

# **LEARNING OUTCOME BASED VOCATIONAL CURRICULUM**

**JOB ROLE: Auto Service Technician  
(Two and Three Wheeler)**

**(QUALIFICATION PACK: Ref. Id. ASC/Q1411)**

**SECTOR: Automotive**

**Classes 11 and 12**

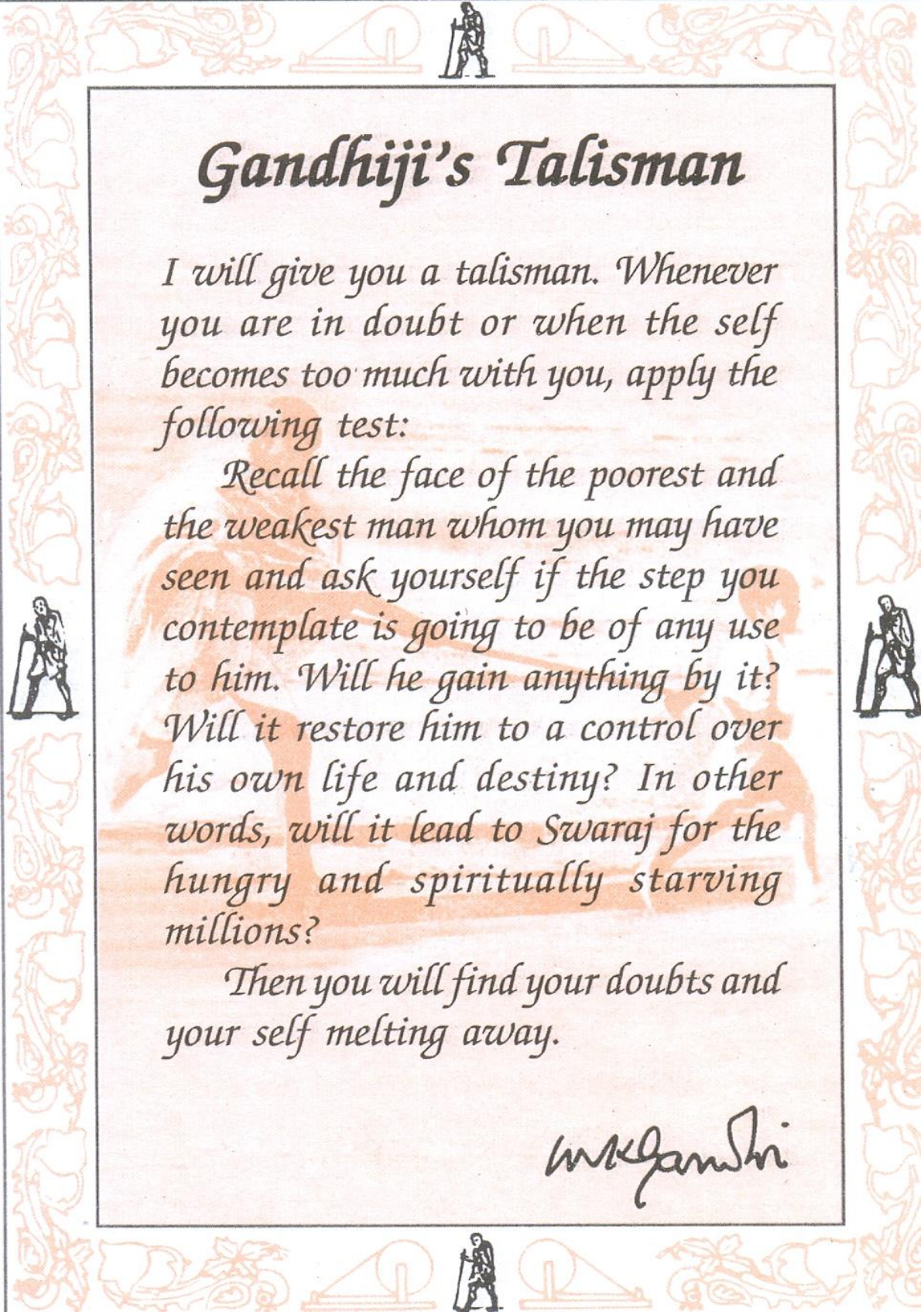


**PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION**

**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  
(Two and Three wheeler, ASC/Q1411)**

**February, 2022**

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## FOREWORD

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The Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE), a constituent unit of National Council of Educational Research and Training (NCERT) is spearheading the efforts of developing learning outcome based vocational curriculum and courseware aimed at integrating both vocational and general qualifications to open pathways of career progression for students. It is a part of Vocationalisation of Education under *Samagra Shiksha*. The PSS Central Institute of Vocational Education (PSSCIVE) is developing curricula under the project approved by the Project Approval Board (PAB) of *Samagra Shiksha* of Ministry of Education (MoE), Govt. of India. The main purpose of the learning outcome based vocational curriculum is to bring about improvement in teaching-learning process and working competencies through learning outcomes embedded in the vocational subject.

It is a matter of great pleasure to introduce this learning outcome based vocational curriculum as part of the vocational training package for the job role of **Auto Service Technician (Two and Three Wheeler) (ASC/Q1411)**. The curriculum has been developed for the higher 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. DINESH PRASAD SAKLANI

*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 Education (MoE), Government of India introduced the revised Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education in 2012 with the aim 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. The scheme was subsumed in *Samagra Shiksha* in 2018 along with other schemes of school education. For spearheading the Vocationalisation Education, the PSS Central Institute of Vocational Education (PSSCIVE) was entrusted the responsibility to develop learning outcome based vocational curriculum, 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 needs 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 vocational curriculum 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 50 job roles in various sectors, besides the curricula developed for 100 job roles.

We extend our gratitude to all the contributors for selflessly sharing their precious knowledge, acclaimed expertise, valuable time and positively responding to our request for development of curriculum. We are grateful to MoE and NCERT for the financial support and cooperation in realising the objective of providing learning outcome based vocational curriculum and courseware to the States and other stakeholders under the PAB (Project Approval Board) approved project of *Samagra Shiksha* of Ministry of Education (MoE) Government of India.

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.

Dr. Deepak Paliwal  
*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 *Samagra Shiksha* and the officials of the Ministry of Education (MoE), Government of India for the financial support to the project for development of curricula.

We are grateful to the Director, National Council of Educational Research & Training (NCERT) for his support and guidance. We also acknowledge the contributions of our colleagues at the Technical Support Group of Samagra Shiksha, MoE, 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 for their earnest effort and contributions in the development of this learning outcome based vocational curriculum. Their names are acknowledged in the list of contributors.

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- Auto Service Technician (Two and Three wheeler) ASC/Q1411**

The present curriculum Automotive Service Technician job role is related to Level L-4. This course fulfils the needs of the students willing to learn activities relating to the Auto 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 OBJECTIVES:** 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 two wheelers like motorcycles, scooters, three wheeler etc
- Understanding the mechanism of major system of two and three wheelers, vehicle chassis, internal combustion engine, electrical systems, workshop tools and equipments etc.

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

**COURSE LEVEL:** This is a course for class XI and XII. On completion of this course, a student can take up a higher-level course in the area of Automotive Sector.

**COURSE DURATION: 600 hrs**

Class 11 : 300 hrs

Class 12 : 300 hrs

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**Total : 600 hrs**

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## 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 11 and 12 opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for Class 11 is as follows:

<b>CLASS 11</b>			
<b>Units</b>		<b>No. of Hours for Theory and Practical 300</b>	<b>Max. Marks for Theory and Practical 100</b>
<b>Part A</b>	<b>Employability Skills</b>		
	Unit 1: Communication Skills-III	25	<b>10</b>
	Unit 2: Self-management Skills-III	25	
	Unit 3: Information and Communication Technology Skills-III	20	
	Unit 4 : Entrepreneurial Skills-III	25	
	Unit 5 : Green Skills-III	15	
		<b>110</b>	
<b>Part B</b>	<b>Vocational Skills</b>		
	Unit 1: History and Introduction of Automobile	15	<b>40</b>
	Unit 2: Introduction of Two wheeler	25	
	Unit 3: Workshop tools and Equipment	30	
	Unit 4: Major Systems of Two wheelers and its components	40	
	Unit 5: Servicing and Maintenance	40	
	Unit 6: Environment & Safety	15	
		<b>165</b>	<b>40</b>
<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
		<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>15</b>	<b>15</b>
	<b>Grand Total</b>	<b>300</b>	<b>100</b>

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

<b>CLASS 12</b>			
<b>Units</b>		<b>No. of Hours for Theory and Practical 300</b>	<b>Max. Marks for Theory and Practical 100</b>
<b>Part A</b>	<b>Employability Skills</b>		
	Unit 1 : Communication Skills-IV	20	10
	Unit 2 : Self-management Skills-IV	10	
	Unit 3 : Information and Communication Technology Skills-IV	20	
	Unit 4 : Entrepreneurial Skills-IV	15	
	Unit 5 : Green Skills-IV	10	
		<b>110</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
	Unit 1: History and Introduction of Automobile	15	30
	Unit 2 : Introduction of Three Wheeler	25	
	Unit 3: Workshop tools and Equipment	30	
	Unit 4: Major Systems of Three Wheelers and its components	40	
	Unit-5 Servicing and Maintenance	40	
	Unit 6: Environment and Safety	15	



		<b>165</b>	<b>30</b>
<b>Part C</b>	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
		<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>15</b>	<b>15</b>
	<b>Grand Total</b>	<b>300</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 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**

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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)	3	2	2	13
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	2	3	2	14
3.	Application – (Use abstract information in concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, provide an example, or solve a problem)	0	2	1	07

4.	High Order Thinking Skills – (Analysis & Synthesis – Classify, compare, contrast, or differentiate between different pieces of information; Organize and/ or integrate unique pieces of information from a variety of sources)	0	2	0	04
5.	Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	0	1	0	02
	<b>Total</b>	<b>5x1=5</b>	<b>10x2=20</b>	<b>5x3=15</b>	<b>40 (20 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 11

#### Part A: Employability Skills

S.No.	Units	Duration (Hrs)
1.	Communication Skills - III	25
2.	Self-management Skills - III	25
3.	Information and Communication Technology Skills- III	20
4.	Entrepreneurial Skills - III	25
5.	Green Skills - III	15
	<b>Total</b>	<b>110</b>

UNIT 1: COMMUNICATION SKILLS – III			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. <b>Demonstrate knowledge of communication</b>	1. Introduction to communication 2. Importance of communication 3. Elements of communication 4. Perspectives in communication 5. Effective communication	1. Role-play on the communication process 2. Group exercise on factors affecting perspectives in communication 3. Classroom discussion on the 7Cs of effective communication 4. Chart making on elements of communication	<b>03</b>
2. <b>Demonstrate verbal communication</b>	1. Verbal communication 2. Public Speaking	1. Role-play of a phone conversation. 2. Group exercise on public speaking	<b>02</b>

