

WEST BENGAL COUNCIL OF HIGHER SECONDARY EDUCATION**SYLLABUS FOR CLASSES XI AND XII****SECTOR: AUTOMOTIVE****JOB ROLE: FOUR - WHEELER SERVICE TECHNICIAN****COURSE OVERVIEW**

The present curriculum Four-Wheeler Service Technician job role is related to Level L-4. This course fulfills the needs of the students willing to learn activities relating to the Four-Wheeler Service Assistant job role. Any student/ entrepreneur willing to start an Automobile Service Centre 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.

COURSE OBJECTIVES

On completion of the course, students should be able to:

- 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 health, 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.
- Communicate effectively with the customers
- Greet, escort, seat the customers and offer refreshments (tea/ coffee)
- Enquire and understand customer queries related to vehicle type, model, specifications
- Identify features of different elements of Engineering such as mechanical, electrical, electronic, software and safety engineering
- Repairing and servicing automobiles such as cars, trucks, motorcycles, scooters etc
- Understanding the mechanism of vehicle chassis, internal combustion engine, electrical systems, motor transport affairs, workshop technology

COURSE STRUCTURE

JOB ROLE: FOUR - WHEELER SERVICE TECHNICIAN									
SECTOR: AUTOMOTIVE									
Class	Semester	Contact Hours					Marks		
		Employability Skills	Domain (Theory & Practical)	Practical Exam/Written Test/ Viva	Project (Practical File/Student Portfolio/ Viva Voce)	Total	Theory		Practical
XI	I	70	75	-	-	145	30	Average of Sem I & Sem II = 30	NIL
	II	40	90	10	15	155	30		50 + 20 = 70
XII	III	70	80	-	-	150	30	Average of Sem III & Sem IV = 30	NIL
	IV	40	85	10	15	150	30		50 + 20 = 70

JOB ROLE: FOUR - WHEELER SERVICE TECHNICIAN**Class XI [Total Theory Marks: 30]****Class XI SEMESTER 1 TOPICS: (MCQ) MARKS: 30 [1 MARK PER QUESTION]**

Sl. No.	Topic	Tuition Hours	Marks Allotted
	Part A: Employability Skills	70	
1	Unit 1: Communication Skills - III	25	2
2	Unit 2: Self-management Skills - III	25	2
3	Unit 3: Information and Communication Technology Skills - III	20	2
	Part B: Vocational Skills	75	
4	Unit 1: Introduction to Engineering Geometrics and drawing	20	7
5	Unit 2: Fastener	15	3
6	Unit 3: Materials for construction of automotive components	20	7
7	Unit 4: Measuring instrument and health and hygiene	20	7
	Total	145	30

Class XI SEMESTER 2 TOPICS: [Short Answer Question, Descriptive Question] MARKS: 30

Sl. No.	Topic & Sub Topic	Tuition Hours	Short Answer Type Question (10 Marks)	Descriptive Type Question (20 Marks)	Total
	Employability Skills	40			
1	Unit 4: Entrepreneurial Skills - III	25	1	2	3
2	Unit 5: Green Skills - III	15	1	2	3
	Part B: Vocational Skills	90			
3	Unit 5: Regular maintenance of an engine	15	1	3	4
4	Unit 6: Maintenance of Transmission system	20	2	3	5
5	Unit 7: Maintenance of Gear Box	20	2	3	5
6	Unit 8: Service of wheels	15	1	3	4
7	Unit 9: Regular maintenance of tubes and tyres	10	1	2	3
8	Unit 10: Regular Maintenance of Brakes	10	1	2	3
	Part C: Practical Work	10			
9	Practical Examination	06			
10	Written Test	01			
11	Viva Voce	03			
	Part D: Project Work/ Field Visit	15			
12	Practical File / Student Portfolio	10			
13	Viva Voce	05			
	Total	155	10	20	30

JOB ROLE: FOUR - WHEELER SERVICE TECHNICIAN**Class XII [Total Theory Marks: 30]****Class XII SEMESTER 1 TOPICS :(MCQ) MARKS: 30 [1 MARK PER QUESTION]**

