

# **LEARNING OUTCOME BASED VOCATIONAL CURRICULUM**

**Job Role: Optical Fiber Splicer**

**(QUALIFICATION PACK: Ref. Id. TEL/Q6400)**

**SECTOR: Telecom System**

**Classes 9 and 10**

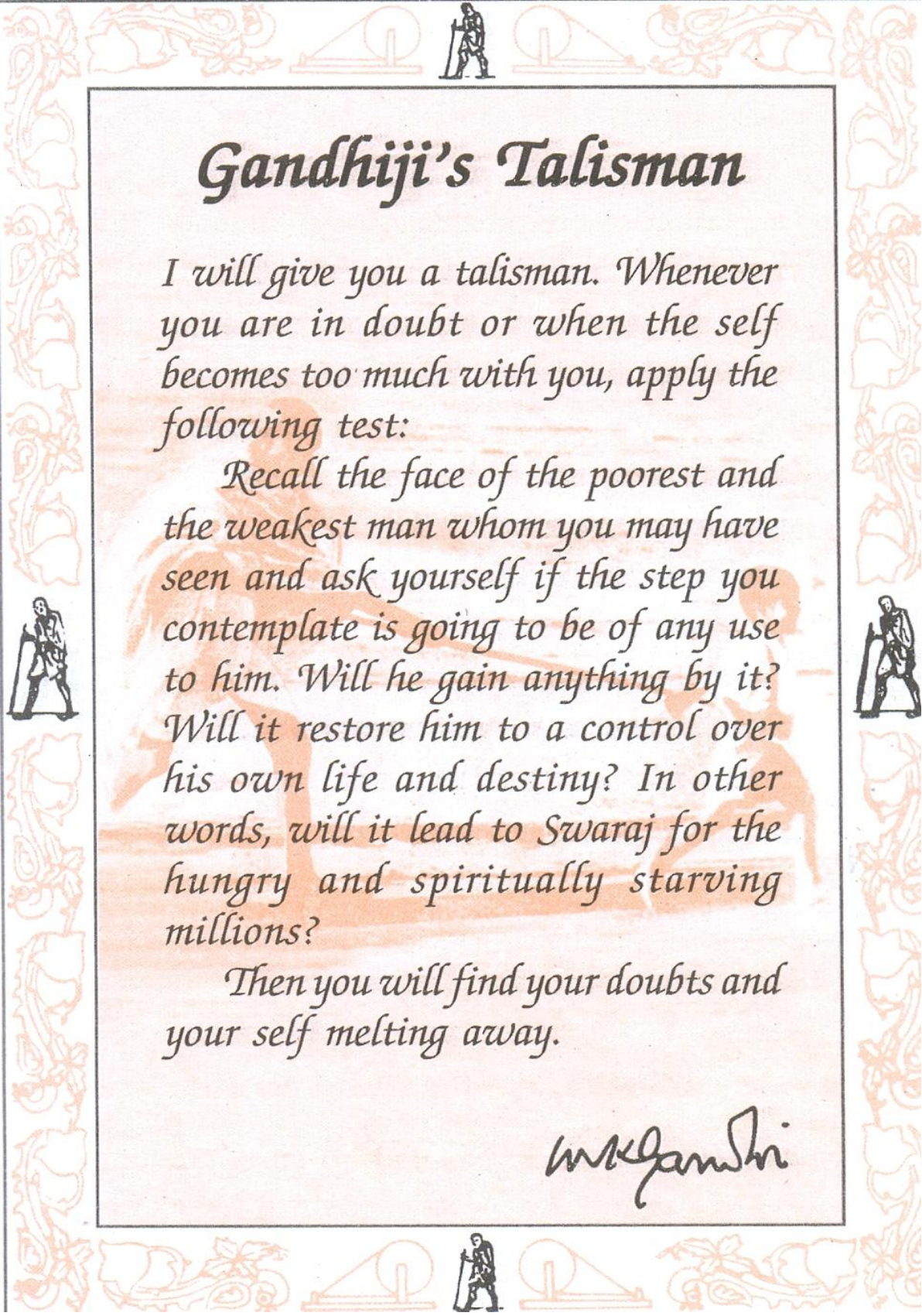


**PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION**

**(a constituent unit of NCERT, under MHRD, Government of India)**

**Shyamla Hills, Bhopal- 462 013, M.P., India**

**<http://www.psscive.ac.in>**



## Gandhiji's Talisman

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

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

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

*M.K. Gandhi*

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CURRICULUM**

**Telecom – Optical fiber Splicer**

**June, 2017**

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# FOREWORD

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**T**he Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE) a constituent of the National Council of Educational Research and Training (NCERT) is spearheading the efforts of developing learning outcome based curricula and courseware aimed at integrating both vocational and general qualifications to open pathways of career progression for students. It is a part of Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education (CSSVSHSE) launched by the Ministry of Human Resource Development, Government of India in 2012. The PSS Central Institute of Vocational Education (PSSCIVE) is developing curricula under the project approved by the Project Approval Board (PAB) of *Rashtriya Madhyamik Shiksha Abhiyan (RMSA)*. The main purpose of the learning outcome based curricula is to bring about the improvement in teaching-learning process and working competences through learning outcomes embedded in the vocational subject.

It is a matter of great pleasure to introduce this learning outcome based curriculum as part of the vocational training packages for the job role of **Optical fiber splicer** Worker. The curriculum has been developed for the secondary students of vocational education and is aligned to the National Occupation Standards (NOSs) of a job role identified and approved under the National Skill Qualification Framework (NSQF).

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

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

Hrushikesh Senapaty  
*Director*  
*National Council of Education Research and Training*

# PREFACE

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

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

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

We extend our gratitude to all the contributors for selflessly sharing their precious knowledge, acclaimed expertise, and valuable time and positively responding to our request for development of curriculum. We are grateful to MHRD and NCERT for the financial support and cooperation in realising the objective of providing learning outcome based 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 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 21<sup>st</sup> Century.

