

**EXCITING WORLD OF
AUTOMOBILES**



STUDENT WORKBOOK

Curriculum : AUTO-SRV L1-NQ²⁰¹²

Unit : AUTO-SRV L1U6

**Introduction to Vehicle Maintenance and
Servicing**

Vocational Learning Material for Schools

PSS Central Institute of Vocational Education

Bhopal

PREFACE

Improving the parity of esteem between the general academic education and vocational education, is the policy priority of the Government of India. The National Vocational Education Qualification Framework (NVEQF) developed by the Ministry of Human Resource Development (MHRD), Government of India, is a descriptive framework that provides a common reference for linking various qualifications. It will be used for setting common principles and guidelines for a nationally recognized qualification system covering Schools, Vocational Education and Training Institutions, Technical Education Institutions, Colleges and Universities. The NVEQF will act as a translation device to make qualifications more understandable to employers, students and institutions. It will promote transparency of qualifications and facilitate learner's mobility between different qualifications, thus encouraging lifelong learning. PSSCIVE has taken lead in development of learning material for the Automobile Sector for all level in collaboration with the Automobile Skill Development Corporation (ASDC).

The present material contains activity related to Level L-1 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 book.

The book has been written by experts but reviewed by all the members of the group. I am grateful to the authors for the development of this book and to the members of the Working Group for their candid suggestions, during the development and review. Their names are given elsewhere.

I appreciate efforts put in the by Dr. Saurabh Prakash, as the Project Coordinator of the Working Group in planning and organizing Meetings which led to the final form of this title.

I shall be grateful to receive suggestions and observations from readers, which would help in bringing out a revised and improved version of this book.

Prof. R.B. Shivagunde
Joint Director

Bhopal
June, 2012

Pandit Sunderlal Sharma
Central Institute of Vocational Education

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This student workbook was developed, with active involvement of Automobile Skill Development Council (ASDC) keeping in view the National Occupation Standard (NOS) for Service Technician L4 developed by ASDC.

This project for development of the student workbook was coordinated by the PSS Central Institute of Vocational Education, a constituent unit of National Council of Educational Research and Training, which is under Ministry of Human Resource Development, Government of India.

Student Details

Student Name: _____

Student Roll Number: _____

Batch Start Date: _____

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About this Workbook

This workbook is to assist students with completing the Auto Sector **L1U6-NQ2012** unit of competency: **Introduction to Vehicle Maintenance & Servicing**. Students should peruse the workbook in class or in their own time.

This workbook contains sessions for imparting knowledge & skills on various aspects of the unit of competency. The workbook also includes information, exercises, and assessment activities to complete. The assessment plan has been included in the workbook to assist you in scheduling your time for completing the assignments. Each assessment activity is followed by a checklist for meeting the assessment criteria. The criteria will help you to ensure that you have fulfilled all of the assessment requirements to receive a 'competency' grading/Certification by ASDC.

Unit Information

Unit name: Introduction to Vehicle Maintenance & Servicing

Unit code: Auto L1U6-NQ2012

Unit descriptor:

This unit provides the knowledge & skills covering Introduction to Vehicle Maintenance & Servicing of automobile. It covers basic tips for vehicle maintenance and servicing.

Resource Required:

Notebooks, Pen, Pencil, Eraser, Computer, Open Source Software for making digital presentation, LCD projector, Drawing of various photographs, animation and videos of Introduction to Vehicle Maintenance & Servicing of automobile. It covers basic tips for vehicle maintenance and servicing.