Sl. No.	Topic	Tuition Hours	Marks Allotted
	Part A: Employability Skills	70	
1	Unit 1: Communication Skills - IV	25	2
2	Unit 2: Self-management Skills - IV	25	2
3	Unit 3: Information and Communication Technology Skills - IV	20	2
	Part B: Vocational Skills	80	
4	Unit 1: Service Manual and material conservation	30	10
5	Unit 2: Serviceability, replacement or repair of engine components	30	8
6	Unit 3: Transmission system	20	6
	Total	150	30

Class XII SEMESTER 2 TOPICS: [Short Answer Question, Descriptive Question] MARKS: 30

Sl. No.	Topic & Sub Topic	Tuition Hours	Short Answer Type Question (10 Marks)	Descriptive Type Question (20 Marks)	Total
	Employability Skills	40			
1	Unit 4: Entrepreneurial Skills - IV	25	1	2	3
2	Unit 5: Green Skills - IV	15	1	2	3
	Part B: Vocational Skills	85			
3	Unit 4: Suspension system	20	2	3	5
4	Unit 5: Auto Electrical	65	6	13	19
	Part C: Practical Work	10			
5	Practical Examination	06			
6	Written Test	01			
7	Viva Voce	03			
	Part D: Project Work/ Field Visit	15			
8	Practical File / Student Portfolio	10			
9	Viva Voce	05			
	Total	150	10	20	30

DETAIL SYLLABUS
CLASS - XI
SEMESTER – I

Part A: Employability Skills			
Unit 1: Communication Skills – III			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Demonstrate knowledge of communication	1. Introduction to communication 2. Importance of communication 3. Elements of communication 4. Perspectives in communication 5. Effective communication	1. Role-play on the communication process 2. Group exercise on factors affecting perspectives in communication	03
2. Demonstrate verbal communication	1. Verbal communication 2. Public Speaking	1. Role-play of a phone conversation. 2. Group exercise on public speaking	02
3. Demonstrate non-verbal communication	1. Importance of non-verbal communication 2. Types of non-verbal communication 3. Visual communication	1. Role-play on non-verbal communication 2. Group exercise on body language 3. Group activity on methods of communication	02
4. Speak using correct pronunciation	1. Pronunciation basics 2. Speaking properly 3. Phonetics 4. Types of sounds	1. Group activities on practicing pronunciation	01
5. Apply an assertive communication style	1. Important communication styles 2. Assertive communication 3. Advantages of assertive communication 4. Practicing assertive communication	1. Group discussion on communication styles 2. Observing and sharing communication styles	03
6. Demonstrate the knowledge of saying no	1. Steps for saying 'No' 2. Connecting words	1. Group discussion on how to respond 2. Group activity on saying 'No'	02
7. Identify and use parts of speech in writing	1. Capitalisation 2. Punctuation 3. Basic parts of speech 4. Supporting parts of	1. Group activity on identifying parts of speech 2. Writing a paragraph with punctuation marks	03

	speech	3. Group activity on constructing sentences 4. Group activity on identifying parts of speech	
8. Write correct sentences and paragraphs	1. Parts of a sentence 2. Types of object 3. Types of sentences 4. Paragraph	1. Activity on writing sentences 2. Activity on active and passive voice 3. Assignment on types of sentences	02
9. Communicate with people	1. Greetings 2. Introducing self and others	1. Role-play on formal and informal greetings 2. Role-play on introducing someone 3. Practice greetings	02
10. Introduce yourself to others and write about oneself	1. Talking about self 2. Filling a form	1. Practice self- introduction and filling up forms 2. Practice self- introduction to others	01
11. Develop questioning skill	1. Main types of questions 2. Forming closed and open-ended questions	1. Practice exercise on forming questions 2. Group activity on framing questions	01
12. Communicate information about family to others	1. Names of relatives 2. Relations	1. Practice talking about family 2. Role-play on relations	01
13. Describe habits and routines	1. Concept of habits and routines	1. Discuss habits and routines 2. Group activity on describing routines	01
14. Ask or give directions to others	1. Asking for directions 2. Using landmarks	1. Role-play on asking and giving directions 2. Identifying symbols	01
Unit 2: Self-management Skills - III			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Identify and analyze own strengths and weaknesses	1. Understanding self 2. Techniques for identifying strengths and weaknesses 3. Difference between interests and abilities	1. Activity on writing aims in life 2. Prepare a worksheet on interests and abilities	03
2. Demonstrate personal grooming skills	1. Guidelines for dressing and grooming 2. Preparing a personal grooming checklist	1. Activity on dressing and grooming standards 2. Self-reflection on dressing and grooming	04
3. Maintain personal hygiene	1. Importance of personal hygiene 2. Three steps to personal hygiene 3. Essential steps of hand	1. Role-play on personal hygiene 2. Assignment on personal hygiene	03