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

## ACKNOWLEDGEMENTS

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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 Telecom Sector Skill Council (TSSC) for their academic support and cooperation in the development of curricula.

We are grateful to the expert contributors Shashank Pancholi, Consultant in Telecom, PSSCIVE, NCERT, Bhopal Dipak D. Shudhalwar, Associate Professor (CSE), and Saurabh Prakash, Head, Engineering and Technology Department, PSSCIVE for their earnest effort and contributions in the development of this learning outcome based curriculum. Their contributions are dully acknowledged.

The contributions made by Vinay Swarup Mehrotra, Professor and Head, Curriculum Development and Evaluation Centre (CDEC), Vipin Kumar Jain, Associate Professor and Head, Programme Planning and Monitoring Cell (PPMC) and Dipak D. Shudhalwar, Associate Professor (CSE) and Head Computer Center, 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

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## **COURSE TITLE: Telecom – Splicer Technician**

**A** Optical fibre splicer is responsible for ensuring efficient splicing of the optical fibre cables and supports in optical fibre installation and in carrying out fibre testing using OTDR and power meter.

This job requires the individual to work in field set-up and be able to handle pressure situations. He should have basic written and oral communication skills and should be able to apply practical judgement to successfully perform the assigned responsibilities.

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

- Communicate effectively with the customers;
- Acquaint self with facets of trenching, laying, jointing and blowing of interpret test reports, as made route diagrams and other numerical data
- create and maintain effective working relationships and team environment
- Take initiatives and progressively assume increased responsibilities
- Share knowledge with other team members and colleagues
- utilize appropriate optical equipment's like cleaver, mechanical and fusion splicing kit, protection sleeves, fiber stripper, fiber reinforced plaster during splicing and jointing
- Operate optical test equipment's like OTDR and power meter
- undertake GPS based route survey to capture appropriate site details
- Utilize appropriate fiber like single mode and multi-mode optical fibre based on specific requirements
- lay duct using specially designed dispensers
- Carry out splicing in a manner ensuring minimum reflectance loss, optical return loss, insertion loss
- Perform optical link testing as per standard process
- Utilize appropriate optical test equipment's like OTDR, power meter based on test requirements
- Perform OFC tests for quality check or Acceptance testing
- Prepare test reports in the specified formats
- Rectify deviations in the test reports by reperforming the splicing/ testing operations
- Perform OTDR test as per standard process and summarize OTDR reports for records and review.
- Perform Power meter tests as per standard process and identify instances of cross-fibres
- Appropriately mark/ tag cables to identify direction and route
- Utilize suitable OFC connectors are used based on the termination equipment
- cables by: authenticating and confirming cable drum is placed near site,
- Aggregate potential knowledge and skill to vouchsafe the importance
- Of health and safety by: safeguard compliance of safety regulations, personal protection and environmental conditions.
- Comprehend and initiate the importance of report and record by:
- Ensuring cable id, cable markings, drum numbers, OTDR findings, are
- identify appropriate cables for splicing based on sequence or color coding to
- avoid occurrence of instances of cross fibers

- Interpret As made documents and perform update based on actual cable routes, joints
- Interpret OTDR and power meter test results to identify and localize faults and/or measure optical losses
- Interpret optical link testing results to ensure link margins Documented for future reference.
- Work as Optical Fiber Splicing Technician
- Work as Optical fiber Laying Technician.
- Work as OTDR Technician.
- Use techniques to provide services based on customer's needs and wants;
- Administer first aid to a casualty with small cuts, grazes, bruises, external bleeding, minor burns and scalds

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

**COURSE LEVEL:** This is a beginner level course. On completion of this course, a student can take up an Intermediate level course for a job role in Horticulture in Class XI and XII.

**COURSE DURATION:** **400 hrs.**

Class 9 : 200 hrs.

Class 10 : 200 hrs.

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**Total : 400 hrs.**

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## 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 9 and 10 opting for vocational subject along with general education subjects.

The unit-wise distribution of hours and marks for Class 9 is as follows:

CLASS 9			
	Units	No. of Hours for Theory and Practical 200	Max. Marks for Theory and Practical 100
<b>Part A</b>	<b>Employability Skills</b>		
	Unit 1: Communication Skills – I	20	<b>10</b>
	Unit 2: Self-management Skills – I	10	
	Unit 3: Information and Communication Technology Skills – I	20	
	Unit 4: Entrepreneurial Skills – I	15	
	Unit 5: Green Skills – I	10	
	<b>Total</b>	<b>75</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
	Unit 1: Basic Survey of route for OFC and guidelines for Installations(OFC)	30	

	Unit 2: Basics of Fiber optic technology	25	30
	Unit 3: Transmitters and Receivers	25	
	Unit 4: Cabling system components	20	
	<b>Total</b>	<b>100</b>	<b>30</b>
<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>
<b>Part D</b>	<b>Project Work/Field Visit</b>		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	<b>Total</b>	<b>15</b>	<b>15</b>
<b>Part E</b>	<b>Continuous and Comprehensive Evaluation (CCE)</b>		
	<b>Total</b>	<b>05</b>	<b>10</b>
	<b>Grand Total</b>	<b>200</b>	<b>100</b>

The unit-wise distribution of hours and marks for Class 10 is as follows:

<b>CLASS 10</b>			
	<b>Units</b>	<b>No. of Hours for Theory and Practical 200</b>	<b>Max. Marks for Theory and Practical 100</b>
<b>Part A</b>	<b>Employability Skills</b>		
	Unit 1: Communication Skills – II	20	10
	Unit 2: Self-management Skills – II	10	
	Unit 3: Information and Communication Technology Skills – II	20	
	Unit 4: Entrepreneurial Skills – II	15	
	Unit 5: Green Skills – II	10	
	<b>Total</b>	<b>75</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
	Unit 1: Splicing of optical fiber	25	30
	Unit 2: Connectors	20	
	Unit 3: Cable Laying (OFC)	15	
	Unit 4: TEST Equipment and Link/Cable Testing (OFC)	20	
	Unit 5: Safety and Precautions	20	
	<b>Total</b>	<b>100</b>	<b>30</b>
<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>