<b>3. Demonstrate non-verbal communication</b>	<ol style="list-style-type: none"> <li>1. Importance of non-verbal communication</li> <li>2. Types of non-verbal communication</li> <li>3. Visual communication</li> </ol>	<ol style="list-style-type: none"> <li>1. Role-play on non-verbal communication</li> <li>2. Group exercise on body language</li> <li>3. Group activity on methods of communication</li> </ol>	<b>02</b>
<b>4. Speak using correct pronunciation</b>	<ol style="list-style-type: none"> <li>1. Pronunciation basics</li> <li>2. Speaking properly</li> <li>3. Phonetics</li> <li>4. Types of sounds</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activities on practicing pronunciation</li> </ol>	<b>01</b>
<b>5. Apply an assertive communication style</b>	<ol style="list-style-type: none"> <li>1. Important communication styles</li> <li>2. Assertive communication</li> <li>3. Advantages of assertive communication</li> <li>4. Practicing assertive communication</li> </ol>	<ol style="list-style-type: none"> <li>1. Group discussion on communication styles</li> <li>2. Observing and sharing communication styles</li> </ol>	<b>03</b>
<b>6. Demonstrate the knowledge of saying no</b>	<ol style="list-style-type: none"> <li>1. Steps for saying 'No'</li> <li>2. Connecting words</li> </ol>	<ol style="list-style-type: none"> <li>1. Group discussion on how to respond</li> <li>2. Group activity on saying 'No'</li> </ol>	<b>02</b>
<b>7. Identify and use parts of speech in writing</b>	<ol style="list-style-type: none"> <li>1. Capitalisation</li> <li>2. Punctuation</li> <li>3. Basic parts of speech</li> <li>4. Supporting parts of speech</li> </ol>	<ol style="list-style-type: none"> <li>1. Group activity on identifying parts of speech</li> <li>2. Writing a paragraph with punctuation marks</li> <li>3. Group activity on constructing sentences</li> <li>4. Group activity on identifying parts of speech</li> </ol>	<b>03</b>
<b>8. Write correct sentences and paragraphs</b>	<ol style="list-style-type: none"> <li>1. Parts of a sentence</li> <li>2. Types of object</li> <li>3. Types of sentences</li> <li>4. Paragraph</li> </ol>	<ol style="list-style-type: none"> <li>1. Activity on writing sentences</li> <li>2. Activity on active and passive voice</li> </ol>	<b>02</b>

		3. Assignment on types of sentences	
<b>9. Communicate with people</b>	1. Greetings 2. Introducing self and others	1. Role-play on formal and informal greetings 2. Role-play on introducing someone 3. Practice greetings	<b>02</b>
<b>10. Introduce yourself to others and write about oneself</b>	1. Talking about self 2. Filling a form	1. Practice self-introduction and filling up forms 2. Practice self-introduction to others	<b>01</b>
<b>11. Develop questioning skill</b>	1. Main types of questions 2. Forming closed and open-ended questions	1. Practice exercise on forming questions 2. Group activity on framing questions	<b>01</b>
<b>12. Communicate information about family to others</b>	1. Names of relatives 2. Relations	1. Practice talking about family 2. Role-play on relations	<b>01</b>
<b>13. Describe habits and routines</b>	1. Concept of habits and routines	1. Discuss habits and routines 2. Group activity on describing routines	<b>01</b>
<b>14. Ask or give directions to others</b>	1. Asking for directions 2. Using landmarks	1. Role-play on asking and giving directions 2. Identifying symbols	<b>01</b>
Total			2 5

### UNIT 2: SELF-MANAGEMENT-III

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration
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			(25 hrs)
<b>1. Identify and analyze own strengths and weaknesses</b>	<ol style="list-style-type: none"> <li>1. Understanding self</li> <li>2. Techniques for identifying strengths and weaknesses</li> <li>3. Difference between interests and abilities</li> </ol>	<ol style="list-style-type: none"> <li>1. Activity on writing aims in life</li> <li>2. Prepare a worksheet on interests and abilities</li> </ol>	<b>03</b>
<b>2. Demonstrate personal grooming skills</b>	<ol style="list-style-type: none"> <li>1. Guidelines for dressing and grooming</li> <li>2. Preparing a personal grooming checklist</li> </ol>	<ol style="list-style-type: none"> <li>1. Activity on dressing and grooming standards</li> <li>2. Self-reflection on dressing and grooming</li> </ol>	<b>04</b>
<b>3. Maintain personal hygiene</b>	<ol style="list-style-type: none"> <li>1. Importance of personal hygiene</li> <li>2. Three steps to personal hygiene</li> <li>3. Essential steps of hand washing</li> </ol>	<ol style="list-style-type: none"> <li>1. Role-play on personal hygiene</li> <li>2. Assignment on personal hygiene</li> </ol>	<b>03</b>
<b>4. Demonstrate the knowledge of working in a team and participating in group activities</b>	<ol style="list-style-type: none"> <li>1. Describe the benefits of teamwork</li> <li>2. Working in a team</li> </ol>	<ol style="list-style-type: none"> <li>1. Assignment on working in a team</li> <li>2. Self-reflection on teamwork</li> </ol>	<b>03</b>
<b>5. Develop networking skills</b>	<ol style="list-style-type: none"> <li>1. Benefits of networking skills</li> <li>2. Steps to build networking skills</li> </ol>	<ol style="list-style-type: none"> <li>1. Activity on networking</li> <li>2. Assignment on networking skills</li> </ol>	<b>03</b>
<b>6. Describe the meaning and importance of self-motivation</b>	<ol style="list-style-type: none"> <li>1. Meaning of self-motivation</li> <li>2. Types of motivation</li> <li>3. Steps to building self-motivation</li> </ol>	<ol style="list-style-type: none"> <li>1. Activity on staying motivated</li> <li>2. Assignment on reasons hindering motivation</li> </ol>	<b>03</b>
<b>7. Set goals</b>	<ol style="list-style-type: none"> <li>1. Meaning of goals and purpose of goal-setting</li> <li>2. Setting SMART goals</li> </ol>	<ol style="list-style-type: none"> <li>1. Assignment on setting SMART goals</li> <li>2. Activity on developing long-term and short-term goals</li> </ol>	<b>03</b>
<b>8. Apply time management strategies and techniques</b>	<ol style="list-style-type: none"> <li>1. Meaning and importance of time management</li> <li>2. Steps for effective time management</li> </ol>	<ol style="list-style-type: none"> <li>1. Checklist for making preparation for daily activities</li> <li>2. Preparing To-do-list</li> </ol>	<b>03</b>
Total			2

**UNIT 3: INFORMATION AND COMMUNICATION TECHNOLOGY-III**

Learning Outcome	Theory (08 hrs)	Practical (12 hrs)	Durati on (20 hrs)
<b>1. Create a document on the word processor</b>	<ol style="list-style-type: none"> <li>1. Introduction to ICT</li> <li>2. Advantages of using a word processor.</li> <li>3. Work with Libre Office Writer</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration and practice of the following: <ul style="list-style-type: none"> <li>• Creating a new document</li> <li>• Typing text</li> <li>• Saving the text</li> <li>• Opening and saving file on Microsoft word/Libre Office Writer.</li> </ul> </li> </ol>	<b>02</b>
<b>2. Identify icons on the toolbar</b>	<ol style="list-style-type: none"> <li>1. Status bar</li> <li>2. Menu bar</li> <li>3. Icons on the Menu bar</li> <li>4. Multiple ways to perform a function</li> </ol>	<ol style="list-style-type: none"> <li>1. Work with a basic user interface of LibreOffice writer</li> <li>2. Working with Libre Office Writer or Microsoft Word</li> </ol>	<b>02</b>
<b>3. Save, close, open and print document</b>	<ol style="list-style-type: none"> <li>1. Save a word document</li> <li>2. Close</li> <li>3. Open an existing document</li> <li>4. Print</li> </ol>	<ol style="list-style-type: none"> <li>1. Perform the functions for saving, closing and printing documents on LibreOffice Writer</li> <li>2. Perform the functions on Microsoft Word</li> </ol>	<b>02</b>
<b>4. Format text in a word document</b>	<ol style="list-style-type: none"> <li>1. Change style and size of text</li> <li>2. Align text</li> <li>3. Cut, Copy, Paste</li> <li>4. Find and replace</li> </ol>	<ol style="list-style-type: none"> <li>1. Perform the functions of formatting on LibreOffice Writer</li> <li>2. Perform the functions of formatting on Microsoft Word</li> </ol>	<b>02</b>
<b>5. Check spelling and grammar in a word document</b>	<ol style="list-style-type: none"> <li>1. Use of spell checker</li> <li>2. Autocorrect</li> </ol>	<ol style="list-style-type: none"> <li>1. Perform the functions of checking spellings on LibreOffice Writer</li> <li>2. Perform the</li> </ol>	<b>02</b>

		functions of checking the spelling on Microsoft Word	
<b>6. Insert lists, tables, pictures, and shapes in a word document</b>	1. Insert bullet list 2. Number list 3. Tables 4. Pictures 5. Shapes	1. Perform the functions on LibreOffice Writer	<b>03</b>
<b>7. Insert header, footer and page number in a word document</b>	1. Insert header 2. Insert footer 3. Insert page number 4. Page count	1. Perform the functions on LibreOffice Writer 2. Perform the functions on Microsoft Word	<b>03</b>
<b>8. Make changes by using the track change option in a word document</b>	1. Tracking option 2. Manage option 3. Compare documents	1. Perform the functions on LibreOffice Writer 2. Perform the functions on Microsoft Word	<b>04</b>
Total			20

#### **UNIT 4: ENTREPRENEURIAL SKILLS – III**

Learning Outcome	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	Duration (25 hrs)
<b>1. Differentiate between different kinds of businesses</b>	1. Introduction to entrepreneurship 2. Types of business activities	1. Role-play on different kinds of businesses	<b>03</b>
<b>2. Describe the significance of entrepreneurial values</b>	1. Meaning of value 2. Values of an Entrepreneur 3. Case study on qualities of an entrepreneur	1. Role-play on qualities of an entrepreneur	<b>03</b>
<b>3. Demonstrate the attitudinal changes required to become an entrepreneur</b>	1. Difference between the attitude of entrepreneur and employee	1. Interviewing employees and entrepreneurs	<b>03</b>
<b>4. Develop thinking skills like an entrepreneur</b>	1. Problems of entrepreneurs 2. Problem-solving 3. Ways to think like an entrepreneur	1. Group activity on identifying and solving problems	<b>04</b>