	washing		
4. Demonstrate the knowledge of working in a team and participating in group activities	1. Describe the benefits of teamwork 2. Working in a team	1. Assignment on working in a team 2. Self-reflection on teamwork	03
5. Develop networking skills	1. Benefits of networking skills 2. Steps to build networking skills	1. Activity on networking 2. Assignment on networking skills	03
6. Describe the meaning and importance of self-motivation	1. Meaning of self-motivation 2. Types of motivation 3. Steps to building self-motivation	1. Activity on staying motivated 2. Assignment on reasons hindering motivation	03
7. Set goals	1. Meaning of goals and purpose of goal-setting 2. Setting SMART goals	1. Assignment on setting SMART goals 2. Activity on developing long-term and short-term goals	03
8. Apply time management strategies and techniques	1. Meaning and importance of time management 2. Steps for effective time management	1. Checklist for making preparation for daily activities 2. Preparing To-do-list	03
Unit 3: Information and Communication Technology Skills - III			
Learning Outcome	Theory (08 hrs)	Practical (12 hrs)	Duration (20 hrs)
1. Create a document on the word processor	1. Introduction to ICT 2. Advantages of using a word processor. 3. Work with Libre Office Writer	1. Demonstration and practice of the following: <ul style="list-style-type: none"> • Creating a new document • Typing text • Saving the text • Opening and saving file on Microsoft word/Libre Office Writer. 	02
2. Identify icons on the toolbar	1. Status bar 2. Menu bar 3. Icons on the Menu bar 4. Multiple ways to perform a function	1. Work with a basic user interface of LibreOffice writer 2. Working with LibreOffice Writer or Microsoft Word	02
3. Save, close, open and print document	1. Save a word document 2. Close 3. Open an	1. Perform the functions for saving, closing and printing documents on LibreOffice Writer	02

	existing document 4. Print	2. Perform the functions on Microsoft Word	
4. Format text in a word document	1. Change style and size of text 2. Align text 3. Cut, Copy, Paste Find and replace	1. Perform the functions of formatting on LibreOffice Writer 2. Perform the functions of formatting on Microsoft Word	02
5. Check spelling and grammar in a word document	1. Use of spell checker 2. Autocorrect	1. Perform the functions of checking spellings on LibreOffice Writer 2. Perform the functions of checking the spelling on Microsoft Word	02
6. Insert lists, tables, pictures, and shapes in a word document	1. Insert bullet list 2. Number list 3. Tables 4. Pictures 5. Shapes	1. Perform the functions on LibreOffice Writer	03
7. Insert header, footer and page number in a word document	1. Insert header 2. Insert footer 3. Insert page number Page count	1. Perform the functions on LibreOffice Writer 2. Perform the functions on Microsoft Word	03
8. Make changes by using the track change option in a word document	1. Tracking option 2. Manage option Compare documents	1. Perform the functions on LibreOffice Writer 2. Perform the functions on Microsoft Word	04

Part B: Vocational Skills

Unit 1: Introduction to Engineering Geometrics and drawing

Learning Outcome	Theory	Practical	Duration
1. Draw engineering geometric and drawings	1. Drawing tools Engineering drawing 2. Different types of projections Dimensioning technique	1. Identify and describe drawing tools 2. Draw geometric construction 3. Identify and describe various simple engineering drawing 4. Draw engineering drawing 5. Draw various projections 6. Measure and draw dimensioning	20 hrs

Unit 2: Fastener

Learning Outcome	Theory	Practical	Duration
1. Identify different type of fasteners used in a vehicle	1. Fasteners and their type and use 2. Various procedure used for removal of fasteners in a vehicle	1. Identify various fasteners used in a vehicle. 2. Handle rusty, broken, spoiled threaded fasteners 3. Use of special tools for	15 hrs

