

LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE: Auto Service Technician L3

(QUALIFICATION PACK: Ref. Id. ASC/Q1401)

SECTOR: Automotive

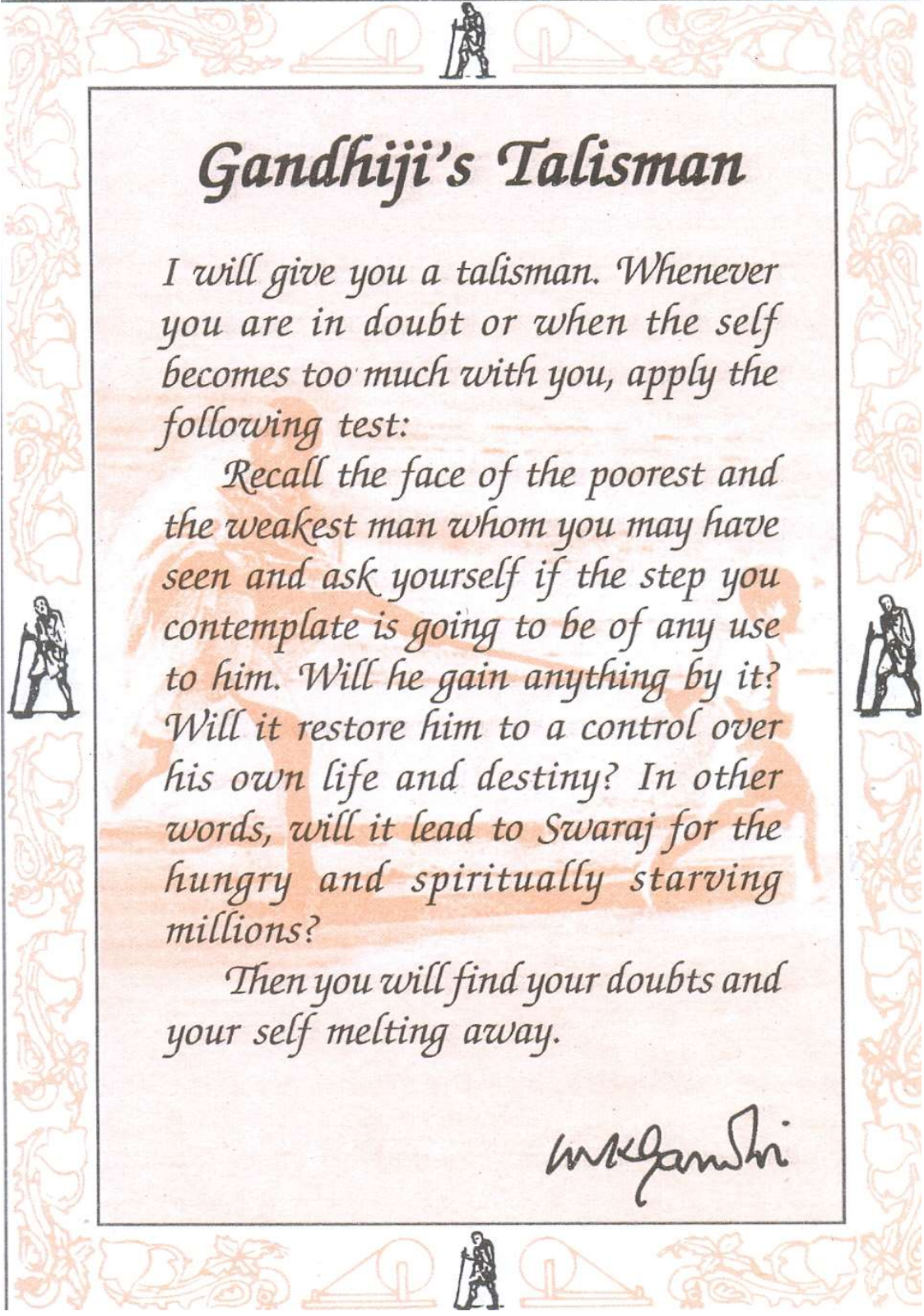
Classes 9 and 10



PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION

Shyamla Hills, Bhopal- 462 002, 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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Automotive- Auto Service Technician L3

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FOREWORD

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

DR. H.K. SENAPATHY
Director
National Council of Education 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 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 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 21st Century.