<b>5. Generate business ideas</b>	<ol style="list-style-type: none"> <li>1. The business cycle</li> <li>2. Principles of idea creation</li> <li>3. Generating a business idea</li> <li>4. Case studies</li> </ol>	1. Group activity to create business ideas	<b>04</b>
<b>6. Describe customer needs and the importance of conducting a customer survey</b>	<ol style="list-style-type: none"> <li>1. Understanding customer needs</li> <li>2. Conducting a customer survey</li> </ol>	1. Conducting a customer survey	<b>04</b>
<b>7. Create a business plan</b>	<ol style="list-style-type: none"> <li>1. Importance of business planning</li> <li>2. Preparing a business plan</li> <li>3. Principles to follow for growing a business</li> <li>4. Case studies</li> </ol>	1. Activity on developing a business plan	<b>04</b>
Total			25

<b>UNIT 5: GREEN SKILLS – III</b>			
Learning Outcome	<b>Theory (07 hrs)</b>	<b>Practical (08 hrs)</b>	Duration (15 hrs)
<b>1. Describe the importance of the main sector of the green economy</b>	<ol style="list-style-type: none"> <li>1. Meaning of ecosystem, food chain and sustainable development</li> <li>2. Main sectors of the green economy- E-waste management, green transportation, renewal energy, green construction, and water management</li> </ol>	<ol style="list-style-type: none"> <li>1. Discussion on sectors of green economy</li> <li>2. Preparing posters on various sectors for promoting green economy</li> <li>3. Writing an essay or a short note on the important initiatives for promoting green economy.</li> </ol>	<b>06</b>
<b>2. Describe the main recommendations of policies for the green economy</b>	<ol style="list-style-type: none"> <li>1. Policies for a green economy</li> </ol>	1. Discussion on initiatives for promoting the green economy	<b>03</b>

<b>3. Describe the major green sectors/ areas and the role of various stakeholders in the green economy</b>	1. Stakeholders in the green economy	1. Group discussion on the role of stakeholders in the green economy 2. Preparation of posters on green sectors and their stakeholders 3. Making solar bulbs.	<b>03</b>
<b>4. Identify the role of government and private agencies in the green economy</b>	1. Role of the government in promoting a green economy 2. Role of private agencies in promoting green economy	1. Discussion on the role of Government and Private Agencies in promoting a green economy. 2. Posters on green sectors.	<b>03</b>
Total			15

### Part B: Vocational Skills

S. No.	Units	Duration (Hrs.)
1	History and Introduction of Automobile	15
2	Introduction of two wheeler	25
3	Workshop tools and Equipment	30
4	Major Systems of Two wheelers and its components	40
5	Servicing and Maintenance	40
6	Environment and Safety	15
	<b>Total</b>	<b>165</b>

#### UNIT 1: HISTORY AND INTRODUCTION OF AUTOMOBILE

Learning Outcome	Practical	Theory	Duration (15Hrs)
1. Describe the History and Introduction of Automobile	<ul style="list-style-type: none"> <li>• Identify the pictures of different two wheelers</li> <li>• Match the picture of two wheeler with their manufacture</li> <li>• Match the picture of two wheeler in chronological order</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of two wheeler</li> <li>• Two wheeler and manufacture Growth of automobile in two wheelers</li> </ul>	3
2. Invention of Two Wheeler	<ul style="list-style-type: none"> <li>• Collect the pictures of different two wheelers</li> <li>• Place the pictures in order of development and innovations</li> <li>• Highlight innovation w.r.t. two wheelers</li> </ul>	<ul style="list-style-type: none"> <li>• Development and Innovation</li> </ul>	6
3. Describe two wheeler	<ul style="list-style-type: none"> <li>• Prepare the chart showing growth of</li> </ul>	<ul style="list-style-type: none"> <li>• Collaboration between automobile</li> </ul>	6

scenarios in India	<p>two wheelers in last five years</p> <ul style="list-style-type: none"> <li>• Prepare a chart of joint ventures companies in India for two wheelers</li> <li>• Draw a neat table about Indian technical websites and organization related to automobile sector (Poster Activity)</li> <li>• Identify and match the logo's of different two wheelers companies</li> </ul>	<p>manufacturing company</p> <ul style="list-style-type: none"> <li>• Growth in two wheeler population</li> <li>• To know about two wheeler automobile companies</li> </ul>	
<b>Total</b>			<b>15</b>

## UNIT 2: INTRODUCTION OF TWO WHEELER

Learning Outcome	Practical	Theory	Duration (25 Hrs)
1. Describe Chassis- frame and Auto body its material	<ul style="list-style-type: none"> <li>• Identify different types of chassis-frame</li> <li>• Identify different types of major body parts</li> <li>• Identify different types of material used for chassis and body parts</li> </ul>	<ul style="list-style-type: none"> <li>• Know about the function of chassis and its types and uses</li> <li>• To know about body parts (Side panel, seat, Mud guard, fuel tank) and their functions and material used</li> </ul>	<b>7</b>
2. Identify and discuss Engine, transmission, Brakes, Suspension, steering, Lighting and horn, Wheel	<ul style="list-style-type: none"> <li>• Identify the Engine, transmission, Brakes, Suspension, steering, Lighting and horn, Wheel</li> </ul>	<ul style="list-style-type: none"> <li>• Engine, transmission, Brakes, Suspension, steering, Lighting and horn, Wheel</li> </ul>	<b>8</b>



and their function in two wheelers	<ul style="list-style-type: none"> <li>• Draw diagram of two wheeler with labelling</li> <li>• Place the given tags on Engine, transmission, Brakes, Suspension, steering, Lighting and horn, Wheel etc.</li> </ul>	and their function in two wheelers	
3. Identify and describe different type of accessories in two wheelers	<ul style="list-style-type: none"> <li>• Identify the different type of Accessories, mud guard, seat cover, Mobile holder and charging point, leg guard and Spare wheel, saree guard, utility box, Foot rest, Side view mirror etc.</li> <li>• Place the given tags on mud guard, seat cover, Mobile holder and charging point, leg guard and Spare wheel, saree guard, utility box, Foot rest, Side view mirror</li> </ul>	<ul style="list-style-type: none"> <li>• Accessories and their uses (Mud guard, seat cover, Mobile holder, leg guard and Spare wheel, saree guard, utility box, Foot rest, Side view mirror etc.)</li> </ul>	<b>10</b>
<b>Total</b>			<b>25</b>

### UNIT 3: WORKSHOP TOOLS AND EQUIPMENT

Learning Outcome	Practical	Theory	Duration (30Hrs)
1. Identify and describe of different types of Personal	<ul style="list-style-type: none"> <li>• Identify of different types of PPE</li> <li>• Practicing the use of Personal Protective</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction and requirement of Personal Protective Equipment (PPE) in workshop</li> </ul>	<b>3</b>

Protective Equipment (PPE)	Equipment (PPE) in workshop		
<p>2. Identify and describe of different types of Hand and special tool</p>	<ul style="list-style-type: none"> <li>• Identify of different types of hand tools ( open end spanners, double end ring spanners, socket spanners with accessories, T spanners, Screw Drivers, Hammers, Files, Mallet, Pliers, Bench Vice, Allen keys etc.)</li> <li>• Place the given tags on different hands tools ( open end spanners, double end ring spanners, socket spanners with accessories, T spanners, Screw Drivers, Hammers, Files, Mallet, Pliers, Bench Vice, Allen keys etc.)</li> <li>• Identification of different types of special tools ( Pullers, Torque Wrench, Spark Plug Wrench, Head Extractor, Dry Face holder, Drifts, Dies and tapes, Clutch Center Holder and Magnet Center Holder, Reamer, C-Clamp etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction and Uses of hand tools (open end spanners, double end ring spanners, socket spanners with accessories, T spanners, Screw Drivers, Hammers, Files, Mallet, Pliers, Bench Vice etc.)</li> <li>• Material used for tools</li> <li>• Introduction and uses of Special Tools( Pullers, Torque Wrench, Spark Plug Wrench, Head Extractor, Dry Face holder, Drifts, Dies and tapes, Clutch Center Holder and Magnet Center Holder, Reamer, C-Clamp etc.)</li> </ul>	<p><b>7</b></p>

<p>3. Identify and describe of different types of Measuring tool</p>	<ul style="list-style-type: none"> <li>• Identify of different types of measuring tools( Scale, Calipers (Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter etc.)</li> <li>• Place the given tags on different measuring tools - Scale, Calipers(Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter etc.</li> <li>• Practice on using different measuring tools - Scale, Calipers(Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction and uses of measuring tools - Scale, Calipers (Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter etc.</li> <li>• To know about how to use different measuring tools and purpose - Scale, Calipers (Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter, Hydro Meter etc.</li> </ul>	<p style="text-align: center;"><b>4</b></p>
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	Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter, Hydro Meter etc.		
4. Identify and describe of different types of Power Tool	<ul style="list-style-type: none"> <li>• Identification of different types of Power tools used in three wheeler Service Station (Pneumatic Gun, Grinder (Bench), Hand Drill machine, Air hoses blower etc.)</li> <li>• Prepare the line diagram of Power Lift, Pneumatic Gun</li> <li>• Practice on using different Power tools (Pneumatic Gun, Grinder (Bench), Hand Drill machine, Air hoses blower etc.) with safety precautions</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction and uses of Power tools (Pneumatic Gun, Grinder (Bench), Hand Drill machine, Air hoses blower etc.)</li> <li>• To know about how to use Power tools and safety precautions (Pneumatic Gun, Grinder (Bench), Hand Drill machine, Air hoses blower etc.)</li> </ul>	<b>6</b>
5. Identify and describe of different types of Diagnostic tool	<ul style="list-style-type: none"> <li>• Observation on use of Engine Diagnostic Tools for fault finding / Trouble shooting</li> <li>• Demonstration working of Diagnostic Tools</li> </ul>	<ul style="list-style-type: none"> <li>• Role of Diagnostic Tools, Procedure to connect Diagnostic Tools</li> </ul>	<b>5</b>
6. Identify and describe of	<ul style="list-style-type: none"> <li>• Identify the different Service</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction and uses of Service</li> </ul>	<b>5</b>

different Service equipments	<p>Equipment's Power lift, Air compressor, washer, machine, Tyre replacement and inflation kit, etc.</p> <ul style="list-style-type: none"> <li>• Demonstrate the working of different Service Equipment's used in workshop</li> </ul>	<p>Equipments with safety measures</p> <ul style="list-style-type: none"> <li>• Functions of the different service equipments used in workshop with safety Precautions</li> </ul>	
<b>Total</b>			<b>30</b>