	<p>3. Various special tools for handling of fasteners</p> <p>4. Importance of specified torque values for tightening the fastener</p>	<p>removal of defected/ affected fasteners</p> <p>4. Selection of appropriate fasteners and tightening at appropriate torque.</p>	
Unit 3: Materials for construction of automotive components			
Learning Outcome	Theory	Practical	Duration
<p>1. Selection and identification of material used in automobiles and their basic manufacturing process</p>	<p>1. Engineering materials and its type</p> <p>Manufacturing process used in manufacturing the component</p>	<p>1. Identification of engineering material used in automobiles</p> <p>2. Selection and describing engineering material</p> <p>3. Making of a list of basic manufacturing process used in fabrication of a part of automobile</p> <p>4. Writing of list of process used in manufacturing</p>	<p>20 hrs</p>
Unit 4: Measuring instrument and health and hygiene			
Learning Outcome	Theory	Practical	Duration
<p>1. Handle and use the various measuring equipment's</p>	<p>1. Dial gauge, telescopic gauge and bore gauge and their least count, Vernier caliper and tyre depth gauge</p> <p>Micrometer</p> <p>2. Hydrometer and bevel gauge</p> <p>3. Torque wrench and filler gauge</p> <p>4. Dashboard and indicators in a vehicle</p> <p>5. Avoid contact with ill people and self- isolate in a similar situation</p>	<p>1. Handling and Use of Vernier caliper and tyre depth gauge</p> <p>2. Setting and uses of micrometer</p> <p>3. Handling and Use of hydrometer and bevel gauge</p> <p>4. Handling and Use of torque wrench and filler gauge</p> <p>5. Identification of various symbolic (gauges) information on dashboard</p>	<p>20 hrs</p>
<p>2. Sanitize workstation and equipment regularly</p> <p>clean hands with soap, alcohol- based sanitizer regularly</p>	<p>1. Wear and dispose PPES regularly and appropriately</p> <p>2. Report advanced hygiene and sanitation issues to appropriate authority</p> <p>3. Follow stress and anxiety management techniques</p>		

DETAIL SYLLABUS
CLASS - XI
SEMESTER – II

Part A: Employability Skills			
Unit 4: Entrepreneurial Skills – III			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Differentiate between different kinds of businesses	1. Introduction to entrepreneurship 2. Types of business activities	1. Role-play on different kinds of businesses	03
2. Describe the significance of entrepreneurial values	1. Meaning of value 2. Values of an Entrepreneur 3. Case study on qualities of an entrepreneur	1. Role-play on qualities of an entrepreneur	03
3. Demonstrate the attitudinal changes required to become an entrepreneur	1. Difference between the attitude of entrepreneur and employee	1. Interviewing employees and entrepreneurs	03
4. Develop thinking skills like an entrepreneur	1. Problems of entrepreneurs 2. Problem-solving 3. Ways to think like an entrepreneur	1. Group activity on identifying and solving problems	04
5. Generate business ideas	1. The business cycle 2. Principles of idea creation 3. Generating a business idea 4. Case studies	1. Group activity to create business ideas	04
6. Describe customer needs and the importance of conducting a customer survey	1. Understanding customer needs 2. Conducting a customer survey	1. Conducting a customer survey	04
7. Create a business plan	1. Importance of business planning 2. Preparing a business plan 3. Principles to follow for growing a business 4. Case studies	1. Activity on developing a business plan	04
Unit 5: Green Skills – III			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Describe the importance of the main	1. Meaning of ecosystem, food chain and	1. Discussion on sectors of green economy	06

sector of the green economy	sustainable development 2. Main sectors of the green economy- E- waste management, green transportation, renewal energy, green construction, and water management	2. Preparing posters on various sectors for promoting green economy 3. Writing an essay or a short note on the important initiatives for promoting green economy.	
2. Describe the main recommendations of policies for the green economy	1. Policies for a green economy	1. Discussion on initiatives for promoting the green economy	03
3. Describe the major green sectors/ areas and the role of various stakeholders in the green economy	1. Stakeholders in the green economy	1. Group discussion on the role of stakeholders in the green economy 2. Preparation of posters on green sectors and their stakeholders 3. Making solar bulbs.	03
4. Identify the role of government and private agencies in the green economy	1. Role of the government in promoting a green economy 2. Role of private agencies in promoting green economy	1. Discussion on the role of Government and Private Agencies in promoting a green economy. 2. Posters on green sectors.	03

