

G OUTCOME BASED

NAL CURRICULUM

OB ROLE:

Technician – Computing and

Peripherals

ON PACK: Ref. Id. ELE/Q4601)

OR: Electronics

es 11 and 12

LEARNIN

VOCATIO

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Field

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SECT

Class



INSTITUTE OF VOCATIONAL EDUCATION

Bhopal – 462 002, M.P., India

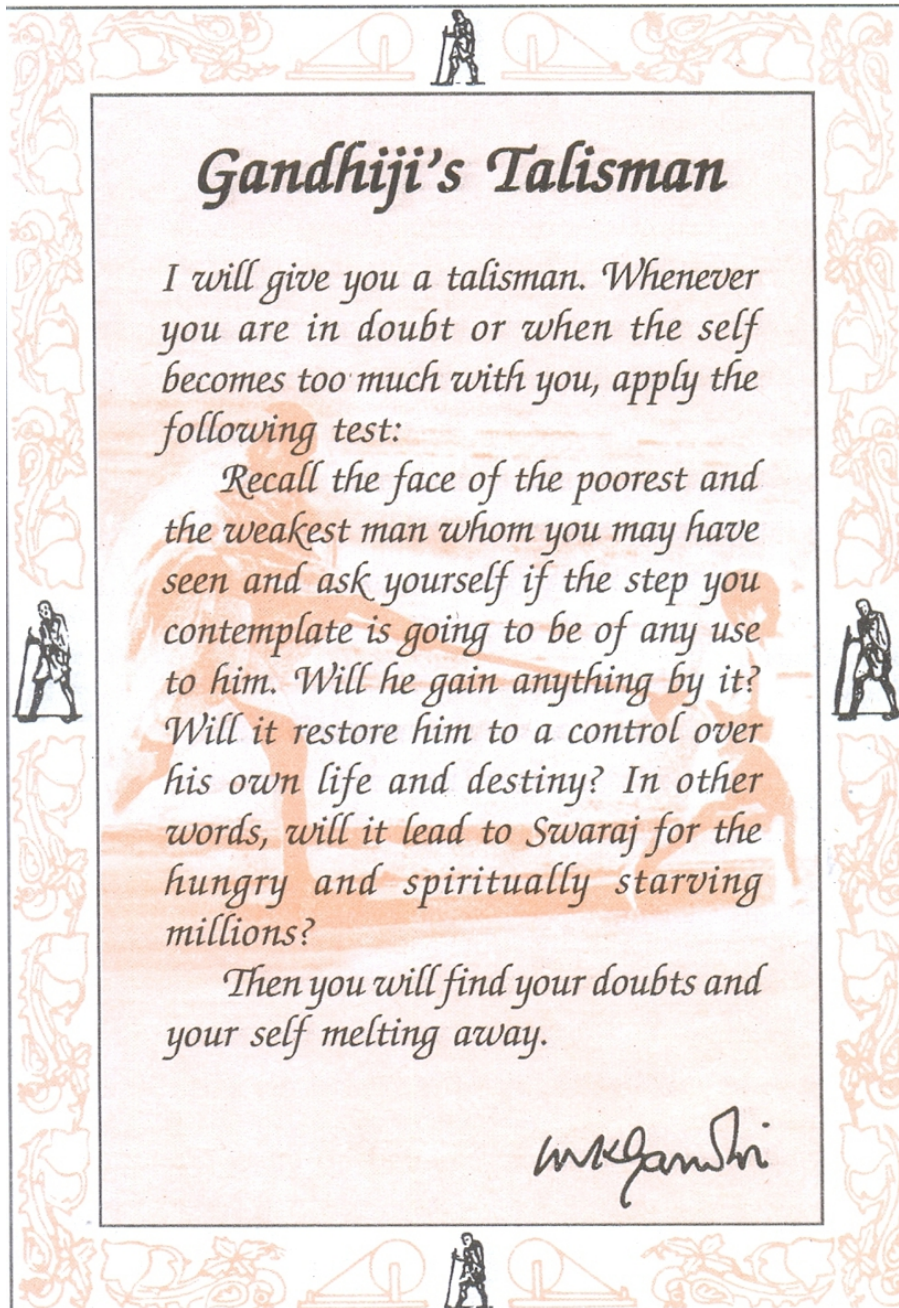
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Gandhiji's Talisman

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

LEARNING OUTCOME BASED

FUNCTIONAL CURRICULUM

JOB ROLE:

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VOCATIONAL

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Field

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SECTOR: Electronics

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Technician Computing and Peripherals

Field

Electronics Sector

June, 2017

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Published by:

Joint Director

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

The PSSCIVE firmly believes that the vocationalisation of education in the nation need to be established on a strong footing of philosophical, cultural and sociological traditions and it should aptly address the needs and aspirations of the students besides meeting the skill demands of the industry. The curriculum, therefore, aims at developing the desired

professional, managerial and communication skills to fulfil the needs of the society and the world of work. In order to honour its commitment to the nation, the PSSSCIVE has initiated the work on developing learning outcome based curricula with the involvement of faculty members and leading experts in respective fields. It is being done through the concerted efforts of leading academicians, professionals, policy makers, partner institutions, Vocational Education and Training experts, industry representatives, and teachers. The expert group through a series of consultations, working group meetings and use of reference materials develops a National Curriculum. Currently, the Institute is working on developing curricula and courseware for over 100 job roles in various sectors.

