LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE:
Installation Technician – Computing and Peripherals

(QUALIFICATION PACK: Ref. Id. ELE/Q4609)

SECTOR: Electronics

Classes 11 and 12

PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION
Shyamla Hills, Bhopal – 462 002, M.P., India
www.psscive.ac.in

Gandhiji's Talisman

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

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

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

M K Gandhi

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FOREWORD

The Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE) a constituent of the National Council of Educational Research and Training (NCERT) is spearheading the efforts of developing learning outcome based curricula and courseware aimed at integrating both vocational and general qualifications to open pathways of career progression for students. It is a part of Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education (CSSVSHSE) launched by the Ministry of Human Resource Development, Government of India in 2012. The PSS Central Institute of Vocational Education (PSSCIVE) is developing curricula under the project approved by the Project Approval Board (PAB) of *Rashtriya Madhyamik Shiksha Abhiyan* (RMSA). The main purpose of the 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 **Electronics – Installation Technician Computing and Peripherals**. The curriculum has been developed for the secondary students of vocational education and is aligned to the National Occupation Standards (NOSs) of a job role identified and approved under the National Skill Qualification Framework (NSQF).

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

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

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

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

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

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

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

RAJESH P. KHAMBAYAT
Joint Director
PSS Central Institute of Vocational Education

ACKNOWLEDGEMENT

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 experts Prof. Prakash Khanale and coordinator, Dipak D. Shudhalwar, Associate Professor (CSE) and Head, Department of Engineering and Technology, PSSCIVE, Bhopal, for his earnest effort and contributions in the development of this learning outcome based curriculum. The contributions is 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 Dipak Shudhalwar, Associate Professor (CSE) and Head, Computer Centre, PSSCIVE in development of the curriculum for the employability skills are duly acknowledged.

We are also grateful to the Course Coordinator Dipak D. Shudhalwar, Associate Professor (CSE) and Head Computer Center, PSSCIVE, for bringing out this curriculum in the final form.

PSSCIVE Team

CONTENTS

1. COURSE OVERVIEW

COURSE TITLE: Installation Technician – Computing and Peripherals

Field Technician also called 'Field Technician', the Installation Technician provides after sale installation support services to customers, typically, at their premises.

The individual at work is responsible for installing newly purchased products, troubleshooting system problems and, configuring peripherals such as printers, scanners and network devices.

The job requires the individual to have: ability to build interpersonal relationships and critical thinking. The individual must be willing to travel to client premises in order to attend to calls at different locations.

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

- ✓ Apply effective oral and written communication skills to interact with people and 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 and abilities;
- ✓ Demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection;
- ✓ 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;
- ✓ Install and configure the peripherals;
- ✓ Attend to field calls from customer and complaints for system troubleshooting and repairs.
- ✓ Interact with the customer prior to visit;
- ✓ Install and configure network devices;
- ✓ Understand the importance of SLAs and Company Processes;
- ✓ Complete the documentation;
- ✓ Achieve productivity and quality as per norms.

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

COURSE LEVEL: This course can be taken up at Intermediate level in Class 11 and Class 12.

COURSE DURATION: **Total : 600 hrs**

Class 11 :	300 hrs
Class 12 :	300 hrs
Total:	**600 hrs**

2. SCHEME OF UNITS AND ASSESSMENT

This course is a planned sequence of instructions consisting of Units meant for developing employability and vocational competencies of students of Class 11 and 12 opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for Class 11 is as follows:

CLASS 11			
	Units	**No. of Hours for Theory and Practical 300**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
	Unit 1: Communication Skills	25	**10**
	Unit 2: Self-management Skills	25	
	Unit 3: Basic ICT Skills	25	
	Unit 4: Entrepreneurial Skills	25	
	Unit 5: Green Skills	15	
	Total	**115**	**10**
Part B	**Vocational Skills**		
	Unit 1: Basics of Electrical and Electronics	15	**40**
	Unit 2: Computer System Fundamentals and Setting up	30	
	Unit 3: Installation & configuration of Operating System	30	
	Unit 4: Computer Hardware Essentials and Installation	40	
	Unit 5: Computer Assembly and Disassembly	30	
	Unit 6: Health, Safety and Ethical use of Computer	15	
	Total	**160**	**40**
Part C	**Practical Work**		
	Practical Examination	6	15
	Written Test	1	10
	Viva Voce	3	10
	Total	**10**	**35**
Part D	**Project Work/Field Visit**		
	Practical File/ Student Portfolio	10	10
	Viva Voce	5	5
	Total	**15**	**15**
	Total	**300**	**100**

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

CLASS 12			
	Units	**No. of Hours for Theory and Practical 300**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
	Unit 1: Communication Skills	25	**10**
	Unit 2: Self-management Skills	25	
	Unit 3: Basic ICT Skills	25	
	Unit 4: Entrepreneurial Skills	25	
	Unit 5: Green Skills	10	
	Total	**115**	**10**
Part B	**Vocational Skills**		
	Unit 1: Network Hardware Essentials	35	**40**
	Unit 2: Installation and configuration of Window Server	35	
	Unit 3: Installation and configuration of Linux Server	35	
	Unit 4: IT Security Fundamentals	35	
	Unit 5: Basics of ITIL v3	10	
	Total	**150**	**40**
Part C	**Practical Work**		
	Practical Examination	6	15
	Written Test	1	10
	Viva Voce	3	10
	Total	**10**	**35**
Part D	**Project Work/Field Visit**		
	Practical File/ Student Portfolio	10	10
	Viva Voce	5	5
	Total	**15**	**15**
	Total	**300**	**100**

