

Competency Based Curriculum Class 9th to 12th (NSQF I to IV)

Course : Automobile Service Technician (For job roles of Mechanic, Car Washer, Auto-Electrician, etc.)



Developed by:
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PSS Central Institute of Vocational Education

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Shyamla Hills, Bhopal – 462 013, MP, India

CURRICULUM –Automobile Service Technician (Mechanic, car washer, auto electrician etc) for Class 9th to 12th

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Preface

Ministry of Human Resource Development, Government of India developed the National Skill Qualification Framework (NSQF) to introduce vocational courses from class 9th onwards. The NSQF organizes qualifications according to a series of levels of knowledge and skills. These levels are defined in terms of learning outcomes i.e., the competencies (knowledge, skills and attitude) which the learners must possess regardless of whether they were acquired through formal, non-formal or informal education and training system. Qualifications are made up of occupational standards for specific areas of learning units or unit of competency. Units of competency are the specification of knowledge and skill and the application of that knowledge and skill to the standard of performance expected in the workplace. The unit of competency or National Occupation Standards comprising generic and technical competencies an employee should possess are laid down by the Sector Skill Council of the respective economic or social sector.

Competency is defined in terms of what a person is required to do (performance), under what conditions it is done (conditions) and how well it is to be done (standards). It can be broadly categorized into foundational, practical and reflexive competencies. Generic competencies are considered essential for a person to participate effectively in the workforce, whereas technical competencies are an individual's knowledge and expertise in the specific group task and its processes and its rules and regulations.

The competency based curriculum is broken down into coherent parts known as Units. Each unit is further broken down into knowledge and skills on the basis of which evidence is to be provided by the learner and the evaluation is to be done by the teacher or trainer.

PSSCIVE which is part of NCERT New Delhi is mandated by Government of India as a apex R&D Institute for Vocational Education. The institute has taken up development of Curriculum and courseware for class 9th to 12th to introduce vocational courses in Secondary and senior secondary schools in of the country.

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10. Teacher's qualifications
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About the Course

The present material consists of curriculum related to Level L-1 to L-4 for the Automobile service sector. This will fulfill the needs of the students willing to learn activities relating to the Automobile Service Sector. Any student/ entrepreneur willing to start an Automobile Service Sector 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.

This curriculum deals with the concept of testing and repairing and servicing automobiles such as cars, trucks, motorcycles, scooters etc. For the perfect blend of manufacturing and designing automobiles, Automobile Engineering uses the features of different elements of Engineering such as mechanical, electrical, electronic, software and safety engineering To become a proficient automobile technician, specialized training is essential and it is a profession which requires a lot of hard work, dedication, determination and commitment. It involves understanding the mechanism of vehicle chassis, internal combustion engine, electrical systems, Motor transport affairs, workshop technology. PSSCIVE has taken lead in development of curriculum and learning material for the Automobile Sector for all level in collaboration with the Automobile Skill Development Corporation (ASDC).

After successfully completing class 9th, 10th, 11th and 12th students will be able to perform job roles mentioned in the course and pass out will be able to pursue higher level diploma degree a post graduate in Automobile Technology field.

2. Objectives of the course

Prepare student about various activities related to automobile servicing of a four wheeler Orient students about various methods and technique used in automobile servicing

3. Course structure

This subject will be taught like other subject in school as per designed time table.

4. Classroom activities

Class room activity will be conducted as per standard procedure. Activity given in curriculum will be implemented by teacher.

5. Practical activities

Practical activity will be conducted as per standard procedure. Activity given in curriculum will be implemented by the teacher.

6. Certification

Certification will be awarded by school board of the respective state.

7. Units

Curriculum

Automobile Service Technician

AUTO-SRV L1-NQ

NSQF Level I - Class IX

Name of Module: Automobile Service Technician

Module Overview:

Student should be able to identify all types of vehicles & their applications, all major systems of a vehicle, introduction to maintenance of vehicles. They will be introduced to various aspects of road safety & environmental issues.

Name and Code of Units

Unit Code	Unit Title	Total Hours
AUTOT-L1-01	History and Evolution of Automobiles	10
AUTO-L1-02	Various types of Automobiles	35
AUTO-L1-03	Major Systems & Components of an Automobile	60
AUTO-L1-04	Road Safety	30
AUTO-L1-05	Automobiles and our Environment	20
AUTO-L1-06	Introduction to Vehicle Maintenance and Servicing	30
AUTO-L1-07	Innovations & Developments in Automobiles	15
	Total	200

**List of Elements of unit AUTO-L1-01
History and Evolution of Automobile**

Element Code	History and Evolution of Automobiles	Duration (in Hours)
AUTO-L1-01-E1	Invention of the wheel	2
AUTO-L1-01-E2	Invention of the wheel cart and animal powered horse cart	2
AUTO-L1-01-E3	Invention of Automobile and Evolution	3
AUTO-L1-01-E4	Invention of Automobile and Evolution (Post World War II)	3
	Total duration in hours	10

**Details of Elements in unit AUTO-L1-01
History and Evolution of Automobile**

UNIT CODE	AUTO-L1-01	
DURATION	10 Hours	
UNIT OVERVIEW	Students will be able to relate the invention of wheel, wheel cart and animal powered horse cart	
ELEMENT AUTO-L1-01-E1	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Describe the Invention of wheel	Able to describe the Invention of wheel	Invention of wheel
ELEMENT AUTO- L1-01-E2	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Invention of wheel cart and animal powered horse cart	Able to describe the wheel cart	Invention of wheel cart and animal powered cart
	Able to explain use of horse power	Use of horse cart and horse power
ELEMENT AUTO-L1-01-E3	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Invention of Automobiles and Evolution till date	Able to describe Invention of Automobiles and Evolution till date	Invention of Automobiles and Evolution till date
ELEMENT AUTO-L1-01-E4	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Invention of automobile (Post world war II)	Able to describe Invention of Automobile and Evolution post World War II	Invention of automobile and Evaluation post World War II

List of Elements of unit AUTO-L1-02
Various types of Automobiles

Element Code	Various types of Automobiles	Duration (in Hours)
AUTO-L1-02-E1	Able to identify two and three wheelers	7
AUTO-L1-02-E2	Able to identify passenger and commercial vehicles	7
AUTO-L1-02-E3	Able to identify agricultural vehicles	7
AUTO-L1-02-E4	Able to identify construction equipment vehicles	7
AUTO-L1-02-E5	Able to identify special vehicles	7
	Total duration in hours	35