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

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

The PSSSCIVE, 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 India (ESSCI) for their academic support and cooperation.

We are grateful to the expert contributors Gaurav Kathel and Dipak D. Shudhalwar, Associate Professor (CSE), PSSCIVE, as well as the reviewers, Ravi Kapoor, Associate Professor, Department of Computer Engineering and Applications, National Institute of Technical Teachers Training and Research (NITTTR), Shyamla Hills, Bhopal, for their earnest effort and contributions in the development of this learning outcome based curriculum. Their contributions are duly 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

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1. COURSE OVERVIEW

COURSE TITLE: Field Technician – Computing and Peripherals

Field Technician also called 'Service Technician', the Field provides after sale support services to customers, typically, at their premises. The individual at work is responsible for attending to customer complaints, 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. Installing the system and configuring the peripherals,

and attending to field calls from customer and complaints for system trouble shooting and repairs.

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 the system and configure the peripherals.
- Attend to field calls from customer and complaints for system trouble shooting and repairs.
- Interact with the customer prior to visit.
- Understand customer's requirements on visit or prior to visit.
- Suggest possible solutions.
- 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

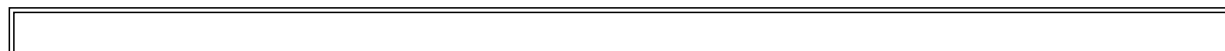
Class 11 :300 hrs

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		
	Communication Skills	25	10
	Self-management Skills	25	
	Basic ICT Skills	25	
	Entrepreneurial Skills	25	
	Green Skills	15	
	Total	115	
Part B	Vocational Skills		
	Unit 1: Computer Fundamentals	60	40
	Unit 2: Installation of Motherboard, CPU, Memory	40	
	Unit 3: Installation of Storage Devices	20	
	Unit 4: Installation of Peripherals and Expansion Cards	20	
	Unit 5: Installation of Video and Display Devices	20	
	Total	160	
Part C	Practical Work		
	Practical Examination	6	15

	Written Test	1	10
	Viva Voice	3	10
	Total	10	35
Part D	Project Work/Field Visit		
	Practical File/ Student Portfolio	10	10
	Viva Voice	5	5
	Total	15	15
	Total	300	

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		
	Communication Skills	25	10
	Self-management Skills	25	
	Basic ICT Skills	25	
	Entrepreneurial Skills	25	
	Green Skills	10	
	Total	115	10

Part B	Vocational Skills		
	Unit 1: Installation and configuration of Desktop Computer	30	40
	Unit 2: Installation and configuration of Laptop Computer	20	
	Unit 3: Installation of Operating System and Software	50	
	Unit 4: Installation and Maintenance of Printer & Scanner	30	
	Unit 5: Diagnosis and troubleshooting of computer system	30	
	Total	160	40
Part C	Practical Work		
	Practical Examination	6	15
	Written Test	1	10
	Viva Voice	3	10
	Total	10	35
Part D	Project Work/Field Visit		
	Practical File/ Student Portfolio	10	10
	Viva Voice	5	5
	Total	15	15
	Total	300	300

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 blueprint for the question paper may be as follows:

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

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

Unit 1: Communication Skills				
S. No.	Learning Outcome	Theory (10 Hours)	Practical (15 Hours)	25 Hrs
1.	Demonstrate knowledge of various methods of communication	<ul style="list-style-type: none"> • Methods of communication • Verbal • Non-verbal • Visual 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Communication styles- assertive, aggressive, passive-aggressive, submissive, etc. 	<ul style="list-style-type: none"> • 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 to the following:	<ul style="list-style-type: none"> • Demonstration and practice of 	15

	writing skills	<ul style="list-style-type: none"> • Sentence • Phrase • Kinds of Sentences • Parts of Sentence • Parts of Speech • Articles • Construction of a Paragraph 	writing sentences and paragraphs on topics related to the subject	
			Total Duration in Hours	25