3. TEACHING/TRAINING ACTIVITIES

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

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

CLASSROOM ACTIVITIES

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

		No. of Questions			
	Typology of Question	**Very Short Answer (1 mark)**	**Short Answer (2 Marks)**	**Long Answer (3 Marks)**	**Marks**
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	**3**	**2**	**2**	**13**
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	**2**	**3**	**2**	**14**
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**	**2**	**1**	**07**
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**	**2**	**0**	**04**
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	**5x1=5**	**10x2=20**	**5x3=15**	**40 (20 Ques.)**

SKILL ASSESSMENT (PRACTICAL)

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

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

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

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

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

CONTINUOUS AND COMPREHENSIVE EVALUATION

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

5. UNIT CONTENTS

CLASS 11

Part A: Employability Skills

Sn	Units	Duration in Hours
1.	Unit 1: Communication Skills – III	25
2.	Unit 2: Self-management Skills – III	25
3.	Unit 3: Basic ICT Skills – III	25
4.	Unit 4: Entrepreneurial Skills – III	25
5.	Unit 5: Green Skills – III	15
	Total	**115**

Unit 1: Communication Skills				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (15 Hours)**	**25 Hrs**
1.	Demonstrate knowledge of various methods of communication	• Methods of communication • Verbal • Non-verbal • Visual	• Writing pros and cons of written, verbal and non-verbal communication • Listing do's and don'ts for avoiding common body language mistakes	15
2.	Identify specific communication styles	• Communication styles- assertive, aggressive, passive-aggressive, submissive, etc.	• Observing and sharing communication styles of friends, teachers and family members and adapting the best practices • Role plays on communication styles.	10
3.	Demonstrate basic writing skills	• Writing skills to the following: • Sentence • Phrase • Kinds of Sentences • Parts of Sentence • Parts of Speech • Articles • Construction of a Paragraph	• Demonstration and practice of writing sentences and paragraphs on topics related to the subject	15
			Total Duration in Hours	**25**

Unit 2: Self-management Skills				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (15 Hours)**	**25 Hrs**
1.	Demonstrate impressive	• Describe the importance of dressing appropriately, looking	• Demonstration of impressive appearance and groomed	07

	appearance and grooming	decent and positive body language. • Describe the term grooming • Prepare a personal grooming checklist. • Describe the techniques of self-exploration.	personality. • Demonstration of the ability to self- explore.	
2.	Demonstrate team work skills	• Describe the important factors that influence in team building. • Describe factors influencing team work.	• Group discussion on qualities of a good team. • Group discussion on strategies that are adopted for team building and team work.	08
3.	Apply time management strategies and techniques	• Meaning and importance of time management – setting and prioritizing goals, creating a schedule, making lists of tasks, balancing work and leisure, using different optimization tools to break large tasks into smaller tasks.	• Game on time management. • Checklist preparation. • To-do-list preparation.	10
			Total Duration in Hours	**25**

Unit 3: Basic ICT Skills				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (15 Hours)**	**25 Hrs**
1.	Describe the role of ICT in day-to-day life.	• Introduction to ICT • Role and importance of ICT in personal life and at workplace • ICT in our daily life (examples) • ICT tools – Mobile, tab, radio, TV, email, etc.	• Discussion on the role and importance of ICT in personal life and at workplace. • Preparing posters / collages for showing the role of ICT at workplace	02
2.	Identify the various components of computer system	• Basic components of computer system. • Hardware and software. • Primary and secondary memory. • Input, Output and Storage devices.	• Identify and name the various components of computer. • List few hardware and software. • Identify and name the primary and secondary memory. • Identify the various Input, Output and Storage devices.	04
3.	Identify various peripheral devices	• Various peripheral devices and their use. • Examples of peripherals.	• List various peripheral devices. • Give the examples of peripheral devices. • Use peripheral devices.	04
4.	Perform basic computer operations	• Procedure for starting and shutting down a computer. • Operating Systems (OS). • Types of OS – DOS, Windows, Linux. • Desktop of Windows and Linux.	• Start the computer in proper sequence and get the intitial screen. • Identify the installed OS on computer. • Identify the destop and its	07

		• Files and folder. • Keyboard and mouse operations. • Common desktop operations.	various components. • Work with desktop. • Create file and folder. • Perform keyboard and mouse operations.	
5.	Connect with the world using Internet and its applications	• Introduction to Internet. • Applications of Internet. • Internet Browser. • Websites and webpages. • Email applications. • Email accounts. • Sending and receiving email. • Introduction to social media. • Blog. • Twitter. • Facebook. • Youtube. • WhatsApp. • Digital India.	• Introduce with Internet. • Explain the applications of Internet. • List the various Internet Browser. • Search the websites. • Create Email account. • Send and receive email. • Use Social Media for education. • Use Blog. • Use Twitter. • Use Facebook. • Use Youtube. • Use WhatsApp. • Use Digital India.	08
			Total Duration in Hours	**25**