DR. RAJESH P. KHAMBAYAT

Joint Director

PSS Central Institute of Vocational Education

ACKNOWLEDGEMENTS

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 Automotive Skill Development Council (ASDC) for their academic support and cooperation.

We are grateful to the expert contributors and reviewers for their earnest effort and contributions in the development of this learning outcome based curriculum. Their names are acknowledged in the list of contributors and reviewers.

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

Mr. Nagendra Kore, RMSA, Goa and Mr. Sudhir Vishwakarma, CRISP, Bhopal for reviewing this document.

We are also grateful to the Course Coordinator **Prof. Saurabh Prakash**, Professor & Head, Department of Engineering & Technology for developing this curriculum.

PSSCIVE Team

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1. COURSE OVERVIEW

COURSE TITLE: Automotive- Automotive Service Technician

The present curriculum Automotive Service Technician job role is related to Level L-3. This course fulfills the needs of the students willing to learn activities relating to the Automotive Service Technician job role. Any student/ entrepreneur willing to start an Automobile Service Centre can acquire the desired competencies with the help of this curriculum. Automobile or Automotive Engineering has gained recognition and importance ever since motor vehicles capable for transporting passengers has been in vogue. Now due to the rapid growth of auto component manufacturers and automobile industries, there is a great demand for Automobile technicians. Automobile Engineering alias Automotive Engineering or Vehicle Engineering is one of the most challenging careers in the field of engineering with a wide scope.

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

- Identify the principal components of a computer system
- Identify and control hazards in the workplace that pose a danger or threat to their safety or health, or that of others.
- Demonstrate self-management skills.
- Demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities.
- Demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection.
- Communicate effectively with the customers
- Greet, escort, seat the customers and offer refreshments(tea/ coffee)
- Enquire and understand customer queries related to vehicle type, model, specifications
- Identify features of different elements of Engineering such as mechanical, electrical, electronic, software and safety engineering
- Repairing and servicing automobiles such as cars, trucks, motorcycles, scooters etc
- Understanding the mechanism of vehicle chassis, internal combustion engine, electrical systems, motor transport affairs, workshop technology

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 Automotive sector, such as **Automotive Service Technician L4** in Class XI and Class XII.

COURSE DURATION: **400 hrs**

Class 9 : 200 hrs

Class 10 : 200 hrs

Total : 400 hrs

2. SCHEME OF UNITS

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
Part A	Employability Skills		
	Unit 1 : Communication Skills-I	20	10
	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	
		75	10
Part B	Vocational Skills		
	Unit 1: History and Evolution of Automobiles	10	30
	Unit 2: Various types of Automobiles	15	
	Unit 3: Major Systems & Components of an Automobile	35	
	Unit 4: Road Safety	10	
	Unit 5: Automobiles and our Environment	05	
	Unit 6: Introduction to Vehicle Maintenance & Servicing	10	
	Unit 7: Innovations & Developments in Automobiles	10	
		95	30
Part C	Practical Work		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
		10	35
Part D	Project Work/Field Visit		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
		15	15

Part E	Continuous and Comprehensive Evaluation (CCE)		
	Total	5	10
	Grand Total	200	100

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

CLASS 10			
Units		No. of Hours for Theory and Practical 200	Max. Marks for Theory and Practical 100
Part A	Employability Skills		
	Unit 1 : Communication Skills-II	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	
		75	10
Part B	Vocational Skills		
	Unit 1 : Automobile and its components	20	30
	Unit 2 : Automobile Service Tools	20	
	Unit 3 : Vehicle Servicing	20	
	Unit 4 : Customer sales care	20	
	Unit 5 : Innovation and Development	15	
		95	30
Part C	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
		10	35
Part D	Project Work/Field Visit		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
		15	15
Part E	Continuous and Comprehensive Evaluation (CCE)		
	Total	5	10
	Grand Total	200	100

3. TEACHING/TRAINING ACTIVITIES

The teaching and training activities have to be conducted in classroom, laboratory/workshops and field visits. Students should be taken to field visits for interaction with experts and to expose them to the various tools, equipment, materials, procedures and operations in the workplace. Special emphasis should be laid on the occupational safety, health and hygiene during the training and field visits.

