

# CBSE | DEPARTMENT OF SKILL EDUCATION CURRICULUM FOR SESSION 2022-2023

## **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 opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for Class XI 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 a computer system
- Identify and control hazards in the workplace that pose a danger or threat to their safety or, 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. Hard toed boots                                     |
| 5. Work tables                                     | 25. Sun glasses (3 m)                                   |
| 6. Bench grinder                                   | 26. Bump caps   |
| 7. Oil draining & filling equipment                | 27. Air filter testing machine                          |
| 8. Cooling system tester                           | 28. Hydraulic press                                     |
| 9. Multi meter                                     | 29. Hydraulic jacks                                     |
| 10. Hydro meter                                    | 30. Vehicle safety stands                               |
| 11. BC clamp meter                                 | 31. Parts washing station car                           |
| 12. Coolant tester                                 | 32. Pullers   |
| 13. Battery & charging system tester (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 (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 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 XI (SUBJECT CODE 804)**

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

	<b>UNITS</b>	<b>NO. OF HOURS for Theory and Practical</b>	<b>MAX. MARKS for Theory andPractical</b>
<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	20	5
	Unit 2: Regular Maintenance of Transmission System	5	2
	Unit 3: Regular Maintenance of Gear	20	5
	Unit 4: Service of Wheels	10	5
	Unit 5: Regular Maintenance of Tubesand Tires	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 viaLab 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.

## 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 stereotyped 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 is given below .Student may be assigned

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 presentation / assignment / practical file / report. Instructor shall assign them any outlet to study the elements in retailing.

### **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

#### 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 and
- d) Observation during the project period.

## **AUTOMOTIVE XII (SUBJECT CODE 804)**

**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-IV*	13	-
	Unit 2 : Self-Management Skills- IV	07	3
	Unit 3 : ICT Skills- IV	13	3
	Unit 4 : Entrepreneurial Skills- IV	10	4
	Unit 5 : Green Skills- IV*	07	-
	<b>Total</b>	<b>50</b>	<b>10</b>
<b>Part B</b>	<b>Subject Specific Skills</b>		
	Unit 1: 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>

**Note:** \* marked units are to be assessed through Internal Assessment/ Student Activities.  
They are not to be assessed in Theory Exams

## **DETAILED CURRICULUM/TOPICS:**

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

<b>S. No.</b>	<b>Units</b>	<b>Duration in Hours</b>
1.	Unit 1: Communication Skills-II*	13
2.	Unit 2: Self-management Skills-II	07
3.	Unit 3: Information and Communication Technology Skills-II	13
4.	Unit 4: Entrepreneurial Skills-II	10
5.	Unit 5: Green Skills-II*	07
	<b>TOTAL DURATION</b>	<b>50</b>

**Note:** \* marked units are to be assessed through Internal Assessment/ Student Activities. They are not to be assessed in Theory Exams

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

### **Part-B – SUBJECT SPECIFIC SKILLS**

<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
Unit 1: 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
	<b>1.5 Wheel Balancing - Procedure of Wheel Balancing/ Working of Wheel Balancing Machine*</b>	
Unit 2: Steering system	2.2.1 Ackerman's Principle of Steering	Working Model of 1 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 recirculating type of steering gearbox
	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 <b>Servicing of shock absorber*</b>	<b>Demonstration of shock absorber*</b>
Unit 4 : Transmission and Final Drive system	4.1.1 Transmission & Final Drive System (Propeller Shaft & Universal Joint Propeller Shaft <b>Types of Universal Joint*</b>	<b>Types of Universal Joint*</b>

**\*Note: To be assessed in practical only. No question shall be asked from this portion in Theory Exams.**



UNIT	TOPIC	ACTIVITY/ PRACTICAL
	4.1.2 Transmission & Final Drive System (Propeller Shaft & Universal Joint Universal Joint <b>Trouble shooting chart for Transmission and Final Drive System*</b> <b>Trouble Shooting Chart for Clutch, Trouble Shouting Chart for Gearbox*</b>	<b>Trouble Shooting Chart for Clutch, Trouble Shouting Chart for Gearbox, Troubleshooting Chart for the Rear Axle*</b>
	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
	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	Automotive Electrical & Electronic System (Introduction and Battery) 5.1.1 Introduction	Importance of Auto electrical system.
	Automotive Electrical & Electronic System (Introduction and Battery) 5.1.2 Purpose of Automotive Electrical System	Purpose of Automotive Electrical System
	Automotive Electrical & Electronic System (Introduction and Battery) 5.1.3 Layout of an Automotive Electrical System	Layout of an Automotive Electrical System
	Automotive Electrical & Electronic System (Charging & Starting System & Different Electrical Circuit) 5.2.1 Charging System	Demonstration of charging system
	Automotive Electrical & Electronic System (Charging & Starting System & Different Electrical Circuit) 5.2.2 Starting System	Demonstration starting system

**\*Note: To be assessed in practical only. No question shall be asked from this portion in Theory Exams.**

UNIT	TOPIC	ACTIVITY/ PRACTICAL
	Automotive Electrical & Electronic System (Charging & Starting System & Different Electrical Circuit) 5.2.3 Different Circuit Diagrams of a Car <b>5.4.2 Automobile DC Generator*</b> <b>5.4.4. Construction of Alternator*</b>	<b>Demonstration of DC Generator* Practical on Alternator *</b>
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 Licence	
	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		

**\*Note: To be assessed in practical only. No question shall be asked from this portion in Theory Exams.**