Unit 2:Self-management Skills				
S. No.	Learning Outcome	Theory (10 Hours)	Practical (15 Hours)	25 Hrs
1.	Demonstrate impressive appearance and grooming	<ul style="list-style-type: none"> • Describe the importance of dressing appropriately, looking decent and positive body language. • Describe the term grooming • Prepare a personal grooming • Describe the term grooming • Prepare a personal grooming checklist • Describe the techniques of self-exploration 	<ul style="list-style-type: none"> • Demonstration of impressive appearance and groomed personality <p>Demonstration of the ability to self-explore</p>	07
2.	Demonstrate team work skills	<ul style="list-style-type: none"> • Describe the important factors that influence team building • Describe factors influencing team 	<ul style="list-style-type: none"> • Group discussion on qualities of a good team • Group discussion on strategies that are adopted for team building and team work 	08

		work		
3.	Apply time management strategies and techniques	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Game on time management • Checklist preparation. • To-do-list preparation. 	10
			Total Duration in Hours	25

Unit 3: Basic ICT Skills				
S. No.	Learning Outcome	Theory (10 Hours)	Practical (15 Hours)	25 Hrs
1.	Describe the role of ICT in day-to-day life	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Basic components of computer 	<ul style="list-style-type: none"> • Identify and name the various 	04

	components of computer system	<p>system.</p> <ul style="list-style-type: none"> • Hardware and software. • Primary and secondary memory. • Input, Output and Storage devices 	<p>components of computer.</p> <ul style="list-style-type: none"> • List few hardware and software • Identify and name the primary and secondary memory. • Identify the various Input, Output and Storage devices 	
3.	Identify various peripheral devices	<ul style="list-style-type: none"> • Various peripheral devices and their use • Examples of peripherals. 	<ul style="list-style-type: none"> • List various peripheral devices. • Give the examples of peripheral • Practice using peripheral devices. 	04
4.	Perform basic computer operations	<ul style="list-style-type: none"> • Procedure for starting and shutting down a computer • Operating Systems (OS). • Types of OS – DOS, Windows, Linux • Desktop of Windows and Linux • Files and folder • Keyboard and mouse operations. • Common desktop operations 	<ul style="list-style-type: none"> • Start the computer in proper sequence and get the initial screen • Identify the installed OS on computer • Identify the desktop and its various components <ul style="list-style-type: none"> • Work with desktop. • Create file and folder • Perform keyboard and mouse operations 	07
5.	Connect with the world using internet and its applications	<ul style="list-style-type: none"> • Introduction to Internet. • Applications of Internet. • Internet Browser. • Websites and webpages. • Email applications. • Email accounts. 	<ul style="list-style-type: none"> • Introduce with Internet. • Explain the applications of Internet • List the various Internet Browser • Search the websites. • Create Email account. • Send and receive email. 	08

		<ul style="list-style-type: none"> • Sending and receiving email • Introduction to social media. • Blog • Twitter • Facebook • Youtube • WhatsApp • Digital India 	<ul style="list-style-type: none"> • Use Social Media for education. • Use Blog • Use Twitter • Use Facebook • Use Youtube • Use WhatsApp • Use Digital India 	
			Total Duration in Hours	25

Unit 4: Entrepreneurial Skills				
S. No.	Learning Outcome Describe the	Theory (10 Hours)	Practical (15 Hours)	25 Hrs
1.	Describe the significance of entrepreneurial values and attitude.	<ul style="list-style-type: none"> • Values in general and entrepreneurial values. Entrepreneurial value orientation with respect to innovativeness, independence, outstanding performance and respect for work	<ul style="list-style-type: none"> • 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 assignment 	10

2.	Demonstrate the knowledge of attitudinal changes required to become an entrepreneur	<ul style="list-style-type: none"> Attitudes in general and entrepreneurial attitudes Using imagination/intuition Tendency to take moderate risk Enjoying freedom of expression Looking for economic opportunities <ul style="list-style-type: none"> Believing that we can change the environment Analyzing situation and planning action Involving in activity 	<ul style="list-style-type: none"> 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 enterprises, etc. 	15
			Total Duration in Hours	25

Unit 5: Green Skills				
S. No.	Learning Outcome	Theory (07 Hours)	Practical (08 Hours)	15 Hrs
1.	Describe importance	<ul style="list-style-type: none"> Main sectors of green 	<ul style="list-style-type: none"> Preparing a poster on any one of the 	08

	of main sector of green economy	economy E-waste management ,green transporatation,renewal energy,green construction, water management. <ul style="list-style-type: none"> • Policy initiatives for greening economy in India 	sectors of green economy. <ul style="list-style-type: none"> • Writing a two-page essay on important initiatives taken in India for promoting green economy 	
2.	Describe the major green Sectors/Areas and the role of various stakeholder in green economy	<ul style="list-style-type: none"> • 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

Part B: Vocational Skills

Unit 1: Communication Skills		
S. No.	Units	Duration in Hours
1.	Unit 1: Computer Fundamentals	60

2.	Unit 2: Installation of Motherboard, CPU, Memory	40
3.	Unit 3: Installation of Storage Devices	20
4	Unit 4: Installation of Peripherals and Expansion Cards	20
5	Unit 5: Installation of Video and Display Devices	20
	Total Duration	160