CLASSROOM ACTIVITIES

Classroom activities are an integral part of this course and interactive lecture sessions, followed by discussions should be conducted by trained vocational teachers. Vocational teachers should make effective use of a variety of instructional or teaching aids, such as audio-video materials, colour slides, charts, diagrams, models, exhibits, hand-outs, online teaching materials, etc. to transmit knowledge and impart training to the students.

PRACTICAL WORK IN LABORATORY/WORKSHOP

Practical work may include but not limited to hands-on-training, simulated training, role play, case based studies, exercises, etc. Equipment and supplies should be provided to enhance hands-on learning experience of students. Only trained personnel should teach specialized techniques. A training plan that reflects tools, equipment, materials, skills and activities to be performed by the students should be submitted by the vocational teacher to the Head of the Institution.

FIELD VISITS/ EDUCATIONAL TOUR

In field visits, children will go outside the classroom to obtain specific information from experts or to make observations of the activities. A checklist of observations to be made by the students during the field visits should be developed by the Vocational Teachers for systematic collection of information by the students on the various aspects. Principals and Teachers should identify the different opportunities for field visits within a short distance from the school and make necessary arrangements for the visits. At least three field visits should be conducted in a year.

4. ASSESSMENT AND CERTIFICATION

Upon successful completion of the course by the candidate, the Central/ State Examination Board for Secondary Education and the respective Sector Skill Council will certify the competencies.

The National Skills Qualifications Framework (NSQF) is based on outcomes referenced to the National Occupation Standards (NOSs), rather than inputs. The NSQF level descriptors, which are the learning outcomes for each level, include the process, professional knowledge, professional skills, core skills and responsibility. The assessment is to be undertaken to verify that individuals have the knowledge and skills needed to perform a particular job and that the learning programme undertaken has delivered education at a given standard. It should

be closely linked to certification so that the individual and the employer could come to know the competencies acquired through the vocational subject or course. The assessment should be reliable, valid, flexible, convenient, cost effective and above all it should be fair and transparent. Standardized assessment tools should be used for assessment of knowledge of students. Necessary arrangements should be made for using technology in assessment of students.

KNOWLEDGE ASSESSMENT (THEORY)

Knowledge Assessment should include two components: one comprising of internal assessment and second an external examination, including theory examination to be conducted by the Board. The assessment tools shall contain components for testing the knowledge and application of knowledge. The knowledge test can be objective paper based test or short structured questions based on the content of the curriculum.

WRITTEN TEST

It allows candidates to demonstrate that they have the knowledge and understanding of a given topic. Theory question paper for the vocational subject should be prepared by the subject experts comprising group of experts of academicians, experts from existing vocational subject experts/teachers, and subject experts from university/colleges or industry. The respective Sector Skill Council should be consulted by the Central/State Board for preparing the panel of experts for question paper setting and conducting the examinations.

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

Duration: 3 hrs

Max. Mark: 30

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 –	0	1	0	02

	(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)				
5.	Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	0	1	0	02
	Total	3x1=3	6x2=12	5x3=15	30 (14 questions)

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
Total		75

Sub-Unit 1: Communication Skills-I			
Learning Outcome	Theory (08 hrs)	Practical (12 hrs)	Total 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

2. Identify elements of communication cycle	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Draw a diagram of communication cycle 2. Role plays on communication process related to the sector/job role 	<p style="text-align: center;">05</p>
3. Identify the factors affecting our perspectives in communication	<ol style="list-style-type: none"> 1. Perspectives in communication 2. Factors affecting perspectives in communication <ul style="list-style-type: none"> - Visual perception - Language - Past experience - Prejudices - Feelings - Environment 	<ol style="list-style-type: none"> 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 	<p style="text-align: center;">05</p>
4. Demonstrate the knowledge of basic writing skills	<ol style="list-style-type: none"> 1. Writing skills related to the following: <ul style="list-style-type: none"> • Phrases • Kinds of sentences • Parts of sentence • Parts of speech • Use of articles • Construction of a paragraph 	<ol style="list-style-type: none"> 1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject 	<p style="text-align: center;">05</p>