Detail of Elements in Unit AUTO-L1-02
Various types of Automobiles

UNIT CODE	AUTO-L1-02	
DURATION	35 Hours	
UNIT OVERVIEW	Student will be able to identify various types of Automobiles	
ELEMENT AUTO-L1-02-E1	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Able to identify Two Wheelers	Able to identify Two Wheelers used	Two Wheelers, make, model, specifications
	Drawing of Two Wheelers	Parts/Components of Two Wheelers
ELEMENT AUTO-L1-02-E2	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Able to identify Three Wheelers	Able to identify Three Wheelers used	Three Wheelers, make, model, specifications
	Drawing of Three Wheelers	Parts/Components of Three Wheelers
ELEMENT AUTO-L1-02-E3	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Able to identify Passenger vehicle	Able to identify Passenger vehicles used	Passenger vehicle, make, model, specifications
	Drawing of Passenger vehicle	Parts/Components of Passenger vehicles

ELEMENT AUTO-L1-02-E4	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Able to identify Commercial vehicle	Able to identify Commercial vehicle used.	Commercial vehicle, make, model, specifications
	Drawing of Commercial vehicle	Parts/Components of Commercial vehicles
ELEMENT AUTO-L1-02-E5	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Able to identify Agricultural vehicle	Able to identify Agricultural vehicle used.	Agricultural vehicle, make, model, specifications
	Drawing of Agricultural vehicle	Parts/Components of Agricultural vehicles
ELEMENT AUTO-L1-02-E6	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Able to identify Construction Equipment Vehicle	Able to identify Construction Equipment Vehicle used.	Construction equipment Vehicles, make, model, specifications
	Drawing of Construction Equipment Vehicles,	Parts/Components of Construction Equipment Vehicles
ELEMENT AUTO-L1-02-E7	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Able to identify Special Vehicles	Able to identify Special Vehicles used.	Special vehicle, make, model, specifications
	Drawing of Special Vehicles	Parts/Components of Special Vehicles

List of Elements of unit AUTO-L1-03
Major Systems & Components of an Automobile

Sr.No	Elements	Duration (in Hours)
1.	Chassis Frame and Auto Body	5
2.	Engine, and its components	10
3.	Lubrication System	5
4.	Cooling System	2
5.	Fuel Supply	5
6.	Transmission System	5
7.	Front and Rear Axle, ,	2
8.	Steering System	2
9.	Suspension System	5
10.	Wheels and Tyre	2
11.	Brake	5

12.	Electrical & Electronic Systems	5
13.	Air Conditioning System	5
14.	Active and Passive Safety	2
	Total	60

Details of Elements of unit AUTO-L1-03
Major Systems & Components of an Automobile

UNIT CODE	AUTO-L1-03	
DURATION	60 hours	
UNIT OVERVIEW	Student will be able to Major Systems & Components of an Automobile	
ELEMENT CODE	KNOWLEDGE CRITERIA	PERFORMANCE CRITERIA
ELEMENT AUTO-L1-02-E1	Use of Chassis Frame and Auto Body	Able to identify and describe the importance of Chassis Frame and Auto Body Able to make a drawing of the Chassis Frame and Auto Body
ELEMENT AUTO-L1-02-E2	Use of Engine and its components	Able to identify and describe the importance of the Engine and its components Able to make a drawing of the Engine and its components.
ELEMENT AUTO-L1-02-E3	Use of Lubrication System	Able to identify and describe the importance of the Lubrication and its components Able to make a drawing of the Lubrication system and its components
ELEMENT AUTO-L1-02-E4	Use of Cooling System	Able to identify and describe the importance Cooling System, Able to make a drawing of the Cooling System
ELEMENT AUTO-L1-03-E5	Use of Fuel Supply system	Able to identify and describe importance Fuel Supply System, Able to make a drawing of the Fuel Supply System,
ELEMENT AUTO-L1-03-E6	Use of Transmission System,	Able to identify, describe importance of Transmission System, Able to make a drawing of the Transmission System,
ELEMENT AUTO-L1-03-E7	Use of Front and Rear	Able to identify and describe the importance of Front and Rear Axle, Able to make a drawing of the Front and Rear Axle
ELEMENT AUTO-L1-03-E8	Use of Steering	Able to identify and describe the importance of steering, Able to make drawing of steering
ELEMENT	Use of Suspension	Able to identify and describe importance of

AUTO-L1-03-E9	System	suspension system Able to make a drawing of the Suspension System
ELEMENT AUTO-L1-03-E10	Use of Wheels and Tyres	Able to identify and describe the importance of Wheels and Tyres Able to make drawing of Wheels and Tyres
ELEMENT AUTO-L1-03-E6\11	Use of Brake	Able to identify and describe importance of Brake Able to make drawing of Brake
ELEMENT AUTO-L1-03-E12	Use of Electrical & electronic Systems	Able to identify and describe the importance of the Electrical & Electronic Systems Able to make a drawing of the Electrical & Electronic Systems.
ELEMENT AUTO-L1-03-E13	Use of Air Conditioning System	Able to identify and describe the importance of Air Conditioning System Able to make a drawing of Air Conditioning System,
ELEMENT AUTO-L1-03-E14	Use of Active and Passive Safety	Able to identify and describe importance of Active and Passive Safety Able to make a drawing of Active and Passive Safety

List of Element of Unit AUTO-L1-04
Road Safety

Element Code	Road safety	Duration (in Hours)
AUTO-L1-04-E1	Importance of road safety rules	5
AUTO-L1-04-E2	Safe and responsible driving	5
AUTO-L1-04-E3	Road Signs	5
AUTO-L1-04-E4	Driving rules and Registration of a vehicle	5
AUTO-L1-04-E5	Driving License	5
	Total Duration	25

Details of Elements in Unit AUTO-L1-04
Road Safety

UNIT CODE	AUTO-L1-04
DURATION	25 Hours
UNIT OVERVIEW	Students will be able to understand about road safety and rules adopted in regulation