Unit 4: Entrepreneurial Skills				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (15 Hours)**	**25 Hrs**
1.	Describe the significance of entrepreneurial values and attitude.	• Values in general and entrepreneurial values. Entrepreneurial value orientation with respect to inattentiveness, independence, outstanding performance and respect for work.	• Listing of entrepreneurial values by the students. • Group work on identification of entrepreneurial values and their roles after listing or reading 2-3 stories of successful entrepreneur. • Exhibiting entrepreneurial values in Ice breaking, rapport building, group work and home assignments.	10
2.	Demonstrate the knowledge of attitudinal changes required to become an entrepreneur.	• Attitudes in general and entrepreneurial attitudes • Using imagination/ intuition • Tendency to take moderate risk • Enjoying freedom of expression and action • Looking for economic opportunities • Believing that we can change the environment • Analyzing situation and planning action • Involving in activity	• Preparing a list of factors that influence attitude in general and entrepreneurial attitude. • Demonstrating and identifying own entrepreneurial attitudes during the following micro lab activities like thematic appreciation test. • Preparing a short write-up on "who am I". • Take up a product and suggest how its features can be improved. • Group activity for suggesting brand names, names of	15

			enterprises, etc.	
			Total Duration in Hours	**25**

Unit 5: Green Skills				
Sn	**Learning Outcome**	**Theory (07 Hours)**	**Practical (08 Hours)**	**15 Hrs**
1.	Describe importance of main sector of green economy	• Main sectors of green economy- E-waste management, green transportation, renewal energy,green construction, water management. • Policy initiatives for greening economy in India.	• Preparing a poster on any one of the sectors of green economy. • Writing a two-page essay on important initiatives taken in India for promoting green economy.	08
2.	Describe the major green Sectors/ Areas and the role of various stakeholder in green economy	• Stakeholders in green economy. • Role of government and private agencies in greening cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries.	• Preparing posters on green Sectors/Areas: cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries.	07
			Total Duration in Hours	**15**

Class XI, Part B: Vocational Skills

Sn	**Units**	**Duration in Hours**
1.	Unit 1: Basics of Electrical and Electronics	15
2.	Unit 2: Computer System Fundamentals and Setting up	30
3.	Unit 3: Installation and configuration of Operating System	30
4.	Unit 4: Computer Hardware Essentials and Installation	40
5.	Unit 5: Computer Assembly and Disassembly	30
6.	Unit 6: Health, Safety Measures and Preventive Maintenance	15
	Total Duration	**160**

Unit 1: Basics of Electrical and Electronics				
Sn	**Learning Outcome**	**Theory (6 Hours)**	**Practical (9 Hours)**	**15 Hrs**
1.	Understand the basic electrical concepts	• Electrical diagrams for providing electrical connections, • Concept of electrical earthing, • Steps to do electrical earthing,	• Draw electrical diagram of electrical connections, • Demonstrate the process of electrical earthing, • Perform the electrical earthing	08

		• AC/ DC • Power supply, • Surge power – UPS, Inverter.	• Measurement of various electrical quantities – current and voltage (AC/DC) • Draw the connectivity diagram of computer to power supply and UPS, • Connect the Computer to UPS and power supply.	
2.	Understand the basic of electronics	• Basic electronic components – Register, capacitor, induct or, ICs, Diodes, • Measuring tools – Digital multi-meter, CRO, Function generator.	• Identify and name the various electronic components. • Measure and test the electronic component using digital multi meter, • Demonstrate the uses of CRO such as voltage measurement, frequency measurement, time period measurement, display of shape of wave forms,	07
			Total Duration in Hours	**15**

Unit 2: Computer System Fundamentals and Setting up				
Sn	**Learning Outcome**	**Theory (12 Hours)**	**Practical (18 Hours)**	**30 Hrs**
1.	Appreciate the basic concept of computer system	• Introduction to Computer – definition, working, hardware and software, main components • Characteristics, history, evolution and generation of computer, • Classification of computer. • Types of computer according to purpose – general purpose, special purpose, • Types of computer according to working principle – Analog, digital, hybrid, • Types of computer according to size – supercomputer, mainframe, mini and microcomputer, • Desktop, laptop, all in one computer, • Mobile computer – tablets, smartphone, • Computer brands – IBM, apple, Macintosh.	• Identify and name the various parts of computer system, • Identify the computer hardware and software, • List the name of computers from various generations, • Identify and name the various types of computers.	06
2.	Appreciate the basic model of computer and system units	• Basic model of computer, • Functional units – input, output and central processing unit (CPU),	• Identify and name the functional units of computer, • List the specifications of different parts of computer,	04

		• Units of CPU – Memory, Control Unit, Arithmetic Logic Unit (ALU), • Uses of different parts of computer systems.	• Identify the uses of different parts of computer.	
3.	Identify the input devices	• Input devices – types • Text input devices, • Pointing devices, • Audio Visual input devices, • Card Readers, • Input sensors, • Examples of various input devices	• List the types of input devices, • List the various text input devices, pointing devices, audio visual devices, input reader devices, input sensor devices. • Identify and name the given text input device, • Identify and name the given pointing device, • Identify and name the given audio visual input devices, • Identify and name the given input reader devices, • Identify and name the given input sensor devices.	04
4.	Identify the Output Devices	• Types of output devices, • Soft copy output devices, • Hard copy output devices, • Sound output devices, • Examples of various output devices	• List the various types of output devices, • Identify and name the given soft copy output devices, • Identify and name the given hard copy output devices, • Identify and name the given sound output devices,	04
5.	Describe memory and storage devices	• Computer memory, • Types of memory – primary and secondary storage, • Primary memory – RAM, ROM, Cache, • Secondary memory, • Types of secondary storage devices – magnetic, optical, solid state storage devices, • Examples of magnetic storage devices, • Examples of optical storage devices, • Examples of solid state storage devices, • Data access method – sequential, random, • Data storage units.	• Classify the given memory into primary and secondary memory, • Identify and list various types of primary memory, • Identify and name the various types of RAM, • List the types of secondary storage devices, • Identify and name the given storage device and its type, • Classify the given storage devices into sequential and random access devices, • Classify the given storage devices into fixed and portable storage devices.	04
6.	Describe ports and connectors	• Concept of port, • I/O ports – PS/2, USB, Firewire, R J45. • Display ports – VGA, DVI, HDMI, • Multimedia Ports – Audio ports/	• List the various types of ports, • Identify and name the various I/O ports. • Identify and name the various multimedia ports.	03

