

# CBSE| DEPARTMENT OF SKILL EDUCATION CURRICULUM FOR SESSION 2023-2024

## **AUTOMOTIVE (SUBJECT CODE 804)** **JOB ROLE: Automotive Service Technician**

Class XI & XII

### **COURSE OVERVIEW:**

This course is a planned sequence of instructions consisting of Units meant for developing employability and vocational competencies of students of Class XI & XII opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for Class XI & XII is as follows

### **OBJECTIVES OF THE COURSE:**

In this course, followings are the main objectives of this course.

- Communicate effectively with the customers.
- Identify the principal components of an automotive system.
- Identify and control hazards in the work place that pose a danger or threat to their safety 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.
- Identify and demonstrate safe use of hand and power tools/equipment used in vehicle service station/workshop
- Recognize the benefits of great customer service;
- Provide customers necessary information appropriately and systematically;
- Use techniques to provide services based on customer's needs and wants;
- Administer first aid to a casualty with small cuts, grazes, bruises, external bleeding, minor burns and scalds

### **SALIENT FEATURES:**

- Automotive as a vehicle unit.
- Systems/sub systems & components.
- Automotive electronics for safety, pollution control, fuel efficiency and comforts.
- Other related areas of automotive electronics for engine management, diagnostics, repair etc.

## **LIST OF EQUIPMENT AND MATERIALS:**

The list given below is suggestive and an exhaustive list should be prepared by the vocational teacher. Only basic tools, equipment and accessories should be procured by the Institution so that the routine tasks can be performed by the students regularly for practice and acquiring adequate practical experience.

Teaching/Training Aids:

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

## **CAREER OPPORTUNITIES:**

Automobile engineering is a huge industry. There is great number of employment opportunities in the following fields:

1. Private national and multinational automobile companies
2. Service stations
3. Private transport companies

## **VERTICAL MOBILITY:**

After 12<sup>th</sup> standard, student can opt for graduation in science, commerce and take Automotive as specialization, following career options are available in field.

## **CURRICULUM:**

This course is a planned sequence of instructions consisting of Units meant for developing employability and Skills competencies of students of Class XI and XII opting for Skills subject along with other subjects

**AUTOMOTIVE (SUBJECT CODE 804)**  
**Class XI (Session-2023-24)**

**Total Marks: 100 (Theory- 60 + Practical- 40)**

	UNITS	NO. OF HOURS For Theory and Practical	MAX. MARKS For Theory and Practical
<b>Part A</b>	<b>Employability Skills</b>		
	Unit 1: Communication Skills-III	13	2
	Unit 2: Self-Management Skills-III	07	2
	Unit 3: ICT Skills-III	13	2
	Unit 4: Entrepreneurial Skills-III	10	2
	Unit 5: Green Skills-III	07	2
	<b>Total</b>	<b>50</b>	<b>10</b>
<b>Part B</b>	<b>Subject Specific Skills</b>		
	Unit 1: Regular Maintenance of an Engine	45	20
	Unit 2: Regular Maintenance of Transmission System	25	7
	Unit 3: Regular Maintenance of Gear Box	20	5
	Unit 4: Servicing of the Wheels	10	5
	Unit 5: Regular Maintenance of Tubes and Tyres	10	5
	Unit 6: Regular Maintenance of Brakes	20	8
	<b>Total</b>	<b>130</b>	<b>50</b>
<b>Part C</b>	<b>Practical Work</b>		
	Project		10
	Viva	20	05
	Practical File		15
	Demonstration of skill competency via Lab Activities	60	10
	<b>Total</b>	<b>80</b>	<b>40</b>
	<b>GRAND TOTAL</b>	<b>260</b>	<b>100</b>

**NOTE:** Detailed Curriculum/ Topics to be covered under Part A: Employability Skills can be downloaded from CBSE website.

## **DETAILED CURRICULUM/TOPICS:**

### **Part-A: EMPLOYABILITY SKILLS**

<b>S. No.</b>	<b>Units</b>	<b>Duration in Hours</b>
1.	Unit 1:CommunicationSkills-III	13
2.	Unit 2:Self-managementSkills-III	07
3.	Unit 3:InformationandCommunicationTechnologySkills-III	13
4.	Unit 4:EntrepreneurialSkills-III	10
5.	Unit 5:GreenSkills-III	07
	<b>TOTALDURATION</b>	<b>50</b>

Detailed Curriculum/ Topics to be covered under Part A: Employability Skills can be downloaded from CBSE website.