ELEMENT AUTO-L1-04-E1	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Importance of road safety rules	Able to list the safety rules to be followed.	Importance of safety rules and safe practices
	Able to use safe practices while driving.	
ELEMENT AUTO-L1-04-E2	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Safe and responsible driving	Able to list the safe and responsible driving procedures	Safe and responsible driving
ELEMENT AUTO-L1-04-E3	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Road Signs signals	Able to identify various road signs, traffic signals and describe the rules	Road Signs, Traffic signals and rules
	Able to make sketch of various road sign, traffic signals and describe the rules	
ELEMENT AUTO-L1-04-E4	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Driving rules and registration	Able to describe driving rules	Driving rules and registration
	Able to fill forms for driving and registration	
ELEMENT AUTO-L1-04-E5	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Driving License	Able to describe different license forms	License rules
	Able to write license rules	
	Able to fill forms for license	

**List of Element of Unit AUTO-L1-05
Automobile and Environment**

Element Code	Automobile and Environment	Duration (in hours)
AUTO-L1-05-E1	Air pollution	5
AUTO-L1-05-E2	Auto Emissions and EU/ BS Standards	5
AUTO-L1-05-E3	PUC Certification	10
	Total Duration	20

Detail of Elements in Unit AUTO-L1-05

Automobile and Environment

UNIT CODE	AUTO-L1-05	
DURATION	25 Hours	
UNIT OVERVIEW	Students will be able to understand about Automobiles and Environment	
ELEMENT AUTO-L1-05-E1	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Air pollution	Able to list Air pollution norms	Air Pollution and norms
	Able to observe Air Pollution and Automobiles	Air Pollution and Automobiles
ELEMENT AUTO-L1-05-E2	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Auto emissions and EU/ BS Standards	Able to identify various Standards like EU/ BS, PUC Certification	Auto emissions and EU/ BS Standards
	Able to make list of various standards	
ELEMENT AUTO-L1-05-E1	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
PUC Certification	Able to describe about PUC Certification.	PUC Certification

Introduction to Vehicle Maintenance and Servicing

List of Elements of Unit AUTO-L1-06

Element Code	Name of Element	Duration (in Hours)
AUTO-L1-06-E1	Importance of Vehicle Maintenance and Servicing	10
AUTO-L1-06-E2	Tips to Extend the Life of Vehicles	10
AUTO-L1-05-E3	Introduction to Vehicle Servicing procedure	10
	Total duration	30

Introduction to Vehicle Maintenance and Servicing

Detail of Elements in Unit AUTO-L1-06

UNIT CODE	AUTO-L1-06	
DURATION	30 Hours	
UNIT OVERVIEW	Student will be able to Introduce Vehicle Maintenance and Servicing	
ELEMENT AUTO-L1-06-E1	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Importance of Vehicle Maintenance and Servicing	Able to perform basic procedures for vehicle maintenance	Importance of Vehicle Maintenance and Servicing
	Able to describe vehicle maintenance	
ELEMENT AUTO-L1-06-E2	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Tips to extend the life of vehicles	Able to list tips to extend the life of Vehicles	Tips to extend the life of vehicles
	Able to check the tips	
ELEMENT AUTO-L1-06-E3	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Introduction to Vehicle Servicing procedure	Able to list procedures during vehicle servicing	Procedures during vehicle servicing

Innovation and Development

List of Elements of Unit AUTO-L1-07

Element Code	Innovation and Development	Duration (in hours)
AUTO-L1-07-E1	Innovation and Development	15
	Total Duration	15

Innovation and Development

Detail of Elements in Unit AUTO-L1-07

UNIT CODE	AUTO-L1-07	
DURATION	15 Hours	
UNIT OVERVIEW	Student will be able to understand about Innovation and Development in Automobiles	
ELEMENT AUTO-L1-07-E1	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Innovation and Development	Able to identify innovation in Automobiles. Able to understand about new developments	Importance of innovation and development

Curriculum
Automobile Service Technician
AUTO-SRV L2

NSQF Level II - Class X

Name of Module: Automobile Service Technician

Module Overview:

Student should be able to know and understand all major systems of a automobile, handling of tools, introduction to servicing of vehicles, customer sales care and innovation and development aspects.

Name and Code of Units

Unit Code	Unit Title	Total Hours
AUTO-L2-01	Automobile and its components	80
AUTO-L2-02	Automobile Service Tools	40
AUTO-L2-03	Vehicle Servicing	30
AUTO-L2-04	Customer sales care	10
AUTO-L2-05	Innovation and Development	10
	Total	200

List of Elements of unit AUTO-L2-01
Automobiles and its component

Element Code	Element	Duration (Hours)
AUTO-L2-01-E1	Chassis	7
AUTO-L2-01-E2	Body	7
AUTO-L2-01-E3	Engine	9
AUTO-L2-01-E4	Lubrication System	8
AUTO-L2-01-E5	Cooling System	7
AUTO-L2-01-E6	Fuel Supply system	8
AUTO-L2-01-E7	Transmission System	9
AUTO-L2-01-E8	Front axle	7
AUTO-L2-01-E9	Steering	7
AUTO-L2-01-E10	Rear axle	8
AUTO-L2-01-E11	Suspension System	9
AUTO-L2-01-E12	Wheel and Tyre	7
AUTO-L2-01-E13	Brake	7
	Total	100

Detail of Elements of unit AUTO-L2-01
Automobiles and its component

UNIT CODE	AUTO-L2-01	
DURATION	100 Hours	
UNIT OVERVIEW	Student will be able to know Automobile and its Components	
Element Code	Performance Criteria	Knowledge Criteria
ELEMENT AUTO-L2-01-E1	Able to identify and describe Chassis	Chassis
	Able to understand details of Chassis	
ELEMENT AUTO-L2-01-E2	Able to identify and describe Body	Body and Use
	Able to understand details of body	
ELEMENT AUTO-L2-01-E3	Able to identify and describe Engine and its type	Engine and its components
	Able to understand details of engine	

