

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBAJINAGAR.



NAAC- 'A+' Grade

CIRCULAR NO.SU/ Sci./College/NEP-2020/73/2025

It is hereby inform to all concerned that, the syllabi prepared by the Board of Studies/ Ad-hoc Boards/Committee and recommended by the Dean, Faculty of Science & Technology, the Academic Council at its meeting held on 09 May 2025 has been accepted **the following B.Sc. Course Structure & Curriculum** under the Faculty of Science & Technology as per National Education Policy – 2020 run at the Affiliated Colleges of Dr. Babasaheb Ambedkar Marathwada University as appended herewith.

Sr.No.	Courses	Semester
1	B.SC. PHYSICS	III RD AND IV TH SEMESTER
2	B.SC. ELECTRONICS	III RD AND IV TH SEMESTER
3	B.SC. MATHEMATICS	III RD AND IV TH SEMESTER
4	B.SC. INDUSTRIAL CHEMISTRY	III RD AND IV TH SEMESTER
5	B.SC. AGROCHEMICAL AND FERTILIZE	III RD AND IV TH SEMESTER
6	B.SC. HORTICULTURE	III RD AND IV TH SEMESTER
7	B.SC. BIOCHEMISTRY	III RD AND IV TH SEMESTER
8	B.SC. BOTANY	III RD AND IV TH SEMESTER
9	B.SC. ZOOLOGY	III RD AND IV TH SEMESTER
10	B.SC. BIOTECHNOLOGY	III RD AND IV TH SEMESTER
11	B.SC. MICROBIOLOGY	III RD AND IV TH SEMESTER
12	B.SC. DIARY SCIENCE AND TECHNOLOGY	III RD AND IV TH SEMESTER
13	B.SC. STATISTICS	III RD AND IV TH SEMESTER
14	B.SC. COMPUTER SCIENCE	III RD AND IV TH SEMESTER
15	B.SC. GEOLOGY	III RD AND IV TH SEMESTER
16	B.SC. CHEMISTRY	III RD AND IV TH SEMESTER
17	B.SC. ANALYTICAL CHEMISTRY	III RD AND IV TH SEMESTER
18	B.SC. POLYMER CHEMISTRY	III RD AND IV TH SEMESTER
19	B.SC. ENVIRONMENTAL SCIENCE	III RD AND IV TH SEMESTER
20.	B.SC. FISHERIES SCIENCE	III RD AND IV TH SEMESTER

21.	B.SC. HOME SCIENCE	III RD AND IV TH SEMESTER
22.	B.SC. DATA SCIENCE	III RD AND IV TH SEMESTER
23.	B.SC. INFORMATION TECHNOLOGY	III RD AND IV TH SEMESTER
24.	B.SC. NETWORKING AND MULTIMEDIA	III RD AND IV TH SEMESTER
25.	B.SC. AUTOMOBILE TECHNOLOGY	III RD AND IV TH SEMESTER
26.	B.SC. FORENSIC SCIENCE	III RD AND IV TH SEMESTER
27.	B.SC. FORENSIC SCIENCE & CYBER SECURITY	III RD AND IV TH SEMESTER
28.	B.SC. NON-CONVENTIONAL & CONVENTIONAL ENERGY	III RD AND IV TH SEMESTER
29.	B.SC. CLINICAL LABORATORY SCIENCE	III RD AND IV TH SEMESTER
30.	BACHELOR OF COMPUTER APPLICATION	III RD AND IV TH SEMESTER

This is effective from the Academic Year 2025-26 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Chhatrapati Sambhajnagar
-431 004.

Ref.No. SU/Sci./2025/ 827-29
Date:- 26/05/2025

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(Signature)
**Deputy Registrar,
Syllabus Section.**

Copy forwarded and necessary action to :-

- 1] **The Principal of all Affiliated Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

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- 1] The Director, Board of Examinations & Evaluation, Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajnagar.

