Syllabus on Vocational Education and Training Course (VTC)

Paper Title	**: Automobile Repairing -I**
CODE	**: VTC: 242.1**
Number of Credits	**: 4**
Semester	**: III**
No. of Theory Hours Per Week	**: One (1 hour)**
No. of Practical Hours per Week	**: Three (3 Hours)**

Outline of the Paper:

Type of Course	Units in the VTC	Hours	Credits	Total Marks	Distribution of Marks (as per OC-8)			
					In-Semester		End-Semester	
					Theory	Practical	Theory	Practical
Automobile Repairing-I	Unit-I Theory (25 Marks)	15	4	100	25			
	Unit-II to IV Theory (75 Marks)	90				15		60

Marks Distribution	**: Internal Assessment: 40** **: External Assessment: 60**
Course Objectives	**1.** To recognise the basic principles of automobile operation and mechanics **2.** To develop proficiency in diagnosing and troubleshooting automotive problems **3.** To demonstrate practical experience in performing repairs and maintenance tasks on various vehicle systems **4.** To identify diagnostic equipment and tools effectively. **5.** To devise safety protocols and practices for working in an automotive repair environment.
Course Learning Outcome	At the end of the course students will able to: 1. Identify customer service skills, time management, and professional conduct in a workshop environment 2. choose employability and carrier prospects in the automotive repair field 3. solve common engine problems and perform its routine maintenance tasks. 4. use equipment and identify hazardous materials effectively.
Unit I: (Theory) 15 Hours	**Introduction to Automobile** • Automobile Engine System, Overview of automobile components, Basic operation • Engine Fundamentals: Introduction to engine components, operation principles and basic troubleshooting techniques, • Safety Procedures: Emphasis on workshop safety practices, Handling of tools, equipment and hazardous materials, Fire safety and Personal Protective Equipment (PPE).

UNIT-II: (Practical) 30 Hours	• Hands-on experience in performing routine maintenance tasks • Oil change, filter replacements • Tyre rotations and fluid checks on various vehicle models
UNIT-III: (Practical) 30 Hours	• Visual inspection of the engine • Fluid analysis • Identification of common engine problems
UNIT-IV: (Practical) 30 Hours	• Practical applications of workshop safety protocols • Proper handling of tools, equipment and hazardous materials • Motor Vehicle Acts and Rules. 30 Hours 30 Hours 30 Hours • Demonstrate the constructional details, working principles and operation of Multi cylinder engine: Diesel and Petrol Engines
Suggested Readings	1. Babu, A.K. Automotive Engines, Khanna Publishing House 2. Babu, K. S. C. Sharma, T.R. Banga, Automobile Mechanics, Khanna Publishing House 3. Giri, N. K., Automobile Mechanics (in S.I. Units) 4. Kirpal Singh, Automobile Engineering: Volume 1 5. Kirpal Singh, Automobile Engineering: Volume 2 6. Kirpal Singh, Automobile Engineering: Volume 3 7. Mahalik,P. Automotive Electrical and Electronics Systems
Requirements	• Workshop Area • Car Washer • Tyre Inflators • Steering System • Suspension System • Air Compressor Demonstration • Automatic Car Washer Procedure • Tyre Inflator Demonstration • Ackerman's Steering Principle Model • Complete Steering System Demonstration • Suspension System Location • Working Models of Suspension Systems • Shock Absorber Demonstration • Manual and Power Steering Systems • Regular Maintenance • Any other items as and when required
Qualified Instructors	• Instructors with experience in automotive technology and teaching.

	• Certifications or relevant qualifications in automotive repair and maintenance.

Paper Title	**: Automobile Repairing -II**
CODE	**: VTC: 262.1**
Number of Credits	**: 4**
Semester	**: IV**
No. of Theory Hours Per Week	**: One (1 hour)**
No. of Practical Hours per Week	**: Three (3 Hours)**

Outline of the Paper:

Type of Course	Units in the VTC	Hours	Credits	Total Marks	Distribution of Marks (as per OC-8)			
					In-Semester		End-Semester	
					Theory	Practical	Theory	Practical
Automobile Repairing-II								
	Unit-I Theory (25 Marks)	15	4	100	25			
	Unit-II to IV Theory (75 Marks)	90				15		60

Marks Distribution	**: Internal Assessment: 40** **: External Assessment: 60**
Course Objectives	**1.** To provide the knowledge of measuring and services equipment. **2.** To analyze the fundamentals and components of Steering and suspension system **3.** To demonstrate the operating functions of air compressor, automatic car washer and tyre Inflator.
Course Learning Outcome	At the end of the course students will able to: 1. describe the principle of steering system and identify the gear box and steering leakage 2. demonstrate the use of air compressor, automatic car washer and tyre Inflator 3. identify the types of suspension system and shock absorber.
Unit I: (Theory) 15 Hours	• **Measuring and service equipment:** Air Compressor, Car Washer, Tyre Inflators; • **Steering System:** Principle of Ackerman's steering, Steering Gear Box, Steering Linkages; • **Suspension System:** Introduction, Types of suspension system, Components of a suspension system (Servicing of shock absorber)
UNIT-II: (Practical) 30 Hours	• Demonstration of Air Compressor • Procedure of Automatic Car washer • Demonstration of tyre Inflator
UNIT-III: (Practical) 30 Hours	• Working model of Ackerman's Principle of steering • Demonstration of rack & pinion and recirculating types of steering gear box