ELEMENT AUTO-L2-01-E4	Able to identify and describe Lubrication system	Lubrication System
	Able to understand details of Lubrication and its components	
ELEMENT AUTO-L2-01-E5	Able to identify and describe importance Cooling System	Cooling System
	Able to understand detail of Cooling System	
ELEMENT AUTO-L2-01-E6	Able to identify and describe Fuel Supply System	Fuel Supply system
	Able to understand Fuel Supply System	
ELEMENT AUTO-L2-01-E7	Able to identify and describe importance of Transmission System	Transmission System
	Able to understand Transmission System	
ELEMENT AUTO-L2-01-E8	Able to identify and describe importance of Front Axle	Front axle
	Able to understand Front Axle	
ELEMENT AUTO-L2-01-E9	Able to identify and describe importance of steering	Steering
	Able to understand steering	
ELEMENT AUTO-L2-01-E10	Able to identify and describe rear axle	Rear axle
	Able to understand rear axle	
ELEMENT AUTO-L2-01-E11	Able to identify and describe importance of suspension system	Suspension System
	Able to understand Suspension System	
ELEMENT AUTO-L2-01-E12	Able to identify and describe wheels and tyres	Wheels and Tyres
	Able to understand of Wheels and Tyres	
ELEMENT AUTO-L2-01-E13	Able to identify and describe of Brake	Brake
	Able to understand Brake system	

List of Elements of Unit AUTO-L2-02
Automobiles Service Tools

Element Code	Automobiles Service Tools	Duration(Hours)
AUTO-L2-02-E1	Hand Tools	8
AUTO-L2-02-E2	Measuring Tools	8
AUTO-L2-02-E3	Electrical Tools	8
AUTO-L2-02-E4	Special Tools	8
AUTO-L2-02-E5	Service Workshop machine	8
	Total	40

Detail of Elements in Unit AUTO-L2-02
Automobiles Service Tools

UNIT CODE	AUTO-L2-02	
DURATION	40Hours	
UNIT OVERVIEW	Student will be able to identify and handle of various types of tools	
ELEMENT AUTO-L2-02-E1	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Hand Tools	Able to identify hand tools used.	Hand tools
	Drawing of hand tools.	Parts/Components of hand tools
ELEMENT AUTO-L2-02-E2	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Measurement Tools	Able to identify measurement tools used.	Measurement tools make, model, specifications
	Drawing of measurement tools	Parts/Components of measurement tools
ELEMENT AUTO-L2-02-E3	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Electrical Tools	Able to identify electrical tools used	Electrical tools make, model, specifications
	Drawing of electrical tools	Parts/Components of electrical tools

ELEMENT AUTO-L2-02-E4	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Special Tools	Able to identify special tools	Special tools make, model, specifications
	Drawing of special tools	Parts/Components of Special tools
ELEMENT AUTO-L2-02-E5	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
Service workshop equipment	Able to identify Service workshop equipment	Service workshop equipment make, model, specifications
	Drawing of hand tools	Parts/Components of hand tools

**List of Elements of unit AUTO-L2-03
Vehicle Servicing**

Element Code	Vehicle Servicing	Duration(Hours)
AUTO-L2-03-E1	Washing of a Vehicle	8
AUTO-L2-03-E2	Changing of oil and oil filter	8
AUTO-L2-03-E3	Changing of air filter	8
AUTO-L2-03-E4	Changing of fuel filter	8
AUTO-L2-03-E5	Changing of Coolant	8
	Total Duration	40

**Detail of Elements in Unit AUTO-L2-03
Vehicle Servicing**

UNIT CODE	AUTO-L2-03	
DURATION	40 Hours	
UNIT OVERVIEW	Student will be able to understand about vehicle servicing	
ELEMENT AUTO-L2-03-E1	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
	Able to understand washing procedure of a Vehicle.	Washing of a Vehicle
	Able to do washing of a Vehicle	

ELEMENT AUTO-L2-03-E2	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
	Able to understand procedure of changing of oil and oil filter	Changing of oil and oil filter
	Able to change the oil and oil filter	
ELEMENT AUTO-L2-03-E3	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
	Able to understand procedure of air filter changing	Changing of air filter
	Able to change air filter	
ELEMENT AUTO-L2-03-E4	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
	Able to understand procedure of fuel filter changing	Changing of fuel filter
	Able to change fuel filter	
ELEMENT AUTO-L2-03-E5	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
	Able to understand procedure of changing of coolant	Changing of coolant
	Able to change coolant	

**List of Element of Unit AUTO-L2-04
Customer sales care**

Element Code	Customer sales care	Duration(Hour)
AUTO-L2-04-E1	Customer sales care	10
	Total Duration	10 hours

**Detail of Elements in Unit AUTO-L2-04
Customer sales care**

UNIT CODE	AUTO-L2-04	
DURATION	10 Hours	
UNIT OVERVIEW	Student will be able to understand about customer sales care	
ELEMENT AUTO-L2-05-E1	PERFORMANCE CRITERIA	KNOWLEDGE CRITERIA
	Able to understand about meaning of customer service	Customer service
	Able to list duties of a automobile sales person	

List of Elements of Unit AUTO-L2-05
Innovation and Development

Element Code	Innovation and Development	Duration
AUTO-L2-05-E1	Innovation and Development	10 Hours
	Total Duration	10 hours

Detail of Elements in Unit AUTO-L2-05
Innovation and Development

UNIT CODE	AUTO-L2-05	
DURATION	10Hours	
UNIT OVERVIEW	Student will be able to understand about Innovation and Development in automobile	
ELEMENT AUTO-L2-05-E1	Knowledge CRITERIA	Performance Criteria
	Importance of innovation and development	Able to identify innovation in automobile. Able to understand about new development

Curriculum
Automobile Service Technician
AUTO-SRV L3

NSQF Level III - Class XI

Name of Module: Automobile Service Technician

Module Overview:

Student should be able to know and understand all major systems of an automobile, handling of tools, get an introduction to servicing of vehicles, customer sales care, innovation and development aspects.