### **Part-B–SUBJECT SPECIFIC SKILLS (Class XI)**

<b>S. No.</b>	<b>Units</b>	<b>Duration in Hours</b>
1.	Unit 1:Regular Maintenance of an Engine	45
2.	Unit 2: Regular Maintenance of Transmission System	25
3.	Unit 3:Regular Maintenance of Gear Box	20
4.	Unit 4: Servicing of the Wheels	10
5.	Unit 5:Regular Maintenance of Tubes and Tyres	10
6.	Unit 6:Regular Maintenance of Brakes	20
	<b>TOTAL DURATION</b>	<b>130</b>

<b>UNIT</b>	<b>SESSION/TOPIC</b>	<b>ACTIVITY/PRACTICAL</b>
Unit 1: Regular Maintenance of an Engine	1.1. Inspection of an Engine	Trace different leakages like oil, coolant and combustion gases.
	1.2. Washing of an Engine	Procedure of External Engine Washing with Precautions
	1.3. Tuning fuel system of an Engine	Demonstration of fuel system in a given vehicle engine
	1.4. Tuning of the Ignition System of an Engine	Identify the primary and secondary circuit(s)
	1.5. Tuning of Engine Lubrication System	Check the level and quality of lubricating oil and replace the oil and change the oil filter
	1.6. Tuning of Engine Cooling System	Check circulation of water in cooling system
	1.7. Tightening of Fastener (Nut/Bolt/Screw)	Procedure to tight fasteners with specified torque
	1.8. Engine Timing (Tuning)	Understand importance of engine timing
Unit 2: Regular Maintenance of Transmission System	2.1. Transmission System	Identify the different units of the transmission system
	2.2..Clutch Maintenance And Adjustments	Inspect the functioning of clutch linkage for free movement
Unit 3: Regular Maintenance of Gear Box	3.1. Lubrication of Gear box	Changing of lubricating oil in the gearbox
	3.2. Setting of Gear Box	Checking gear lever and selecting mechanism
Unit 4: Servicing of the Wheels	4.1. Importance of Wheels	Identify different types of wheels
	4.2. Importance of Hub Greasing and Bearing Play Adjustments	Remove the wheel from axle
Unit 5: Regular Maintenance of Tubes and Tyres	5.1. Tyre and Tube Maintenance	Measure air pressure in tyres as per specifications
	5.2. Repairing of Punctured Tubes	Identify punctured methods i.e. hot patch, and cold patch method
Unit 6: Regular Maintenance of Brakes	6.1 Brakes and Maintenance	Understand different components of different types of brakes
	6.2 Brakes and Adjustment	Checking efficiency of brake

**AUTOMOTIVE (SUBJECT CODE 804)****Class XII (Session-2023-24)****Total Marks: 100 (Theory-60 + Practical-40)**

	<b>UNITS</b>	<b>NO. OF HOURS For Theory and Practical</b>	<b>MAX. MARKS for Theory and Practical</b>
<b>Part A</b>	<b>Employability Skills</b>		
	Unit 1:Communication Skills-IV	13	2
	Unit 2:Self-Management Skills-IV	07	2
	Unit 3: ICT Skills-IV	13	2
	Unit 4:Entrepreneurial Skills-IV	10	2
	Unit 5: Green Skills-IV	07	2
	<b>Total</b>	<b>50</b>	<b>10</b>
<b>Part B</b>	<b>Subject Specific Skills</b>		
	Unit1:Measuring & service Equipment	30	10
	Unit 2: Steering system	15	07
	Unit 3:Suspension system	15	06
	Unit 4: Transmission and Final Drive system	15	07
	Unit 5 : Automotive Electrical and electronic system	35	15
	Unit 6:Motor Vehicle Act and Rules	10	05
	<b>Total</b>	<b>120</b>	<b>50</b>
<b>Part C</b>	<b>Practical Work</b>		
	Project	60	10
	Viva		05
	Practical File		15
	Demonstration of skill competency via Lab Activities	60	10
	<b>Total</b>	<b>90</b>	<b>40</b>
	<b>GRAND TOTAL</b>	<b>260</b>	<b>100</b>

## **DETAILED CURRICULUM/TOPICS:**

### **Part-A: EMPLOYABILITY SKILLS**

<b>S. No.</b>	<b>Units</b>	<b>Duration in Hours</b>
1.	Unit1:CommunicationSkills-IV	13
2.	Unit2:Self-managementSkills-IV	07
3.	Unit3:InformationandCommunicationTechnologySkills-IV	13
4.	Unit4:EntrepreneurialSkills-IV	10
5.	Unit5:GreenSkills-IV	07
	<b>TOTALDURATION</b>	<b>50</b>

Detailed Curriculum/ Topics to be covered under Part A: Employability Skills can be downloaded from CBSE website.