	• Demonstration of steering system with all components
UNIT-IV: (Practical) 30 Hours	• Location of suspension system • Working models of suspension systems • Demonstration of shock absorber • Demonstrate the constructional details, working principles and operation of Manual Steering Systems and Power steering
Suggested Readings	1. Babu, A.K. Automotive Engines, Khanna Publishing House 2. Babu, K. S. C. Sharma, T.R. Banga, Automobile Mechanics, Khanna Publishing House 3. Giri, N. K., Automobile Mechanics (in S.I. Units) 4. Kirpal Singh, Automobile Engineering: Volume 1 5. Kirpal Singh, Automobile Engineering: Volume 2 6. Kirpal Singh, Automobile Engineering: Volume 3 7. Mahalik,P. Automotive Electrical and Electronics Systems
Requirements	• Workshop Area • Car Washer • Tyre Inflators • Steering System • Suspension System • Air Compressor Demonstration • Automatic Car Washer Procedure • Tyre Inflator Demonstration • Ackerman's Steering Principle Model • Complete Steering System Demonstration • Suspension System Location • Working Models of Suspension Systems • Shock Absorber Demonstration • Manual and Power Steering Systems • Regular Maintenance • Any other items as and when required
Qualified Instructors	• Instructors with experience in automotive technology and teaching. • Certifications or relevant qualifications in automotive repair and maintenance.

Paper Title	**: Automobile repairing -III**
CODE	**:VTC: 362.2**
Number of Credits	**: 4**
Semester	**:VI**
No. of Theory Hours Per Week	**: One (1 hour)**
No. of Practical Hours per Week	**: Three (3 Hours)**

Outline of the Paper:

Type of Course	Units in the VTC	Hours	Credits	Total Marks	Distribution of Marks (as per OC-8)			
					In-Semester		End-Semester	
					Theory	Practical	Theory	Practical
Automobile Repairing-III								
	Unit-I Theory (25 Marks)	15			25			
	Unit-II to IV Theory (75 Marks)	90	4	100		15		60

Marks Distribution	**: Internal Assessment: 40** **: External Assessment: 60**
Course Objectives	**1.** To identify the fundamentals of workshop equipment and engine tuning. **2.** To demonstrate the details of fault diagnosis, overhaul and reconditioning procedure. **3.** To be able to operate the cooling and fuel systems.
Course Learning Outcome	At the end of the course students will able to: 1. apply and perform equipment testing, spark plug replacement, belt and hose inspection 2. identify the fault diagnosis by using MAP Sensor Circuit, VSS Circuit check, evaporative emission control system check. 3. conduct the procedure of overhaul and reconditioning in engine, clutch, gear box 4. determine the necessity of cooling system and concepts of fuel system in petrol and diesel engine 5. design and analyse various road emission testing of petrol and diesel vehicles for PUC/RTO.
Unit I: (Theory) 15 Hours	• **Workshop Equipment:** Equipment for testing electrical accessories: Electric test bench, growler, coil tester, ignition and cam-dwell-angle tester; wiring harness tester, Ampere-hour battery tester, Brake efficiency measurement; • **Engine Tuning:** Adjustments of spark plug gap, valve tappet clearance, head bolts, Air cleaner cleaning, Ignition timing setting by timing light; • **Fault Diagnosis:** MAP Sensor Circuit, VSS Circuit Check, Evaporative Emission Control system Check, Inspection of ECM & its Control; Overhaul and Reconditioning Procedure: Overhaul and reconditioning procedures of engine, clutch, gear box; • **Cooling System:** Necessity of cooling of I.C. engines. Methods of

	cooling-air cooling, water cooling, liquid cooling. Pressurized cooling system; • **Fuel System (Diesel & Petrol Engines):** Fuel supply system, Fuel injection pump, Common Rail Direct Injection, Air/fuel ratio, Air cleaners (wet & dry).
UNIT-II: (Practical) 30 Hours	• Diagnostic tools and equipment to troubleshoot electrical issues • Battery testing, alternator output checks, circuit continuity testing • Advanced practice in brake system repair and upgrade options
UNIT-III: (Practical) 30 Hours	• Spark plug replacement, belt and hose inspection, coolant flushes, timing bely replacement • Exploration of specialized automotive systems (air conditioning, heating, emission control) • Practical training in diagnosis and repair
UNIT-IV: (Practical) 30 Hours	• ABS System diagnosis and brake line replacement • Report based on visit to vehicle testing and research organization • On road emission testing of petrol and diesel vehicles for PUC/RTO 30 Hours • Demonstrate the constructional details, working principles and operation of Carburetors, Diesel Fuel Injection Systems and Gasoline Fuel Injection Systems
Suggested Readings	1. Babu, A.K. Automotive Engines, Khanna Publishing House 2. Babu, K. S. C. Sharma, T.R. Banga, Automobile Mechanics, Khanna Publishing House 3. Giri, N. K., Automobile Mechanics (in S.I. Units) 4. Kirpal Singh, Automobile Engineering: Volume 1 5. Kirpal Singh, Automobile Engineering: Volume 2 6. Kirpal Singh, Automobile Engineering: Volume 3 7. Mahalik,P. Automotive Electrical and Electronics Systems
Requirements	• Workshop Area • Car Washer • Tyre Inflators • Steering System • Suspension System • Air Compressor Demonstration • Automatic Car Washer Procedure • Tyre Inflator Demonstration • Ackerman's Steering Principle Model • Complete Steering System Demonstration • Suspension System Location • Working Models of Suspension Systems • Shock Absorber Demonstration

	• Manual and Power Steering Systems • Regular Maintenance • Any other items as and when required
Qualified Instructors	• Instructors with experience in automotive technology and teaching. • Certifications or relevant qualifications in automotive repair and maintenance.