21.	B.SC. HOME SCIENCE	III RD AND IV TH SEMESTER
22.	B.SC. DATA SCIENCE	III RD AND IV TH SEMESTER
23.	B.SC. INFORMATION TECHNOLOGY	III RD AND IV TH SEMESTER
24.	B.SC. NETWORKING AND MULTIMEDIA	III RD AND IV TH SEMESTER
25.	B.SC. AUTOMOBILE TECHNOLOGY	III RD AND IV TH SEMESTER
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**Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajnagar- 431001**



B.Sc. Degree Programme
(Three Year / Four Years (Hons) / Four Years (Hons with Research))

Course Structure

(Revised)
(AS PER NEP-2020)

Subject (Major): Automobile Technology
(Third and Fourth Semester)

Effective from 2025-26

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18/06/2025

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Prof. Prashant Ambad

B.Sc Automobile Technology Second Year: 3rd Semester

Students will have to select / declare choice of **one major subject** and **one minor subject** from three major options M1, M2 and M3 (which were opted in the first year)

Course Type	Course Code	Examination Code	Course Name	Teaching Scheme (Hrs. / Week)		Credits Assigned		Total Credits
				Theory	Practical	Theory	Practical	
Major (Core) Mandatory DSC	AUT/DSC/T /200	SAC10302003T	Transmission System	2		2		2+2+2+2 = 08
	AUT/DSC/T /201	SAC10302013T	Automotive Engine	2		2		
	AUT/DSC/P / 226	SAC10302263P	Practical based on AUT/DSC/T/200		4		2	
	AUT/DSC/P / 227	SAC10302273P	Practical based on AUT/DSC/T/201		4		2	
Minor (Choose any two from pool of courses) It is from different discipline of the same faculty	AUT/Mn/T/ 200	SCC10302003T	To be chosen from other discipline of same faculty	2		2		2+2 = 04
	AUT/Mn/T/ 201	SCC10302013T	To be chosen from other discipline of same faculty	2		2		
Generic / Open Elective (GE/OE) (Choose any one from pool of courses) It should be chosen compulsorily from the faculty other than that of Major	AUT/GE/OE /T/200	SDC10302003T	To be chosen from other faculty	2		2		02
VSC (Vocational Skill Courses) (Choose any one from AUT/VSC/T/ 200 and AUT/VSC/T/ 201) and corresponding Practical's	AUT/VSC/T / 200	SEC10302003T	Machine Drawing	1		1		1+1 =02
	AUT/VSC/T / 201	SEC10302013T	Strength Of Material	1		1		
	AUT/VSC/P / 226	SEC10302263P	Practical's based on AUT/VSC/T/200		2		1	
	AUT/VSC/P / 227	SEC10302273P	Practical's based on AUT/VSC/T/201		2		1	
AEC, VEC, IKS	AUT/AEC/T /200		English (Common for all the faculty)	2		2		2 + 2 = 04
	AUT/VEC/T /201		Environmental Studies	2		2		
OJT/ FP/CEP/CC/RP	AUT/CC/P/ 226		Cultural Activity / NSS,NCC (Common for all the faculty)		4		2	02
				15	14	15	07	22

Minor: - 1) Fundamental Of Engine

2) Workshop Tools-I

Generic / Open Elective: - Three Wheeler Servicing

SAC10302003T
Major (Core) Mandatory (AUT/DSC/T/200)
Transmission System

Total Credits: 2	Teaching Time / Week: 2 Hours (30 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

The Transmission System course provides an in-depth understanding of the fundamental components and mechanisms involved in power transmission in automobiles. It covers the working principles, construction, and functions of key systems such as the clutch, gearbox, final drive, suspension, braking, and steering. Students will learn about various types of transmissions, drivetrain configurations, axle systems, and their applications. The course also explores wheel and tire dynamics, suspension design, and steering geometry. By the end of this course, students will develop a strong foundation for analyzing and understanding modern automotive transmission technologies.