		jacks, • Connectors, types of connectors, • Multimedia Devices. • Connectivity of multimedia devices in the respective ports. • Connectivity of I/O devices in the respective I/O ports.	• Identify and name the various connectors, • Identify and name the various multimedia devices. • Connect the given I/O device in the respective port. • Connect the given multimedia devices in the respective ports.	
7.	Setup the computer system	• Various components of computer system, • Physical connectivity of various parts of computer system. • Physical connectivity of various peripheral devices. • Booting procedure.	• Make list of different components of computer, • Check that all components of computer system are available, • Identify the various ports, connectors and cables, • Connect the various parts of computer to appropriate port • Connect the peripheral devices to appropriate port, • Check for correct connectivity of computer parts and peripheral devices, • Start the computer system and peripherals in proper manner. • Observe booting process and note the errors if any.	05
			Total Duration in Hours	**30**

Unit 3: Installation of operating System and Software				
Sn	**Learning Outcome**	**Theory (12 Hours)**	**Practical (18 Hours)**	**30 Hrs**
1.	Prepare for installation of Windows 10	• Concept of operating system, • Types of operating system, • Introduction to desktop operating system – Windows, • Installation requirement for Windows 7/10. • BIOS settings.	• Start the computer and check the BIOS settings. • Note the system configuration. • Match the requirement of OS installation with the exiting system configuration. • Set or change boot sequence in BIOS settings as per installation media. • Save the BIOS settings.	05
2.	Install and configure Windows 10 OS.	• HDD partitioning, • Types of file system, • Procedure for installing Windows 7/10, • Windows 7/10 device setting, • Device drivers, • Procedure to install and configure devices in Windows, • Procedure to configure network connectivity in	• Make the partitions in HDD, • Format the HDD with the required file system, • Choose the appropriate partition to install OS, • Follow the installation instructions and provide the necessary data, • Complete installation with all device drivers,	05

		Windows, • Basic troubleshooting in Windows.	• Perform basic troubleshooting in Windows.	
3.	Use various Windows utilities	• The various system utilities and its features. • Installation of anti-virus. • Using anti-virus software for removing virus. • Firewall and its configuration. • System requirement and installation of various software and utilities.	• List out the various system utilities, • Install the anti-virus software, • Run the anti-virus software to detect and remove virus, • Configure firewall. • Install and configure various software and system utilities.	05
4.	Configure and troubleshoot peripheral devices in Windows	• Windows control panel. • Configuration of various peripheral devices, • Testing the working of various peripheral devices, • Various options to change the settings of peripheral devices, • Troubleshooting operating problems of peripheral devices.	• Explore the control panel for configuring the devices and printer. • Configure and test various devices and printers for their operation. • Use various options to change the settings of devices and printer. • Troubleshoot operating problems of devices and printer in Windows.	05
5.	Install and configure Linux OS	• Procedure to install and configure Linux, • Installation of packages, • Procedure to configure devices in Linux, • Procedure to configure wired and wireless network in Linux, • Creating user accounts, • Updating and upgrading Linux, • Troubleshooting Linux.	• Make the partitions in HDD, • Format the HDD with the required file system, • Choose the appropriate partition to install OS, • Follow the installation instructions and provide the necessary data, • Confirm for the complete installation with all device drivers.	10
			Total Duration in Hours	**30**

Unit 4: Computer Hardware Essentials				
Sn	**Learning Outcome**	**Theory (20 Hours)**	**Practical (20 Hours)**	**40 Hrs**
1.	Describe the motherboard and its components	• Introduction to motherboard. • Latest make and models of motherboards. • Components of motherboard. • Processor sockets, memory banks on the motherboard and expansion slots. • Slots and ports on the motherboard. • Motherboard form factors and	• Identify the model and make of given motherboard. • Identify various component on the motherboard. • Identify the processor sockets, memory banks on the motherboard. • Identify various expansion slots and ports on the motherboard. • Identify various connectors	08

		its types. • Various connectors and jumpers on the motherboard. • CMOS (Complementary Metal-Oxide Semiconductor). • Setup parameters and features on motherboard.	and jumpers on motherboard. • Identify the CMOS • Change setup parameters and features on the motherboard.	
2.	Describe CPU	• Introduction to processor, • CPU generations,1 • Characteristics of CPU chips – 32 bits, 64 bits, • Configuration and capability of CPU chips, • Different generations of CPU, • CPU types – Intel and AMD.	• Identify the given CPU, • List the configuration and capability of CPU chips, • List the generations of CPU, • Check the compatibility of CPU with the motherboard, • Identify the CPU socket on the motherboard.	06
3.	Describe CPU Fan	• Overview of CPU fan, • Importance of CPU fan, • Working of CPU fan, • Positioning of CPU fan.	• Identify the CPU Fan or Heat sink and place to plug it, • Demonstrate the working of CPU fan.	02
4.	Describe RAM	• Introduction to Memory. • Types and capacity of RAM, • Memory form factors and slot types. • Characteristics of RAM. • Speed requirements of RAM. • Single, Dual and Triple channel architecture. • Single vs double sided. • RAM installation process.	• Identify the given RAM chip for its configuration, • Check the compatibility with the socket on motherboard, • List the characteristics of the given RAM chip, • Demonstrate to plug the RAM in the socket.	06
5.	Describe Hard Disk Drive	• Introduction of Hard Disk Drive (HDD), • Physical and logical components of HDD, • Types of HDD – SATA and SSD • SCSI interfaces, • HDD speed and characteristics, • External connections types, • Installation process of HDD, • Common symptoms of problem in HDD.	• Identify the given HDD, • Draw a diagram showing the various components of HDD, • Identify the physical and logical components of HDD. • List the specifications of SATA and SSD HDD, • Demonstrate the difference between SATA and SSD HDD, • Demonstrate the installation process of HDD, • Identify and list the common symptoms of problems in HDD. • Draw the connection diagram of HDD.	06
6.	Describe Optical Drive	• Optical drive and devices, • Read only and Read-Write optical drive, • Speed and configuration of optical drive, • Internal and external optical drive, • Installation process of optical	• List the optical drive and devices, • Identify the given optical drive as CD or DVD, • Identify the given optical drive as internal or external, • Identify the given optical drive as Read or Read/Write,	04