<b>Part D</b>	<b>Project Work/Field Visit</b>		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	<b>Total</b>	<b>15</b>	<b>15</b>
<b>Part E</b>	<b>Continuous and Comprehensive Evaluation (CCE)</b>		
	<b>Total</b>	<b>05</b>	<b>10</b>
	<b>Grand Total</b>	<b>200</b>	<b>100</b>

### 3. TEACHING/TRAINING ACTIVITIES

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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, subject experts from university/colleges or industry. The respective Sector Skill Council should be consulted by the Central/State Board for preparing the panel of experts for question paper setting and conducting the examinations.

The blue print for the question paper may be as follows:

**Duration: 3 hrs**

**Max. Mark: 30**

S.No.	Typology of Question	No. of Questions			Marks
		Very Short Answer (1 mark)	Short Answer (2 Marks)	Long Answer (3 Marks)	
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	2	1	2	10

2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	1	2	2	11
3.	Application – (Use abstract information in concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, provide an example, or solve a problem)	0	1	1	05
4.	High Order Thinking Skills – (Analysis & Synthesis – Classify, compare, contrast, or differentiate between different pieces of information; Organize and/ or integrate unique pieces of information from a variety of sources)	0	1	0	02
5.	Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	0	1	0	02
	<b>Total</b>	<b>3x1=3</b>	<b>6x2=12</b>	<b>5x3=15</b>	<b>30 (14 questions)</b>

### 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 9

#### Part A: Employability Skills

S.No.	Units	Duration (Hrs)
1.	Communication Skills - I	20
2.	Self-management Skills - I	10
3.	Information and Communication Technology Skills-I	20
4.	Entrepreneurial Skills - I	15
5.	Green Skills - I	10
	<b>Total</b>	<b>75</b>



<b>Unit 1: Communication Skills - I</b>			
<b>Learning Outcome</b>	<b>Theory (08 hrs)</b>	<b>Practical (12 hrs)</b>	<b>Duration (20 Hrs)</b>
1. Demonstrate knowledge of various methods of communication	1. Methods of communication - Verbal - Non-verbal - Visual	1. Writing pros and cons of written, verbal and non-verbal communication 2. Listing do's and don'ts for avoiding common body language mistakes	05
2. Identify elements of communication cycle	1. Meaning of communication 2. Importance of communication skills 3. Elements of communication cycle– (i) sender, (ii) ideas, (iii) encoding, (iv) communication channel, (v) receiver, (vi) decoding, and (vii) feedback	1. Draw a diagram of communication cycle 2. Role plays on communication process related to the sector/job role	05
3. Identify the factors affecting our perspectives in communication	1. Perspectives in communication 2. Factors affecting perspectives in communication - Visual perception - Language - Past experience - Prejudices - Feelings - Environment	1. Group discussion on factors affecting perspectives in communication 2. Sharing of experiences on factors affecting perspectives 3. Sharing experiences on factors affecting communication at workplace	05
4. Demonstrate the knowledge of basic writing skills	1. Writing skills related to the following: • Phrases • Kinds of sentences • Parts of sentence • Parts of speech • Use of articles	1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject	05

	<ul style="list-style-type: none"> <li>• Construction of a paragraph</li> </ul>		
Total			20

<b>Unit 2: Self-management Skills – I</b>			
<b>Learning Outcome</b>	<b>Theory (07 hrs)</b>	<b>Practical (03 hrs)</b>	<b>Duration (10 Hrs)</b>
1. Describe the meaning and importance of self-management	<ol style="list-style-type: none"> <li>1. Meaning of self-management</li> <li>2. Positive results of self-management</li> <li>3. Self-management skills</li> </ol>	<ol style="list-style-type: none"> <li>1. Identification of self-management skills</li> <li>2. Strength and weakness analysis</li> </ol>	05
2. Identify the factors that helps in building self-confidence	<ol style="list-style-type: none"> <li>1. Factors that help in building self-confidence – social, cultural, and physical factors</li> <li>2. Self-confidence building tips – getting rid of the negative thoughts, thinking positively, staying happy with small things, staying clean, hygienic and smart, chatting with positive people, etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Role play exercises on building self-confidence</li> <li>2. Use of positive metaphors/ words</li> <li>3. Positive stroking on wakeup and before going bed</li> <li>4. Helping others and working for community</li> </ol>	05
Total			10

<b>Unit 3: Information and Communication Technology Skills – I</b>			
<b>Learning Outcome</b>	<b>Theory (06 hrs)</b>	<b>Practical (14 hrs)</b>	<b>Duration (20 Hrs)</b>
1. Describe the role of Information and Communication Technology (ICT) in day-to-day life and workplace	<ol style="list-style-type: none"> <li>1. Introduction to ICT</li> <li>2. Role and importance of ICT in personal life and at workplace</li> <li>3. ICT in our daily life (examples)</li> <li>4. ICT tools - Mobile, tab, radio, TV, email, etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discussion on the role and importance of ICT in personal life and at workplace.</li> <li>2. Preparing posters / collages for showing the role of ICT at workplace</li> </ol>	04
2. Identify components of basic computer system and their functions	<ol style="list-style-type: none"> <li>1. Computer system - Central Processing Unit (CPU), memory, motherboard, storage devices</li> </ol>	<ol style="list-style-type: none"> <li>1. Connecting the cables and peripherals to the Central Processing Unit</li> </ol>	