#### **UNIT 4: MAJOR SYSTEMS OF TWO WHEELERS AND ITS COMPONENTS**

<b>Learning Outcome</b>	<b>Practical</b>	<b>Theory</b>	<b>Duration (40 Hrs)</b>
1. Describe working of engine and its components	<ul style="list-style-type: none"> <li>• Identification of engine based on two stroke and four stroke cycle</li> <li>• Identify the components of engine</li> <li>• Cylinder Block, cylinder head</li> <li>• Piston, piston rings, gudgeon pin and lock Valves and Cam Shaft, Connecting Rod Crank assembly, Carburettor / Fuel Injectors Spark Plug, Engine Oil Filter, Engine mounting bush</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of engine working and classification</li> <li>• Introduction of the engine and its components (Cylinder Block, cylinder head Piston, piston rings, gudgeon pin and lock Valves and Cam Shaft, Connecting Rod</li> <li>• Crankshaft, Carburettor / Fuel Injector system, Spark Plug, Engine Oil Filter Engine mounting bush, crank case.</li> <li>• Know about the functions and</li> </ul>	<b>5</b>

		working of an engine components	
2. Describe Air intake and exhaust system	<ul style="list-style-type: none"> <li>• Identification of air intake system</li> <li>• Identification and function of the different components used in the air intake system(air hose, filter, induction pipe, carburettor, Sensors</li> <li>• Identification of exhaust system</li> <li>• Identification and function of the different components used in the exhaust system parts (Exhaust packing, Exhaust pipe, Sensors, catalytic convertor, muffler, tail pipe, silencer heat protector)</li> </ul>	<ul style="list-style-type: none"> <li>• Function of the air intake system</li> <li>• Location and functions of components used in air intake system air hose, filter, induction pipe, carburettor</li> <li>• Function of the Exhaust system</li> <li>• Location and functions of components used in exhaust system (Exhaust packing, Exhaust pipe, Sensors, catalytic convertor, muffler, tail pipe, silencer heat protector)</li> </ul>	<b>4</b>
3. Describe about working system of fuel system	<ul style="list-style-type: none"> <li>• Identification of Fuel System</li> <li>• Identification and function of the different components used in the Fuel system(Fuel tank, Fuel tank cap, Fuel filter and Element, Fuel Cock, Fuel Line, Carburetor or</li> <li>• Fuel Injection pump, Fuel Injector and ECU)</li> </ul>	<ul style="list-style-type: none"> <li>• Function of the Fuel system</li> <li>• Location and functions of components used in Fuel System (Fuel tank, Fuel tank cap, Fuel filter and Element, Fuel Cock, Fuel Line, Carburetor or</li> <li>• Fuel Injection pump, Fuel Injector and ECU)</li> </ul>	<b>4</b>
4. Describe about working system of	<ul style="list-style-type: none"> <li>• Identification of Ignition System</li> </ul>	<ul style="list-style-type: none"> <li>• Function and types (Conventional, Electronic,</li> </ul>	<b>3</b>

Ignition system	<ul style="list-style-type: none"> <li>• Identification and function of the different components used in the Ignition System (Ignition Switch, Battery, Magneto, Coil, High Tension cable, Spark Plug)</li> </ul>	<p>Condenser Discharge CDI)of the Ignition System</p> <ul style="list-style-type: none"> <li>• Location and function of the different components used in the Ignition System (Ignition Switch, Battery, Magneto, Coil, High Tension cable, Spark Plug)</li> </ul>	
5. Describe about working system of Cooling system	<ul style="list-style-type: none"> <li>• Identification of Cooling System</li> <li>• Identification and function of the different components used in the Cooling System (Air Fins on Cylinder Block and Head,</li> <li>• Forced Air Cooling System fan and crawling head.</li> <li>• Liquid Cooling System: Radiator, radiator Pressure Cap, Coolant, pump, Thermostat</li> </ul>	<ul style="list-style-type: none"> <li>• Function of the Cooling System</li> <li>• Location and function of the different components used in the Cooling System (Air Fins on Cylinder Block and Head,</li> <li>• Forced Air Cooling System fan and crawling head.</li> <li>• Liquid Cooling System: Radiator, radiator Pressure Cap, Coolant, pump, Thermostat</li> </ul>	<b>4</b>
6. Describe about working system of Lubrication system	<ul style="list-style-type: none"> <li>• Line Diagram of Lubrication System</li> <li>• Trace the following :</li> <li>• Oil dipstick, filer cap</li> <li>• Oil Level Indicator on Engine</li> <li>• Drain Plug</li> <li>• Oil Pump</li> <li>• Oil Filter</li> </ul>	<ul style="list-style-type: none"> <li>• Importance of the Lubrication System</li> <li>• Location and function of the Oil dipstick, Filer cap, Oil level Indicator, Drain Plug and Oil Pump.</li> </ul>	<b>3</b>
7. Describe about working	<ul style="list-style-type: none"> <li>• Identification of types of</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction and function of</li> </ul>	<b>3</b>



system of Transmission system	<p>Transmission System used Gear and gear less</p> <ul style="list-style-type: none"> <li>• Identification of Transmission System components clutch, gear box, final drive (belt, shaft, chain)</li> </ul>	<p>Transmission System clutch, gear box, final drive (belt, shaft, chain), gear selection while driving</p>	
8. Describe about working system of Suspension System and Steering control	<ul style="list-style-type: none"> <li>• Identification of Suspension System components( Spring, Shock Absorber)</li> <li>• Inspection of Shock Absorber(Condition of Bushes, Oil Leakage, Smooth Stroke)</li> <li>• To check the free movement of handle bar</li> </ul>	<ul style="list-style-type: none"> <li>• Importance and Function of suspension system</li> <li>• To know about steering handle bar</li> </ul>	<b>3</b>
9. Describe about working system of Brake system	<ul style="list-style-type: none"> <li>• Identify different types of Brake System( Drum and Disc Brake)</li> <li>• Identify components of brake system</li> <li>• Drum Brake: Brake Paddle, Brake Lever, Brake cable, Brake, Combo brake, Rod, Drum Brake, Brake Shoes</li> <li>• Disc Brake:- Brake Disc/ Rotor, Caliper Assembly, Brake pads, Master Cylinder, Brake Pipes, Bleeding nipple,</li> <li>• ABS System: ECU, Sensors,</li> </ul>	<ul style="list-style-type: none"> <li>• Importance and Function of Brake System</li> <li>• Function of Different components of brake System</li> <li>• Drum Brake: Brake Paddle, Brake Lever, Brake cable, Brake, Combo brake, Rod, Drum Brake, Brake Shoes</li> <li>• Disc Brake: Brake Disc/ Rotor, Caliper Assembly, Brake pads, Master Cylinder, Brake Pipes, Bleeding nipple,</li> </ul>	<b>3</b>

	<ul style="list-style-type: none"> <li>• Electro Hydraulic unit</li> <li>• Place the given tags on different brakes components as per the system</li> <li>• Check Working of Brake System</li> </ul>	<ul style="list-style-type: none"> <li>• ABS System: ECU, Sensors,</li> <li>• Electro Hydraulic unit</li> </ul>	
10. Describe about working system of Electrical system	<ul style="list-style-type: none"> <li>• Identify different electrical system (Charging, Starting, Ignition, Lighting, Horn, Accessories)</li> <li>• Locate the different Components of electrical system</li> <li>• Charging system: Magneto, Regulator Unit, battery and its wiring harness(fuse, relay and switches) connections</li> <li>• Starting system: Starter Relay, Starter Motor, Wiring harness</li> <li>• Ignition System Ignition Switch, Battery, Magneto, Coil, High Tension cable, Spark Plug</li> <li>• Lighting System: Headlight, Tail light, Indicator and buzzer, Indication lights and gauges(Speedometer, Tachometer, Odometer, Fuel gauge, Engine Check Lamp)</li> </ul>	<ul style="list-style-type: none"> <li>• Different electrical system :(Charging, Starting, Ignition, Lighting, Horn, Accessories)</li> <li>• Locate the different Components of electrical system</li> <li>• Charging system: Magneto, Regulator Unit, battery and its wiring harness(fuse, relay and switches) connections</li> <li>• Starting system: Starter Relay, Starter Motor, Wiring harness</li> <li>• Ignition System Ignition Switch, Battery, Magneto, Coil, High Tension cable, Spark Plug</li> <li>• Lighting System: Headlight, Tail light, Indicator and buzzer, Indication lights and gauges(Speedometer, Tachometer, Odometer, Fuel gauge, Engine Check Lamp)</li> </ul>	<b>5</b>

	<ul style="list-style-type: none"> <li>• Horn: Relay, Wiring harness</li> </ul>	<ul style="list-style-type: none"> <li>• Horn: Relay, Wiring harness</li> </ul>	
11. Describe about Electric two wheeler	<ul style="list-style-type: none"> <li>• Identify the major component of electric bike (charging unit, battery, wiring harness, wheel motor, Accelerator, relays</li> </ul>	<ul style="list-style-type: none"> <li>• Need of the electric bike and functions of different components, charging unit, battery, wiring harness, wheel motor, Accelerator, relays</li> </ul>	<b>3</b>
<b>Total</b>			<b>40</b>

#### **UNIT 5: SERVICING AND MAINTENANCE**

<b>Learning Outcome</b>	<b>Practical</b>	<b>Theory</b>	<b>Duration (40 Hrs)</b>
1. Describe the two wheeler workshop and different job role	<ul style="list-style-type: none"> <li>• Draw Layout of two wheeler workshop: (Reception, workshop manager room, Customer waiting lounge, wash room working bays, washing area, spare parts counter, Tool room, back office, parking, vehicle receiving and delivery area, Security room)</li> <li>• Describe Duties of workshop manager, service advisor, Floor Supervisor, Technical Expert, service technician, washing boys, final inspector, Accountant / cashier tele-caller</li> </ul>	<ul style="list-style-type: none"> <li>• Familiarization with Layout of two wheeler workshop (Reception, workshop manager room, Customer waiting lounge, wash room working bays, washing area, spare parts counter, Tool room, back office, parking, vehicle receiving and delivery area, Security room)</li> <li>• Familiarization with Duties of workshop manager, service advisor, Floor Supervisor, Technical Expert, service technician, washing boys, final inspector, Accountant / cashier, tele-caller</li> </ul>	<b>5</b>

<p>2. Describe about two wheeler owner and workshop Manual</p>	<ul style="list-style-type: none"> <li>• Collect Owner’s Manual of different makes with help of student and read the Manual in class room (Specification, importance tip, vehicle service record, periodic maintenance schedule chart, Service coupon and service jobs warranty term and conditions)</li> <li>• Visit and observe workshop functioning. Read service / repair manual. Also read other manual if available.</li> </ul>	<ul style="list-style-type: none"> <li>• Familiarization with Owner’s Manual of different makes with help of student and read the Manual in class room (Specification, importance tip, vehicle service record, periodic maintenance schedule chart, Service coupon and service jobs warranty term and conditions )</li> <li>• To know about workshop functioning and getting information available in different manual</li> </ul>	<p><b>4</b></p>
<p>3. Describe about job card filling and taking inventory</p>	<ul style="list-style-type: none"> <li>• Collect the specimen copy of the job card</li> <li>• Fill in the job card with the help of trainer (After taking inventory of the vehicle – quantity of Fuel, tool kit, Accessories, any damage mark of the vehicle etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Familiarization with the contents of the job card and need of taking inventory.</li> </ul>	<p><b>4</b></p>
<p>4. Describe and doing servicing and minor repair of two wheeler</p>	<ul style="list-style-type: none"> <li>• To carry out Pre delivery inspection(PDI)</li> <li>• (Washing, lubrication, control cable adjustment, inspection of the lightening system,</li> </ul>	<ul style="list-style-type: none"> <li>• Importance and how to carryout PDI</li> <li>• To understand the importance of the maintenance services and how to carryout</li> </ul>	<p><b>20</b></p>