Unit 1:Computer Fundamentals				
S. No.	Learning Outcome	Theory (30 Hours)	Practical (30 Hours)	60 Hrs
1.	Appreciate the concept of Information Technology (IT) and explore its various application areas	<ul style="list-style-type: none"> • Introduction to IT. • Hardware and software in IT. • IT and Information Technology Enabled. Service (ITeS). • Application areas of IT. 	<ul style="list-style-type: none"> • List out various IT and ITeS services • Collect the information about the various application areas of IT. 	02
2.	Study the brief history and evolution of computer	<ul style="list-style-type: none"> • History of computing device • Technological variations in the generations of computers in hardware and software <ul style="list-style-type: none"> • Classification of computers – As per Purpose, working principle, size and storage capacity. • Specification of various types of computer with justification 	<ul style="list-style-type: none"> • Draw a table comparing the hardware technology of computers with example • Draw a table comparing the programming language with example. • List out the specifications of computer with justification. 	06

3.	Explain the various parts of computer system	<ul style="list-style-type: none"> • Different components of computer system • Features and specifications of different parts of computer system • Uses of different parts of computer system • Different types of cables and connector 	<ul style="list-style-type: none"> • Identify and list different components connectors and cables • List features, types and specifications of different parts. 	02
4.	Explain Input, Output Devices	<ul style="list-style-type: none"> • Introduction to various input, output devices • Features, working of various input and output devices • Computer hardware for assistive technology 	<ul style="list-style-type: none"> • Identify and make a list of various input, output devices • Identify various input, output devices of a given computer system • List the various devices used for assistive technology 	04
5.	Explain the various storage devices.	<ul style="list-style-type: none"> • Common fixed and portable storage devices and their uses. • Optical storage media. • Solid state drive, Memory sticks/Pen drives, Flash memory and data cards. • Backup and its need. • Difference between primary and secondary memory. 	<ul style="list-style-type: none"> • Identify and list the common fixed and portable storage devices and their uses. • Identify and list the optical backing storage media and their uses. • Classify the storage media into sequential and random. 	04
6.	Explain the Motherboards,	<ul style="list-style-type: none"> • Motherboard and its components 	<ul style="list-style-type: none"> • Identify the motherboard and 	06

	Processors and Adapter Cards	<ul style="list-style-type: none"> • Block diagram of CPU. • Various parts and functions of CPU • Latest commonly available processor and their specifications • Adapter cards. 	various components mounted on it <ul style="list-style-type: none"> • Draw block diagram of CPU. • Collect the make, model and specifications of commonly available motherboard and processor from the market 	
7.	Explain the various types of internal memory	<ul style="list-style-type: none"> • Various types of internal memory and their uses • Difference between various internal memory. • How data is stored in computer system 	List various types of internal memory and state their uses Differentiate the various internal memory Draw the data storage diagram.	06
8.	Connect I/O and multimedia devices to the respective ports	<ul style="list-style-type: none"> • I/O Ports. • Multimedia Ports. • Multimedia Devices • Connectivity of multimedia devices in the respective ports. • Connectivity of I/O devices in the respective I/O ports. 	<ul style="list-style-type: none"> • Identify the various I/O ports • Identify the various multimedia ports. • Identify the various multimedia devices. • Connect the given I/O device in the respective port. • Connect the given multimedia devices in the respective ports 	04
9.	Demonstrate the use of	The display device of computer. Quality of display.	List the various display device of computer	06

	Graphic Card in video Display	Graphic Cards and its function. Features/ specification of graphics card	Collect the specifications of various types of graphics card with its quality of display.	
10.	Setup and boot computer system	<ul style="list-style-type: none"> Physical connectivity of various parts of computer system. Connectivity and operation of peripheral devices. Booting procedure. 	<ul style="list-style-type: none"> Verify the physical connectivity of various parts Start the computer system and peripherals in proper manner. Check the working of computer system and peripherals Observe booting process and note the errors if any 	04
11.	Explore system information	<ul style="list-style-type: none"> User name and password. Operating system and application programs Operating system navigation to access system information. Hardware and software configuration On-line help functions. 	<ul style="list-style-type: none"> Enter user name and password. Identify the various and explore various applications installed. List the hardware and software configuration. Use on-line help functions. 	04
12.	Explore the basic operations of Operating System	Concept of operating system. Types of operating system. Desktop applications. Basic desktop operations	<ul style="list-style-type: none"> List various types of operating system Perform the basic operations on the desktop 	04
13.	Upkeep computer	<ul style="list-style-type: none"> Tips to clean the computer parts 	Keep the cabinet. Clean the keyboard and	04

	system and peripherals	<ul style="list-style-type: none"> and peripherals • Tools and materials required to keep the computer parts and peripheral 	mouse Clean the monitor Clean the CD/DVD drive Clean the headphone	
14.	Follow the safety practices while using computer	<ul style="list-style-type: none"> • Various safety issues in computer • Electrical safety. • Equipment and self-grounding. • Electrostatic discharge. • Material safety. • Compliance with regulations • Fire safety. • Tools for safety measures. • Examples with incident. 	List common health and safety issues when using a computer. Recycle printed outputs, printer toner cartridges to maintain the green environment. Use a monitor that consumes less power	04
			Total Duration in Hours	60