Part B: Vocational Skills

Unit 5: Regular maintenance of an engine

Learning Outcome	Theory	Practical	Duration
1. Describe regular maintenance procedures for an engine	1. Inspection of an engine Washing of the engine Tuning fuel system of an engine. 2. Tuning of an ignition system of an engine. 3. Tuning of lubrication system 4. Tuning of cooling system 5. Tightening of fastener (Nuts/Bolts/S crews) 6. Engine Timing	1. Tracing different leakages like oil, coolant and combustion gases Washing of an engine externally 2. Handling of the washing equipment 3. Listing the precautions during washing of engine 4. Tracing the fuel system in a given vehicle engine 5. Checking of the fuel line for leakage 6. Conducting fuel pump test and compare its reading with the service manual Practice of setting of carburettor for ideal speed	15 hrs

		<p>7. Testing of nozzle for pressure</p> <p>8. Do tracing of the primary and secondary circuit(s)</p> <p>9. Checking the terminals for loose connection</p> <p>10. Cleaning spark plug and distributor</p> <p>11. Checking the level and quality of lubricating oil</p> <p>12. Replacing the oil and hanging the oil filter</p> <p>13. Check the oil pressure</p> <p>14. Reading temperature gauge</p> <p>15. Checking circulation of water in cooling system</p> <p>16. Tracing for coolant leakage</p> <p>17. Tightening the fasteners with specified torque and with sequence in the following components: cylinder head, induction manifold, exhaust manifold and engine foundation nuts and bolt.</p> <p>18. Checking and observing importance of engine timing</p> <p>19. Observing the sound change after tuning process</p>	
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Unit 6: Maintenance of Transmission system

Learning Outcome	Theory	Practical	Duration
1. Maintenance procedure on the transmission system of a vehicle	<p>1. Transmission system</p> <p>2. Clutch maintenance</p> <p>3. Clutch adjustments</p>	<p>1. Explain the function of different units used to transmit engine power identify the different units of the transmission system clean motor cycle drive chain</p> <p>2. Lubricate the drive chain Adjust the drive chain Able to inspect the</p>	20 hrs

		functioning of clutch linkage for free movement Lubricate the clutch linkage 3. Tighten the fasteners as per need 4. Doing of setting of free play adjustment of clutch Setting of pedal travel adjustment of clutch pedal Inspecting the power transmission from clutch assembly	
Unit 7: Maintenance of Gear Box			
Learning Outcome	Theory	Practical	Duration
1. Maintenance of gears	1. Lubrication of gear box 2. Setting of gears	1. Checking the level of lubricating oil and quality of oil in the gear box Changing of the lubricating oil from the gearbox 2. Checking the various combination of gears Setting of gear lever and selecting mechanism 3. Check the power transmission through respective gears	20 hrs
Unit 8: Service of wheels			
Learning Outcome	Theory	Practical	Duration
1. Identify the components of service of wheels	1. Importance of wheels Importance of hub greasing and bearing play adjustments	1. Identify different types of wheels 2. Make a list the functions of wheels 3. Practice of removing the wheel from axle 4. Practice of removing the hub 5. Practice of removing and replacing wheel stud Cleaning the wheel bearing 6. Greasing of hub and wheel bearing 7. Do adjust wheel play (Bearing) adjustment	15 hrs

Unit 9: Regular maintenance of tubes and tyres			
Learning Outcome	Theory	Practical	Duration
1. Repairing puncture in tyres and their maintenance	1. Tyres and their maintenance 2. Tyre puncture	1. Measuring air pressure in tyres as per specifications 2. Doing rotation of tyres for normal wear 3. Do the repairing practice of punctured tubes with hot patch, and cold patch 4. Do repairing practice of a puncture of tubeless tyres	10 hrs
Unit 10: Regular Maintenance of Brakes			
Learning Outcome	Theory	Practical	Duration
1. Brakes and its maintenance	1. Brake and its maintenance 2. Brake and its adjustment	1. Identify the different components of different types of brakes 2. Inspect and lubricate the controls of the braking system 3. Carry out Free pedal/lever adjustment 4. Carry out Checking efficiency of brake 5. Able to carry out adjustments of rear brake Do the adjustments of front brake	10 hrs

