

AUTOMOTIVE (804)
Job Role: (Automotive Service Technician)
CLASS XI- XII (SESSION 2019-2020)

1. 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:

2. OBJECTIVES OF THE 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 showroom;
- Generate sales leads through telemarketing activities
- Support the overall sales process
- Plan and organise work to meet expected outcomes
- 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

3. SALIENT FEATURES OF AUTOMOTIVE:

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

4. 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 Skill subject along with general education subjects.

Theory	60 marks
Practical	40 marks
Total Marks	100 marks

The unit-wise distribution of periods and marks for Class XI is as follows:

	Units	No. of Periods for Theory and Practical		Max. Marks
		260		
Part A	Employability Skills			
	Unit 1: Communication Skills - III	13		10
	Unit 2: Self-management Skills - III	9		
	Unit 3: Information and Communication Technology Skills – III	6		
	Unit 4: Entrepreneurial Skills - III	16		
	Unit 5: Green Skills – III	6		
	Total	50		10
Part B	Vocational Skills			
		Theory	Practical	
	Unit 1: Regular Maintenance of an Engine	40	45	20
	Unit 2: Regular Maintenance of Transmission System	15	15	7
	Unit 3: Regular Maintenance of Gear	10	10	5
	Unit 4: Service of Wheels	10	10	5
	Unit 5: Regular Maintenance of Tubes and Tires	10	10	5
	Unit 6: Regular Maintenance of Brakes	15	20	8
	Total	100	110	50
Part C	Practical Assessment			
	Project			10
	Viva based on Project			10
	Practical File/Report/portfolio Power Point presentation			10
	Demonstration of skill competency on Lab Activities			10
	Total			40
	Grand Total	260		100

Part B–Vocational Skills

1. Regular Maintenance of an Engine

- Inspection of an engine.
- Washing of an engine.
- Tuning fuel system of an engine.
- Tuning of the ignition system of an engine.
- Tuning engine lubrication system.
- Tuning engine cooling system.
- Checking other engine components (Mechanical Setting).
- Engine Timing and engine sound test after setting.

2. Regular Maintenance of Transmission System

- Transmission system.
- Clutch maintenance.
- Clutch adjustments.
- Overhauling of clutch.

3. Regular Maintenance of Gear

- Lubrication of gear box.
- Setting of gears.

4. Service of Wheels

- Importance of wheels.
- Importance of hub greasing and bearing play adjustments.

5. Regular Maintenance of Tubes and Tires

- Tyre and its maintenance.
- Tyre puncture.

6. Regular Maintenance of Brakes

- Brakes and maintenance.
- Brakes and adjustment.

The unit-wise distribution of periods and marks for Class XII is as follows:

	Units	No. of Periods for Theory and Practical		Max. Marks for Theory and Practical
Part A	Employability Skills			10
	Unit 1: Communication Skills-IV	13		
	Unit 2: Self-Management Skills-IV	9		
	Unit 3: Information and Communication Technology Skills-IV	6		
	Unit 4: Entrepreneurial Skills-IV	16		
	Unit 5: Green Skills-IV	6		
	Total	50		
Part B	Vocational Skills	Theory Practical		
	Unit 1: Measuring & service Equipment	20	20	10
	Unit 2: Steering system	15	17	07
	Unit 3: Suspension system	15	17	06
	Unit 4 : Transmission and Final Drive system	15	16	07
	Unit 5 : Automotive Electrical and electronic system	25	30	15
	Unit 6 : Motor Vehicle Act and Rules	10	10	05
	Total	100	110	50
Part C	Practical Assessment			
	Project			10
	Viva based on Project			05
	Practical File/ Report / portfolio Power Point presentation			05
	Demonstration of skill competency via Demonstration of skill competency via Lab Activities			20
	Total			40
	Grand Total	260		100

Part B Vocational Skills

Measuring and Service Equipment

Construction and working :-Micro meter, vernier Caliper, dial, cylinder bore gauge, torque wrench, filler gauge, hydrometer, air compressor, car washer tyre inflator, spark plug cleaner and tester, wheel balancing machine , battery charger

Steering System

Concept of dead and live axles, Ackermann's Principle, toe-in, toe-out caster angle, camber angle, steering axis/ king pin inclination. Mechanical & power steering mechanism- Rack & pinion, worm & nut with recirculating ball type. Trouble shooting and maintenance- servicing, repair and replacement of different steering system components.

Suspension system

Description of suspension systems, struts, leaf spring, coil spring torsion bar& shock absorbers Trouble shooting and maintenance- servicing, repair and replacement of different suspension system components.

Transmission and final drive system:-

Difference between manual and automatic transmission, propeller shaft, universal joint, differential and rear axle assembly. Trouble shooting and maintenance- servicing, repair and replacement of different transmission and final drive system components.