Unit 2: Installation of Motherboard, CPU, Memory				
S. No.	Learning Outcome	Theory (20 Hours)	Practical (20 Hours)	25 Hrs
1.	Identify the given component formed on motherboard	Introduction to motherboard. Current make and models of motherboards Components of motherboard. Processor sockets, memory banks on the motherboard and expansion slots.	<ul style="list-style-type: none"> • List the current make and model of motherboards. • Identify various component on the motherboard • Identify the processor sockets, 	12

		<p>Ports on the motherboard. Motherboard form factors and its types Various connectors and jumpers on the motherboard. CMOS (Complementary Metal-Oxide Semiconductor). Setup parameters and features on motherboard.</p>	<p>memory banks on the motherboard.</p> <ul style="list-style-type: none"> Identify various expansion slots and ports on the motherboard. Identify various connectors and jumpers on the motherboard. Identify the CMOS Change setup parameters and features on the motherboard. 	
2.	Perform the given setting on BIOS	<ul style="list-style-type: none"> BIOS and CMOS Accessing BIOS Various BIOS settings – Bootsequence, Visualization support, Clock speed, Security. POST and other diagnostics. 	<ul style="list-style-type: none"> Access BIOS Verify the existing BIOS settings. Set or change BIOS configurations. 	06
3.	Explain the given characteristic of processor (CPU)	<ul style="list-style-type: none"> Introduction to processor. CPU Generations. Characteristics of CPU chips – 32 bits, 64 bits. Configuration and capability of CPU chips Different generations of CPU. CPU socket types – Intel and AMD 	<p>Identify and name the current CPU chips</p> <p>Collect configuration of current CPU chips</p> <p>Collect the pictures and videos of various types of processor and observe the difference in technology</p>	08
4.	Install CPU	<ul style="list-style-type: none"> Installation process of 	<ul style="list-style-type: none"> Watch the video for 	06

		<p>CPU.</p> <ul style="list-style-type: none"> • Voltage, clock multiplier and bus speed 	<p>installation of CPU</p> <ul style="list-style-type: none"> • Install CPU and test it for proper functioning • Use the diagnostic tool. 	
5.	Install and test Memory card	<ul style="list-style-type: none"> • Introduction to Memory. • Types of RAM and ROM. • Memory form factors and slot types • Characteristics of RAM. • Speed requirements of RAM. • Single, Dual and Triple channel architecture. • Single vs double sided. 	<ul style="list-style-type: none"> • Identify the various types of RAM chips • Identify and install the slot to install the RAM chip • Test the RAM for proper functioning • Verify the capability and speed of the RAM on the system 	08
			Total Duration in Hours	40

Unit 3: Installation of Storage Devices				
S. No.	Learning Outcome	Theory (10 Hours)	Practical (10 Hours)	20 Hrs
1.	Classify Hard disk drives based on their working characteristics	<ul style="list-style-type: none"> • Introduction of Hard Disk Drive (HDD) • Physical and logical components of HDD. • HDD speeds and characteristics. • External connections types. • Solid state drives. • Optical disk drives. 	<ul style="list-style-type: none"> • Identify the physical and logical components of HDD • Observe the working of HDD in video clip. • Compare the solid state drives with normal drive 	10

			<ul style="list-style-type: none"> Identify and list other storage media. 	
2.	Install/uninstall storage devices	<ul style="list-style-type: none"> Installation process of optical drive. interfaces – IDE, EIDE, PATA Master and slave configuration SATA and SSD. SATA connectors & cables. SCSI Interfaces Common symptoms of problem in HDD	<ul style="list-style-type: none"> Install optical drive Identify the different disk drive interfaces. Identify SATA data connectors and cables Identify the problems in HDD if any. Disconnect the HDD Re-connect the HDD. 	10
			Total Duration in Hours	20

Unit 4: Installation of Peripherals and Expansion Cards				
S. No.	Learning Outcome	Theory (10 Hours)	Practical (10 Hours)	20 Hrs
1.	Install and configure the given peripheral devices.	<ul style="list-style-type: none"> The various peripheral devices. Device drivers. Connectivity of various peripheral devices with the system. 	Identify and list various peripheral device Connect the peripheral devices like printer and scanner in appropriate port.	10
2.	Identify the given connector type and associated cable.	<ul style="list-style-type: none"> Types of connector and associated cable USB controller. Firewire. Firewire cables and connections 	<ul style="list-style-type: none"> Identify various types of connector and cable Connect the devices to USB port Identify the firewire cables and 	05

			connections.	
3.	Install and configure expansion cards.	<ul style="list-style-type: none"> • Various types of expansion cards and its connectivity • Steps to add expansion card. 	<ul style="list-style-type: none"> • Identify the various types of expansion/ add on cards. • Fix the add on card in slot. • Install/configure relevant driver for the add on card 	05
			Total Duration in Hours	20