Course Objectives:

The student will be made to learn

- 1) The anatomy of the automobile in general
- 2) The location and importance of each part
- 3) The functioning of the gear box, clutch, final drive, Wheel.
- 4) The functioning of the Suspension brakes, steering, axles and wheels
- 5) Suspension, frame, springs and other connections

Course Outcomes:

The student will be able to

- 1) Identify the different parts of the automobile
- 2) Explain the working of various parts like brakes, steering, Suspension.
- 3) Describe how the steering and the suspension systems operate.
- 4) Develop a strong base for understanding future developments in the automobile industry
- 5) Explain the working of various parts like transmission, clutch,

Unit:-I: Clutch & Transmissions

(10 Hrs.)

- Introduction, Function, Necessity of Clutch
- Types Of Clutches And Their Working Principles,
- Components Of Clutch System
- Operating Mechanism Of Clutch ,Fluid Flywheel, Torque Converter
- Principles Of Gears, Function And Need Of Gear Box
- Gear Ratio, Types Of Gear,
- Types of Gear Box.
- Gear Selecting Mechanism, Parts Of Gear Box, Gear Box Foundation
- Epicyclic Gears, Free Wheel , Over Drive
- Use Of Propeller Shaft, Material And Construction, Use And Types Of U Joints
- Types of drive (front, rear and four wheel), types of rear axle, types of final drives,
- Function, principle, necessity, construction of differential. Types Of Axle

Unit:-II: Suspension System & Wheels

(10 Hrs.)

- Function, Principle, Necessity And Requirements Of Good Suspension
- Types Of Spring, Construction And Working Of Spring
- Types Of Suspension System - Rigid And Independent System
- Stabilizer Bar, Swing Arm, Lubrication Of Suspension
- Rubber Bushing, Design Aspect Of Suspension System
- Air Suspension System.

- Function, Necessity Construction Of Shock Absorber, Types Of Shock Absorber
- Construction And Types Of Wheel, Tyre- Construction Of Tyre,
- Types Of Tyre, Trade Pattern
- Tyre Specification, Factor Affecting Tyre Performance, Tyre Rotations, Tyre Remolding

Unit:-III: Brake & Steering System

(10 Hrs.)

- Introduction, Principle, Necessity Of Brake System
- Construction, And Types Of Brake System,
- Parking Brake, Design Aspect of Brake System,
- Factor Affecting Brake Efficiency.
- Types Of Steering System & Gear Box
- Steering Geometry, Ackerman Principle
- Wheel Alignment, Under Steer And Over Steer, Turning Circle Radius.

Reference Text Books

- 1) Automobile Engineering by C.P. Nakra, Dhanpat Rai Publishing Company
- 2) Automobile Engineering Volume 2 and Volume 1 by K.M.Gupta, Umesh Publications

SAC10302263P
Major (Core) Mandatory
Transmission System

AUT/DSC/P/226:- Lab Practical (Practical based on AUT/DSC/T/200)

Total Credits: 2	Teaching Time / Week: 4 Hours (15 Practical Total)
Marks: 50	20 IA + 30 UA

- 1) To study construction and working single and multi-plate clutch
- 2) To study construction and working Centrifugal Clutch
- 3) To study construction and working Sliding mesh gear box
- 4) To study construction and working Constant mesh gear box
- 5) To study construction and working Synchromesh gear box
- 6) To study construction and working Universal Joints
- 7) To study construction and working different types Wheel
- 8) To study Construction Of Tyre
- 9) To study construction and working of Leaf Spring
- 10) To study construction and working of Independent Suspension system
- 11) To study Lubrication Of Suspension system
- 12) To study construction and working of Telescopic shock absorber
- 13) To study construction and working of Disk And Drum Brake
- 14) To study construction and working of Mechanical brake system
- 15) To study construction and working of pneumatic brake system

SAC10302013T
Major (Core) Mandatory (AUT/DSC/T/201)
Automotive Engine

Total Credits: 2	Teaching Time / Week: 2 Hours (30 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

The Automotive Engine course provides a comprehensive study of internal combustion (IC) engines, covering their classification, working principles, and key components. It explores essential engine subsystems such as ignition, carburetion, fuel supply, lubrication, and cooling systems. Students will gain insights into fuel supply mechanisms for both petrol and diesel engines, along with advanced injection technologies. The course emphasizes understanding engine performance, efficiency, and the foundational concepts necessary for analyzing modern and future automotive engine technologies.