Sub-Unit 2: Self-management-I

Learning Outcome	Theory (07 hrs)	Practical (03 hrs)	Total Duration (10 Hrs)
1. Describe the meaning and importance of self-management	<ol style="list-style-type: none"> 1. Meaning of self-management 2. Positive results of self-management 3. Self-management skills 	<ol style="list-style-type: none"> 1. Identification of self-management skills 2. Strength and weakness analysis 	<p style="text-align: center;">05</p>

2. Identify the factors that helps in building self-confidence	<ol style="list-style-type: none"> 1. Factors that help in building self-confidence – social, cultural, and physical factors 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. 	<ol style="list-style-type: none"> 1. Role play exercises on building self-confidence 2. Use of positive metaphors/ words 3. Positive stroking on wakeup and before going bed 4. Helping others and working for community 	05
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Sub-Unit 3: Information and Communication Technology Skills– I

Learning Outcome	Theory (06 hrs)	Practical (14 hrs)	Total Duration (20 Hrs)
1. Describe the role of Information and Communication Technology (ICT) in day-to-day life and workplace	<ol style="list-style-type: none"> 1. Introduction to ICT 2. Role and importance of ICT in personal life and at workplace 3. ICT in our daily life (examples) 4. ICT tools - Mobile, tab, radio, TV, email, etc. 	<ol style="list-style-type: none"> 1. Discussion on the role and importance of ICT in personal life and at workplace. 2. Preparing posters / collages for showing the role of ICT at workplace 	04
2. Identify components of basic computer system and their functions	<ol style="list-style-type: none"> 1. Computer system - Central Processing Unit (CPU), memory, motherboard, storage devices 2. Hardware and software of a computer system 3. Role and functions of Random Access Memory(RAM) and Read Only Memory(ROM) 4. Role and functions of Central Processing Unit 5. Procedure for starting and shutting down a computer 	<ol style="list-style-type: none"> 1. Connecting the cables and peripherals to the Central Processing Unit 2. Starting and shutting down a computer 3. Group discussion on the various aspects of hardware and software 	07
3. Demonstrate use of various components and peripherals of computer system	<ol style="list-style-type: none"> 1. Peripherals devices and their uses – mouse, keyboard, scanner, webcam, etc. of a computer system 	<ol style="list-style-type: none"> 1. Identification of various parts and peripherals of a computer 2. Demonstration and practice on the use of mouse 3. Demonstration and practice on the use of keyboard 4. Demonstration of 	05

		the uses of printers, webcams, scanner and other peripheral devices 5. Drawing diagram of computer system and labelling it	
4. Demonstrate basic computer skills	1. Primary operations on a computer system – input, process, storage, output, communication networking, etc.	1. Identification of the various input and output units and explanation of their purposes	04

Sub-Unit 4: Entrepreneurship Development - I

Learning Outcome	Theory (06 hrs)	Practical (09 hrs)	Total Duration (15 Hrs)
1. Identify various types of business activities	1. Types of businesses – service, manufacturing, hybrid 2. Types of businesses found in our community Business activities around us	1. Prepare posters of business activities found in cities/villages, using pictures 2. Discuss the various types of activities, generally adopted by small businesses in a local community 3. Best out of waste 4. Costing of the product made out of waste 5. Selling of items made from waster materials 6. Prepare list of businesses that provides goods and services in exchange for money	09
2. Demonstrate the knowledge of distinguishing characteristics of entrepreneurship	1. Meaning of entrepreneurship development 2. Distinguishing characteristics of entrepreneurship 3. Role and rewards of entrepreneurship	1. Prepare charts showing advantages of entrepreneurship over wages 2. Group discussions on role and features of entrepreneurship 3. Lectures/presentation s by entrepreneurs on their experiences and success stories 4. Identify core skills of successful entrepreneur	06