Unit 5: Installation of Video and Display Devices				
S. No.	Learning Outcome	Theory (10 Hours)	Practical (10 Hours)	20 Hrs
1.	Explain characteristics and features of display devices	<ul style="list-style-type: none"> • Different types of display devices – CRT, LCD, LED, Plasma, Projector, OLED. • Common resolution of various display • Configuration of resolution. 	Identify the different display devices Identify the resolution of various display Configure the resolution in windows	10
2.	Identify video connector types and associated cables	<ul style="list-style-type: none"> • Various types of connectors and cables. • Interface • VGA, DVI, HDMI • Adapters • Other connections. • Display ports. • Video cards and drivers 	<ul style="list-style-type: none"> • Identify various types of connectors and cables. • Identify the port • Connect the devices in the appropriate port • Verify the connectivity and make the connected device functional 	05
3.	Troubleshoot	Basic troubleshooting	<ul style="list-style-type: none"> • Rectify the common 	05

	common video and display issues	VGA mode, No image on screen, Dim/ Flickering image Discoloration, Overheat shutdown, Dead pixels Artifacts and distorted images, Color patterns.	display issues • Rectify the problem in display. • Correct the problem in display.	
			Total Duration in Hours	20

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				
S. No.	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	<ul style="list-style-type: none"> 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	Demonstration and practice of writing sentences and paragraphs on topics related to the subject	15

		Sentences Parts of Sentence Parts of Speech Articles Construction of a Paragraph	
			Total Duration in Hours
			25

Unit 2: Self-management Skills – IV				
S. No.	Learning Outcome	Theory	Practical	25 Hrs
1.	Describe the various factors influencing self-motivation	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Group discussion on identifying needs and desire. Discussion on sources of motivation and inspiration 	10
2.	Describe the basic personality traits, types and disorders	<ul style="list-style-type: none"> 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				
S. No.	Learning Outcome	Theory	Practical	25 Hrs
1.	Prepare documentation using Word Processing Application	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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	Introduction to spreadsheet application	Introduce with the spreadsheet application	10

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

Unit 4: Entrepreneurial Skills – IV				
S. No.	Learning Outcome	Theory (10 Hours)	Practical (15 Hours)	25 Hrs

1.	Identify the general and entrepreneurial behavioral competencies	<ul style="list-style-type: none"> Barriers to becoming entrepreneur. Behavioral and entrepreneurial competencies – adaptability/decisiveness, initiative/perseverance, interpersonal skills, organizational skills, stress management, valuing service and diversity. 	<ul style="list-style-type: none"> 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 knowledge of self-assessment of behavioral competencies	Entrepreneurial competency 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.	Games and exercises on changing entrepreneurial behavior and development of competencies for enhancing self-confidence, problem solving, goal setting, information seeking, team building and creativity.	15
			Total Duration in Hours	25

Unit 5: Green Skills – IV				
S. No.	Learning Outcome	Theory (05 Hours)	Practical (10 Hours)	15 Hrs
1.	Identify the	<ul style="list-style-type: none"> Role of green jobs in toxin- 	<ul style="list-style-type: none"> Listing of green jobs 	15

	role and importance of green jobs in different sectors	<p>free homes</p> <ul style="list-style-type: none"> • Green organic gardening, public <p>transport and energy conservation</p> <ul style="list-style-type: none"> • Green jobs in water conservation. • Green jobs in solar and wind <p>power, waste reduction, reuse and recycling of wastes</p> <ul style="list-style-type: none"> • Green jobs in green tourism • Green jobs in building and construction • Green jobs in appropriate technology • Role of green jobd 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 <p>adaptation to the effects of climate change</p>	<p>andpreparation of posters on green job profiles</p> <ul style="list-style-type: none"> • Prepare posters on green jobs. 	
			Total Duration in Hours	15

Part B: Vocational Skills

S. No.	Units	Duration in Hours
1.	Unit 1: Installation and configuration of Desktop Computer	30
2.	Unit 2: Installation and configuration of Laptop Computer	20

3.	Unit 3: Installation of Operating System and Software	50
4.	Unit 4: Installation and Maintenance of Printer and Scanner	30
5.	Unit 5: Diagnosis and troubleshooting of computer system	30
Total Duration		160