		drive.	• Demonstrate the process of installation of optical drive.	
7.	Describe Power Supply (SMPS)	• Overview of Power Supply (SMPS), • Types of SMPS, • Compatibility of SMPS with CPU, • SMPS installation process.	• Power Supply (SMPS), • Identify the power connector port on the motherboard, • Count the pins of connector, • Demonstrate to plug the SMPS connectors into appropriate ports of the motherboard.	04
8.	Connect internal cables and connectors	• Types of internal connector and associated cable.	• Identify various types of internal connector and cable.	04
			Total Duration in Hours	**40**

Unit 5: Computer Assembly and Disassembly				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (20 Hours)**	**30 Hrs**
1.	Arrange tools and prepare for computer assembly	Tools required for installation - • Anti-static wrist strep, • Screwdrivers, • Wire cutters and strippers • Needle-nosed pliers • Utility knife • Small flashlight • Adjustable wrench • Small container to hold screws • Heat sink compound • Grounding Strap	• Identify and list the various tools required for computer assembly and disassembly, • Demonstrate the proper use of tools, • Draw the diagram of various tools, • Draw the connection diagram.	04
2.	Select different components to assemble PC	• Components inside computer, • Power supply, types of Power connectors, Motherboard, Central Processing Unit (ALU, CU, registers), • Primary memory (RAM, ROM, registers, Cache memory), • Secondary memory : HDD, CD/ DVD drives, • Adapter cards, CPU Fan, • Elements attached to motherboard, CPU sockets, RAM sockets, Chipset, Expansion slots, • BIOS chip, CMOS battery, Data connectors (Data buses)	• Identify computer system, components, • Identify computer peripherals , ports and connectors, • Differentiate types and purpose of computer case, • Identify different components inside computer case, • Explore internal environment of the desktop computer, • identify each component, de-attach it and re-attach it,	04
3.	Assemble and disassemble	• Process to install CPU on the motherboard	• Place the motherboard, • Install CPU on the	12

	desktop computer	• Process to install CPU Fan, • Process to install RAM, • Process to fix the motherboard in cabinet, • Process to attach the components to the motherboard, • Process to install add on card on the motherboard, • Process to install Power Supply Unit (PSU) • Process to install the HDD, • Process to install Optical drive, • Process to install adapter cards • Process to connect internal cables to PSU. • Disassembly process of computer	motherboard • Install CPU Fan, • Install RAM, • Fix the motherboard in cabinet, • Attach the components to the motherboard, • Install add on card on the motherboard, • Install Power Supply Unit (PSU) • Install the HDD, • Install Optical drive, • Install adapter cards • Connect all internal cables, • Connect internal cables to PSU • Close the cabinet. • Disassemble the computer in proper sequence.	
4.	Setup and start the computer	• Computer setup procedure, • POST and booting process.	• Establish the external connectivity to setup the PC, • Start the computer and check for proper functionality.	04
5.	Remove and install components in laptop	• Tools used to open Laptop, • Laptop battery removal process, • Accessible components of Laptop – RAM, add on cards.	• Use appropriate tools to open the laptop, • Remove and install the power supply and battery, • Remove and install the accessible components.	06
				30

Unit 6: Maintain Health, Safety and Ethical use of Computer				
Sn	**Learning Outcome**	**Theory (05 Hours)**	**Practical (10 Hours)**	**15 Hrs**
1.	Integrate general computer use and safety procedures at work place	General safety guidelines : • Ergonomics concept and associated health problems, • Common health problems (back pain, eye strain etc) • Correct sitting position • Ergonomic furniture and equipment.	• List the general safety procedures at work place • Identify and list ergonomic issues and health related risk due to improper use of compute, • Find cause and solution of Health related problems.	06
2.	Protect equipment from physical damage	• Fire safety, • Physical damage: Electrostatic discharge(ESD), ESD protection and Recommendations, • Power fluctuation (Blackout, Brownout, Noise) • Power protection devices:	• Identify problems arise in school computer lab which can cause physical damage and provide solutions. • Connect computer and other equipment to power protection devices, • Practice the proper disposal of	06

		Surge Suppressor, Uninterrupted Power Supply (UPS), • Protection of environment : Proper disposal of batteries, CRTs, LCDs monitors, Toner kits, cartridges, Chemical solvents.	batteries, CRTs, LCDs monitors, Toner kits, cartridges, Chemical solvents.	
3.	Identify ethical issues and Software Licensing	• Ethical Issues: Software Licensing, Anti-Piracy, • Form of software license agreement (licensed, freeware, shareware, open source), Individual Privacy.	• List some software identify if they are open source or commercial and belong to which company.	03
			Total Duration in Hours	**15**

CLASS 12

Part A: Employability Skills

S. No.	Units	Duration in Hours
1.	Unit 1: Communication Skills – IV	25
2.	Unit 2: Self-management Skills – IV	25
3.	Unit 3: Basic ICT Skills – IV	25
4.	Unit 4: Entrepreneurial Skills – IV	25
5.	Unit 5: Green Skills – IV	15
	Total	**115**