Name and Code of Units

Unit Code	Unit Title	Periods
AUTO-L3-01	Regular maintenance of an engine	70
AUTO-L3-02	Regular maintenance of Transmission system	55
AUTO-L3-03	Regular maintenance of Gear	45
AUTO-L3-04	Service of wheels	70
AUTO-L3-05	Regular maintenance of tubes and tyres	30
AUTO-L3-06	Regular Maintenance of Brakes	30
	On the Job training	50
	Total	350

List of elements of unit AUTO-L3-01 Regular maintenance of an engine

Element Code	Element	Period
AUTO-L3-01-E1	Inspection of an engine	10
AUTO-L3-01-E2	Washing of an engine	10
AUTO-L3-01-E3	Tuning fuel system of an engine	10
AUTO-L3-01-E4	Tuning of the ignition system of an engine	10
AUTO-L3-01-E5	Tuning engine lubrication system	10
AUTO-L3-01-E6	Tuning engine cooling system	10

AUTO-L3-01-E7	Checking other engine components (Mechanical Setting)	10
AUTO-L3-01-E8	Engine Timing and engine sound test after setting	10
	Total	80

Details of elements of unit AUTO-L3-01
Regular maintenance of an engine

UNIT CODE	AUTO-L3-01	
DURATION	80 periods	
UNIT OVERVIEW	Student will be able to perform regular maintenance procedures for an engine	
Element Code	Performance Criteria	Knowledge Criteria
AUTO-L3-01-E1	Able to trace different leakages like oil, coolant and combustion gases	Inspection of an engine
AUTO-L3-01-E2	Able to wash an engine externally	Washing of the engine
	Able to handle the washing equipment	
	Able to follow appropriate precautions	
AUTO-L3-01-E3	Able to trace the fuel system in a given vehicle engine	Tuning fuel system of an engine
	Able to check the fuel line for leakage	
	Able to conduct fuel pump test and compare its reading with the service manual	
	Able to set carburetor for ideal speed	
	Able to test nozzle for pressure	
AUTO-L3-01-E4	Able to trace the primary and secondary circuit(s)	Tuning of an ignition system of an engine
	Check the terminals for loose connection	
	Able to clean spark plug and distributor	

AUTO-L3-01-E5	Able to check the level and quality of lubricating oil	Tuning of engine lubrication system
	Able to replace the oil and change the oil filter	
	Able to check the oil pressure	
AUTO-L3-01-E6	Able to read temperature gauge	Tuning of engine cooling system
	Able to check circulation of water in cooling system	
	Able to trace for coolant leakage	
AUTO-L3-01-E7	Able to tight fasteners with specified torque and with sequence in the following components: cylinder head, induction manifold, exhaust manifold and engine foundation nuts and bolt.	Tightening of fastener (Nuts/Bolts/Screws)
AUTO-L3-01-E8	Able to understand importance of engine timing	Engine Timing
	Able to feel the sound change after tuning process	

List of elements of unit AUTO-L3-02
Regular maintenance of the Transmission system

Element Code	Automobiles Service Tools	Periods
AUTO-L3-02-E1	Transmission system	15
AUTO-L3-02-E2	Clutch maintenance	15
AUTO-L3-02-E3	Clutch adjustments	10
	Total	40

Details of elements in unit AUTO-L3-02
Regular maintenance of the Transmission system

UNIT CODE	AUTO-L3-02
DURATION	40 Periods
UNIT OVERVIEW	Student will be able to perform regular maintenance procedure on the transmission system of a vehicle

ELEMENT AUTO-L3-02-E1	Performance Criteria	Knowledge Criteria
Transmission system	Able to understand the function of different units used to transmit engine power	Transmission system
	Able to identify the different units of the transmission system	
	Able to clean motor cycle drive chain	
	Able to lubricate the drive chain	
	Able to adjust the drive chain	
ELEMENT AUTO-L3-02-E2	Performance Criteria	Knowledge Criteria
Clutch maintenance	Able to inspect the functioning of clutch linkage for free movement	Clutch maintenance
	Able to lubricate the clutch linkage	
	Able to tighten the fasteners as per need	
ELEMENT AUTO-L3-02-E3	Performance Criteria	Knowledge Criteria
Clutch adjustments	Able to set free play adjustment of clutch	Clutch adjustments
	Able to set pedal travel adjustment of clutch pedal	
	Able to inspect the power transmission from clutch assembly	

List of elements of unit AUTO-L3-03
Regular maintenance of Gears

Element Code	Regular maintenance of Gears	Periods
AUTO-L3-03-E1	Lubrication of gear box	15
AUTO-L3-03-E2	Setting of gears	15
	Total	30

Details of elements in unit AUTO-L3-03
Regular maintenance of Gears

UNIT CODE	AUTO-L3-03	
DURATION	30 Hours/period	
UNIT OVERVIEW	Student will be able to understand maintenance of gears	
ELEMENT AUTO-L3-03-E1	Performance Criteria	Knowledge Criteria
Lubrication of gear box	Able to check the level of lubricating oil and quality of oil in the gear box	Lubrication of gear box
	Able to change the lubricating oil from the gearbox	
ELEMENT AUTO-L3-03-E2	Performance Criteria	Knowledge Criteria
Setting of gears	Able to check the various combination of gears	Setting of gears
	Able to set gear lever and selecting mechanism	
	Able to check the power transmission through respective gears	

List of elements of unit AUTO-L3-04
Service of wheels

Element Code	Service of wheels	Period
AUTO-L3-04-E1	Importance of wheels	20
AUTO-L3-04-E2	Importance of hub greasing and bearing play adjustments	20
	Total	40

Details of elements in unit AUTO-L3-04
Service of wheels

UNIT CODE	AUTO-L3-04	
DURATION	40 periods	
UNIT OVERVIEW	Student will be able to understand importance of service of wheels	
ELEMENT AUTO-L3-04-E1	Performance Criteria	Knowledge Criteria
Importance of wheels	Able to identify different types of wheels	Importance of wheels
	Able to list the functions of wheels	

ELEMENT AUTO-L3-04-E2	Performance Criteria	Knowledge Criteria
Importance of hub greasing and bearing play adjustments	Able to remove the wheel from axle	Importance of hub greasing and bearing play adjustments
	Able to remove the hub	
	Able to replace wheel stud	
	Able to clean the wheel bearing	
	Able to do greasing of hub and wheel bearing	
	Able to adjust wheel play (Bearing) adjustment	

**List of elements of unit AUTO-L3-05
Maintenance of tubes and tyres**

Element Code	Maintenance of tubes and tyres	Period
AUTO-L3-05-E1	Tyre and its maintenance	10
AUTO-L3-05-E2	Tyre puncture	20
	Total	30