Nominal hours: 30 hours

Elements and Performance Criteria

- Elements define the critical learning outcomes of a unit of competency.
- Performance criteria specify the level of performance required to demonstrate the achievement of the Competency Element.

| Element | Performance Criteria |
|---|--|
| <ul style="list-style-type: none">• Importance of Vehicle Maintenance and Servicing | <ul style="list-style-type: none">• Able to do basic vehicle maintenance.• Able to describe vehicle maintenance |
| <ul style="list-style-type: none">• Tips to Extend the Life of Vehicle | <ul style="list-style-type: none">• Able to list Tips to Extend the Life of Vehicle |
| <ul style="list-style-type: none">• Introduction to Vehicle service procedure | <ul style="list-style-type: none">• Able to list service procedure adopted by service station of a vehicle |

Relevant Knowledge and Skills

1. Relevant Knowledge

- Introduction to Vehicle Maintenance & Servicing
- Tips to Extend the Life of Vehicle
- Introduction to Vehicle service procedure

2. Skills

Able to describe about

- Introduction to Vehicle Maintenance & Servicing
- Tips to Extend the Life of Vehicle
- Introduction to Vehicle service procedure

Assessment Plan

| Session No. | Assessment method | Due Date | Completion Date |
|-------------|--------------------|----------|-----------------|
| 1. | Fill in the Blanks | | |
| 2. | Fill in the Blanks | | |
| 3. | Fill in the Blanks | | |



Introduction

Automobiles need Maintenance from time to time. Like we need to wash , bathe similarly our automobiles also need to be kept clean. Automobiles have to run on dirty roads and in polluted environment. Automobiles also run on uneven roads with pot holes and other obstructions. Automobiles and its parts are subjected to loads as described above. This makes them either damaged or in poor working condition. Therefore there is need for regular maintenance and servicing of automobiles. Maintenance of an Automobile is usually done in a place called Auto Workshop or Auto Service Station.

In this Unit, you will develop an understanding of the concept of vehicle maintenance and servicing.

Session 1: Importance to Vehicle Maintenance and Servicing Relevant Knowledge

As you know that there is increase in the number of vehicle in our city. Vehicles such as motorcycle, scooter, bus, car, jeep, tempo, truck and tanker etc are running in the our cities.

Every new vehicle comes with a vehicle maintenance manual. Vehicle owner should read and use this manual. This manual helps user for vehicle maintenance tips during driving. People after getting a car or vehicle often care little about regular car maintenance.

Although you may be doing regular servicing of your vehicle, but with the help of vehicle maintenance tips given in your vehicle maintenance manual, lasting of your vehicle can be increased to a much greater extent.

The Vehicle Maintenance and Servicing is carried out when the vehicle completes certain kilometer on its normal running and when the vehicle does not give proper performance. It is suggested that vehicle owner should do regular and periodical checkup of their vehicle. Some of checks are given her for users.

Daily Inspection (DI)

It is the responsibility of a driver or owner of a vehicle to carry out the following inspection/checks daily before the starting of engine to avoid any type of breakdown on the road.

- Check all the tyre pressure visually or hitting the tyre wall with the help of a stone piece and judging the sound.
- Check radiator coolant level.
- Check the fan belts for looseness.
- Check the level of engine oil.
- Check the wind screen, rear view mirror and rear window glass for their cleanliness.

Maintenance Checkup

When you plan to go outside from your home for long distance travel, It is necessary to do some routine checkup. We should read vehicle maintenance manual for more clarification. Some of important checkups is to be done for better maintenance.

1. Topping of oil level
2. Proper tension of Belt
3. Battery for cleanliness and level of electrolyte (Add only distilled water for topping of electrolyte water)
4. Brakes
5. Topping up of Coolant if required in the coolant reservoir
6. Check the Serviceability of cooling system Hoses
7. Proper Tyre inflation pressure
8. Air-conditioning

Vehicle maintenance/checkup is generally done at vehicle service centre. You must visit to nearby vehicle service centre and see how a vehicle is being properly maintained.

We will be visiting a nearby vehicle service centre and see the how the common checkups are being made by service mechanic. Some of important checkup are discussed here:

Check/Top up all vehicles' oil levels: Service mechanic with the help of measuring stick check the engine oil, coolant, brake oil, and water. During routine checkup, oil, water, coolants are topped up otherwise it is changed.