Unit 1: Communication Skills – IV				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (15 Hours)**	**25 Hrs**
1.	Describe the steps to active listening skills	• Importance of active listening at workplace • Steps to active listening.	• Demonstration of the key aspects of becoming active listener. • Preparing posters of steps for active listening.	10
2.	Demonstrate basic writing skills	• Writing skills to the following: • Sentence • Phrase • Kinds of Sentences • Parts of Sentence • Parts of Speech • Articles • Construction of a Paragraph	• Demonstration and practice of writing sentences and paragraphs on topics related to the subject.	15
			Total Duration in Hours	**25**

Unit 2: Self-management Skills – IV				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (15 Hours)**	**25 Hrs**
1.	Describe the various factors influencing self-motivation	• Finding and listing motives (needs and desires); • Finding sources of motivation and inspiration (music, books, activities); expansive thoughts; living fully in the present moment; dreaming big.	• Group discussion on identifying needs and desire. • Discussion on sources of motivation and inspiration.	10
2.	Describe the basic personality traits, types and disorders	• Describe the meaning of personality. • Describe how personality influence others. • Describe basic personality traits. • Describe common personality disorders- paranoid, antisocial, schizoid, borderline, narcissistic, avoidant, dependent and obsessive.	• Demonstrate the knowledge of different personality types.	15
			Total Duration in Hours	**25**

Unit 3: Basic ICT Skills				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (15 Hours)**	**25 Hrs**
1.	Prepare documentation using Word Processing Application	• Introduction to word processing. • Software packages for word processing. • Opening and exiting the word processor. • Creating a document. • Saving document. • Text editing. • Word wrap and alignment. • Font size, type and face. • Header and Footer. • Auto Correct. • Numbering and Bullet. • Creating Table. • Password protection. • Printing document. • Find and Replace. • Page numbering. • Saving a document in various formats.	• List the features of word processing. • List the software packages for word processing. • Open and exit word processor. • Create a document. • Edit the text. • Wrap and align the text. • Change the font type, size, and face. • Insert Header and Footer. • Use Autocorrect option. • Assign numbering and bullets to list items. • Create Table. • Save the document. • Protect the document with password. • Print the document. • Use Find and Replace. • Give page numbering. • Save the document in various formats.	10
2.	Perform Tabulation using Spreadsheet	• Introduction to spreadsheet application.	• Introduce with the spreadsheet application.	10

	Application	• Various spreadsheet applications. • Creating a new worksheet. • Opening workbook and entering data. • Resizing fonts and styles. • Copying and moving. • Filter and sorting. • Formulas and functions. • Password protection. • Printing a spreadsheet. • Saving a spreadsheet in various formats.	• List the spreadsheet applications. • Create a new worksheet. • Open the workbook and enter text. • Resize fonts and styles. • Copy & move the cell data. • Sort and Filter the data. • Apply elementary formulas and functions. • Protect the spreadsheet with password. • Print a spreadsheet. • Save the spreadsheet in various formats.	
3.	Prepare Presentation using Presentation Application	• Introduction to presentation software . • Software packages for presentation. • Creating a new presentation. • Entering and editing text. • Adding a slide. • Deleting a slide. • Formatting text. • Inserting clipart & images. • Slide layout. • Slide transition and custom animation. • Saving a presentation. • Printing a presentation.	• Explain the features of presentation. • List the software packages for presentation. • Create a new presentation. • Add a slide to presentation. • Delete a slide. • Enter and edit text. • Format text. • Insert clipart & images. • Slide layout. • Save a presentation. • Print a presentation. document.	05
			Total Duration in Hours	**25**

Unit 4: Entrepreneurial Skills – IV				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (15 Hours)**	**25 Hrs**
1.	Identify the general and entrepreneurial behavioral competencies	• Barriers to becoming entrepreneur. • Behavioral and entrepreneurial competencies – adaptability/decisiveness, initiative/perseverance, interpersonal skills, organizational skills, stress management, valuing service and diversity.	• Administering self-rating questionnaire and score responses on each of the competencies. • Collect small story/ anecdote of prominent successful entrepreneurs. • Identify entrepreneurial competencies reflected in each story and connect it to the definition of behavioral competencies. • Preparation of competency profile of students.	10
2.	Demonstrate the	• Entrepreneurial competency	• Games and exercises on	15

	knowledge of self-assessment of behavioral competencies	in particular: self-confidence, initiative, seeing and acting on opportunities, concern for quality, goal setting and risk taking, problem solving and creativity, systematic planning and efficiency, information seeking, persistence, influencing and negotiating, team building.	changing entrepreneurial behavior and development of competencies for enhancing self-confidence, problem solving, goal setting, information seeking, team building and creativity.	
			Total Duration in Hours	**25**

Unit 5: Green Skills – IV				
Sn	**Learning Outcome**	**Theory (05 Hours)**	**Practical (10 Hours)**	**15 Hrs**
1.	Identify the role and importance of green jobs in different sectors	• Role of green jobs in toxin-free homes. • Green organic gardening, public transport and energy conservation, • Green jobs in water conservation. • Green jobs in solar and wind power, waste reduction, reuse and recycling of wastes, • Green jobs in green tourism • Green jobs in building and construction. • Green jobs in appropriate technology. • Role of green jobs in Improving energy and raw materials use • Role of green jobs in limiting greenhouse gas emissions • Role of green jobs minimizing waste and pollution • Role of green jobs in protecting and restoring ecosystems • Role of green jobs in support adaptation to the effects of climate change	• Listing of green jobs and preparation of posters on green job profiles. • Prepare posters on green jobs.	15
			Total Duration in Hours	**15**