Sub-Unit 5: Green Skills - I			
Learning Outcome	Theory (07 hrs)	Practical (03 hrs)	Total Duration (10 Hrs)
1. Demonstrated the knowledge of the factors influencing natural resource conservation	1. Introduction to environment, 2. Relationship between society and environment, ecosystem and factors causing imbalance 3. Natural resource conservation 4. Environment protection and conservation	1. Group discussion on hazards of deteriorating environment 2. Prepare posters showing environment conservation 3. Discussion on various factors that influence our environment	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	34	41	75

Part B: Vocational Skills

S. No.	Units	Duration (Hrs.)
1	Unit 1: History and Evolution of Automobiles	10
2	Unit 2: Various types of Automobiles	15
3	Unit 3: Major Systems & Components of an Automobile	35
4	Unit 4: Road Safety	10
5	Unit 5: Automobiles and our Environment	05
6	Unit 6: Introduction to Vehicle Maintenance & Servicing	10
7	Unit 7: Innovations & Developments in Automobiles	10
	Total	95

Unit 1: History and Evolution of Automobile

Learning Outcome	KNOWLEDGE CRITERIA	PERFORMANCE CRITERIA	Duration (10 Hrs)
Describe the Invention of wheel, Invention of wheel cart and animal	Invention of wheel Invention of wheel cart and animal powered cart, Use of horse cart	Able to describe the Invention of wheel, wheel cart, Able to explain use of horse	10

powered horse cart, Invention of Automobiles and Evaluation fill date, Invention of automobile (Post world war II)	and horse power, Invention of Automobiles and Evolution fill date, Invention of automobile and Evaluation post World War II	power, Able to describe Invention of Automobiles and Evolution fill date, Able to describe Invention of Automobile and Evolution post World War II	
Total			10

Unit 2: Various types of Automobiles			
Learning Outcome	Theory	Practical	Duration (15 Hrs)
Able to identify Two Wheelers Three Wheelers , Passenger vehicle, Commercial vehicle, Agricultural vehicle, Construction Equipment Vehicle, Special Vehicles	Special vehicle, make, model, specifications Parts/Components of Special Vehicles	Able to identify three Wheelers used, Make drawing of three Wheelers, Able to identify passenger vehicles used, make a drawing of passenger vehicle, Able to identify commercial vehicle used, make drawing of commercial vehicle, Able to identify agricultural vehicle used. Make drawing of agricultural vehicle. Identify construction equipment vehicle used. Drawing of construction equipment vehicles, Able to identify special vehicles used, Drawing of special vehicles	15
Total			15

Unit 3: Major Systems & Components of an Automobile			
Learning Outcome	Theory	Practical	Duration (30 Hrs)
Identify and discuss major systems and components of an automobile	Use of Chassis Frame and Auto Body Use of Engine and its components Use of Lubrication System Use of Cooling System Use of Fuel Supply system Use of Transmission System, Use of Front and Rear Use of Steering	Able to identify and describe the importance of Chassis Frame and Auto Body Able to make a drawing of the Chassis Frame and Auto Body Able to identify and describe the importance of the Engine and its components	30

	<p>Use of Suspension System Use of Wheels and Tyres Use of Brake Use of Electrical & electronic Systems Use of Air Conditioning System Use of Active and Passive Safety</p>	<p>Able to make a drawing of the Engine and its components. Able to identify and describe the importance of the Lubrication and its components Able to make a drawing of the Lubrication system and its components Able to identify and describe the importance Cooling System, Able to make a drawing of the Cooling System Able to identify and describe importance Fuel Supply System, Able to make a drawing of the Fuel Supply System, Able to identify, describe importance of Transmission System, Able to make a drawing of the Transmission System, Able to identify and describe the importance of Front and Rear Axle, Able to make a drawing of the Front and Rear Axle Able to identify and describe the importance of steering, Able to make drawing of steering Able to identify and describe importance of suspension system Able to make a drawing of the Suspension System Able to identify and describe the importance Wheels and Tyres Able to make drawing of Wheels and Tyres Able to identify and describe importance of Brake Able to make drawing of Brake Able to identify and describe the importance of the Electrical & Electronic Systems Able to make a drawing of the Electrical &</p>	
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		<p>Electronic Systems. Able to identify and describe the importance of Air Conditioning System Able to make a drawing of Air Conditioning System, Able to identify and describe importance of Active and Passive Safety Able to make a drawing of Active and Passive Safety</p>	
Total			30