Automotive Electrical and electronic System

study of different electric circuits (Charging circuit, starting circuit, lighting circuit, horn circuit, wiper circuit), Wiring diagram of car, construction and working of dynamo, alternator, self-starter concept of engine management system- sensors and actuators. Trouble shooting and maintenance- servicing, repair and replacement of different auto electrical components of a car.

Motor Vehicle Act and Rules

Provision regarding issue of driving licence, registration, insurance, transfer of ownership, fitness certificate, traffic signs, hand signals used by driver and traffic personnel.

Emission, control, sources of emission/pollutants, Emission Norms in India.

5 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.

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

6 PRACTICAL GUIDELINES

A. Practical Guidelines of Class XI

1. MINIMUM PASS MARKS

The Minimum number of marks required to pass as per the examination cell guidelines.

2. Marks for record, Viva Project etc., in respect of Senior Secondary School Curriculum OF School Certificate Examination:

Marks allotted for laboratory Record, Viva Voice etc., should separately be stated in the answer book (if answer-Books are used) and added to the marks given for other items. The projects and the practical records, duly punched should be returned to the students concerned immediately after evaluation.

3. Assessment of performance.

- The two examiners, **one internal and the other external**, assigned for the conduct and assessment of Practical Examinations each in Senior Secondary School Curriculum. 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.
- In the assessment and award of marks, follow strictly the marking Scheme which is given in the list of practical i.e. provided to the Examiners/Schools at the time of Examination.
- Every effort should be made to reach a consensus on the marks to be awarded to individual candidates. If a difference of one or two marks still persists even after discussion the average marks should be awarded.
- Marks awarded for Project / Practical activities, for viva, for project and for Practical files must be separately shown on the answer-book as the total.
- If irregularities are perceived by either examiner in the conduct of the Practical Examination these should be included in the examiner's report and should be sent to the Asstt. Secretary (A.B. Cell) within three days after the end of practical examination.
- The external examiner should assume responsibility of deposit of answer books & award list to the Board.
- Award lists should be signed by both the examiners and should be sent separately through messenger/personally in a double sealed cover and not mixed with the Answer-books. The answer-books can be delivered personally in the Board's office.
- The related material will be collected by the external examiner from the allotted schools.
- In other subject involving practical's, there will be only an external examiner

4. Procedure for Record of Marks in the Practical answer-books (Total 40 marks)

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

The subject Teacher in charge of conducting practical may assign practical activities to the students so as to generate interest in students in the subject.

Project for the final practical

Project may be based on any one of the following –

- Servicing and testing of major/minor components of a vehicle,
- Project on automotive innovations
- Project maybe on automobile related Production, such as cut-section of components, etc.

Project -10 marks

Students should make a project file on the above projects in the proper format. The marks can be allocated based on the quality of work done by the students as per the Curriculum

Viva based on Project -10 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/ Report / portfolioPower Point presentation -10 Marks

Students to make a power point presentation. Alternatively, if they can't be assigned a power point presentation then they can communicate their project work.

Demonstration of skill competency via Lab Activities -10 marks

Activity question to be created by internal examiner, to be conducted on the practical day -30 minutes.

B. Practical Guidelines of Class XII

1. MINIMUM PASS MARKS

The Minimum number of marks required to pass as per the examination cell guidelines.

2. Marks for record, Viva Project etc., in respect of Senior Secondary School Curriculum OF School Certificate Examination:

Marks allotted for laboratory Record, Viva Voice etc., should separately be stated in the answer book (if answer-Books are used) and added to the marks given for other items. The projects and the practical records, duly punched should be returned to the students concerned immediately after evaluation.

3. Assessment of performance.

- A. The two examiners, **one internal and the other external**, assigned for the conduct and assessment of Practical Examinations each in **Senior Secondary School Curriculum**. 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.
- B. In the assessment and award of marks, follow strictly the marking Scheme which is given in the list of practical i.e. provided to the Examiners/Schools at the time of Examination.
- C. Every effort should be made to reach a consensus on the marks to be awarded to individual candidates. If a difference of one or two marks still persists even after discussion the average marks should be awarded.
- D. Marks awarded for Project / Practical activities, for viva, for project and for Practical files must be separately shown on the answer-book as the total.
- E. If irregularities are perceived by either examiner in the conduct of the Practical Examination these should be included in the examiner's report and should be sent to the Asstt. Secretary (A.B. Cell) within three days after the end of practical examination.
- F. The external examiner should assume responsibility of deposit of answer books & award list to the Board.
- G. Award lists should be signed by both the examiners and should be sent separately through messenger/personally in a double sealed cover and not mixed with the Answer-books. The answer-books can be delivered personally in the Board's office.
- H. The related material will be collected by the external examiner from the allotted schools.
- I. In other subject involving practical's, there will be only an external examiner.

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Practical File/ Report / portfolioPower Point presentation -10 Marks

Students to make a power point presentation. Alternatively, if they can't be assigned a power point presentation then they can communicate their project work.

Demonstration of skill competency via Lab Activities -10 marks

Activity question to be created by internal examiner, to be conducted on the practical day -30 minutes.

7 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