonstrate to perform a firmware update on a smart device	06
3	Diagnose hardware and software issues in AI-powered devices	• Hardware issues in AI devices, • Software issues in AI devices, • Repairing of faulty AI device components (sensor, power circuit), • Safety precautions while handling AI hardware and circuits	• List the probable hardware issues in AI devices, • List the probable software issues in AI devices, • Hands on repairing of faulty AI device components (sensor, power circuit) with safety precautions.	16
			Total Duration in Hours	**30**

Unit 2: Programming AI Devices (Basic Coding)				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (15 Hours)**	**30**
1	Demonstrate to control AI device using Python program	• Introduction to Python programming for AI devices, • Basics of writing scripts to control AI-powered gadgets	• Write simple Python programs for AI devices, • Write a Python program to control an IoT device	10
2	Create an AI powered voice assistants	• AI-powered voice assistants (e.g., Google Assistant API)	• Demonstrate to create AI-based voice command system to control lights or fans	10
3	Develop a motion-detection automation system	• Motion-detection automation system using AI and sensors.	• Develop a motion-detection automation system using AI and sensors.	10
			Total Duration in Hours	**30**

Unit 3: Safety, Ethical Use, and Industry Standards				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (20 Hours)**	**30**
1	Demonstrate safety protocols while installing AI devices	• Electrical safety measures while working with AI devices	• Illustrate to prctice electrical safety measures while working with AI devices	05
2	Secure an AI device against cyber threats	• Cyber threats - password protection, encryption, • Cybersecurity threats and protection against hacking.	• Conduct a risk assessment for an AI-powered home security setup	05
3	Demonstrate the Ethical use of AI devices	• Ethical issues – data privacy, surveillance laws, •	• Practice Ethical use of AI devices	05
5	Identify the Industry standards and certifications for installation of AI device	• Certifications required for AI device installations (e.g., CE, FCC, RoHS)	• List the Industry standards and certifications for installation of AI device	05
			Total Duration in Hours	**20**

Unit 4: Practical Assessment and Real-World Applications				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (10 Hours)**	**20**
1	Install and configure AI security camera	• Procedure for installing and configuring AI security camera	• Develop a project to install and configure AI security camera	08
2	Set up a smart home ecosystem	• Process to set up smart home ecosystem	• Group Activity: Set up a mini smart home ecosystem with AI devices	06
3	Analyze the case studies on AI in industries	• AI in industries: healthcare, agriculture, retail, and smart cities, • Future trends in AI & IoT devices	• Analyze a case study of AI-based industrial automation system	06
			Total Duration in Hours	**20**

Unit 5: Occupational Health & Safety				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (10 Hours)**	**20**
1.	Maintain the self and workplace health and hygine to achieve optimum productivity	• Recent trends in telecom industry, • Organisation structure of telecom industry, • Policies, procedures, standards and work ethics in telecom industry,	• List the receent trends in telecom industry, • Draw a chart showing orgnisation structure of telecom industry with different positions, • List the different methods of cleaning, disinfection, and	08

		• Importance of basic hygine practices, cleanliness, safety and tidy workplace, • Organisational hygiene and sanitation guidelines and procedure to report breaches and gaps, • Different methods of cleaning, disinfection, sanitization • Importance of time management and quality to meet daily target,	sanitization, • Demonstrate to sanitize and disinfect work area, • Demonstrate the different approches to clean the tools, equipment and machines, • Identify any spills and leaks that need to be plugged/stopped, • Demonstrate to wash, sanitizing hands using soap, water and alcohol-based hand rubs, • Prepare a time schedule to complete the tasks	
2.	Describe the workplace hazards and procedure to deal with hazards	• Different types of hazards, • Procedure to report it to the supervisor, • Correct postures while working and handling hazardous materials at workplace, • Precautionary steps to follow while handling hazardous materials, • Warning labels, symbols and other related signages, • Safety equipment – goggles, gloves, ear plugs, shoes, • PPE – face masks, hand gloves, face shields, PPE suits, • Self quarantine and isolation, • Emergency and Evacuation procedure	• List different types of hazards, • Stetch the procedure to report the hazards to the supervisor, • Demonstrate the correct postures while working and handling hazardous materials at workplace, • Demonstrate warning labels, symbols and other related signages, • Demonstrate to use safety equipment – goggles, gloves, ear plugs, shoes, • Demonstrate to wear and remove PPE – face masks, hand gloves, face shields, PPE suits, • Demonstrate to evacuate the workplace in emergency	06
3.	Optimise the use of resources and organizing waste management and recycling	• Optimum utilisation of resources, • Recyclable/non-recyclable and hazardous wastes, • Recycling, repairing and reusing electronic components, • Different waste categories –dry, wet, recyclable, non-recyclable, • Waste management and waste disposal procedures, • Colour dustbins for different types of waste, • Common source of pollution and ways to minimize it.	• Prepare a chart showing optimul utilisation of resources, • Identify and segregate recyclable/non-recyclable and hazardous wastes, • Group activity to recycle, repair and reuse components, • Use disposal techniques for different types of waste, • Demonstrate the ways for efficient utilization of material and water, • Demonstrate to use energy efficient electrical appliances	06
			Total Duration in Hours	**20**