	<ol style="list-style-type: none"> <li>2. Hardware and software of a computer system</li> <li>3. Role and functions of Random Access Memory(RAM) and Read Only Memory(ROM)</li> <li>4. Role and functions of Central Processing Unit</li> <li>5. Procedure for starting and shutting down a computer</li> </ol>	<ol style="list-style-type: none"> <li>2. Starting and shutting down a computer</li> <li>3. Group discussion on the various aspects of hardware and software</li> </ol>	07
3. Demonstrate use of various components and peripherals of computer system	<ol style="list-style-type: none"> <li>1. Peripherals devices and their uses – mouse, keyboard, scanner, webcam, etc. of a computer system</li> </ol>	<ol style="list-style-type: none"> <li>1. Identification of various parts and peripherals of a computer</li> <li>2. Demonstration and practice on the use of mouse</li> <li>3. Demonstration and practice on the use of keyboard</li> <li>4. Demonstration of the uses of printers, webcams, scanner and other peripheral devices</li> <li>5. Drawing diagram of computer system and labelling it</li> </ol>	05
4. Demonstrate basic computer skills	<ol style="list-style-type: none"> <li>1. Primary operations on a computer system – input, process, storage, output, communication networking, etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Identification of the various input and output units and explanation of their purposes</li> </ol>	04
Total			20

**Unit 4: Entrepreneurial Skills - I**

Learning Outcome	Theory (06 hrs)	Practical (09 hrs)	Duration (15 Hrs)
1. Identify various types of business activities	<ol style="list-style-type: none"> <li>1. Types of businesses – service, manufacturing, hybrid</li> </ol>	<ol style="list-style-type: none"> <li>1. Prepare posters of business activities found in cities/villages,</li> </ol>	09

	<ol style="list-style-type: none"> <li>2. Types of businesses found in our community</li> <li>3. Business activities around us</li> </ol>	<p>using pictures</p> <ol style="list-style-type: none"> <li>2. Discuss the various types of activities, generally adopted by small businesses in a local community</li> <li>3. Best out of waste</li> <li>4. Costing of the product made out of waste</li> <li>5. Selling of items made from waste materials</li> <li>6. Prepare list of businesses that provides goods and services in exchange for money</li> <li>7.</li> </ol>	
2. Demonstrate the knowledge of distinguishing characteristics of entrepreneurship	<ol style="list-style-type: none"> <li>1. Meaning of entrepreneurship development</li> <li>2. Distinguishing characteristics of entrepreneurship</li> <li>3. Role and rewards of entrepreneurship</li> </ol>	<ol style="list-style-type: none"> <li>1. Prepare charts showing advantages of entrepreneurship over wages</li> <li>2. Group discussions on role and features of entrepreneurship</li> <li>3. Lectures/presentations by entrepreneurs on their experiences and success stories</li> <li>4. Identify core skills of successful entrepreneur</li> </ol>	06
Total			15

<b>Unit 5: Green Skills - I</b>			
<b>Learning Outcome</b>	<b>Theory (07 hrs)</b>	<b>Practical (03 hrs)</b>	<b>Duration (10 Hrs)</b>
1. Demonstrated the knowledge of the factors influencing natural resource conservation	<ol style="list-style-type: none"> <li>1. Introduction to environment,</li> <li>2. Relationship between society and environment, ecosystem and factors causing imbalance</li> <li>3. Natural resource conservation</li> <li>4. Environment protection and conservation</li> </ol>	<ol style="list-style-type: none"> <li>1. Group discussion on hazards of deteriorating environment</li> <li>2. Prepare posters showing environment conservation</li> <li>3. Discussion on various factors that influence our environment</li> </ol>	05

2. Describe the importance of green economy and green skills	1. Definition of green economy 2. Importance of green economy	1. Discussion on the benefits of green skills and importance of green economy 2. Prepare a Poster showing the importance of green economy with the help of newspaper/magazine cuttings	05
Total			10

## Part B: Vocational Skills

S.No.	Units	Duration (Hrs)
1.	Basic Survey of route for OFC and guidelines for Installations(OFC)	30
2.	Basics of Fiber optic technology	25
3.	Transmitters and Receivers	25
4.	Cabling system components	20
	<b>Total</b>	<b>100</b>

### Unit 1: Basic Survey of route for OFC and guidelines for Installations(OFC)

Learning Outcome	Theory	Practical	Duration
1. Fundamentals of Survey	1. Basics of Survey 2. Fundamental of surveying	1. Survey exercise 2. Listing the survey step wise	05
2. Survey types	1. Branches of surveying 2. Phases of surveying 3. -Field Work 4. -Office Work.	1. Understand the surveying 2. Process of survey	05
3. Role of levelling in surveying	1. Kinds of Surveys. 2. Levelling. 3. Importance of levelling	1. Do field surveying. 2. Try Levelling work on field.	05
4. Identify the routes and tagging.	1. Markings and Tagging. 2. Route	1. Process of markings 2. Marking use for	05

	Identification. 3. Highlighting the curves, joints, redundancy path	surveying 3. Indications of markings	
5. Industry best practices	1. Survey for underground 2. Survey for overhead 3. Guidelines for use of OFC on various routes. 4. Digging roads for OFC path.	1. Do the survey of underground 2. Do the survey of overhead 3. Reading guidelines 4. Demonstration of digging tools.	10
Total			30

### Unit 2: Basics of fiber optic technology

Learning Outcome	Theory	Practical	Duration
1. Identify the various Mediums of communications	1. Channels/ medium of communication 2. Types of channels. 3. -Copper 4. -Fiber 5. -Wireless	1. Identify the role of medium in communication 2. Identification of the cables. 3. Familiarization with different cables 4. Identify the channels 5. Copper 6. Fiber 7. Wireless And uses	05
2. Describe fiber optic Links	1. Introduction Of OFC. 2. Advantages of OFC over Other modes of communication 3. construction of cables based on material, component, function	8. Demonstrate the construction of cables based on material, component, function	05
3. Explain components of optical fiber	1. Optical Windows/Bands. 2. Optical power and loss measurement. 3. Signal strength and quality 4. Design values and margins	1. Observe the selection of optics as per requirement 2. Understand power management 3. Requirements 4. Rectification of power loss	05