DETAIL SYLLABUS
CLASS - XII
SEMESTER – I

Part A: Employability Skills			
Unit 1: Communication Skills - IV			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Demonstrate active listening skills	1. Active listening - listening skill, stages of active listening 2. Overcoming barriers to active listening	1. Demonstration of the factors affecting active listening 2. Preparing posters of steps for active listening 3. Role-play on negative effects of not listening actively	10
2. Identify the parts of speech	1. Parts of speech – using capitals, punctuation, basic parts of speech, supporting parts of speech	1. Group practice on identifying parts of speech 2. Group practice on constructing sentences	10
3. Write sentences	1. Writing skills to the following: <ul style="list-style-type: none"> • Simple sentence • Complex sentence • Types of objects 2. Types of sentences <ul style="list-style-type: none"> • Active and Passive sentences • Statement/ Declarative sentence • Question/ Interrogative sentence • Emotion/ Reaction or Exclamatory sentence • Order or Imperative sentence 3. Paragraph writing	1. Group work on writing sentences and paragraphs 2. Practice writing sentences in the active or passive voice 3. Writing different types of sentence	05
Unit 2: Self-Management Skills – IV			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Describe the various factors influencing motivation and positive attitude	1. Motivation and positive attitude 2. Intrinsic and extrinsic motivation 3. Positive attitude – ways	1. Role-play on avoiding stressful situations 2. Activity on self-reflection	10

	to maintain positive attitude 4. Stress and stress management – ways to manage stress		
2. Describe how to become result oriented	1. How to become result oriented? 2. Goal setting – examples of result-oriented goals	1. Pair and share activities on the aim of life	05
3. Describe the importance of self-awareness and the basic personality traits, types and disorders	1. Steps towards self-awareness 2. Personality and basic personality traits 3. Common personality disorders- <ul style="list-style-type: none"> • Suspicious • Emotional and impulsive • Anxious 4. Steps to overcome personality disorders	1. Group discussion on self-awareness	10

Unit 3: Information and Communication Technology Skills - IV

Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Identify the components of a spreadsheet application	1. Introduction to spreadsheet application - types of a spreadsheet, creating a new worksheet, components of a worksheet.	1. Group practice on working with LibreOffice	02
2. Perform basic operations in a spreadsheet	1. Opening workbook and entering data – types of data, steps to enter data, editing and deleting data in a cell 2. Selecting multiple cells 3. Saving the spreadsheet in various formats 4. Closing the spreadsheet 5. Opening the spreadsheet. 6. Printing the spreadsheet.	1. Group practice on working with data on LibreOffice Calc.	03
3. Demonstrate the knowledge of working with data and formatting text	1. Using a spreadsheet for addition – adding value directly, adding by using cell address, using a mouse to select values in	1. Demonstration of basic calculations in LibreOffice Calc. 2. Group practice on formatting a spreadsheet	02

	a formula, using sum function, copying and moving formula 2. Need to format cell and content 3. Changing text style and font size 4. Align text in a cell 5. Highlight text	in LibreOffice Calc.	
4. Demonstrate the knowledge of using advanced features in spreadsheet	1. Sorting data 2. Filtering data 3. Protecting spreadsheet with password	1. Group practice on sorting data in LibreOffice Calc	03
5. Make use of the software used for making slide presentations	1. Available software presentation 2. Steps to start LibreOffice Impress 3. Adding text to a presentation	1. Group practice on working with LibreOffice Impress tools 2. Group practice on creating a presentation in LibreOffice Impress	02
6. Open, close and save slide presentations	1. Open, Close, Save and Print a slide presentation	1. Practice exercises on steps to save, close, open and save a presentation	01
7. Demonstrate the operations related to slides and texts in the presentation	1. Working with slides and text in a presentation-adding slides to a presentation, deleting slides, adding and formatting text, highlighting text, aligning text, changing text colour	1. Group practice on working with font styles and types in LibreOffice Impress	04
8. Demonstrate the use of advanced features in a presentation	1. Advanced features used in a presentation 2. Inserting shapes in the presentation 3. Inserting clipart and images in a presentation 4. Changing slide layout	1. Group practice on working with slides in LibreOffice Impress	03