6. ORGANISATION OF FIELD VISITS

In a year, at least 3 field visits/educational tours should be organised for the students to expose them to the activities in the workplace.
Visit a workshop or service center and observe the following: Location, Site, Computer system and peripherlas, AI Devices, Preparation to be udertaken for installation of AI Devices, Installation of AI Devices, Use of tools and equipment. During the visit, students should obtain the following information from the owner or the supervisor :

1. AI devies connectivity and installation process,
2. Use of appropriate tools, parts, relevant reference sheets, manuals and documents,
3. Installation of smart devices,
4. Testing of the sensors and actuators,
5. Monitor and improvise the network performance,
6. Using simulators, emulators and debuggers,
7. Troubleshooting and fixing the faults on site,
8. Running tests and system health checks,
9. Recording data and how to generate required diagnostic and other reports,
10. Timeline and quality standards.

7. LIST OF EQUIPMENT AND MATERIALS

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

Tools, Equipment and Other Materials

Tools and equipment, different AI devices.

Processors, controllers, sensors and communication hardware.

Types of microprocessor boards like Arduino, raspberry-Pi, customized platforms etc.

Devices such as humidity sensor, temperature sensor, gyro meter, accelerometer, video surveillance cameras.

Service Manual/User Manuals, Customer Registration, Program Authentication Form, Customer Feedback form.

Documents of standard operating procedures, code of conduct, checklists, schedules tools and equipment, status report.

Personal Protection Equipment: safety glasses, head protection, rubber gloves, safety footwear, warning signs and tapes, fire extinguisher and first aid kit.

Classroom Aids

Whiteboard, marker pen, computer or laptop attached to LCD projector, scanner, computer speakers

8. TEACHER/TRAINER QUALIFICATIONS

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:

Qualifications	**Age Limit**
Essential : Bachelor's degree in appropriate branch of Engineering/ Technology with 1 year of work experience in Industry/ Training. **OR** Diploma in appropriate branch of Engineering/ Technology with 4 years of work experience in Industry/ Training. ***Desirable:*** SSC Certified in the said Job Role. Knowledge and skills of Active Networks/IoT.	18-37 years (as on Jan. 01 (year)) Age relaxation to be provided as per Govt. rules

Note – The qualifications for vocational teachers mentioned above is suggestive and not prescriptive. The States/ UTs can make modifications in the qualifications for appointment of vocational teachers/ trainers as per their requirement through a committe appointed by the competent authority in the State/ UT Directorate/ Department of School Education.

Vocational Teachers/Trainers form the backbone of Vocational Education being imparted as an integral part of Samagra Shiksha. 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 Samagra Shiksha in following ways:

1. 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**
2. 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:

1. Written test for the technical/domain specific knowledge related to the sector;
2. Interview for assessing the knowledge, interests and aptitude of trainer through a panel of experts from the field and state representatives; and
3. 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:

- Prepare session plans and deliver sessions which have a clear and relevant purpose and which engage the students;
- Deliver education and training activities to students, based on the curriculum to achieve the learning outcomes;
- Make effective use of learning aids and ICT tools during the classroom sessions;
- 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;
- 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;
- Identify the weaknesses of students and assist them in up-gradation of competency;
- Cater to different learning styles and level of ability of students;
- Assess the learning needs and abilities, when working with students with different abilities
- Identify any additional support the student may need and help to make special arrangements for that support;
- 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:

- Participation in guidance and counseling activities conducted at Institutional, District and State level;
- Adoption of innovative teaching and training methods;
- Improvement in result of vocational students of Class X or Class XII;
- Continuous up-gradation of knowledge and skills related to the vocational pedagogy, communication skills and vocational subject;

- Membership of professional society at District, State, Regional, National and International level;
- Development of teaching-learning materials in the subject area;
- Efforts made in developing linkages with the Industry/Establishments;
- Efforts made towards involving the local community in Vocational Education
- Publication of papers in National and International Journals;
- Organisation of activities for promotion of vocational subjects;
- Involvement in placement of students/student support services.

9. LIST OF CONTRIBUTORS

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