Fig : Service Centre

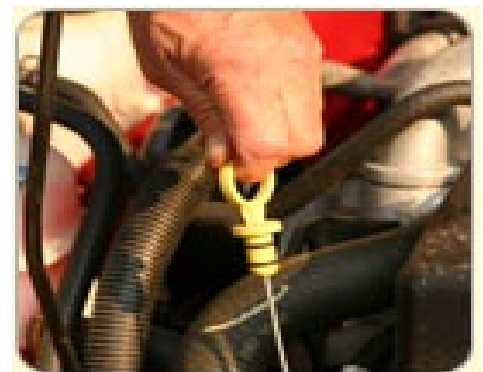


Fig : Checking of Oil Levels

Belt Checkup: Checking of belt is very important. If it is loose or broken then it will be replaced immediately.

Battery: Battery is very important component of a vehicle. It should be checked up regularly. Battery electrolyte (distilled water) is checked by removing the battery caps and looking inside. If level is low, it will be topped up by distilled water. Now day's battery are maintenance free batteries. Maintenance free batteries have sealed caps and require no checking. But some batteries say maintenance free but do have removable caps. These should be checked in the usual manner.



Fig : Battery

Brakes:

Service mechanic checkup the break also by pushing the pedal. If he feels that there is need of servicing, he will inform to the customer.



Fig : Wheel Brakes

Cooling System:

Technician checks the cooling system by topping up the coolant. The cooling system should be refilled with the correct coolant. Don't refill with just straight water.



Fig : Cooling System

Air-conditioning:

Service mechanic will check the cooling and heating by checking the airflow is coming from all appropriate vents.



Fig : Air-conditioning

Tyres:

Mechanic will check the tyre by checking correct tyre pressures. He will also see also external damage also if any.



Fig : Tyres

The Safety Rules during servicing of vehicle to be followed:

You have visited the service station and seen that service technician is doing their work properly. During servicing of vehicle in a garage or service station the technician must follow some precaution and safety rules to prevent the accidents to occur, please observe that whether safety rules are being followed or not. These safety rules are:



Fig : Service Station

- Always select right tools for specific job. The wrong tool could damage the part being worked on and could cause you to get hurt.
- Keep your tools and equipments under control.
- Wipe excess oil and grease off your hands and tools so that you can get a good grip on tools or parts.
- Work quietly and give full attention on your job.
- Keep jack handles out of the way. Stand the creeper against the wall when it is not in use.
- Do not put sharp objects, such as screw drivers, in your pocket. You could cut yourself or get stabbed, you could damage the seat.
- Make sure that technician cloths are right for the job and he should wear full leather safety shoes.
- If oil, grease, or any liquid spill on the floor, clean it up so that no one will slip and fall.
- Always wear eye protection when using a grinding wheel or welding equipment or working with chemicals such as solvents.
- While using jack, place it properly to avoid slip.
- Never run an engine in a closed garage that does not have proper ventilation system. The exhaust gases contain carbon monoxide. Carbon monoxide is a colorless, odorless, tasteless poisonous gas that can kill you.

Session 1: Importance to Vehicle Maintenance and Servicing

Exercise: Assignment

1. List the pre checkup activity of a vehicle to be taken:

| S.No. | Pre checkup activity |
|-------|----------------------|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| 6. | |
| 7. | |
| 8. | |
| 9. | |
| 10. | |

2. Observe and identify vehicles in your area/ premises and suggest preventative maintenance to be taken.

| Type of Vehicle | Preventive maintenance |
|-----------------|------------------------|
| | |
| | |

Session 1: Importance to Vehicle Maintenance and Servicing

Answer the following questions

(Use additional sheets of paper if necessary)

Fill in the blanks

1. The Vehicle Maintenance and Servicing is carried out when the vehicle completes _____ kilometer.
2. After overhauling the vehicle regains its almost _____.