### **Part-B–SUBJECT SPECIFIC SKILLS (Class XII)**

<b>S. No.</b>	<b>Units</b>	<b>Duration in Hours</b>
1.	Unit 1:Measuring & service Equipment	30
2.	Unit 2: Steering system	15
3.	Unit 3:Suspension system	15
4.	Unit 4:Transmission and Final Drive system	15
5.	Unit 5:Automotive Electrical and electronic system	35
6.	Unit 6:Motor Vehicle Act and Rules	10
	<b>TOTAL DURATION</b>	<b>120</b>

UNIT	TOPIC	ACTIVITY/PRACTICAL
Unit1: Measuring & service Equipment	1.1.1 Air Compressor	Demonstration of air compressor
	1.1.2 Car Washer	Procedure of automatic car washer
	1.1.3 Tyre Inflators	Demonstration of tyre Inflator
	1.1.4 Spark Plug Cleaner and Tester	Model of Spark Plug Cleaner and Tester
	1.5 Wheel Balancing - Procedure of Wheel Balancing/ Working of Wheel Balancing Machine.	
Unit 2: Steering system	2.2.1 Ackerman's Principle of Steering	Working Model of Ackerman's Principle of Steering
	2.2.2 Steering Geometry	Model of steering geometry
	2.2.3 Steering Gear Box	Demonstration of rack & pinion and re-circulating type of steering gear box
	2.2.4 Steering Linkages	Demonstration of steering system With all components.
	2.2.5 Power Steering	Demonstration of hydraulic power steering
	2.2.6 Trouble Shooting and Remedies	Discussion of various problems With its remedies.
Unit 3: Suspension system	3.2.1 Introduction	Location of suspension system.
	3.2.2 Types of Suspension System	Working Models of suspension system.
	3.2.3 Description of Suspension System	Demonstration of parts of Suspension system.
	3.2.4 Components of a Suspension system Servicing of shock absorber	Demonstration of shock absorber
Unit 4: Transmission and Final Drive system	4.1.1 Transmission & Final Drive System (Propeller Shaft & Universal Joint Propeller Shaft Types of Universal Joint	Types of Universal Joint
	4.1.2 Transmission & Final Drive System (Propeller Shaft & Universal Joint Universal Joint Trouble shooting chart for Transmission and Final Drive System Trouble Shooting Chart for Clutch, Trouble Shouting Chart for Gearbox	Trouble Shooting Chart for Clutch, Trouble Shouting Chart for Gearbox, Trouble shooting Chart for the Rear Axle
	4.2.1 Transmission & Final Drive System (Differential and Rear Axle) Final Drive	Components of final drive
	4.2.2 Transmission & Final Drive System (Differential and Rear Axle) Differential	Demonstration of Differential



UNIT	TOPIC	ACTIVITY/PRACTICAL
	4.2.3 Transmission & Final Drive System (Differential and Rear Axle) Rear Axle	Model on various types of rear axle
Unit 5: Automotive Electrical and electronic system	5.1.1 Introduction	Importance of Auto electrical system.
	5.1.2 Purpose of Automotive Electrical System	Purpose of Automotive Electrical System
	5.1.3 Layout of an Automotive Electrical System	Layout of an Automotive Electrical System
	(Charging & Starting System & Different Electrical Circuit) 5.2.1 Charging System	Demonstration of charging system
	5.2.2 Starting System 5.2.3 Different Circuit Diagrams of a Car 5.4.2 Automobile DC Generator 5.4.4. Construction of Alternator	Demonstration starting system  Demonstration of DC Generator Practical on Alternator
Unit 6: Motor Vehicle Act and Rules	6.1.1 Provision regarding Issue of Driving	Documents required for registration, Insurance, claims, Transfer of Ownership and fitness certificates
	6.1.2 Registration of Vehicle	
	6.1.3 Insurance	
	6.1.4 Claims	
	6.1.5 Transfer of Ownership License	
	6.1.6 Fitness Certificate	
	6.2.1 Indian Traffic Rules & Signs	Models of Road signs and practical demo on hand signals.
	6.2.2 Hand Signals used by the Drivers	
	6.2.3 The Driving Hand Signals used by the Driver	
	6.2.4 Hand Signals used by the Traffic Personnel	
	6.2.5 Traffic Police Hand Signals (Manual)	
	6.3.1 Emission	Demonstration of PCV system and Evaporative Emission Control system.
	6.3.2 Sources of Emission	
	6.3.3 Types of Emission	
	6.3.4 Emission Control	
6.3.5 Emission Norms in India		