**Details of elements in unit AUTO-L3-05
Maintenance of tubes and tyres**

UNIT CODE	AUTO-L3-05	
DURATION	30 Periods	
UNIT OVERVIEW	Student will be able to understand about repairing puncture in tyres and their maintenance	
ELEMENT AUTO-L3-05-E1	Performance Criteria	Knowledge CRITERIA
Tyre and its maintenance	Able to measure air pressure in tyres as per specifications	Tyres and their maintenance
	Able to rotate tyres for normal wear	
ELEMENT AUTO-L3-04-E2	Performance Criteria	Knowledge Criteria
Tyre puncture	Able to repair punctured tubes with hot patch, and cold patch	Tyre puncture
	Able to do repairing a puncture of tubeless tyres	

List of Elements of Unit AUTO-L3-06
Maintenance of Brake

Element Code	Maintenance of Brakes	Period
AUTO-L3-06-E1	Brakes and maintenance	40
AUTO-L3-06-E2	Brakes and adjustment	40
	Total	80

Details of Elements in Unit AUTO-L3-06
Maintenance of Brake

UNIT CODE	AUTO-L3-06	
DURATION	80 periods	
UNIT OVERVIEW	Student will be able to understand about brakes and its maintenance	
ELEMENT AUTO-L3-05-E1	Performance Criteria	Knowledge Criteria
Brakes and maintenance	Able to understand different components of different types of brakes	Brake and its maintenance
	Inspect and lubricate the controls of the braking system	
ELEMENT AUTO-L3-04-E2	Performance Criteria	Knowledge Criteria
Brakes and adjustment	Able to carry out Free pedal/lever adjustment	Brake and its adjustment
	Able to carry out Checking efficiency of brake	
	Able to carry out adjustments of rear brake	
	Able to carry out adjustments of front brake	

Curriculum
Automobile Service Technician
AUTO-SRV L4

NSQF Level IV - Class XII

Name of Module: Automobile Service Technician

Module Overview:

Student should be able to know and understand use of service manual, Inspection and repairs of the fasteners, measuring equipments, suspension system Serviceability, replacement or repair of components, transmission System and auto electrical system in a vehicle.

Name and Code of Units

Unit Code	Unit Title	Periods
AUTO-L4-01	Service Manual	10
AUTO-L4-02	Inspection and Repairs of the Fasteners	10
AUTO-L4-03	Measuring Equipments	30
AUTO-L4-04	Suspension system	40
AUTO-L4-05	Serviceability, replacement or repair of engine components	90
AUTO-L4-06	Transmission system	30
AUTO- L4-07	Auto Electrical System	90
	On the Job training	50
	Total	350

AUTO-L4-01

Service Manual

List of Elements of unit AUTO-L4-01

Element Code	Element	Period
AUTO-L4-01-E1	Reading of service manual	10
	Total	10

Detail of Elements in Unit AUTO-L4-01
Service Manual

UNIT CODE	AUTO-L4-01	
DURATION	10 periods	
UNIT OVERVIEW	Student will be able to understand about uses of service manual	
ELEMENT AUTO-L4-01-E1	Performance Criteria	Knowledge Criteria
Reading of manual	Able to understand and read service manual	Service manual and its use in workshop

List of Elements of Unit AUTO-L4-02
Inspection and Repairs of the Fasteners

Element Code	Element	Period
AUTO-L4-02-E1	Identification of fasteners used in a vehicle	05
AUTO-L4-02-E2	Various procedure used for removal of fasteners from the unit	05
	Total	10

Detail of Elements of unit AUTO-L4-02

UNIT CODE	AUTO-L4-02	
DURATION	10 periods	
UNIT OVERVIEW	Student will be able to Identify different type of fasteners used in a vehicle	
Element Code AUTO-L4-02-E1	Performance Criteria	Knowledge Criteria
Identification of fasteners in a vehicle	Able to identify various fasteners used in a vehicle.	Fasteners and their type and uses
Element Code AUTO-L4-02-E2	Performance Criteria	Knowledge Criteria
Various procedure used for removal of fasteners in a vehicle	Able to handle rusty, broken, spoiled threaded fasteners	Various procedure used for removal of fasteners in a vehicle
	Able to use special tools for removal of defected/ affected fasteners	Various special tools for handling of fasteners
	Able to select appropriate fasteners and tightening at appropriate torque.	Importance of specified torque values for tightening the fastener

List of Elements of unit AUTO-L4-03
Measuring Equipments

Element Code	Element	Period
AUTO-L4-03-E1	Handling and Use of dial gauge, telescopic gauge and bore gauge	6
AUTO-L4-03-E2	Handling and Use of Vernier caliper and tyre depth gauge	6
AUTO-L4-03-E3	Handling and Use of micrometer	6
AUTO-L4-03-E4	Handling and Use of hydrometer and bevel gauge	2
AUTO-L4-03-E5	Handling and Use of torque wrench and filler gauge	4
AUTO-L4-03-E6	Usage of various gauges in a dash board in vehicle	6
	Total	30

Measuring Equipments
Detail of Elements of unit AUTO-L4-03

UNIT CODE	AUTO-L4-03	
DURATION	30 periods	
UNIT OVERVIEW	Student will be able to understand and handle various measuring equipment and their uses	
Element Code AUTO-L4-03-E1	Performance Criteria	Knowledge Criteria
Handling and Use of dial gauge, telescopic gauge and bore gauge	Able to set and use the dial gauge, telescopic gauge	Dial gauge, telescopic gauge and bore gauge and their least count
	Able to set and handle the bore gauge	
Element Code AUTO-L4-03-E2	Performance Criteria	Knowledge Criteria
Handling and Use of Vernier caliper and tyre depth gauge	Handling and Use of Vernier caliper and tyre depth gauge	Vernier caliper and tyre depth gauge
Element Code AUTO-L4-03-E3	Performance Criteria	Knowledge Criteria
Handling and Use of micrometer	Setting and uses of micrometer	Micrometer

Element Code AUTO-L4-03-E4	Performance Criteria	Knowledge Criteria
Handling and Use of hydrometer and bevel gauge	Handling and Use of hydrometer and bevel gauge	Hydrometer and bevel gauge
Element Code AUTO-L4-03-E5	Performance Criteria	Knowledge Criteria
Handling and Use of torque wrench and filler gauge	Handling and Use of torque wrench and filler gauge	Torque wrench and filler gauge
Element Code AUTO-L4-03-E6	Performance Criteria	Knowledge Criteria
Usage of various gauges in a vehicle	Identification of various symbolic (gauges) information on dashboard in a vehicle	Dashboard and indicators in a vehicle