Part B: Vocational Skills

Unit 1: Service Manual and material conservation

Learning Outcome	Theory	Practical	Duration
1. Use of service manual 2. Check for spill and leakage	1. Service manual and its use in workshop 2. Check for spills/ leakages in various tasks/ activities/ processes. Plug spills/ leakages and escalate to appropriate authority if unable to	1. Reading and understanding of service manual 2. Report malfunctioning (fumes/ sparks/ emission/ vibration/ noise) and lapse in maintenance of equipment	30 hrs

	rectify 3. Carry out routine cleaning of tools, machines and equipment 4. Check if the equipment/ machine is functioning normally before commencing work and rectify wherever required 5. Report malfunctioning (fumes/sparks/ emission/vibration/noise) and lapse in maintenance of equipment 6. Ensure electrical equipment and appliances are properly connected and turned off when not in use		
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Unit 2: Serviceability, replacement or repair of engine components

Learning Outcome	Theory	Practical	Duration
1. Do test and replace/ repair of components in auto engine	1. Valve mechanism, reasons for leakage 2. Importance of reface valve, cutting of the valve seat, and valve lapping operations 3. Use of valve spring, valve seat and valve guide 4. Piston ring and gapes with piston clearance in cylinder bore 5. Connecting rod 6. Engine bearing 7. Cooling System functions Importance, advantages and use of MPFI Loose connection and reasons Nozzle pressure Throttle chamber 8. Importance and use of CRDI 9. Reasons for loose connection and rectification Faulty nozzle, sensors 10. Turbo charger	1. Test for leakage from the valve mechanism 2. Do the reface valve, cut the valve seat, valve lapping operations 3. Inspecting valve spring, valve seat and valve guide 4. Inspecting and replace piston ring 5. Inspecting the piston 6. Clearance in cylinder bore 7. Inspect and do replacement of connecting rod 8. Checking and doing replacement of engine bearings with appropriate clearance 9. Identify and locate faults in the cooling system 10. Replace defective component in the cooling system 11. Able to trace and	30 hrs

		<p>inspect the components of MPFI systems with fuel and air intake</p> <p>12. Able to trace for the loose connection Replace faulty nozzle, Sensors Servicing throttle body</p> <p>13. To do trace connection and inspect the components of CRDI</p> <p>14. Systems with fuel and air intake</p> <p>15. Checking of loose connection, Replacing faulty nozzle, sensors</p> <p>16. Do servicing of turbo charger</p>	
Unit 3: Transmission system			
Learning Outcome	Theory	Practical	Duration
1. Explain working of transmission system	<p>1. Clutch adjustment and overhaul procedure Importance of propeller shaft, universal and slip joints</p> <p>2. Differential unit and its adjustment</p> <p>3. Introduction to automatic power transmission</p>	<p>1. Do adjustment in Clutch Overhauling practices clutch assembly used in vehicle and inspection of components Servicing/ overhauling of propeller shaft, universal and slip joints</p> <p>2. Servicing and adjustment of differential unit</p> <p>3. Identify and understand automatic transmission system used in power transmission</p>	20 hrs

DETAIL SYLLABUS
CLASS - XII
SEMESTER – II

Part A: Employability Skills			
Unit 4: Entrepreneurial Skills-IV			
Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Describe the concept of entrepreneurship and the types and roles and functions entrepreneur	1. Entrepreneurship and entrepreneur 2. Characteristics of entrepreneurship 3. Entrepreneurship-art and science 4. Qualities of a successful entrepreneur 5. Types of entrepreneurs 6. Roles and functions of an entrepreneur 7. What motivates an entrepreneur 8. Identifying opportunities and risk-taking 9. Startups	1. Group discussion on the topic “An entrepreneur is not born but created”. 2. Quiz on various aspects of entrepreneurship.	10
2. Identify the barriers to entrepreneurship	1. Barriers to entrepreneurship 2. Environmental barriers 3. No or faulty business plan 4. Personal barriers	1. Fishbowl of fears-group discussion about what we fear about entrepreneurship 2. Facing an Interview.	05
3. Demonstrate the knowledge of entrepreneurial attitude and competencies	1. Entrepreneurial attitude 2. Entrepreneurial competencies 3. Decisiveness, 4. Initiative 5. Interpersonal skills-positive attitude, stress management 6. Perseverance 7. Organisational skills-time management, goal setting, efficiency, managing quality.	1. Group discussion on business ideas 2. Group practice on best out of waste 3. Group discussion on the topic of lets grow together 4. Group practice on a snowball fight. 5. Activity on rating friends and self for entrepreneurial qualities. 6. Playing games, such as “Who am I”.	10