Unit 4 : Road safety

Learning Outcome	Theory	Practical	Duration (10 Hrs)
Importance of road safety rules Safe and responsible driving Road Signs Driving rules and Registration of a vehicle Driving License	Importance of safety rules and safe practices, Safe and responsible driving, Road Signs, Traffic signals and rules, Driving rules and registration, License rules	Able to list the safety rules to be followed. Able to use safe p Able to list the safe and responsible driving procedures racfices while driving. Able to identify various road signs, traffic signals and describe the rules Able to make sketch of various road sign, traffic signals and describe the rules, Able to describe driving rules Able to fill forms for driving and registration, Able to describe different license forms Able to write license rules Able to fill forms for license	10
Total			25

Unit 5 : Automobile and Environment			
Learning Outcome	Theory	Practical	Duration (5 Hrs)
Air pollution Auto Emissions and EU/ BS Standards PUC Certification	Air Pollution and its norms Air Pollution and Automobiles, Auto emissions and EU/ BS Standards, PUC Certification	Able to list Air pollution norms Able to observe Air Pollution and Automobiles, Able to identify various Standards like EU/ BS, PUC Certification Able to make list of various standards, Able to describe about PUC Certification.	5
Total			5

Unit 6: Introduction to Vehicle Maintenance and Servicing			
Learning Outcome	Theory	Practical	Duration (10 Hrs)
Importance of Vehicle Maintenance and Servicing Tips to Extend the Life of Vehicles Introduction to Vehicle Servicing procedure	Importance of Vehicle Maintenance and Servicing, Tips to extend the life of vehicles, Procedures during vehicle servicing	Able to perform basic procedures for vehicle maintenance Able to describe vehicle maintenance Able to list tips to extend the life of Vehicles Able to check the tips, Able to list procedures during vehicle servicing	10
Total			10

Unit 7: Innovation and Development			
Learning Outcome	Theory	Practical	Duration (10 Hrs)
Explain Innovation and Development	Importance of innovation and development	Able to identify innovation in Automobiles. Able to understand about new developments	10
Total			10

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
Total		75

Unit 1: Communication Skills - II			
Learning Outcome	Theory (12 hrs)	Practical (08 hrs)	Total 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 feedback	1. Communication cycle and importance of feedback 2. Meaning and importance of feedback 3. Descriptive feedback - written comments or conversations 4. Specific and non-specific feedback	1. Constructing sentences for providing descriptive and specific feedback	03
3. Apply measures to overcome barriers in communication	1. Barriers to effective communication – types and factors 2. Measures to overcome barriers in effective communication	1. Enlisting barriers to effective communication 2. Applying measures to overcome barriers in communication	04
4. Apply principles of communication	1. Principles of effective communication 2. 7 Cs of effective communication	1. Constructing sentences that convey all facts required by the receiver 2. Expressing in a manner that shows respect to the receiver of the message 3. Exercises and games	03

		on applying 7Cs of effective communication	
5. Demonstrate basic writing skills	2. Writing skills to the following: <ul style="list-style-type: none"> • Sentence • Phrase • Kinds of Sentences • Parts of Sentence • Parts of Speech • Articles • Construction of a Paragraph 	1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject	05
Total			20

Unit 2: Self-management Skills - II

Learning Outcome	Theory (05 hrs)	Practical (05 hrs)	Total Duration (10 Hrs)
1. Apply stress management techniques	1. Meaning and importance of stress management 2. Stress management techniques – physical exercise, yoga, meditation 3. Enjoying, going to vacations and holidays with family and friends 4. Taking nature walks	3. Exercises on stress management techniques – yoga, meditation, physical exercises 4. Preparing a write-up on an essay on experiences during a holiday trip	06
2. 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 goals 2. Planning of an activity 3. Executing tasks in a specific period, with no help or directives 4. Demonstration on the qualities required for working independently	04
Total			10