	<p>air checking and proper functioning of all systems)</p> <ul style="list-style-type: none"> <li>• To carry out free and Paid services as per the OEM (original equipment manufacturer) maintenance schedule.</li> <li>• Carry out following minor repair Replacement of the control cables Accelerator, speedometer, Brakes, clutch, choke, seat lock.</li> <li>• Engine Oil change, brake oil, transmission oil, fork fluid, lubrication of chain</li> <li>• Replacement of the Air filter, fuel filter, oil filter, Brake shoes / pads, clutch plates, spark plug, bulbs</li> <li>• Adjustment of clutch brake paddle/ lever, Accelerator cable, chain, head light Aiming, setting of horn,</li> <li>• Engine tuning (idle Speed, idle mixture, spark plug gap, wheel Removing)</li> </ul>	<ul style="list-style-type: none"> <li>• Why to Carry out following minor repair Replacement of the control cables Accelerator, speedometer, Brakes, clutch, choke, seat lock.</li> <li>• Engine Oil change, brake oil, transmission oil, fork fluid, lubrication of chain</li> <li>• Replacement of the Air filter, fuel filter, oil filter, Brake shoes / pads, clutch plates, spark plug, bulbs</li> <li>• Adjustment of clutch brake paddle/ lever, Accelerator cable, chain, head light Aiming, setting of horn,</li> <li>• Engine tuning (idle Speed, idle mixture, spark plug gap, wheel Removing )</li> </ul>	
5. Tips for extension of	<ul style="list-style-type: none"> <li>• Make a list for extension of vehicle</li> </ul>	<ul style="list-style-type: none"> <li>• Importance of the services provided</li> </ul>	<b>2</b>

vehicle Age and better fuel mileage /efficiency	Age and better fuel mileage / efficiency	and use of vehicle for better fuel mileage / efficiency	
6. Describe about Warranty Inspections	<ul style="list-style-type: none"> <li>• Prepare the list of the component which are not covered under warranty</li> <li>• Limitations of the warranty</li> <li>• Inspection of the component before warranty claim for ascertaining if it is a manufacturing defect or defective workmanship</li> </ul>	<ul style="list-style-type: none"> <li>• To know about the terms and condition of the warranty (k.m/time, availing all preventive maintenances, use of only recommended lubricants and consumable etc.)</li> </ul>	<b>5</b>
<b>Total</b>			<b>40</b>

#### **UNIT 6: ENVIRONMENT AND SAFETY**

<b>Learning Outcome</b>	<b>Practical</b>	<b>Theory</b>	<b>Durati on (15 Hrs)</b>
1. Describe the role of Environment and pollution	<ul style="list-style-type: none"> <li>• Identify and list the important rules of environment and pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Importance of environment and pollution</li> </ul>	<b>3</b>
2. Explain about disposal of hazards material	<ul style="list-style-type: none"> <li>• To visit the workshop to observe Conversion of the grey water caused by washing of the vehicle before connecting to drain</li> </ul>	<ul style="list-style-type: none"> <li>• To know about hazardous material used/produced in the workshop while servicing (Used lubricant, Coolant, Asbestos Dust, Filters, Bulbs, Battery etc.) and to know the government policies its safe disposal.</li> </ul>	<b>5</b>

<p>3. Explain about Emission Norms BS / EU standards</p>	<ul style="list-style-type: none"> <li>• Visit to Workshop/ PUC centre and observe pollution checking Procedure. Note down pollutant level (CO, HC, NOX and Particulate Matters / Dust Particles) in more than two vehicles compare with the normal values</li> <li>• To find out a bike to meeting with BS-6 norms and observe the differences as compared to BS-4 bike</li> <li>• Draw a table showing differences in BS-4 and BS-6 bikes</li> </ul>	<ul style="list-style-type: none"> <li>• To know about pollutants (CO, HC, NOX and Particulate Matters / Dust Particles) and its effect on environment.</li> <li>• To know about pollution norms as per BS-4 and BS-6 .</li> <li>• To know about modifications(Engine, fuel ) done in the bike to make it BS-6 compliant</li> <li>• To know about reasons for adopting BS-6 skipping</li> <li>• BS-5 in our Country( to reduce pollutant)</li> </ul>	<p><b>3</b></p>
<p>4. Describe about road safety and First aid</p>	<ul style="list-style-type: none"> <li>• Describe the drivers role for road safety (Using of Helmet, following the road signs/signals, traffic rules, controlled driving, avoiding use of cell phone while driving, Not mixing drink and drive, use of hazard lights in case of stopping</li> </ul>	<ul style="list-style-type: none"> <li>• To know about traffic sign and signals, hazards of using cell phone, not wearing helmet while driving</li> <li>• To know about maintaining safe distance in between two vehicles in normal and hazards road conditions (distance travelled in 2 sec. and 4 seconds rule)</li> </ul>	<p><b>1</b></p>



	<p>vehicle for any reason etc.)</p> <ul style="list-style-type: none"> <li>• Taking extra precaution while driving on hazardous conditions (dim light/ night, rains/wet road driving on snow, ice, mud, gravels etc.)</li> <li>• Describe pedestrians role for road safety (not using headphone/ ear phone while walking on the road, using zebra road sign and traffic signals for crossing road )</li> <li>• Proper maintenance of the vehicle (Brake, tyre wear, tyre pressure, free moment of steering handle)</li> </ul>	<ul style="list-style-type: none"> <li>• To know about safe use of the roads (not using headphone/ ear phone while walking on the road, using zebra road sign and traffic signals for crossing road)</li> <li>• To know about maintenance of the vehicle for Proper control (Brake, tyre wear, tyre pressure, free moment of steering handle)</li> </ul>	
5. Discuss about Automotive Innovations	<ul style="list-style-type: none"> <li>• Visit to the two wheelers show room</li> <li>• Read the Auto journals, magazines and Internet site related to Automobile</li> </ul>	<ul style="list-style-type: none"> <li>• Identify the new Innovations in two wheelers</li> </ul>	<b>3</b>
<b>Total</b>			<b>15</b>

## Part A: Employability Skills

S. No.	Units	Duration in Hours
1.	Unit 1: Communication Skills – IV	25
2.	Unit 2: Self-management Skills – IV	25
3.	Unit 3: Basic ICT Skills – IV	20
4.	Unit 4: Entrepreneurial Skills – IV	25
5.	Unit 5: Green Skills – IV	15
	<b>Total</b>	<b>110</b>

<b>UNIT 1: COMMUNICATION SKILLS - IV</b>			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Demonstrate active listening skills	1. Active listening - listening skill, stages of active listening 2. Overcoming barriers to active listening	1. Demonstration of the factors affecting active listening 2. Preparing posters of steps for active listening 3. Role-play on negative effects of not listening actively	10
2. Identify the parts of speech	1. Parts of speech – using capitals, punctuation, basic parts of speech, supporting parts of speech	1. Group practice on identifying parts of speech 2. Group practice on constructing sentences	10
3. Write sentences	1. Writing skills to the following: <ul style="list-style-type: none"> <li>• Simple sentence</li> <li>• Complex sentence</li> <li>• Types of object</li> </ul> 2. Types of sentences <ul style="list-style-type: none"> <li>- Active and Passive sentences</li> <li>- Statement/ Declarative</li> </ul>	1. Group work on writing sentences and paragraphs 2. Practice writing sentences in the active or passive voice 3. Writing different types of sentence	5

	sentence - Question/ Interrogative sentence - Emotion/ Reaction or Exclamatory sentence - Order or Imperative sentence 3. Paragraph writing		
<b>Total</b>			<b>25</b>

<b>UNIT 2: SELF-MANAGEMENT SKILLS – IV</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Describe the various factors influencing motivation and positive attitude	1. Motivation and positive attitude 2. Intrinsic and extrinsic motivation 3. Positive attitude – ways to maintain positive attitude 4. Stress and stress management - ways to manage stress	1. Role-play on avoiding stressful situations 2. Activity on self-reflection	10
2. Describe how to become result oriented	1. How to become result oriented? 2. Goal setting – examples of result-oriented goals	1. Pair and share activities on the aim of life	5
3. Describe the importance of self-awareness and the basic personality traits, types and disorders	1. Steps towards self-awareness 2. Personality and basic personality traits 3. Common personality disorders- • Suspicious • Emotional and impulsive • Anxious 4. Steps to overcome personality disorders	1. Group discussion on self-awareness	10
<b>Total</b>			<b>25</b>

**UNIT 3: INFORMATION AND COMMUNICATION TECHNOLOGY SKILLS - IV**

<b>Learning Outcome</b>	<b>Theory (06 hrs)</b>	<b>Practical (14 hrs)</b>	<b>Duration (20 hrs)</b>
1. Identify the components of a spreadsheet application	1. Introduction to spreadsheet application - types of a spreadsheet, creating a new worksheet, components of a worksheet.	1. Group practice on working with LibreOffice	02
2. Perform basic operations in a spreadsheet	1. Opening workbook and entering data – types of data, steps to enter data, editing and deleting data in a cell 2. Selecting multiple cells 3. Saving the spreadsheet in various formats 4. Closing the spreadsheet 5. Opening the spreadsheet. 6. Printing the spreadsheet.	1. Group practice on working with data on LibreOffice Calc.	03
3. Demonstrate the knowledge of working with data and formatting text	1. Using a spreadsheet for addition – adding value directly, adding by using cell address, using a mouse to select values in a formula, using sum function, copying and moving formula 2. Need to format cell and content 3. Changing text style and font size 4. Align text in a cell 5. Highlight text	1. Demonstration of basic calculations in LibreOffice Calc. 2. Group practice on formatting a spreadsheet in LibreOffice Calc.	02
4. Demonstrate the knowledge of using advanced features in spreadsheet	1. Sorting data 2. Filtering data 3. Protecting spreadsheet with password	1. Group practice on sorting data in LibreOffice Calc	03
5. Make use of the software used for making slide presentations	1. Available software presentation 2. Steps to start LibreOffice Impress 3. Adding text to a presentation	1. Group practice on working with LibreOffice Impress tools 2. Group practice on creating a presentation in LibreOffice Impress	02

6. Open, close and save slide presentations	1. Open, Close, Save and Print a slide presentation	1. Practice exercises on steps to save, close, open and save a presentation	01
7. Demonstrate the operations related to slides and texts in the presentation	1. Working with slides and text in a presentation- adding slides to a presentation, deleting slides, adding and formatting text, highlighting text, aligning text, changing text colour	1. Group practice on working with font styles and types in LibreOffice Impress	04
8. Demonstrate the use of advanced features in a presentation	1. Advanced features used in a presentation 2. Inserting shapes in the presentation 3. Inserting clipart and images in a presentation 4. Changing slide layout	1. Group practice on working with slides in LibreOffice Impress	03
<b>Total</b>			<b>20</b>