4. Explain the advantages to choosing fiber over copper cable	<ol style="list-style-type: none"> <li>1. Features of OFC.</li> <li>2. Greater Bandwidth</li> <li>3. Low attenuation</li> <li>4. Greater distance</li> <li>5. Security</li> <li>6. Immunity and reliability</li> <li>7. Design</li> <li>8. Migration</li> <li>9. Cost</li> <li>10. Limitations of OFC</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstrate by videos the role of OFC in practical life</li> <li>2. Demonstrate limitation of OFC</li> <li>3. Observation of OFC working over the other modes of communications</li> <li>4. List the uses of OFC.</li> <li>5. Prepare a report on OFC</li> </ol>	05
5. Prepare type of cables on different aspect	<ol style="list-style-type: none"> <li>1. Type of cable on the basis of conductors</li> <li>2. Type of cable on the basis of voltage grading</li> <li>3. Type of cable on the basis of conductors used like copper, aluminium.</li> <li>4. Type of cable on the basis of insulation</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstrate the preparation of cable on the basis of voltage grading.</li> <li>2. Demonstrate the preparation of cable on the basis of conductors used like copper, aluminium.</li> <li>3. Demonstrate the preparation of cable on the basis of insulation</li> <li>4. Videos of OFC making.</li> </ol>	05
Total			25

### Unit 3: Transmitters and Receivers

Learning Outcome	Theory	Practical	Duration
1. Familiarization of laser transmitter and receivers	<ol style="list-style-type: none"> <li>1. Fiber Optic Transmitters and Receivers (Transceivers)</li> <li>2. Features of fiber optics</li> <li>3. Advantage of Optical Fiber Systems</li> <li>4. Semiconductors Light Sources</li> <li>5. LED/LASER Source</li> </ol>	<ol style="list-style-type: none"> <li>1. Draw model diagram for transceivers</li> <li>2. Identify the Transmitters</li> <li>3. Identify the Receiver</li> <li>4. Differentiate between Transmitters and Receiver</li> <li>5. Observe the Working of them.</li> </ol>	05
2. Familiarization of source, detectors etc.	<ol style="list-style-type: none"> <li>1. Optical source</li> <li>2. Optical Detectors,</li> <li>3. Optical Convertors</li> <li>4. Safety handling</li> </ol>	<ol style="list-style-type: none"> <li>1. Working of source</li> <li>2. Demonstrate the working of detectors</li> <li>3. Convertor working</li> </ol>	05

	precautions	and testing.	
3. Get familiar with the terms of optical fiber	<ol style="list-style-type: none"> <li>1. Technical terms related to fiber Optical</li> <li>2. Optical connectors and coupling of source to fiber's</li> </ol>	<ol style="list-style-type: none"> <li>1. Connection of source to fiber</li> <li>2. Checking the working and attachments of fiber with source</li> </ol>	05
4. Familiar with the receivers used in optics	<ol style="list-style-type: none"> <li>1. Describe the receivers</li> <li>2. Type of receivers</li> <li>3. PIN and APD Detectors</li> <li>4. Need of receiver</li> <li>5. Receive noise in optic.</li> <li>6. Elimination method of noise at receiving end.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the working of receiver.</li> <li>2. Demonstrate the type of receivers.</li> <li>3. Uses of receivers</li> <li>4. Demonstrate the noise elimination method at receiving end.</li> </ol>	05
5. Prepare type of cables on different aspect	<ol style="list-style-type: none"> <li>1. Type of cable on the basis of conductors</li> <li>2. Type of cable on the basis of voltage grading</li> <li>3. Type of cable on the basis of conductors used like copper, aluminium.</li> <li>4. Type of cable on the basis of insulation</li> </ol>	<ol style="list-style-type: none"> <li>1. Videos for the preparation of cable on the basis of voltage grading.</li> <li>2. Videos for the preparation of cable on the basis of of conductors used like copper, aluminium.</li> <li>3. Videos for the preparation of cable on the basis of insulation</li> </ol>	05
Total			25

### Unit 4: Cabling system components

Learning Outcome	Theory	Practical	Duration
1. Prepare the optical fiber.	<ol style="list-style-type: none"> <li>1. Construction of Optical fiber.</li> <li>2. Basic Structure of OFC</li> <li>3. Core</li> <li>4. Cladding</li> <li>5. Coating</li> <li>6. Standards</li> <li>7. Tensile strength</li> <li>8. Types of fibers.</li> <li>9. ITU T G654, G655</li> <li>10. Buffer</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstrate the followings</li> <li>2. Core</li> <li>3. Coating</li> <li>4. Standards</li> <li>5. Tensile strength</li> <li>6. Types of fiber</li> <li>7. Differentiate between fibers</li> <li>8. Reports and uses of buffers</li> </ol>	05
2. Identify the supporting parts of fiber	<ol style="list-style-type: none"> <li>1. Strength Members</li> <li>2. Jacks used in fiber</li> <li>3. Cable manufacturers</li> <li>4. Cable types</li> <li>5. Colour coding</li> </ol>	<ol style="list-style-type: none"> <li>1. Identify the supporting parts</li> <li>2. Jacks</li> <li>3. Identify Cabels by their type</li> <li>4. Prepare the reports</li> </ol>	05



	6. Ordinary fibers 7. Pig tail and patch cord 8. Ribbon cable	of codings of cables. 5. Fibers patch cords 6. Ribbon cables connectors	
3. Identification of submarine cabling	1. Submarine Cable 2. Cable termination Methods	1. An animation showing a method used to repair submarine communications cables.	05
4. Identification of Cable markings and codes	1. Define Cable markings and codes 2. Define External Markings 3. Bend Radius Specification	1. Guideline of markings 2. Demonstrated bend and their disadvantages 3. Checking of Permissible bending.	05
Total			20