## **PRACTICAL GUIDELINES FOR CLASS XI**

### **Assessment of performance:**

The two internal examiners, assigned for the conduct and assessment of Practical Examinations each in Senior Secondary School Curriculum (Under NSQF). Question for the viva examinations should be conducted by both the examiners. Question to be more of General nature, project work or the curriculum. Investigatory Project especially those that show considerable amount of effort and originality, on the part of the student, should get suitable high marks, while project of a routine or stereo typed nature should only receive MEDIOCRE marks.

### **Procedure for Record of Marks in the Practical answer-books:**

The examiner will indicate separately marks of practical examination on the title page of the answer-books under the following heads:-

#### **Project-10 marks**

Projects for the final practical are given below. Student may be assigned  
Guidelines for Project Preparation:

#### **The final project work should encompass chapters on:**

- a) Introduction,
- b) Identification of core and advance issues,
- c) Learning and understanding
- d) Observation during the project period.

#### **Viva based on Project-05 marks**

The teacher conducting the final practical examination may ask verbal questions related to the project, if any, done by the student. Alternatively, if no project has been assigned to the students, viva may be based on questions of practical nature from the field of subject as per the Curriculum

#### **Practical File-15 Marks**

Students to make a power point presentations / session assignment / practical file / report.

#### **Suggested list of Practical–**

1. Inspection of an engine.
2. Washing of an engine.
3. Tuning of an engine.

4. Tuning of the ignition system of an engine.
5. Replace engine oil and oil filter of a car.
6. Servicing of cooling systems.
7. Engine Timing and engine sound test after setting.
  8. Servicing of transmission system.
  9. Servicing of clutch system.
  10. Adjust clutch pedal free play.
  11. Overhauling of clutch.
  12. Replace gear and different oil.
  13. Adjust gear lever free play.
  14. Servicing of wheel assembly.
  15. Hub greasing and bearing play adjustments.
  16. Tyre Rotation of a car.
  17. Tyre puncture repair.
  18. Servicing of brakes system.

**Demonstration of skill competency in Lab Activities-10 marks**

Internal Examiner shall allot marks based on whole year performance of students during regular practicals.

Practical performance/Periodic Test marks/Notebook Presentation shall be considered.

## **PRACTICAL GUIDELINES FOR CLASS XII**

### **Assessment of performance:**

In class XII: One Internal and one External examiner, assigned for the conduct and assessment of Practical Examinations each in Senior Secondary School Curriculum (Under NSQF). Question for the viva examinations should be conducted by both the examiners. Question to be more of General nature, project work or the curriculum. Investigatory Project especially those that show considerable amount of effort and originality, on the part of the student, should get suitable high marks, while project of a routine or stereo typed nature should only receive MEDIOCRE marks.

### **Procedure for Record of Marks in the Practical answer-books:**

The examiner will indicate separately marks of practical examination on the title page of the answer-books under the following heads:-

#### **Project-10 marks**

Projects for the final practical are given below. Student may be assigned  
Guidelines for Project Preparation:

**The final project work should encompass chapters on:**

- a) Introduction,
- b) Identification of core and advance issues,
- c) Learning and understanding
- d) Observation during the project period.

#### **Viva based on Project-05 marks**

The teacher conducting the final practical examination may ask verbal questions related to the project, if any, done by the student. Alternatively, if no project has been assigned to the students, viva may be based on questions of practical nature from the field of subject as per the Curriculum

#### **Practical File-15 Marks**

Students to perform activities listed Part-B–SUBJECT SPECIFIC SKILLS/ make a power point presentations / session assignment / practical file / report.

### **Demonstration of skill competency in Lab Activities-10 marks**

Internal Examiner shall allot marks based on whole year performance of students during regular practicals.

Practical performance/Periodic Test marks/Notebook Presentation shall be considered.