Class XII, Part B: Vocational Skills

Sn	Units	Duration in Hours
1.	Unit 1: Computer Network Essentials	35
2.	Unit 2: Installation and configuration of Windows Server	35
3.	Unit 3: Installation and configuration of Linux Server	35
4.	Unit 4: IT Security fundamentals	35
5.	Unit 5: Basics of ITIL v3	20
	Total Duration	**160**

Unit 1: Computer Network Essentials				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (20 Hours)**	**35 Hrs**
1.	Appreciate the network concept and technology	• Concept of networking, • Computer Networking, • OSI Model , • Concept of Protocol, • Protocol: TCP, IP, UDP, FTP, • Network Technologies : peer to peer and Client/ Server, • Inter-network (Internet, Intranet, Extranet), • Data transmission : simplex, half duplex, full duplex.	• Draw a diagram of network and write importance of network in our daily life, • Draw a diagram of OSI model, • Identify the network technology of the given network, • Identify the given network as Internet, Intranet or Extranet, • Draw the diagram of simplex, half duplex and full duplex data flow.	10
2.	Connect and use network devices and peripherals	• Physical components : nodes/ computer/ hosts, Modem, RJ 45 connector and port, NIC, • Installation and configuration of NIC, • Network Devices – Hub, Switch, Gateway, Router, Repeaters, Bridges.	• Identify and name the given network component, • Identify and name the given network devices, • Connect computers/ host to switch/hub, • Assign IP address to host, • Check connectivity using ping and ipconfig command, • Attach network peripherals to the hosts and share files, folders and peripherals	10
3.	Prepare cable and configure network	• Introduction to Ethernet, • Color coding in Ethernet, • Network transmission medium: Guided and, Unguided, • Guided : Coaxial cable, Twisted pair cable (UTP/ STP)	• Check and verify system is in connected to ethernet, • Check color coding in Ethernet • Demonstrate to prepare the given cable for networking,	08

		• Unguided : Radio waves, Wi-Fi, Bluetooth, GSM, • Cable preparation, • Network adapter, • Configuring network adapter.	• Demonstrate to crimp the cable.	
4.	Recognize the network designed structure	• Concept of Internet, • IP addressing : Definition, Type (IPv4, IPv6), Ping, ipconfig command, • Routing, • Types of networking – LAN, MAN, WAN, • Network Topology – Bus, Star, Mesh, Hybrid, Ring, • Advantages and disadvantages of different topology	• Perform installation of LAN and troubleshooting of frequently occurred problems, • Draw the diagram of given network topology, • Identify the network topology from the given graphics.	07
			Total Duration in Hours	**35**

Unit 2: Installation and configuration of Windows Server				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (20 Hours)**	**35 Hrs**
1.	Install Windows Server 2012	• Windows Server 2012 Overview, • Installing Windows Server 2012, • Partitioning, • Post-Installation Configuration of Windows Server 2012.	• Deploying Windows Server 2012, • Install Windows Server 2012, • Create partitioning, • Configuring Windows Server 2012 Server, • Perform post-installation configuration of Windows Server 2012.	08
2.	Manage Windows Server 2012	• Overview of Windows Server 2012 Management, • Management tools available in Windows Server 2012, • Introduction to Windows PowerShell.	• Managing Servers • Using Windows PowerShell to Manage Servers, • Perform basic administrative tasks using Windows PowerShell.	08
3.	Install and configure Active Directory Domain Services	• Overview of AD DS • Overview of Domain Controllers • Installing a Domain Controller, • Structure of AD DS, • Purpose of domain controllers	• Installing a Domain Controller, • Configuring Active Directory Domain Services	08
4.	Manage Active Directory Domain Services Objects	• Managing User Accounts • Managing Groups	• Creating and Configuring User Accounts in AD DS • Managing user accounts through GUI, • Manage group accounts user accounts through GUI.	06

5.	Implementing Group Policy	• Overview of Group Policy • Group Policy Processing • Creating GPOs	• Create and manage Group Policy Objects (GPOs).	05
			Total Duration in Hours	**35**

Unit 2: Installation and configuration of Linux Server				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (20 Hours)**	**35 Hrs**
1.	Install Linux Server	• Linux Server Overview, • Installation process of Linux Server, • Partitioning, • Post-Installation Configuration of Linux Server.	• Install Linux Server, • Create partitioning, • Configuring Linux Server, • Perform post-installation configuration of Linux Server.	10
2.	Manage Linux Server	• Overview of Linux Server Management, • Introduction to Linux terminal, • Concept of superuser, • Linux Server management commands.	• Login as a superuser, • List the common administrative tasks, • List basic commands to manage server, • Use Linux commands for basic administration.	09
3.	Understand the file structure of Linux	• Overview of Linux file structure, • Linux users – superuser, group user and others, • User permissions – read, write, execute, • Common commands for system administration.	• Draw the diagram of Linux file structure, • List the various system directory, • Create user and group, • Change user and group permissions, • Perform the basic system administration using command	08
4.	Install and remove packages for services	• Overview of various services, • Commands for installing packages for various services, • Commands for removing packages for various services, • Updating packages.	• List the various services and its commands, • Install packages for various services, • Remove packages, • Update packages.	08
			Total Duration in Hours	**35**

Unit 4: IT Security fundamentals				
Sn	**Learning Outcome**	**Theory (15 Hours)**	**Practical (20 Hours)**	**35 Hrs**
1.	Appreciate IT Security Concepts	• Concept of security, • IT security, • Data Threats – Virus, malware, DoS attacks, Trojan, worm, phishing attacks, man-in-the-middle,	• List different types of threats in computer system, • List the Characteristics of Phishing mail and websites, • Recognise malicious, accidental threats to data	07