#### **UNIT 4: ENTREPRENEURIAL SKILLS-IV**

<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Describe the concept of entrepreneurship and the types and roles and functions entrepreneur	1. Entrepreneurship and entrepreneur 2. Characteristics of entrepreneurship 3. Entrepreneurship-art and science 4. Qualities of a successful entrepreneur 5. Types of entrepreneurs 6. Roles and functions of an entrepreneur 7. What motivates an entrepreneur 8. Identifying opportunities and risk-taking 9. Startups	1. Group discussion on the topic “An entrepreneur is not born but created”. 2. Quiz on various aspects of entrepreneurship.	10
2. Identify the barriers to entrepreneurship	1. Barriers to entrepreneurship 2. Environmental barriers 3. No or faulty business plan 4. Personal barriers	1. Fishbowl of fears- group discussion about what we fear about entrepreneurship 2. Facing an Interview.	05
3. Demonstrate the knowledge of entrepreneurial	1. Entrepreneurial attitude 2. Entrepreneurial competencies	1. Group discussion on business ideas 2. Group practice on	

attitude and competencies	3. Decisiveness, 4. Initiative 5. Interpersonal skills- positive attitude, stress management 6. Perseverance 7. Organisational skills- time management, goal setting, efficiency, managing quality.	best out of waste 3. Group discussion on the topic of lets grow together 4. Group practice on a snowball fight. 5. Activity on rating friends and self for entrepreneurial qualities. 6. Playing games, such as “Who am I”.	10
<b>Total</b>			<b>25</b>

### UNIT 5: GREEN SKILLS-IV

<b>Learning Outcome</b>	<b>Theory (05 hrs)</b>	<b>Practical (10 hrs)</b>	<b>Duration (15 hrs)</b>
1. Identify the benefits of the green jobs	1. Green jobs 2. Benefits of green jobs 3. Green jobs in different sectors: <ul style="list-style-type: none"> <li>• Agriculture</li> <li>• Transportation</li> <li>• Water conservation</li> <li>• Solar and wind energy</li> <li>• Eco-tourism</li> <li>• Building and construction</li> <li>• Solid waste management</li> <li>• Appropriate technology</li> </ul>	1. Group discussion on the importance of green job.	8
2. State the importance of green jobs	1. Importance of green jobs in <ul style="list-style-type: none"> <li>• Limiting greenhouse gas emissions</li> <li>• Minimizing waste and pollution</li> <li>• Protecting and restoring ecosystems</li> <li>• Adapting to the effects of climate change</li> </ul>	1. Preparing posters on green jobs. 2. Activities on tree plantation.	7
<b>Total</b>			<b>15</b>

## Part B: Vocational Skills

<b>S. No.</b>	<b>Units</b>	<b>Duration (Hrs.)</b>
1	History and Introduction of Automobile	15
2	Introduction of Three Wheeler	25
3	Workshop tools and Equipment	30
4	Major Systems of Three Wheelers and its components	40
5	Servicing and Maintenance	40
6	Environment and Safety	15
	<b>Total</b>	<b>165</b>

<b>UNIT 1: HISTORY AND INTRODUCTION OF AUTOMOBILE</b>			
<b>Learning Outcome</b>	<b>Practical</b>	<b>Theory</b>	<b>Duration (15 Hrs)</b>
1. Describe the history and Introduction of Automobile	<ul style="list-style-type: none"> <li>• Identify the pictures of different three wheelers</li> <li>• Match the picture of three wheeler with their manufacture</li> <li>• Match the picture of three wheeler in chronological order</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of three wheeler</li> <li>• Three wheeler and manufacture Growth of automobile in three wheelers</li> </ul>	5
2. Invention of Three Wheeler	<ul style="list-style-type: none"> <li>• Collect the pictures of different three wheelers</li> <li>• Place the pictures in order of development and innovations</li> <li>• Highlight innovation w.r.t three wheeler</li> </ul>	Development and Innovation	5
3. Describe three wheeler scenario in India	<ul style="list-style-type: none"> <li>• Prepare the chart showing growth of three wheelers in last five years</li> </ul>	<ul style="list-style-type: none"> <li>• Collaboration between automobile manufacturing company</li> </ul>	5



	<ul style="list-style-type: none"> <li>• Prepare a chart of joint ventures companies in India for three wheelers</li> <li>• Draw a neat table about Indian technical websites and organization related to automobile sector (Poster Activity)</li> <li>• Identify and match the logo's of different Three wheelers companies</li> </ul>	<ul style="list-style-type: none"> <li>• Growth in three wheeler population</li> <li>• To know about three wheeler automobile companies</li> </ul>	
<b>Total</b>			<b>15</b>

<b>UNIT 2: INTRODUCTION OF THREE WHEELER</b>			
<b>Learning Outcome</b>	<b>Practical</b>	<b>Theory</b>	<b>Duration (25 Hrs)</b>
1. Describe Chassis-frame and Auto body its material	<ul style="list-style-type: none"> <li>• Identify different types of chassis-frame</li> <li>• Identify different types of major body parts</li> <li>• Identify different types of material used for chassis and body parts</li> </ul>	<ul style="list-style-type: none"> <li>• Know about the function of chassis and its types and uses</li> <li>• To know about body parts (Side panel, seat, Mud guard, fuel tank) and their functions and material used</li> </ul>	<b>5</b>
2. Identify and discuss Engine, transmission, Brakes, Suspension, steering, Lighting and horn, Wheel and their	<ul style="list-style-type: none"> <li>• Identify the Engine, transmission, Brakes, Suspension, steering, Lighting and horn, Wheel</li> <li>• Draw diagram of three wheeler with labelling</li> <li>• Place the given tags on Engine, transmission, Brakes, Suspension,</li> </ul>	<ul style="list-style-type: none"> <li>• Engine, transmission, Brakes, Suspension, steering, Lighting and horn, Wheel and their function in three wheelers</li> </ul>	<b>10</b>

function in three wheelers	steering, Lighting and horn, Wheel etc.		
3. Identify and describe different type of accessories in three wheelers	<ul style="list-style-type: none"> <li>Identify the different type of Accessories, mud guard, seat cover, Mobile holder and charging point, leg guard and Spare wheel, saree guard, utility box, Foot rest, Side view mirror etc.</li> <li>Place the given tags on mud guard, seat cover, Mobile holder and charging point, leg guard and Spare wheel, saree guard, utility box, Side view mirror</li> </ul>	<ul style="list-style-type: none"> <li>Accessories and their uses (Mud guard, seat cover, Mobile holder, leg guard and Spare wheel, saree guard, utility box, Side view mirror etc.)</li> </ul>	<b>10</b>
<b>Total</b>			<b>25</b>

### UNIT 3: WORKSHOP TOOLS AND EQUIPMENT

<b>Learning Outcome</b>	<b>Practical</b>	<b>Theory</b>	<b>Duration (30 Hrs)</b>
1. Identify and describe of different types of Personal Protective Equipment (PPE)	<ul style="list-style-type: none"> <li>Identify of different types of PPE</li> <li>Practicing the use of Personal Protective Equipment (PPE) in workshop</li> </ul>	<ul style="list-style-type: none"> <li>Introduction and requirement of Personal Protective Equipment (PPE) in workshop</li> </ul>	<b>4</b>
2. Identify and describe of different types of Hand and special tool	<ul style="list-style-type: none"> <li>Identify of different types of hand tools ( open end spanners, double end ring spanners, socket spanners with accessories, T spanners, Screw Drivers, Hammers, Files, Mallet, Pliers,</li> </ul>	<ul style="list-style-type: none"> <li>Introduction and Uses of hand tools (open end spanners, double end ring spanners, socket spanners with accessories, T spanners, Screw Drivers, Hammers, Files,</li> </ul>	<b>6</b>

	<p>Bench Vice, Allen keys etc.)</p> <ul style="list-style-type: none"> <li>• Place the given tags on different hands tools (open end spanners, double end ring spanners, socket spanners with accessories, T spanners, Screw Drivers, Hammers, Files, Mallet, Pliers, Bench Vice, Allen keys etc.)</li> <li>• Identification of different types of special tools (Pullers, Torque Wrench, Spark Plug Wrench, Head Extractor, Dry Face holder, Drifts, Dies and tapes, Clutch Center Holder and Magnet Center Holder, Reamer, C-Clamp etc.)</li> </ul>	<p>Mallet, Pliers, Bench Vice etc.)</p> <ul style="list-style-type: none"> <li>• Material used for tools</li> <li>• Introduction and uses of Special Tools (Pullers, Torque Wrench, Spark Plug Wrench, Head Extractor, Dry Face holder, Drifts, Dies and tapes, Clutch Center Holder and Magnet Center Holder, Reamer, C-Clamp etc.)</li> </ul>	
<p>3. Identify and describe of different types of Measuring tool</p>	<ul style="list-style-type: none"> <li>• Identify of different types of measuring tools (Scale, Calipers (Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter etc.)</li> <li>• Place the given tags on different measuring tools</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction and uses of measuring tools (Scale, Calipers (Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter etc.)</li> </ul>	<b>5</b>

	<p>Scale, Calipers (Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter etc.)</p> <ul style="list-style-type: none"> <li>• Practice on using different measuring tools (Scale, Calipers (Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter, Hydro Meter etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• To know about how to use different measuring tools and purpose Scale, Calipers (Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter, Hydro Meter etc.)</li> </ul>	
<p>4. Identify and describe of different types of Power Tool</p>	<ul style="list-style-type: none"> <li>• Identification of different types of Power tools used in three wheeler Service Station (Pneumatic Gun, Grinder (Bench), Hand Drill machine, Air hoses blower etc.)</li> <li>• Prepare the line diagram of Power Lift, Pneumatic Gun</li> <li>• Practice on using different Power tools (Pneumatic Gun, Grinder (Bench), Hand Drill machine,</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction and uses of Power tools (Pneumatic Gun, Grinder (Bench), Hand Drill machine, Air hoses blower etc.)</li> <li>• To know about how to use Power tools and safety precautions (Pneumatic Gun, Grinder (Bench), Hand Drill machine, Air hoses blower etc.)</li> </ul>	<b>5</b>

	Air hoses blower etc.) with safety precautions		
5. Identify and describe of different types of Diagnostic tool	<ul style="list-style-type: none"> <li>• Observation on use of Engine Diagnostic Tools for fault finding / Trouble shooting</li> <li>• Demonstration working of Diagnostic Tools</li> </ul>	<ul style="list-style-type: none"> <li>• Role of Diagnostic Tools, Procedure to connect Diagnostic Tools</li> </ul>	<b>5</b>
6. Identify and describe of different Service equipment's	<ul style="list-style-type: none"> <li>• Identify the different Service Equipment's Power lift, Air compressor, washer, machine, Tyre replacement and inflation kit, etc.</li> <li>• Demonstrate the working of different Service Equipment's used in workshop</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction and uses of Service Equipment's with safety measures</li> <li>• Functions of the different service equipment's used in workshop with safety Precautions</li> </ul>	<b>5</b>
<b>Total</b>			<b>30</b>