Unit 5: Green Skills-IV			
Learning Outcome	Theory (05 hrs)	Practical (10 hrs)	Duration (15 hrs)
1. Identify the benefits of the green jobs	1. Green jobs 2. Benefits of green jobs 3. Green jobs in different sectors: <ul style="list-style-type: none"> • Agriculture • Transportation • Water conservation • Solar and wind energy • Eco-tourism • Building and construction • Solid waste management • Appropriate technology 	1. Group discussion on the importance of green job.	08
2. State the importance of green jobs	1. Importance of green jobs in <ul style="list-style-type: none"> • Limiting greenhouse gas emissions • Minimizing waste and pollution • Protecting and restoring ecosystems • Adapting to the effects of climate change 	1. Preparing posters on green jobs. 2. Activities on tree plantation.	07

Part B: Vocational Skills			
Unit 4: Suspension system			
Learning Outcome	Theory	Practical	Duration
1. Test working of suspension system	1. Suspension system in a vehicle with introductory air suspension 2. Cambering of leaf springs, shackle, shackle pin and centre bolt 3. Strut/shock absorbers, steering linkages Manual Steering systems Power steering systems 4. Power steering system with EPS and Hydraulic	1. Inspect and identify the faulty suspension system, Carry out the maintenance 2. Trace trouble in suspension system Replace the defective components of Suspension system Tracing and test working of strut, shock, absorber and steering linkage Replace the defective components	20 hrs

	<p>5. Wheel balancing Wheel alignment 6. Steering adjustment</p>	<p>3. Check working of the manual steering system Check the working of power steering system Check and handle power steering system with EPS and Hydraulic Do wheel balancing Carryout the wheel alignment 4. Do steering adjustment</p>	
Unit 5: Auto Electrical			
Learning Outcome	Theory	Practical	Duration
<p>1. Auto electrical application in a vehicle</p>	<p>1. Use of electrical symbol and circuit diagram 2. Multimeter and oscilloscope and its uses Battery and its maintenance 3. Electrical connection, lights and their uses 4. Fuse Amperage Horn assembly, electrical fuel gauge and fuel pump 5. Battery charging system Self-starter circuit diagram and its components 6. Circuit diagram for ignition system and components Wiper and its servicing method 7. Heater Ventilator Air Condition system in a Vehicle and its use</p>	<p>1. Practice of reading electrical symbol and circuit diagram, colour code and specification of cables and wiring hardness 2. Checking multi meter, timing light (stroboscope) and oscilloscope for resistance, ampere rage and voltage 3. Regular maintenance of the battery 4. Identify the components of earthling 5. Practice of topping Up of battery electrolyte Do the replacement of positive / negative battery cable 6. Checking electrical Connection, test and replace of head Light / indicator/ brake Bulbs Practice of replacement of fuses and do continuity test Practice of replacement of Horn assembly, electrical fuel gauge and fuel pump their application and maintenance 7. Draw and check the circuit for battery charging system with alternator 8. Draw and check self-starter circuit and its component 9. Draw and check circuit diagram for ignition system</p>	<p>65 hrs</p>

		10. Do the servicing of the wiper system 11. Identify the components of HVAC system in	
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ORGANISATION OF FIELD VISITS

In a year, at least 3 field visits/educational tours should be organized for the students to expose them to the activities in the workplace like. Automobile show room, Automobile Fair, Different section of show room and service centre, Telecaller centre, Service centre

Visit an Automobile showroom and service centre and observe the following: During the visit, students should obtain the following information from the owner or the supervisor of the showroom:

- Activity of Automobile show room
- Different section of show room and service centre
- Service centre activity
- Automobile Fair
- Different section of showroom
- Number of Vehicle sold annually
- Power transmission section of engine
- Type of engine and technology
- Automation system
- Denting and painting section
- Electrical section
- Auto electrical system



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