Unit 1: Installation and configuration of Desktop Computer				
S. No.	Learning Outcome	Theory (10 Hours)	Practical (20 Hours)	30 Hrs
1.	Add and remove field-replaceable modules for desktop.	<ul style="list-style-type: none"> Field-replaceable modules in desktop Procedures to add and remove modules in the desktop 	<ul style="list-style-type: none"> Identify the various modules of desktop and the place of installation Apply the established procedure to add and remove the modules 	06
2.	Install and configure devices	Typical IRQs, DMAs, and I/O addresses and settings	Identify typical IRQs, DMAs, and I/O addresses. Alter the settings when installing and configuring devices.	08
3.	Install and configure common IDE devices	Establish procedure to install and configure common IDE devices.	Follow established practices to install and configure common IDE devices	04
4.	Install, configure and upgrade system components	<ul style="list-style-type: none"> System components. Installation of system components. Configuration of system components Up-gradation of system components 	<ul style="list-style-type: none"> Identify and name the system components Install system components. Configure the system components Up-grade the system components 	10

			Total Duration in Hours	30
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Unit 2: Installation and configuration of Laptop Computer				
S. No.	Learning Outcome	Theory (20 Hours)	Practical (30 Hours)	50 Hrs
1.	Prepare for installation of Windows 10	<ul style="list-style-type: none"> • System configuration – processor, RAM, HDD. • Introduction to desktop operating system-Windows • BIOS settings. • Installation media • Installation manual. • License agreement. • Installation key. • HDD Partitioning. • Types of file system • Device drivers – VGA, Sound. 	<ul style="list-style-type: none"> • 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. 	04
2.	Install and configure Windows 10 OS	<p>Procedure for installing Windows 10</p> <p>Windows 10 device setting</p> <p>Procedure to configure devices in windows 10</p> <p>Procedure to configure networkconnectivity in Windows 10.</p> <p>Procedure to connect wired and wireless network in Windows 10</p>	<p>Insert the media for installation</p> <p>Read and interpret the license agreement.</p> <p>Make the partitions in HDD</p> <p>Format the HDD with the required file system</p> <p>Choose the appropriate partition to install OS</p> <p>Follow the installation instructionsand provide the necessary data</p>	08

			Confirm for the complete installation with all device drivers.	
3.	Managing files in Windows	<ul style="list-style-type: none"> • Windows basics. • File explorer. • Working with files & folders. • Windows 10 Apps 	<ul style="list-style-type: none"> • Manage files and folders in Windows 10. • Copy, move, share files and folders in Windows 10. 	08
4.	Use various Windows utilities	<ul style="list-style-type: none"> • The various system utilities and its features • Installing and using system utilities • Installation of anti-virus. • Using anti-virus software for removing virus • Firewall and its configuration • System requirement and installation of various software and utilities 	<ul style="list-style-type: none"> • List out the various system utilities. • Install and use 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. 	08
5.	Configure and troubleshoot devices and Printers in windows	<ul style="list-style-type: none"> • Windows control panel. • Configuration of various devices and printers • Testing the working of various devices and printer. • Various options to change the settings of devices and printer. • Troubleshooting operating problems 	<ul style="list-style-type: none"> • 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. 	08

		of devices and printer in windows	<ul style="list-style-type: none"> • Troubleshoot operating problems of devices and printer in Windows. 	
6.	Install and configure Linux OS	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Insert media for installation. • 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 	08
7.	Install anti-virus and	<ul style="list-style-type: none"> • Anti-virus packages – latest 	List out the latest anti-virus	06

	software packages	version with features <ul style="list-style-type: none"> • Installation process. • How to run anti-virus software for detection and removal of viruses 	packages with its version and features Read the installation instructions. Install the anti virus software. Run the anti-virus software to detect and remove virus.	
			Total Duration in Hours	50

Unit 4: Installation, Maintenance & Repair of Printer, Scanner				
S. No.	Learning Outcome	Theory (10 Hours)	Practical (20 Hours)	30 Hrs
1.	Identify the fundamental working principles of printers and scanners	<ul style="list-style-type: none"> • Basics of printer and scanner. • Terminology in printing and scanning • Fundamental principle of printer and scanner 	<ul style="list-style-type: none"> • List the printing terminology • Identify the fundamental principle of printing and scanning 	04
2.	Describe printing and scanning technologies.	Printing and scanning technology. working of printers working of scanner Types of printers Types of scanner	Observe the printing process and working for different printers. Observe the scanning process and working of different scanner	04
3.	Establish the proper connectivity of printer and	<ul style="list-style-type: none"> • Printer and scanner components. • Interfaces. • Connectors 	Identify the components of printer and scanner Identify interfaces and	06

	scanner	<ul style="list-style-type: none"> • Consumables and accessories 	connectors for printer and scanner. Connect printer and scanner to computer Identify the consumables and accessories for printing.	
4.	Install, configure, optimize, and upgrade printers and scanners	<ul style="list-style-type: none"> • Requirement for installation. • Installation process and commands under Windows and Linux • Adding network printer. 	<ul style="list-style-type: none"> • Observe the requirement for printer installation. • Install the printer by following the instruction • Add network printer. 	08
5.	Troubleshoot problems with printers and scanner	Common problem in printer functioning. Diagnostic procedures, and troubleshooting techniques for printers and scanners.	Observe the functioning of the printer Notice the problem in printer functioning Resolve the problem for proper functioning	08
			Total Duration in Hours	30