## CLASS 10

### Part A - Employability Skills

S.No.	Units	Duration (Hrs)
1.	Communication Skills – II	20
2.	Self-management Skills - II	10
3.	Information and Communication Technology Skills – II	20
4.	Entrepreneurial Skills – II	15
5.	Green Skills - II	10
	<b>Total</b>	<b>75</b>

Unit 1: Communication Skills - II			
Learning Outcome	Theory (12 hrs)	Practical (08 hrs)	Duration (20 Hrs)
1. Demonstrate knowledge of various methods of communication	1. Methods of communication - Verbal - Non-verbal - Visual	1. Writing pros and cons of written, verbal and non-verbal communication 2. Listing do's and don'ts for avoiding common body language mistakes	05
3. Provide descriptive and specific	1. Communication cycle and importance of	1. Constructing sentences for providing descriptive and specific feedback	03

feedback	<p>feedback</p> <p>2. Meaning and importance of feedback</p> <p>3. Descriptive feedback - written comments or conversations</p> <p>4. Specific and non-specific feedback</p>		
3. Apply measures to overcome barriers in communication	<p>1. Barriers to effective communication – types and factors</p> <p>2. Measures to overcome barriers in effective communication</p>	<p>1. Enlisting barriers to effective communication</p> <p>2. Applying measures to overcome barriers in communication</p>	04
4. Apply principles of communication	<p>1. Principles of effective communication</p> <p>2. 7 Cs of effective communication</p>	<p>1. Constructing sentences that convey all facts required by the receiver</p> <p>2. Expressing in a manner that shows respect to the receiver of the message</p> <p>3. Exercises and games on applying 7Cs of effective communication</p>	03
5. Demonstrate basic writing skills	<p>2. Writing skills to the following:</p> <ul style="list-style-type: none"> <li>• Sentence</li> <li>• Phrase</li> <li>• Kinds of Sentences</li> <li>• Parts of Sentence</li> <li>• Parts of Speech</li> <li>• Articles</li> <li>• Construction of a Paragraph</li> </ul>	<p>1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject</p>	05
Total			20

**Unit 2: Self-management Skills - II**

Learning Outcome	Theory (05 hrs)	Practical (05 hrs)	Duration (10 Hrs)
1. Apply stress management techniques	<p>1. Meaning and importance of stress management</p> <p>2. Stress management techniques – physical exercise, yoga, meditation</p> <p>3. Enjoying, going to</p>	<p>1. Exercises on stress management techniques – yoga, meditation, physical exercises</p> <p>2. Preparing a write-up on an essay on experiences during a holiday trip</p>	06

	vacations and holidays with family and friends 4. Taking nature walks		
3. Demonstrate the ability to work independently	1. Importance of the ability to work independently 2. Describe the types of self-awareness 3. Describe the meaning of self-motivation and self-regulation	1. Demonstration on working independently 2. goals 3. Planning of an activity 4. Executing tasks in a specific period, with no help or directives 5. Demonstration on the qualities required for working independently	04
Total			10

<b>Unit 3: Information and Communication Technology Skills– II</b>			
<b>Learning Outcome</b>	<b>Theory (08 hrs)</b>	<b>Practical (12 hrs)</b>	<b>Duration (20 Hrs)</b>
1. Distinguish between different operating systems	1. Classes of operating systems 2. Menu, icons and task bar on the desktop 3. File concept, file operations, file organization, directory structures, and file-system structures 4. Creating and managing files and folders	1. Identification of task bar, icons, menu, etc. 2. Demonstration and practicing of creating, renaming and deleting files and folders, saving files in folders and sub-folders, restoring files and folders from recycle bin	17
2. Apply basic skills for care and maintenance of computer	1. Importance and need of care and maintenance of computer - Cleaning computer components - Preparing maintenance schedule - Protecting computer against viruses - Scanning and cleaning viruses and removing SPAM files, temporary files and folders	1. Demonstration of the procedures to be followed for cleaning, care and maintenance of hardware and software	03
Total			20

<b>Unit 4: Entrepreneurial Skills - II</b>			
<b>Learning Outcome</b>	<b>Theory (06 hrs)</b>	<b>Practical (09 hrs)</b>	<b>Duration (15 Hrs)</b>
1. List the characteristics of successful entrepreneur	1. Entrepreneurship and society 2. Qualities and functions of an entrepreneur 3. Role and importance of an entrepreneur 4. Myth about entrepreneurship 5. Entrepreneurship as a career option	1. Writing a note on entrepreneurship as career option 2. Collecting success stories of first generation and local entrepreneurs 3. Listing the entrepreneurial qualities – analysis of strength and weaknesses 4. Group discussion of self-qualities that students feel are needed to become successful entrepreneur 5. Collect information and related data for a business 6. Make a plan in team for setting up a business	15
Total			15

<b>Unit 5: Green Skills - II</b>			
<b>Learning Outcome</b>	<b>Theory (07 hrs)</b>	<b>Practical (03 hrs)</b>	<b>Duration (10 Hrs)</b>
1. Demonstrate the knowledge of importance, problems and solutions related to sustainable development	1. Definition of sustainable development 2. Importance of sustainable development 3. Problems related to sustainable development	1. Identify the problem related to sustainable development in the community 2. Group discussion on the importance of respecting and conserving indigenous knowledge and cultural heritage 3. Discussion on the responsibilities and benefits of environmental	10

		citizenship, including the conservation and protection of environmental values 4. Preparing models on rain water harvesting, drip / sprinkler irrigation, vermin-compost, solar energy, solar cooker, etc.	
Total			10

## Part B–Vocational Skills

S.No.	Units	Duration (Hrs)
1.	Splicing of optical fiber.	25
2.	Connectors.	20
3.	Cable Laying (OFC)	15
4.	TEST Equipment and Link/Cable Testing (OFC)	20
5.	Safety and Precautions	20
	<b>Total</b>	<b>100</b>