**List of Elements of Unit AUTO-L4-04
Suspension System**

Element Code	Suspension System	Period
AUTO-L4-04-E1	Maintenance of suspension system	05
AUTO-L4-04-E2	Service and replacement of leafs, cambering of leaf springs, shackle, shackle pin and centre bolt	10
AUTO-L4-04-E3	Replacement of strut/shock absorbers, inspection of steering linkages	05
AUTO-L4-04-E4	Manual and Power steering systems, Air suspension system	10
AUTO-L4-04-E5	Steering system adjustments	10
	Total	40

**Detail of Elements in Unit AUTO-L4-04
Suspension System**

UNIT CODE	AUTO-L4-04	
DURATION	40 Period	
UNIT OVERVIEW	Student will be able to test working of suspension system	
ELEMENT AUTO-L4-04-E1	Performance Criteria	Knowledge Criteria

Maintenance of suspension system	Able to inspect and identify the faulty suspension system, Able to carry out the maintenance	Suspension system in a vehicle with introductory air suspension
ELEMENT AUTO-L4-04-E2	Performance Criteria	Knowledge Criteria
Service and replacement of leafs, cambering of leaf springs, shackle, shackle pin and centre bolt	Able to trace trouble in suspension system Replace the defective components of suspension system	Cambering of leaf springs, shackle, shackle pin and centre bolt
Element Code AUTO-L4-04-E3	Performance Criteria	Knowledge Criteria
Replacement of strut/shock absorbers, inspection of steering linkages	Able to trace and test working of strut, shock, absorber and steering linkage Replace the defective components	Strut/shock absorbers, steering linkages
Element Code AUTO-L4-04-E4	Performance Criteria	Knowledge Criteria
Manual and Power steering systems, air suspension system	Able to check working of the manual steering system Able to check working of power steering system Able to check and handle power steering system with EPS and Hydraulic	Manual steering systems Power steering systems Power steering system with EPS and Hydraulic
Element Code AUTO-L4-04-E5	Performance Criteria	Knowledge Criteria
Steering system adjustments	Able to do wheel balancing Able to do wheel alignment Able to check steering adjustment	Wheel balancing Wheel alignment Steering adjustment

List of Elements of Unit AUTO-L4-05
Serviceability, replacement or repair of engine components

Element Code	Elements	Periods
AUTO-L4-05-E1	Reconditioning of valve mechanism	10
AUTO-L4-05-E2	Inspection and replacement of piston rings	15
AUTO-L4-05-E3	Inspection and replacement of connecting rod and engine bearing	20
AUTO-L4-05-E4	Testing of cooling system and replacement of defective component	10

AUTO-L4-05-E5	Regular servicing of MPFI system	15
AUTO-L4-05-E6	Servicing of CRDI / non CRDI system	20
	Total	90

Detail of Elements in Unit AUTO-L4-05
Serviceability, replacement or repair of engine components

UNIT CODE	AUTO-L4-05	
DURATION	90 period	
UNIT OVERVIEW	Student will be able to do test and replace/repair of components in a auto engine	
ELEMENT AUTO-L4-05-E1	Performance Criteria	Knowledge Criteria
Reconditioning of valve	Ability to test for leakage from the valve mechanism	Valve mechanism, reasons for leakage
	Ability to reface valve, cut the valve seat, valve lapping operations	Importance of reface valve, cutting of the valve seat, and valve lapping operations
	Able to inspect valve spring, valve seat and valve guide	Use of valve spring, valve seat and valve guide
ELEMENT AUTO-L4-05-E2	Performance Criteria	Knowledge Criteria
Replacement of piston rings	Able to inspect and replace piston ring	Piston ring and gapes with piston clearance in cylinder bore
	Able to inspect piston clearance in cylinder bore	
ELEMENT AUTO-L4-05-E3	Performance Criteria	Knowledge Criteria
Replacement of sleeves, connecting rod and engine bearing	Able to inspect and do replacement of connecting rod	Connecting rod
	Able to inspect and do replacement of engine bearings with appropriate clearance	Engine bearing
ELEMENT AUTO-L4-05-E4	Performance Criteria	Knowledge Criteria
Testing of cooling system and replacement of defective component	Able to locate faults in the cooling system	Cooling System functions
	Able to replace defective component in the cooling system	

ELEMENT AUTO-L4-05-E5	Performance Criteria	Knowledge Criteria
Regular servicing of MPFI system	Able to trace and inspect the components of MPFI systems with fuel and air intake	Importance, advantages and use of MPFI
	Able to trace for the loose connection	Loose connection and reasons
	Able to replace faulty nozzle, sensors	Nozzel pressure
	Able to service throttle body	Throttle chamber
ELEMENT AUTO-L4-05-E6	Performance Criteria	Knowledge Criteria
Servicing of CRDI/ non CRDI system	Able to trace connection and inspect the components of CRDI systems with fuel and air intake	Importance and use of CRDI
	Able to inspect loose connection	Reasons for loose connection and rectification
	Able to replace faulty nozzle, sensors	Faulty nozzle, sensors
	Able to service turbo charger	Turbo charger

**List of Element of Unit AUTO-L4-06
Transmission System**

Element Code	Element	Period
AUTO-L4-06-E1	Overhauling of clutch	10
AUTO-L4-06-E2	Servicing of propeller/drive shaft, universal and slip joints	05
AUTO-L4-06-E3	Servicing of differential unit and adjustments	10
AUTO-L4-06-E4	Introduction to automatic transmission system	05
	Total	30

**Detail of Elements in Unit AUTO-L4-06
Transmission System**

UNIT CODE	AUTO-L4-06	
DURATION	60 periods	
UNIT OVERVIEW	Student will be able to understand proper working of transmission system	
ELEMENT AUTO-L4-06-E1	Performance Criteria	Knowledge Criteria
Overhauling of clutch	Able to do adjustment in Clutch	Clutch adjustment