3. When you plan to go _____ from your home for long distance travel, take some time to make sure that your _____ is ready to take you to outside.
4. During pre checkup following items like vital fluids, battery, _____, air conditioning, _____, belt & hoses, cooling system should be touched.
5. Always select right _____ for specific job. The wrong tool could damage the part being worked on and could cause you to get _____.

Session 1: Importance to Vehicle Maintenance and Servicing

Checklist for Assessment Activity

Use the following checklist to see if you've met all the requirements for Assessment Activity.

Part A

- Pre check points of an vehicle

Part B

Discussed in class the following:

1. What Safety Rules during servicing of vehicle to be followed?
2. Why right tools are selected for right jobs. List the reasons.
3. Important safety gadget should be used by service technician.

| Performance standards | Yes | No |
|--|-----|----|
| Able to list pre service checkup which should be done by vehicle owner | | |
| Able to list safety precautions during vehicle checkup and servicing | | |

Session 2 : Tips to Extend the Life of Vehicle Related Knowledge

Care and Maintenance tips keep your car running in good condition. These tips will help in better maintaining of a vehicle. You must observe these points in your daily life.

1. Drive the vehicle with care everyday
2. Be patient during the accident or breakdown of a vehicle, call helpline number of vehicle or police or hospital
3. Buy petrol at reputable service stations
4. Don't fill up if you see the tanker
5. Go easy when you're stuck
6. Car key chain should be lighten
7. Preserve your car during long-term storage
8. Park in the shade
9. Clean the inside, too
10. Clean dash gauges carefully
11. Preserve door and window seals
12. Don't try to carry too much
13. Use upholstery cleaners on soiled seats
14. Place a towel under baby seats
15. Protect car paint from the sun
16. Wash in winter
17. Wax to protect your car's paint job
18. Maintain proper inflation
19. Check for uneven wear
20. Rotate your tires
21. Have wheel alignment checked
22. Top off your brake fluid
23. Care for anti-lock brakes
24. Check engine oil at every other fill-up
25. Change oil frequently
26. Don't mix coolants
27. Avoid hose hassles
28. Test drive-belt tension

29. Clean your engine
30. Run your AC in winter
31. Maintain your car's battery
32. Seal a leaky radiator
33. Dilute your coolant.

Session 2: Tips to Extend the Life of Vehicle

Exercise: Assignment

- 1 List some important safety tips of a vehicle

| S.No. | Tips |
|-------|------|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| 6. | |
| 7. | |

2. Observe and draw maintenance practices done of a vehicle in your area.

| |
|--|
| |
|--|

Session 2: Importance to Vehicle Maintenance and Servicing

Answer the following questions

(Use additional sheets of paper if necessary)

Fill in the blanks

1. Clean dash gauges _____
2. Let floor mats _____ winter's beating.
3. Maintain proper inflation in _____.
4. Protect _____ paint from the sun .
5. Preserve door and _____ seals.
6. Fix bad _____ stripping immediately.
7. Keep leather from _____ and cracking.
8. Maintain your _____ car's battery.

Session 2: Importance to Vehicle Maintenance and Servicing

Checklist for Assessment Activity

Use the following checklist to see if you've met all the requirements for Assessment Activity.

Part A

- Importance of safety tips of a vehicle.

Part B

Discussed in class the following:

- What is the use of servicing a vehicle?
- Important service tips.

Performance standards/criteria covered by this assessment

| Performance standards | Yes | No |
|---|-----|----|
| Able to list the tips of servicing of a vehicle | | |
| Able to list the servicing point of a vehicle | | |

Session 3: Introduction to Vehicle service procedure

Related Knowledge

During the visit of vehicle service centre, you must have seen that authorized automobile service centre adopt certain procedure during service of a vehicle. We shall list the common activity done in the centre. One of the most important part is Job Card and its filling procedure. At this level you must know some of these servicing activities in your training programme

Common activity in the workshop:

- Job card and its filling procedure
- Washing of vehicle and Washing Procedure
- Engine Minor tune up
- Oil Replacement
- Checking of battery electrolyte level and top up
- Clutch and brake free play and their adjustment
- Lighting System, its various part and their checking
- Identification of greasing points of wheelers and procedure of greasing.
- Checking of tyre inflation and procedure of inflation.