		• Value of Information, • Personal Security, • File Security.	from individuals, service providers, external organisations, • Demonstrate to set the security level – Low, Medium or High.	
2.	Use antivirus software	• Anti-virus, • anti-malware, • Antivirus installation process • Automatic and manual update procedure of antivirus, • Settings of antivirus software.	• List the antivirus software, • Install the antivirus software in the given system, • Scan and eradicate the virus form the disk, • Update the antivirus software automatically and manually, • Check and change settings of antivirus software.	06
3.	Describe vulnerabilities	• Ports, • Services, • Code.	• List the different types of ports, • List the various services running in computer, • Identify the errors and bugs in the code for vulnerability.	05
4.	Describe security procedures	• Security policy, • Physical security, • Securing the network, • Securing devices, • Securing applications, • O/S updates.	• Check security setting in operating system, • Change security setting parameters, • Check auto and manual updates of operating system.	06
5.	Practice to protect data	• File and folder permissions, • Encryption, • Group policy.	• Demonstrate simple encryption and decryption method, • Draw the diagram of cryptography process.	05
6.	Appreciate the use of firewalls	• Firewall, • Types of firewall – software and hardware, • Packet filter, • Stateful, • Application level; • Intrusion detection systems; • Intrusion prevention systems.	• Draw a diagram of firewall, • Demonstrate to restrict sites, • Checking firewall is enabled or disabled in PC, • Name and list intrusion related tools. • Draw the diagram of anti intrusion technique-honey pot.	06
			Total Duration in Hours	**35**

Unit 5: Basics of ITIL v3				
Sn	**Learning Outcome**	**Theory (10 Hours)**	**Practical (10 Hours)**	**20 Hrs**
1.	Appreciate the concept of ITIL	• Concept of ITIL, • Definition of ITIL, • The business perspective of ITIL, • The core structure of ITIL.	• List the business perspective of ITIL, • Draw the core structure of ITIL.	04
2.	Describe the	• Internal and external	• Identify the internal and	06

	concepts of Service	customers, • Internal and external services, • Service management, • IT service management, • Stakeholders in service management.	external customer, • List the internal and external services, • List the benefits of IT service management, • List the stakeholders in service management.	
3.	Describe the structure of the ITIL service lifecycle	• Structure of the ITIL service lifecycle, • Concept of critical success factors (CSF), • Concept of Key performance indicators (KPI), • Concept of Service Level Agreement (SLA), • The Five Core Processes • Service Strategy, • Service Design, • Service Transition, • Service Operation.	• Determine the CSF and KPI for the given problem, • List the components of service strategy, • List the components of service design, • List the components of service transition, • List the components of service operation,	06
4.	Problem management	• Problem management process flow, Determination resolution • Problem management, tracking report and control measures.	• Draw the problem management process flow, • List the significant problems, • Determine the resolution of the given problem.	04
			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 computer assembly and service centre and observe the following: Location, Site, Computer systems and peripheral devices. During the visit, students should obtain the following information from the owner or the supervisor of the nursery:

1. Computer System of various brands.
2. Computer parts and peripherals of various brands.
3. Specifications of various parts of computer system.
4. Comparison of various brands.
5. Types of computers.
6. Types of printers.
7. Types of scanners.
8. External and Internal Hard Disk.
9. Storage capacity of various storage devices.
10. Comparison of various parts based on cost.
11. Tools and equipment required for computer assembly.
12. Cost benefit analysis to purchase computer.
13. Specifications of computer based on the work requirement.
14. Any other information

7. LIST OF EQUIPMENT AND MATERIALS

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

Tools	Equipment	Materials
• Components / Dividers • Oscilloscope • Rulers • T-square • Multi-tester • Pliers • Cutters • Screw drivers • Goggles • Gloves • Protractor • Steel rule • LAN tester • Utility softwares • Anti-static wrist wrap • Masks • Crimping tools • Flashlights • Sharp pointed tweezers • Mirror (inspection) • Soldering gun	• Hubs/switches • CDROMs • Modem/router • Printers • Hubs • Server • Peripherals • Desktop Computers • Laptops • Laser Printers • Ink Jet Printers • Dot Matrix Printers • Scanners • Soldering irons • Multimeters • Cabels • Network switch	• UTP Cat. 5 cables • UTP Cat. 6 cables • RJ 45 modular plug • Learning Manuals • Work Instruction • Hand-outs • Board marker • White board • Schematic diagrams • Charts • Block diagrams • Layout plans • Location Plans • Instrumentation diagrams • Loop diagrams • System Control diagrams • Drawing boards

8. TEACHER'S/TRAINER'S QUALIFICATION

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

S.No.	Qualification	Minimum Competencies	Age Limit
1	Bachelor of Engineering / Technology in Computer Science / Technology **OR** Master of Computer Science **OR** Master of Computer Application **OR** Master of Information Technology **OR** DOEACC B Level Certificate. It is recommended to have additional qualification such as CCNA, CCP or any other diploma in computer hardware maintenance.	The candidate should have a minimum of 1 year of work experience in the same job role. S/He should be able to communicate in English and local language. S/He should have knowledge of equipment, tools, material, Safety, Health & Hygiene.	18-37 years (as on Jan. 01 (year)) Age relaxation to be provided as per Govt. rules

Vocational Teachers/Trainers form the backbone of Vocational Education being imparted as an integral part of Rashtriya Madhyamik Shiksha *Abhiyan* (RMSA). They are directly involved in

teaching of vocational subjects and also serve as a link between the industry and the schools for arranging industry visits, On-the-Job Training (OJT) and placement.

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

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