<b>Unit 1: Splicing of optical fiber</b>			
Learning Outcome	Theory	Practical	Duration
1. Identification of Splicing of fiber optical	1. Technical terms related to fiber optical connectors and splicer's 2. Splicing(Jointing) of OFC	1. Identify the cables. 2. Demonstrate the different cabling components	05
2. Process of splicing	1. Describe Process of splicing. 2. Stripping 3. Cleaning 4. Cleaving 5. Different types of Splicing	1. Demonstration of stripping 2. Demonstration of Cleaning 3. Demonstration of Cleaving	05
3. Fundamental of splicing	1. Precautions during the Splicing. 2. Role of Splicer in splicing. 3. Responsibilities of splicer. 4. Fusion Splicer's	1. Demonstration of Splicing 2. Process of splicing 3. Steps to approach	05

4. Troubleshooting for splicing	1. Testing of Splicing. 2. Splice Problem 3. Troubleshooting.	1. Testing of Splicing by tools. 2. Observation splice Problem during practical 3. prepare the list of problems. 4. Troubleshooting approach.	05
5. Advance splicing methods	1. Fusion Splicing Procedure 2. Digital Splicing. 3. Thermo Shrinking 4. Maintenance Schedule.	1. Demonstration of Fusion Splicing Procedure 2. Demonstration of digital Splicing. 3. Demonstration of thermo Shrinking 4. Prepare the maintenance Schedule and reports.	05
Total			25

<b>Unit 2: Connectors</b>			
<b>Learning Outcome</b>	<b>Theory</b>	<b>Practical</b>	<b>Duration</b>
1. Identify connectors	5. Describe Connectors 1. Types of connectors. 2. Uses and functions of connectors.	1. Identify the Connectors 2. List the connector's uses at different places.	05
2. Connector in detail	1. Features of good connectors. 2. Parts of connectors. 3. Ferrule 4. Connectors body 5. Cable 6. Coupling Devise	1. Analysis differences in connectors. 2. By their uses 3. By their requirements. 4. Practice of joining the connectors with cables	10
3. Characteristics of connectors.	1. Characteristics of connectors. 2. Connectors Termination 3. FDF etc 4. Study Fiber attenuation and bending	1. Identify the Connectors terminators.	05
Total			20

<b>Unit 3: Cable Laying (OFC)</b>			
<b>Learning Outcome</b>	<b>Theory</b>	<b>Practical</b>	<b>Duration</b>

1. Cable Laying	1. Laying Specifications 2. Minimum Bend Radius 3. Pulling Eyes 4. Pullbox	1. Observe the cables 2. Observe cable bending	05
2. Cable laying procedure	1. Installation methods 2. Procedure of cable laying in ducts	1. Visit the site and see procedure of cable laying	05
3. Preparation of installation	1. Installation Preparation 2. Aerial Drop Installations 3. Underground Installations 4. Labeling 5. Documentation	1. Prepare a report of installation 2. Visit the site and see Aerial Drop Installations 3. Visit the site and see Underground Installations	05
Total			15

#### Unit 4: TEST Equipment and Link/Cable Testing (OFC)

Learning Outcome	Theory	Practical	Duration
1. Identify the testing procedure.	1. Describe testing 2. Procedure of Continuity Testing 3. Testing by using Light Source 4. Testing by using Optical Power Meter	1. Visit the site and see the cables testing Demonstrate the procedure of testing steps 2. Demonstrate the testing by light source 3. Demonstrate the testing by using Optical Power Meter	10
2. Demonstrate OTDR	1. Study OTDR 2. Function of OTDR 3. OTDR Display 4. OTDR Setup 5. OTDR limitations 6. Functionality of OTDR	1. Demonstrate the testing by OTDR 2. Display the videos on OTDR working.	05
3. Demonstrate testing of OTDR	1. Testing with OTDR 2. Trace Analysis with OTDR 3. Documentation 4. OTDR Fault Localization Techniques	1. Restoration Practices with OTDR 2. View the videos of restoration.	05
Total			20

#### Unit 5: Safety and Precautions

Learning Outcome	Theory	Practical	Duration
1. Demonstrate safety tools	1. Basic Safety in handling fiber cables 2. Basic Safety in handling connectors 3. Safety in handling with source 4. Safety in handling with Connectors	1. Demonstrate basic safety in handling fiber cables 2. Demonstrate basic Safety in handling connectors 3. Demonstrate of basic Safety in	05

	5. Safety in handling With Joints 6. Safety in handling With Tools	handling with source 4. Demonstration of basic Safety in handling safety in handling With Joints 5. Demonstration of basic Safety in handling With tools	
2. Describe the importance of Personal Safety	1. Need of personnel safety 2. Safety during the construction and installation of Earthing and Trenching 3. What are the Personal protection equipment like anti-static bands	1. Demonstrate the Safety procedure for construction and installation of Earthing and Trenching.	05
3. Workplace Asset management	1. Creating Tool list and Storage of tools 2. Procedure of Calibrating Measuring instruments 3. Managing Tool Crib library 4. What is proper earthing of the equipment	1. Make a tool list 2. Calibrate measuring instruments 3. Checking proper earthing of the equipment. tool Crib library 4. Return the tools to the store after completion of work	05
4. Identify the materials for safety	1. Describe the equipment and its uses 2. Describe the Safety Harness and their uses 3. Prepare safety tools like Helmet, Gloves, Eye glasses earplugs, Nose mask etc. 4. Applications of equipment under different working condition	1. Demonstration of arrangement of equipment and uses like safety Harness, helmet, gloves, eye glasses, earplugs, nose mask etc.	05
Total			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 data entry centre and observe the following: Location, Site, Office building, Computer Systems, Tools and Equipment, Printer, Scanner. During the visit, students should obtain the following information from the owner or the supervisor of the Data Centre:

1. Data Entry Centre.
2. Computer Infrastructure.
3. Sitting Posture of data entry operators.
4. Assistive technology.



5. Manpower engaged
6. Total expenditure of Data Entry Centre.
7. Total annual income.
8. Profit/Loss (Annual)
9. 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.