Job card and its filling procedure

When a vehicle owner enters in service centre. He is attended by supervising engineer. Customer informs about vehicle defect After getting the feed back from the vehicle owner/driver regarding defects of the vehicle, the supervising engineer in a service station or workshop carry out an inspection on it. The defects pointed out or listed are noted down in a standard format, which is called the Job card or Work Order.

In order to indicate his satisfaction with the diagnosis made by the supervising engineer, the customer of the vehicle puts his signature on the Job card before the repairs on the vehicle are started. The work assigned to the appropriate person to carry out the repairs. And the supervisor puts his signature on the job card. The work order/Job card is prepared in duplicate.

Contents of a standard job card

- Job card Number.
- Name address & phone no. of the Service Centre.
- Name address & phone no. of customer.
- Details of vehicle such as – Make; Model, Registration No., Chassis No, Engine No., Date of Sale, Kms. Reading, Receiving date & time and delivery date & time by the service centre.
- Check list before trial
- Customer's observation.
- Job to be done.
- Estimated cost in Rs. for customer and Insurance company.
- Labour required
- Name of Mechanic.
- Name & Signature of Supervisor.
- Customer's authorization for repair and his signature
- Acknowledgment.

Filling the Job Card:

Almost all the information's must be properly filled in the job card by the supervisor and has to be signed by him and the customer also has to sign on the authorization for work column. Then the repairing or servicing job on the vehicle is taken over. A standard job card is shown below. The student must practice to fill the same.

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Session 3: Introduction to Vehicle service procedure

Exercise: Assignment

1. List some important vehicle service procedure of a vehicle

| S. No. | Vehicle service procedure |
|--------|---------------------------|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| 6. | |
| 7. | |

Session 3 : Introduction to Vehicle service procedure

Answer the following questions

(Use additional sheets of paper if necessary)

Fill in the blanks

1. Job card is used for filling _____ of a vehicle.
2. Customer of the vehicle puts his _____ on the Job card before the repairs on the vehicle are started.
3. The work order/Job card is prepared in _____.
4. Engine tune up means different things to different _____
5. The work order/Job card is prepared in _____.

Session 3: Introduction to Vehicle service procedure Checklist for Assessment Activity

Use the following checklist to see if you've met all the requirements for Assessment Activity.

Part A

- Importance of safety service procedure of a vehicle.

Part B

Discussed in class the following:

- What is the use of servicing a vehicle?
- Job card and its importance.
- Activities during service of a vehicle..

Performance standards/criteria covered by this assessment

| Performance standards | Yes | No |
|--|-----|----|
| Able to discuss safety service procedure | | |

Suggested Reading

Books

| Title | Author | Publisher |
|-------------------------------------|--------------|------------------------|
| Automobile Engineering Vol I | Kirpal Singh | Standard Publishers |
| Automobile Engineering, Vol 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 |
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List of Contributors

1. Mr. Sunil K. Chaturvedi, CEO, Automotive Skills Development Council, Core 4-B 5th Floor India Habitat Centre, Lodhi Road, New Delhi – 110 003
2. Mr. A.C. Deb, Sr. Lecturer, (Auto) – HOD, PUSA Polytechnic PUSA, New Delhi -12
3. Mr. Vikas Gautam, S.B.V. NO.1, Morigate, Delhi – 06,
4. Prof. A.P. Verma, Ex-Prof. & HOD, PSSCIVE, Bhopal.
5. Sh. Deepak Shudhalwar, Assistant Professor, E & T Division, PSSCIVE, Bhopal
6. Dr. Saurabh Prakash, Associate Professor, E & T Division, PSSCIVE, Bhopal – Programme Coordinator