#### **UNIT 4: MAJOR SYSTEMS OF THREE WHEELERS AND ITS COMPONENTS**

<b>Learning Outcome</b>	<b>Practical</b>	<b>Theory</b>	<b>Duration (40 Hrs)</b>
1. Describe working of engine and its components	<ul style="list-style-type: none"> <li>• Identification of engine based on four stroke cycle</li> <li>• Identification of engine based on fuel used CNG/LPG, petrol, diesel</li> <li>• Identify the components of engine</li> <li>• Cylinder Block, cylinder head</li> <li>• Piston, piston rings, gudgeon pin and lock Valves and</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of engine working principle classification and its Specifications (Bore, stroke, engine capacity, power and torque).</li> <li>• To know about CNG/LPG, petrol, diesel Engine and differences in design</li> <li>• Introduction of the engine and its</li> </ul>	<b>5</b>

	<p>Cam Shaft, Connecting Rod Crank assembly, Carburetor / Fuel Injectors Spark Plug, Engine Oil Filter, Engine mounting bush</p>	<p>components (Cylinder Block, cylinder head Piston, piston rings, gudgeon pin and lock Valves and Cam Shaft, Connecting Rod</p> <ul style="list-style-type: none"> <li>• Crankshaft, Carburetor / Fuel Injector system, Spark Plug, Engine Oil Filter Engine mounting bush, crank case.</li> <li>• Know about the functions and working of an engine component</li> </ul>	
<p>2. Describe Air intake and exhaust system</p>	<ul style="list-style-type: none"> <li>• Identification of air intake system</li> <li>• Identification and function of the different components used in the air intake system (air hose, filter, induction pipe, carburetor, Sensors</li> <li>• Identification of exhaust system</li> <li>• Identification and function of the different components used in the exhaust system parts (Exhaust packing, Exhaust pipe, Sensors, catalytic convertor, muffler, tail pipe,</li> </ul>	<ul style="list-style-type: none"> <li>• Function of the air intake system</li> <li>• Location and functions of components used in air intake system air hose, filter, induction pipe, carburetor</li> <li>• Function of the Exhaust system</li> <li>• Location and functions of components used in exhaust system (Exhaust packing, Exhaust pipe, Sensors, catalytic convertor, muffler, tail pipe, silencer heat protector)</li> </ul>	<b>3</b>

	silencer heat protector)		
3. Describe about working system of fuel system	<ul style="list-style-type: none"> <li>• Identification of Fuel System</li> <li>• Identification and function of the different components used in the Fuel system (Fuel tank, Fuel tank cap, Fuel filter and Element, Fuel Cock, Fuel Line, Carburetor or</li> <li>• Fuel Injection pump, Fuel Injector and ECU)</li> </ul>	<ul style="list-style-type: none"> <li>• Function of the Fuel system</li> <li>• Location and functions of components used in Fuel System (Fuel tank, Fuel tank cap, Fuel filter and Element, Fuel Cock, Fuel Line, Carburetor or</li> <li>• Fuel Injection pump, Fuel Injector and ECU)</li> </ul>	<b>3</b>
4. Describe about working system of Ignition system	<ul style="list-style-type: none"> <li>• Identification of Ignition System</li> <li>• Identification and function of the different components used in the Ignition System (Ignition Switch, Battery, Magneto, Coil, High Tension cable, Spark Plug)</li> </ul>	<ul style="list-style-type: none"> <li>• Function and types (Conventional, Electronic, Condenser Discharge CDI) of the Ignition System</li> <li>• Location and function of the different components used in the Ignition System (Ignition Switch, Battery, Magneto, Coil, High Tension cable, Spark Plug)</li> </ul>	<b>4</b>
5. Describe about working system of Cooling system	<ul style="list-style-type: none"> <li>• Identification of Cooling System</li> <li>• Identification and function of the different components used in the Cooling System</li> </ul>	<ul style="list-style-type: none"> <li>• Function of the Cooling System</li> <li>• Location and function of the different components used in the Cooling</li> </ul>	<b>4</b>

	<p>(Air Fins on Cylinder Block and Head,</p> <ul style="list-style-type: none"> <li>• Forced Air Cooling System fan and crawling head.</li> <li>• Liquid Cooling System: Radiator, radiator Pressure Cap, Coolant, pump, Thermostat</li> </ul>	<p>System (Air Fins on Cylinder Block and Head,</p> <ul style="list-style-type: none"> <li>• Forced Air Cooling System fan and crawling head.</li> <li>• Liquid Cooling System: Radiator, radiator Pressure Cap, Coolant, pump, Thermostat</li> </ul>	
6. Describe about working system of Lubrication system	<ul style="list-style-type: none"> <li>• Line Diagram of Lubrication System</li> <li>• Trace the following:</li> <li>• Oil dipstick, filer cap</li> <li>• Oil Level Indicator on Engine</li> <li>• Drain Plug</li> <li>• Oil Pump</li> <li>• Oil Filter</li> </ul>	<ul style="list-style-type: none"> <li>• Importance of the Lubrication System</li> <li>• Location and function of the Oil dipstick, Filer cap, Oil level Indicator, Drain Plug and Oil Pump.</li> </ul>	<b>3</b>
7. Describe about working system of Transmission system	<ul style="list-style-type: none"> <li>• Identification of types of Transmission System used Gear</li> <li>• Identification of Transmission System components clutch, gear box, final drive (belt, shaft, chain)</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction and function of Transmission System clutch, gear box, final drive (belt, shaft, chain), gear selection while driving</li> </ul>	<b>4</b>
8. Describe about working system of Suspension System and Steering control	<ul style="list-style-type: none"> <li>• Identification of Suspension System components (Spring, Shock Absorber)</li> <li>• Inspection of Shock Absorber (Condition of Bushes, Oil Leakage, Smooth Stroke)</li> </ul>	<ul style="list-style-type: none"> <li>• Importance and Function of suspension system</li> <li>• To know about steering handle bar</li> </ul>	<b>3</b>



	<ul style="list-style-type: none"> <li>• To check the free movement of handle bar</li> </ul>		
9. Describe about working system of Brake system	<ul style="list-style-type: none"> <li>• Identify different types of Brake System (Drum and Disc Brake)</li> <li>• Identify components of brake system</li> <li>• Drum Brake: Brake Paddle, Brake Lever, Brake cable, Brake, Combo brake, Rod, Drum Brake, Brake Shoes</li> <li>• Disc Brake: - Brake Disc/ Rotor, Calliper Assembly, Brake pads, Master Cylinder, Brake Pipes, Bleeding nipple,</li> <li>• ABS System: - ECU, Sensors,</li> <li>• Electro Hydraulic unit</li> <li>• Place the given tags on different brakes components as per the system</li> <li>• Check Working of Brake System</li> </ul>	<ul style="list-style-type: none"> <li>• Importance and Function of Brake System</li> <li>• Function of Different components of brake System</li> <li>• Drum Brake: Brake Paddle, Brake Lever, Brake cable, Brake, Combo brake, Rod, Drum Brake, Brake Shoes</li> <li>• Disc Brake: - Brake Disc/ Rotor, Calliper Assembly, Brake pads, Master Cylinder, Brake Pipes, Bleeding nipple,</li> <li>• ABS System: - ECU, Sensors,</li> <li>• Electro Hydraulic unit</li> </ul>	<b>4</b>
10. Describe about working system of Electrical system	<ul style="list-style-type: none"> <li>• Identify different electrical system</li> <li>• (Charging, Starting, Ignition, Lighting, Horn, Accessories)</li> <li>• Locate the different Components of electrical system</li> <li>• Charging system:</li> </ul>	<ul style="list-style-type: none"> <li>• Different electrical system</li> <li>• (Charging, Starting, Ignition, Lighting, Horn, Accessories)</li> <li>• Locate the different Components of electrical system</li> </ul>	<b>4</b>

	<ul style="list-style-type: none"> <li>• Magneto, Regulator Unit, battery and its wiring harness (fuse, relay and switches) connections</li> <li>• Starting system:</li> <li>• Starter Relay, Starter Motor, Wiring harness</li> <li>• Ignition System</li> <li>• Ignition Switch, Battery, Magneto, Coil, High Tension cable, Spark Plug</li> <li>• Lighting System:</li> <li>• Headlight, Tail light, Indicator and buzzer, Indication lights and gauges (Speedometer, Tachometer, Odometer, Fuel gauge, Engine Check Lamp)</li> <li>• Horn: Relay, Wiring harness</li> </ul>	<ul style="list-style-type: none"> <li>• Charging system:</li> <li>• Magneto, Regulator Unit, battery and its wiring harness (fuse, relay and switches) connections</li> <li>• Starting system:</li> <li>• Starter Relay, Starter Motor, Wiring harness</li> <li>• Ignition System</li> <li>• Ignition Switch, Battery, Magneto, Coil, High Tension cable, Spark Plug</li> <li>• Lighting System:</li> <li>• Headlight, Tail light, Indicator and buzzer, Indication lights and gauges (Speedometer, Tachometer, Odometer, Fuel gauge, Engine Check Lamp)</li> <li>• Horn: Relay, Wiring harness</li> </ul>	
11. Describe about Electric three wheeler	<ul style="list-style-type: none"> <li>• Identify the major component of E-rickshaw (charging unit, battery, wiring harness, wheel motor, Accelerator, relays</li> </ul>	<ul style="list-style-type: none"> <li>• Need of the electric bike and functions of different components, charging unit, battery, wiring harness, wheel motor, Accelerator, relays</li> </ul>	<b>3</b>
<b>Total</b>			<b>40</b>

**UNIT 5: SERVICING AND MAINTENANCE**

<b>Learning Outcome</b>	<b>Practical</b>	<b>Theory</b>	<b>Duration (40 Hrs)</b>
1. Describe the three wheeler workshop and different job role	<ul style="list-style-type: none"><li>• Draw Layout of three wheeler workshop</li><li>• (Reception, workshop manager room, Customer waiting lounge, wash room working bays, washing area, spare parts counter, Tool room, back office, parking, vehicle receiving and delivery area, Security room)</li><li>• Describe Duties of workshop manager, service advisor, Floor Supervisor, Technical Export, service technician, washing boys, final inspector, Accountant / cashier tele-caller</li></ul>	<ul style="list-style-type: none"><li>• Familiarization with Layout of three wheeler workshop (Reception, workshop manager room, Customer waiting lounge, wash room working bays, washing area, spare parts counter, Tool room, back office, parking, vehicle receiving and delivery area, Security room)</li><li>• Familiarization with Duties of workshop manager, service advisor, Floor Supervisor, Technical Export, service technician, washing boys, final inspector, Accountant / cashier, tele-caller</li></ul>	<b>7</b>
2. Describe about three wheeler owner and workshop Manual	<ul style="list-style-type: none"><li>• Collect Owner's Manual of different makes with help of student and read the Manual in class room (Specification, importance tip, vehicle service</li></ul>	<ul style="list-style-type: none"><li>• Familiarization with Owner's Manual of different makes with help of student and read the Manual in class room (Specification,</li></ul>	<b>5</b>