Unit 3: Information and Communication Technology Skills– II

Learning Outcome	Theory (08 hrs)	Practical (12 hrs)	Total Duration (20 Hrs)
1. Distinguish between different operating systems	1. Classes of operating systems 2. Menu, icons and task bar on the desktop	1. Identification of task bar, icons, menu, etc. 2. Demonstration and practicing of creating,	17

	<ol style="list-style-type: none"> 3. File concept, file operations, file organization, directory structures, and file-system structures 4. Creating and managing files and folders 	renaming and deleting files and folders, saving files in folders and sub-folders, restoring files and folders from recycle bin	
2. Apply basic skills for care and maintenance of computer	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Demonstration of the procedures to be followed for cleaning, care and maintenance of hardware and software 	03
Total			20

Unit 4: Entrepreneurial Skills - II

Learning Outcome	Theory (06 hrs)	Practical (09 hrs)	Total Duration (15 Hrs)
1. List the characteristics of successful entrepreneur	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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

Unit 5: Green Skills - II			
Learning Outcome	Theory (07 hrs)	Practical (03 rs)	Total Duration (10 Hrs)
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 citizenship, including the conservation and protection of environmental values 4. Preparing models on rain water harvesting, drip / sprinkler irrigation, vermicompost, solar energy, solar cooker, etc.	10
Total			10

Part B: Vocational Skills

S. No.	Units	Duration (Hrs.)
1	Unit 1 : Automobile and its components	20
2	Unit 2 : Automobile Service Tools	20
3	Unit 3 : Vehicle Servicing	20
4	Unit 4 : Customer sales care	20
5	Unit 5 : Innovation and Development	15
	Total	95

Unit 1: Automobile and its components			
Learning Outcome	Theory	Practical	Duration (20 Hrs)
Identify Chassis Body Engine Lubrication System Cooling System Fuel Supply system Transmission System	Chassis Body and Use Engine and its components Lubrication System Cooling System Fuel Supply system	Able to identify and describe Chassis Able to understand details of Chassis Able to identify and describe Body Able to understand details	20

Front axle Steering Rear axle Suspension System Wheel and Tyre Brake	Transmission System Front axle Steering Rear axle Suspension System Wheels and Tyres Brake	of body Able to identify and describe Engine and its type Able to understand details of engine	
Total			20

Unit 2: Automobile Service tools

Learning Outcome	Theory	Practical	Duration (20 Hrs)
Identify Hand Tools, Measuring Tools, Electrical Tools, Special Tools, Service, Workshop machine.	Able to identify hand tools used. Drawing of hand tools. Measurement tools make, model, specifications Parts/Components of measurement tools. Electrical tools make, model, specifications Parts/Components of electrical tools, Special tools make, model, specifications Parts/Components of Special tools Service workshop equipment make, model, specifications Parts/Components of hand tools	Identify and handle hand tools Parts/Components of hand tools Able to identify measurement tools used. Drawing of measurement tools Able to identify electrical tools used Drawing of electrical tools Able to identify special tools Drawing of special tools, Able to identify Service workshop equipment Drawing of hand tools	20
Total			20

Unit 3: Vehicle Servicing

Learning Outcome	Theory	Practical	Duration (20 Hrs)
Washing of a Vehicle Changing of oil and oil filter Changing of air filter Changing of fuel filter Changing of Coolant	Washing of a Vehicle Changing of oil and oil filter Changing of air filter Change the fuel filter Changing of coolant	Able to understand washing procedure of a Vehicle. Able to do washing of a Vehicle Able to understand procedure of changing of oil and oil filter Able to understand procedure of air filter changing Able to change air filter Able to change the oil	20

		and oil filter Able to understand procedure of air filter changing Able to change air filter Able to understand procedure of fuel filter changing Able to change fuel filter Able to understand procedure of changing of coolant Able to change coolant	
<i>Total</i>			20

Unit 4: Customer Sales care

Learning Outcome	Theory	Practical	Duration (20 Hrs)
Customer service	Customer service	Able to understand about meaning of customer service Able to list duties of a automobile sales person	20
Total			20