Unit 4: Installation, Maintenance & Repair of Printer, Scanner				
S. No.	Learning Outcome	Theory (10 Hours)	Practical (20 Hours)	30 Hrs
1.	Identify the fundamental working principles of printers and scanners	<ul style="list-style-type: none"> • Basics of printer and scanner Terminology in printing and scanning • Fundamental principle of printer and scanner 	<ul style="list-style-type: none"> • List the printing terminology. • Identify the fundamental principle of printing and scanning 	04

2.	Describe printing and scanning technologies.	<ul style="list-style-type: none"> • Printing and scanning technology. • Working of printer. • Working of scanner. • Types of printers. • Types of scanners. 	<ul style="list-style-type: none"> • Observe the printing process and working for different printers • Observe the scanning process and working of different scanner. 	04
3.	Establish the proper connectivity of printer and scanner	<ul style="list-style-type: none"> • Printer and scanner components. • Interfaces • Connectors. • Consumables and accessories 	Identify the components of printer and scanner Identify interfaces and connectors for printer and scanner. Connect printer and scanner to computer Identify the consumables and accessories for printing.	06
4.	Install, configure, optimize, and upgrade printers and scanners.	Requirement for installation. Installation process and commands under Windows and Linux Adding network printer.	Observe the requirement for printer. Notice the problem in printer functioning Resolve the problem for proper functioning	08
5.	Troubleshoot problems with printers and scanners.	Common problem in printer functioning Diagnostic procedures, and troubleshooting techniques for printers and scanners	Observe the functioning of the printer Notice the problem in printer functioning Resolve the problem for proper functioning	08
			Total Duration in Hours	30

Unit 5: Diagnosis and troubleshooting computer system

S. No.	Learning Outcome	Theory (10 Hours)	Practical (20 Hours)	30 Hrs
1.	Describe the basic troubleshooting procedures and tools	<ul style="list-style-type: none"> • Basic troubleshooting procedures and tools 	Read basic troubleshooting procedures and tools.	06
2.	Understand the customer's problem.	<ul style="list-style-type: none"> • Techniques for eliciting information and problem symptoms from customers • Analyzing the customer environment. 	Practice techniques for eliciting information and problem symptoms from customers. Analyze the customer environment	06
3.	Identify common problems and symptoms of system	<ul style="list-style-type: none"> • Common problems associated with individual system components and their symptoms. 	<ul style="list-style-type: none"> • Identify common problems associated with individual system components and their symptoms 	06
4.	Use tools and techniques for troubleshooting	<ul style="list-style-type: none"> • Tools, techniques and diagnostic procedures for isolating and troubleshooting problems • Performing corrective measures and component replacement. 	<ul style="list-style-type: none"> • Using tools, diagnostic procedures and techniques for isolating and troubleshooting problems. • Perform corrective measures and replace component. 	06
5.	Test and validate the	<ul style="list-style-type: none"> • Service tests. • Benchmarks 	Perform service tests, benchmarks and validation	06

	device/equipment	• Validation procedures.	procedures	
			Total Duration in Hours	30

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
<ul style="list-style-type: none"> • Components / Dividers • Oscilloscope • Rulers 	<ul style="list-style-type: none"> • Hubs/switches • CDROMS • Modem/router 	<ul style="list-style-type: none"> • UTP Cat. 5 cables • UTP Cat.3 cables • RJ 45 modular plug

- T-square
- Multi-tester
- Pliers
- Clutters
- Screw drivers
- Goggles
- Gloves
- Protractor
- Steel rule
- LAN tester
- Utility Softwares
- Anti-static wrist wrap
- Masks
- Crimping tools
- Flashlights
- Sharp pointed tweezers
- Mirrors(inspection)
- Soldering gun

- Printers
- Hubs
- Server
- Peripherals
- Desktop Computer

- 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	<p>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</p> <p>It is recommended to have additional qualification such as CCNA, CCP or any other diploma in computer hardware maintenance</p>	<p>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.</p>	<p>18-37 years (as on Jan. 01 (year))</p> <p>Age relaxation to be provided as per Govt. rule</p>

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

Skil 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
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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 annual y. Performance based appraisal in relation to certain pre-established criteria and objectives should be done periodical y to ensure the quality of the Vocational Teachers/Trainers. Fol owing parameters may be considered during the appraisal process:

- Participation in guidance and counsel ing 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 skil s related to the vocational pedagogy, communication skil s 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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