1. Hot knife with blade attachment and stand
2. Professional Fiber Cutter
3. Micro-Strip fiber stripper
4. Fiber optic crimping tool
5. Fiber optic inspection microscope
6. Vial of index-matching gel
7. Fiber optic splice
8. 2-meter fiber cable with ST® connectors on both ends (one assembled in
9. Previous activity.)
10. Fiber Optic Demonstration System (plastic or glass model)

## 8. VOCATIONAL TEACHER'S/ TRAINER'S QUALIFICATION AND GUIDELINES

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

S. No.	Qualification	Minimum Competencies	Age Limit
1	Graduate in Engineering in Telecommunication. with minimum 65% marks from a recognized university/institution with 2 years' experience in teaching or work experience in telecommunication  OR  Master's degree in telecommunication from a recognized university/ institution	<ul style="list-style-type: none"> <li>• Effective communication skills (oral and written)</li> <li>• Basic computing skills</li> </ul>	18-40 years (as on Jan. 01 (year))  Age relaxation to be provided as per Govt. rules

	with minimum 65% marks and 1 year experience in teaching or work/teaching experience in telecommunication		
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Vocational Teachers/Trainers form the backbone of Vocational Education being imparted as an integral part of Rashtriya Madhyamik Shiksha Abhiyan (RMSA). They are directly involved in teaching of vocational subjects and also serve as a link between the industry and the schools for arranging industry visits, On-the-Job Training (OJT) and placement.

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

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

- (i) directly as per the prescribed qualifications and industry experience suggested by the PSS Central Institute of Vocational Education (PSSCIVE), NCERT or the respective Sector Skill Council (SSC)

OR

- (ii) Through accredited Vocational Training Providers accredited under the National Quality Assurance Framework (NQAF\*) approved by the National Skill Qualification Committee on 21.07.2016. If the State is engaging Vocational Teachers/Trainers through the Vocational Training Provider (VTP), it should ensure that VTP should have been accredited at NQAF Level 2 or higher.

\* *The National Quality Assurance Framework (NQAF) provides the benchmarks or quality criteria which the different organisations involved in education and training must meet in order to be accredited by competent bodies to provide government-funded education and training/skills activities. This is applicable to all organizations offering NSQF-compliant qualifications.*

The educational qualifications required for being a Vocational Teacher/Trainer for a particular job role are clearly mentioned in the curriculum for the particular NSQF compliant job role. The State should ensure that teachers / trainers deployed in the schools have relevant technical competencies for the NSQF qualification being delivered. The Vocational Teachers/Trainers preferably should be certified by the concerned Sector Skill Council for the particular Qualification Pack/Job role which he will be teaching. Copies of relevant certificates and/or record of experience of the teacher/trainer in the industry should be kept as record.

To ensure the quality of the Vocational Teachers/Trainers, the State should ensure that a standardized procedure for selection of Vocational Teachers/Trainers is followed. The selection procedure should consist of the following:

- (i) Written test for the technical/domain specific knowledge related to the sector;
- (ii) Interview for assessing the knowledge, interests and aptitude of trainer through a panel of experts from the field and state representatives; and
- (iii) Practical test/mock test in classroom/workshop/laboratory.

In case of appointment through VTPs, the selection may be done based on the above procedure by a committee having representatives of both the State Government and the VTP.

The State should ensure that the Vocational Teachers/ Trainers who are recruited should undergo induction training of 20 days for understanding the scheme, NSQF framework and Vocational Pedagogy before being deployed in the schools.

The State should ensure that the existing trainers undergo in-service training of 5 days every year to make them aware of the relevant and new techniques/approaches in their sector and understand the latest trends and policy reforms in vocational education.

The Head Master/Principal of the school where the scheme is being implemented should facilitate and ensure that the Vocational Teachers/Trainers:

- (i) Prepare session plans and deliver sessions which have a clear and relevant purpose and which engage the students;
- (ii) Deliver education and training activities to students, based on the curriculum to achieve the learning outcomes;
- (iii) Make effective use of learning aids and ICT tools during the classroom sessions;
- (iv) Engage students in learning activities, which include a mix of different methodologies, such as project based work, team work, practical and simulation based learning experiences;
- (v) Work with the institution's management to organise skill demonstrations, site visits, on-job trainings, and presentations for students in cooperation with industry, enterprises and other workplaces;
- (vi) Identify the weaknesses of students and assist them in up gradation of competency;
- (vii) Cater to different learning styles and level of ability of students;
- (viii) Assess the learning needs and abilities, when working with students with different abilities
- (ix) Identify any additional support the student may need and help to make special arrangements for that support;
- (x) Provide placement assistance

Assessment and evaluation of Vocational Teachers/Trainers is very critical for making them aware of their performance and for suggesting corrective actions. The States/UTs should ensure that the performance of the Vocational Teachers/Trainers is appraised annually. Performance based appraisal in relation to certain pre-established criteria and objectives

should be done periodically to ensure the quality of the Vocational Teachers/Trainers. Following parameters may be considered during the appraisal process:

1. Participation in guidance and counselling activities conducted at Institutional, District and State level;
2. Adoption of innovative teaching and training methods;
3. Improvement in result of vocational students of Class X or Class XII;
4. Continuous up gradation of knowledge and skills related to the vocational pedagogy, communication skills and vocational subject;
5. Membership of professional society at District, State, Regional, National and International level;
6. Development of teaching-learning materials in the subject area;
7. Efforts made in developing linkages with the Industry/Establishments;
8. Efforts made towards involving the local community in Vocational Education
9. Publication of papers in National and International Journals;
10. Organisation of activities for promotion of vocational subjects;
11. Involvement in placement of students/student support services.

## 9. LIST OF CONTRIBUTORS

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