Unit 5: Innovation and development

Learning Outcome	Theory	Practical	Duration (15 Hrs)
Explain about Innovation and Development in automobile	Importance of innovation and development	Able to identify innovation in automobile. Able to understand about new development	15
Total			15

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 like . Automobile show room, Automobile Fair, Different section of show room and service centre, Telecaller centre, Service centre

Visit a Automobile showroom and service centre and observe the following: During the visit, students should obtain the following information from the owner or the supervisor of the showroom:

1. Activity of Automobile show room
2. Different section of show room and service centre
3. Service centre activity
4. Automobile Fair

5. Different section of showroom
6. Number of Vehicle sold annually
7. Power transmission section of engine
8. Type of engine and technology
9. Automation system
10. Denting and painting section
11. Electrical section
12. Auto electrical system

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 and Equipment's and Training materials

- Compressor
- Spark plug cleaning machine
- Screw driver (Star & minus)
- Double End Ring spanner
- Open and Close (Fix) spanner
- Socket (Goti) spanner
- Plier
- Monkey plier
- Outer and inner plier
- Tool box
- T spanner (tommy) set
- Allen key set
- Tappet puller
- Tappet gauge
- Multimeter
- Tachometer
- Hammer
- Compressor gauge
- Oil measure container, funnel
- Oil can
- Tools trolley
- Magnetic bar

Basic Tool Box

- Workshop tool/equipment: drain pan, oil can, jack hydraulic, bench vice, ramp, pneumatic tool, equipment stands, etc.
- Pressure indicators: oil pressure gauges, tire pressure gauges etc.
- Specialty wrenches: alignment wrenches, chain wrenches, locking wrenches, lug wrenches etc.
- Trim or moulding tools: carbon scrapers, gasket scrapers, scrapers, spoons etc.
- Measuring equipment: Vernier, calipers, micrometer, feeler gauges, multi-metre, flow meter, temp gauge, dial gauge etc.
- Other tools: hand tools, power tools, lifting and jacking equipment, tensioning equipment, brake roller tester, chassis dynamometer, suspension activation, security activator etc.
- Tools for other tasks such as cleaning of vehicles, tools, equipment and workshop
- Personal Protection Equipment: Gloves, Safety Shoes, goggles, ear plugs, boiler suit

- Workshop Safety: Fire extinguishers
 - First Aid
- Consumable items:** cotton waste, petrol/diesel, lubricant, grease, storage containers, air filters, oil filters, spark plugs, glow plugs etc etc
- Worn out/ defective/ spurious samples: seal, gaskets, clutch plate, brake shoes, brake pads, spark plug, oil filter, air cleaner etc.

Teaching Aids:

- Charts, CBTs, LCD Projector and Videos.
- Cleaning equipment and solutions
- SOP Charts on safety norms and drills
- Charts of dos and Don'ts in work area.
- Audio/video on English, hindi or local language course
- Reference books
- Work books
- Study for Soft Skills
- CBTs on working on computer
- Computer system
- UPS
- Vehicle service manuals, vehicle hand book, job card, work order, completion material requests, Technical reference books.

List of cut section working model

S.No.	Name of working automotive model	Quantity	Price
1.	Four stroke working petrol engines or diesel engines model	1	30,000
3	Old second hand Radiator	1	2000
4	Old second hand pressure cap	1	150
5	Old second hand thermostat	1	2000
6	Old second hand disc brake	1	1000
8	Four wheeler old second hand vehicle	1	50000
9	MPFI working model system	1	5000
10	Old second hand motor cycle	1	10000

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.	Degree in Automobile Engineering /Mechanical Engineering from a recognized Institute /University, with at least 1 year work / teaching experience	<ul style="list-style-type: none"> • Effective communication skills (oral and written) • Basic computing skills. 	18-37 years (as on Jan. 01 (year)) Age relaxation to be provided as per Govt. rules.

	Or Diploma in Automobile Engineering /Mechanical Engineering from a recognized Institute /University, with at least 3 year work / teaching experience		
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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.

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