	Able to overhaul clutch assembly used in vehicle and inspection of components	and overhaul procedure
ELEMENT AUTO-L4-06-E2	Performance Criteria	Knowledge Criteria
Servicing of propeller shaft, universal and slip joints	Able to do servicing/ overhauling of propeller shaft, universal and slip joints	Importance of propeller shaft, universal and slip joints
ELEMENT AUTO-L4-06-E3	Performance Criteria	Knowledge Criteria
Servicing of differential unit and adjustments	Able to do servicing and adjustment of differential unit	Differential unit and its adjustment
ELEMENT AUTO-L4-06-E4	Performance Criteria	Knowledge Criteria
Introduction to automatic transmission system,	Identify and understand automatic transmission system used in power transmission	Introduction to automatic power transmission

List of Elements of Unit AUTO-L4-07
Auto Electrical

Element Code	Auto electrical	Period
AUTO-L4-07-E1	Reading of electrical symbol, circuit diagrams, colour codes and specification of cables and wiring hardness	05
AUTO-L4-07-E2	Multi meter, Timing light (stroboscope) and oscilloscope and its application	15
AUTO-L4-07-E3	Battery and its maintenance	10
AUTO-L4-07-E4	Circuit diagram for battery charging	05
AUTO-L4-07-E5	Checking of electrical connections and lights in a vehicle	10
AUTO-L4-07-E6	Lighting system, application and replacement of fuses	10
AUTO-L4-07-E7	Horn assembly, electrical fuel gauge and fuel pump their application and maintenance	05
AUTO-L4-07-E8	Circuit diagram for starter circuit	05
AUTO-L4-07-E9	Circuit diagram for ignition circuit	15
AUTO-L4-07-E10	Servicing of wiper system	05
AUTO-L4-07-E11	Introduction of HVAC System in a vehicle	05
	Total	90

Detail of Elements in Unit AUTO-L4-07
Auto Electrical

UNIT CODE	AUTO-L4-07	
DURATION	40 Periods	
UNIT OVERVIEW	Student will be able to understand about auto electrical application in a vehicle	
ELEMENT AUTO-L4-07-E1	Performance Criteria	Knowledge Criteria
Reading of electrical symbol, circuit diagrams, colour codes and specification of cables and wiring hardness	Able to read electrical symbol and circuit diagram, colour code and specification of cables and wiring hardness	Use of electrical symbol and circuit diagram
ELEMENT AUTO-L4-07-E2	Performance Criteria	Knowledge Criteria
Multi meter, Timing light (stroboscope) and oscilloscope and its application	Able to use multi meter, timing light (stroboscope) and oscilloscope for resistance, amperage and voltage	Multi meter and Oscilloscope and its uses
ELEMENT AUTO-L4-07-E3	Performance Criteria	Knowledge Criteria
Battery and its maintenance	Able to do regular maintenance of the battery importance of earthing	Battery and its maintenance
	Able to do topping Up of battery electrolyte	
	Able to do replacement of positive / negative battery cable	
ELEMENT AUTO-L4-07-E4	Performance Criteria	Knowledge Criteria
Checking of electrical connections and lights in a vehicle	Able to check electrical connection, test and replace of head Light / indicator/ brake Bulbs	Electrical connection, lights and their uses
ELEMENT AUTO-L4-07-E5	Performance Criteria	Knowledge Criteria
Lighting system, application and replacement of fuses	Able to do replacement of fuses and do continuity test	Fuse Amperage

ELEMENT AUTO-L4-07-E6	Performance Criteria	Knowledge Criteria
Horn assembly, electrical fuel gauge and fuel pump their application and maintenance	Able to do replacement of Horn assembly, electrical fuel gauge and fuel pump their application and maintenance	Horn assembly, electrical fuel gauge and fuel pump
ELEMENT AUTO-L4-07-E7	Performance Criteria	Knowledge Criteria
Circuit diagram for battery charging	Able to draw and check the circuit for battery charging system with alternator	Battery charging system
ELEMENT AUTO-L4-07-E8	Performance Criteria	Knowledge Criteria
Starter Circuit	Able to draw and check self starter circuit and its component	Self starter circuit diagram and its components
ELEMENT AUTO-L4-07-E9	Performance Criteria	Knowledge Criteria
Circuit diagram for ignition circuit	Able to draw and check circuit diagram for ignition system	Circuit diagram for ignition system and components
ELEMENT AUTO-L4-07-E10	Performance Criteria	Knowledge Criteria
Servicing of wiper system	Able to carry out the servicing of the wiper system	Wiper and its servicing method
ELEMENT AUTO-L4-07-E11	Performance Criteria	Knowledge Criteria
Introduction of HVAC System in a vehicle	Identify the components of HVAC system in	Heater Ventilator Air Condition system in a Vehicle and its use

8. List of reference books and Instructional material

Automobile Engineering, Vol 1 and II	Kirpal Singh	Standard Publishers
Text Book of Automobile Engineering	R. K. Rajput	Laxmi Publications
Automobile Engineering	R. K. Singal	S. K. Kataria and Sons
Automobile Engineering Theory	Kapil Dev	Computech Publications
Automobile Engineering,	K. M. Moeed	S. K. Kataria and Sons

9. List of tools, equipment and materials

1. Two Post lift
2. Air compressor
3. Wheel balancer
4. Bench vice
5. Work tables
6. Bench grinder
7. Oil draining & filling equipment
8. Cooling system tester
9. Multi meter
10. Hydro meter
11. BC clamp meter
12. Coolant tester
13. Battery & charging system tester (Megatronics)
14. Diagnostic tool (genesis Evo)
15. Hand tools
16. Pneumatic tools
17. Torque wrenches
18. Car seat covers
19. Steering covers
20. Gear Knob covers
21. Fender covers/kits
22. Floor mats
23. Cotton gloves
24. Hard toed boots
25. Sun glasses (3 m)
26. Bump caps
27. Air tester filter machine
28. Hydraulic press
29. Hydraulic jacks
30. Vehicle safety stands
31. Parts washing station car
32. Pullers
33. Sliding hammer
34. Wheel aligner
35. Head Light Focusing
36. A/c Machine (124 Robin air)
37. General Hand Tools
38. A/c Leakage Tester
39. Old car

10. Teacher's qualifications

Diploma in automobile/mechanical engineering with 3 year experience

Or

Degree in automobile/mechanical engineering with two year experience

11. List of contributors

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Dr. Saurabh Prakash

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PSS Central Institute of Vocational Education

(a constituent unit of NCERT, an autonomous organization under Ministry of Human Resource Development, Government of India)

Shyamla Hills, Bhopal