	<p>record, periodic maintenance schedule chart, Service coupon and service jobs warranty term and conditions)</p> <ul style="list-style-type: none"> <li>• Visit and observe workshop functioning. Read service / repair manual. Also read other manual if available.</li> </ul>	<p>importance tip, vehicle service record, periodic maintenance schedule chart, Service coupon and service jobs warranty term and conditions)</p> <ul style="list-style-type: none"> <li>• To know about workshop functioning and getting information available in different manual</li> </ul>	
3. Describe about job card filling and taking inventory	<ul style="list-style-type: none"> <li>• Collect the specimen copy of the job card</li> <li>• Fill in the job card with the help of trainer (After taking inventory of the vehicle – quantity of Fuel, tool kit, accessories, any damage mark of the vehicle etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Familiarization with the contents of the job card and need of taking inventory.</li> </ul>	<b>3</b>
4. Describe and doing servicing and minor repair of three wheeler	<ul style="list-style-type: none"> <li>• To carry out Pre delivery inspection (PDI)</li> <li>• (Washing, lubrication, control cable adjustment, inspection of the lightening system, air checking and proper functioning of all systems)</li> <li>• To carry out free and Paid services as per the OEM (original equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Importance and how to carryout PDI</li> <li>• To understand the importance of the maintenance services and how to carryout</li> <li>• Why to Carry out following minor repair Replacement of the control cables Accelerator, speedometer,</li> </ul>	<b>20</b>

	<p>manufacturer) maintenance schedule.</p> <ul style="list-style-type: none"> <li>• Carry out following minor repair Replacement of the control cables Accelerator, speedometer, Brakes, clutch, choke, seat lock.</li> <li>• Engine Oil change, brake oil, transmission oil, fork fluid, lubrication of chain</li> <li>• Replacement of the Air filter, fuel filter, oil filter, Brake shoes / pads, clutch plates, spark plug, bulbs</li> <li>• Adjustment of clutch brake paddle/ lever, Accelerator cable, chain, head light Aiming, setting of horn,</li> <li>• Engine tuning (idle Speed, idle mixture, spark plug gap, wheel Removing)</li> </ul>	<p>Brakes, clutch, choke, seat lock.</p> <ul style="list-style-type: none"> <li>• Engine Oil change, brake oil, transmission oil, fork fluid, lubrication of chain</li> <li>• Replacement of the Air filter, fuel filter, oil filter, Brake shoes / pads, clutch plates, spark plug, bulbs</li> <li>• Adjustment of clutch brake paddle/ lever, Accelerator cable, chain, head light Aiming, setting of horn,</li> <li>• Engine tuning (idle Speed, idle mixture, spark plug gap, wheel Removing)</li> </ul>	
5. Tips for extension of vehicle Age and better fuel mileage/ efficiency	<ul style="list-style-type: none"> <li>• Make a list for extension of vehicle Age and better fuel mileage / efficiency</li> </ul>	<ul style="list-style-type: none"> <li>• Importance of the services provided and use of vehicle for better fuel mileage / efficiency</li> </ul>	<b>3</b>
6. Describe about Warranty Inspections	<ul style="list-style-type: none"> <li>• Prepare the list of the component which are not</li> </ul>	<ul style="list-style-type: none"> <li>• To know about the terms and</li> </ul>	<b>2</b>

	covered under warranty <ul style="list-style-type: none"> <li>• Limitations of the warranty</li> <li>• Inspection of the component before warranty claim for ascertaining if it is a manufacturing defect or defective workmanship</li> </ul>	condition of the warranty <ul style="list-style-type: none"> <li>• (k.m/time, availing all preventive maintenances, use of only recommended lubricants and consumable etc.)</li> </ul>	
<b>Total</b>			<b>45</b>

### UNIT 6: ENVIRONMENT AND SAFETY

<b>Learning Outcome</b>	<b>Practical</b>	<b>Theory</b>	<b>Duration (15 Hrs)</b>
1. Describe the role of Environment and pollution	<ul style="list-style-type: none"> <li>• Identify and list the important rules of environment and pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Importance of environment and pollution</li> </ul>	<b>1</b>
2. Describe about disposal of hazards material	<ul style="list-style-type: none"> <li>• To visit the workshop to observe Conversion of the grey water caused by washing of the vehicle before connecting to drain</li> </ul>	<ul style="list-style-type: none"> <li>• To know about hazardous material used/produced in the workshop while servicing (Used lubricant, Coolant, Asbestos Dust, Filters, Bulbs, Battery etc.) and to know the government policies its safe disposal.</li> </ul>	<b>2</b>
3. Describe about Emission Norms BS / EU standards	<ul style="list-style-type: none"> <li>• Visit to Workshop/ PUC centre and observe pollution checking Procedure. Note down pollutant level (CO, HC, NOX and Particulate</li> </ul>	<ul style="list-style-type: none"> <li>• To know about pollutants (CO, HC, NOX and Particulate</li> <li>• Matters / Dust Particles) and its</li> </ul>	<b>4</b>

	<p>Matters / Dust Particles) in more than two vehicles compare with the normal values</p> <ul style="list-style-type: none"> <li>• To find out a bike to meeting with BS-6 norms and observe the differences as compared to BS-4 bike</li> <li>• Draw a table showing differences in BS-4 and BS-6 bikes</li> </ul>	<p>effect on environment.</p> <ul style="list-style-type: none"> <li>• To know about pollution norms as per BS-4 and BS-6 .</li> <li>• To know about modifications (Engine, fuel) done in the bike to make it BS-6 compliant</li> <li>• To know about reasons for adopting BS-6 skipping</li> <li>• BS-5 in our Country (to reduce pollutant)</li> </ul>	
<p>4. Describe about road safety and First aid</p>	<ul style="list-style-type: none"> <li>• Describe the driver's role for road safety (Using of Helmet, following the road signs/signals, traffic rules, controlled driving, avoiding use of cell phone while driving, Not mixing drink and drive, use of hazard lights in case of stopping vehicle for any reason etc.)</li> <li>• Taking extra precaution while driving on hazardous conditions (dim light/ night, rains/wet road driving on snow,</li> </ul>	<ul style="list-style-type: none"> <li>• To know about traffic sign and signals, hazards of using cell phone, not wearing helmet while driving</li> <li>• To know about maintaining safe distance in between two vehicles in normal and hazards road conditions (distance travelled in 2 sec. and 4 seconds rule)</li> <li>• To know about safe use of the roads (not using headphone/ ear phone while walking on the</li> </ul>	<p><b>8</b></p>

	ice, mud, gravels etc.) <ul style="list-style-type: none"> <li>• Describe pedestrian's role for road safety (not using headphone/ ear phone while walking on the road, using zebra road sign and traffic signals for crossing road)</li> <li>• Proper maintenance of the vehicle (Brake, tyre wear, tyre pressure, free moment of steering handle)</li> </ul>	road, using zebra road sign and traffic signals for crossing road) <ul style="list-style-type: none"> <li>• To know about maintenance of the vehicle for Proper control (Brake, tyre wear, tyre pressure, free moment of steering handle)</li> </ul>	
<b>Total</b>			<b>15</b>

## 6. ORGANISATION OF FIELD VISITS

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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. Tele caller centre activities
4. Service centre
5. Automobile Fair
6. Different section of showroom
7. Number of Vehicle sold annually
8. Sale procedure
9. Manpower engaged
10. Total expenditure of showroom



11. Total annual income
12. Profit/Loss (Annual)
13. Any other information

## **7. LIST OF EQUIPMENT AND MATERIALS**

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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
- Pneumatic gun
- Air pressure gun
- Spark plug cleaning machine
- Fork Lift
- 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
- CO Machine /Emission check machine
- Clutch puller
- Hammer
- Compressor gauge
- Oil measure container, funnel
- Oil can
- Tools trolley
- Magnetic bar
- Stud extractor
- Arbour press

## **Basic Tool Box**

- Workshop tool/equipment: drain pan, oil can, jack hydraulic, bench vice, ramp, pneumatic tool, air compressor, special maintenance tools, bins/racks, trolley, equipment stands, etc.
- Serviceable training Vehicle: 2 wheeler and 3 wheelers
- Aggregates, Assemblies/ sub-assemblies, cut sections and Working Models:
- Engines and fuel system (diesel, petrol, electrical, gas etc.)
- Cooling system Radiator, pressure cap, thermostate, water pump
- Emission and exhaust system- Mufler, Catalytic convertor,
- Clutch assembly –pressure plate, clutch plate, bell housing and centrifugal clutch
- Transmission /Transaxle (manual, variomatic etc.)
- Disc & drum brakes system, master cylinder, wheel cylinder, caliper assembly, brake pad, brake shoe
- Suspension system- Hydraulic shock absorber, springs (coil spring, torsion bar)
- Tyres and wheel alignment
- Electrical, ignition, electronic and air-conditioning system etc.
- Pressure indicators: fuel pressure testers, manifold gauge sets, oil pressure gauges, tire pressure gauges etc.
- Pullers: Ball joint separators, bearing pullers, gear puller tools, slide hammers 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: cotton waste, petrol/diesel, lubricant, grease, storage containers, air filters, oil filters, spark plugs, glow plugs etc etc
- Vehicle service manuals, vehicle hand book, job card, work order, completion material requests, Technical reference books.
- Samples: oil seals, sealants, fittings, gaskets, fasteners etc

- Worn out/ defective/ spurious samples: seal, gaskets, clutch plate, brake shoes, brake pads, spark plug, oil filter, air cleaner etc.
- Vehicle service manuals, vehicle hand book, work order/job card, Technical reference books.
- 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
- Internet connection

## **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:

<b>S.No.</b>	<b>Qualification</b>	<b>Minimum Competencies</b>	<b>Age Limit</b>
<b>1.</b>	Degree in Automobile or Mechanical Engineering from a recognized Institute /University, with at least 1-year work / teaching experience Or Diploma in Automobile or Mechanical Engineering from a recognized Institute /University, with at least 3-year work / teaching experience Or	<ul style="list-style-type: none"> <li>• Effective communication skills (oral and written)</li> <li>• Basic computing skills.</li> </ul>	18-37 years (as on Jan. 01 (year)) Age relaxation to be provided as per Govt. rules.

	B.Voc in Automotive with at least 2 year of 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.

## **9. LIST OF CONTRIBUTORS**

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