Course Objectives:

- 1) Understand the classification, working principles, and components of IC engines.
- 2) Learn about the design and functioning of ignition, carburetion, and fuel systems.
- 3) Gain knowledge of lubrication and cooling systems used in automotive engines.
- 4) Analyze fuel supply mechanisms for petrol and diesel engines.
- 5) Develop a foundation for advanced automotive engine technologies and future innovations.

Course Outcomes:

- 1) Identify and describe the key components and functions of an automotive engine.
- 2) Explain the working principles of ignition, lubrication, cooling, and fuel supply systems.
- 3) Analyze different fuel systems used in petrol and diesel engines.
- 4) Compare various engine technologies and their efficiency in real-world applications.
- 5) Apply fundamental concepts to diagnose and understand engine performance issues.

Unit I: Carburetion & Ignition Systems

(10 Hrs.)

- Classification of IC engines.
- Principles and working of 2-stroke and 4-stroke diesel and petrol engines.
- Definition and principle of carburetion, factors affecting carburetion.
- Air-fuel mixtures and requirements at various loads/speeds.
- Simple carburetor: parts and working (fuel strainer, float chamber, choke, throttle).
- Air-fuel ratio calculation and compensating devices (air-bleed jet, emulsion tube).
- Ignition energy requirements and system components (battery, coil, distributor, spark plug).
- Magneto ignition systems, advantages of 12V systems. Limitations and dwell angle.

Unit II: Lubrication Systems & Cooling Systems

(10 Hrs.)

- Functions and mechanism of lubrication.
- Types of lubrication: mist, wet sump, dry sump.
- Lubrication of engine components (piston, crankshaft bearings, wristpin bearings).
- Need for cooling and characteristics of efficient systems.
- Liquid cooling systems (forced circulation, pressure cooling) and air cooling systems.
- Cooling fins, advantages, and limitations of liquid vs. air cooling.

Unit III: Fuel Supply Systems for Petrol and Diesel Engines

(10 Hrs.)

- Fuel supply in petrol engines: fuel pumps, filters, tanks, and air cleaners.
- Diesel fuel systems: injection pumps, injectors, and governors.
- Piezoelectric fuel injection and electronic petrol injection systems.

Reference Textbooks:

- 1) Automobile Engineering by C.P. Nakra, Dhanpat Rai Publishing Company.
- 2) Automobile Engineering Volume 1 by K.M. Gupta, Umesh Publications.
- 3) Internal Combustion Engines by V. Ganesan, McGraw Hill Education.

SAC10302273P
Major (Core) Mandatory
Automotive Engine

AUT/DSC/P/227:- Lab Practical (Practical based on AUT/DSC/T/201)

Total Credits: 2	Teaching Time / Week: 4 Hours (15 Practical Total)
Marks: 50	20 IA + 30 UA

- 1) To study construction and working 2 and 4-stroke petrol engine
- 2) To study construction and working 2 and 4-stroke diesel engine
- 3) To study Engine specification in details
- 4) To study construction and working of Components of an Engine in details (Cylinder Block, Cylinder Head, Gaskets)
- 5) To study construction and working of Engine Mountings
- 6) To study construction and working of Connecting Rod, Crankshaft, Camshaft
- 7) To study construction and working of Valve Operating Mechanism
- 8) To study construction and working of Simple Carburetor
- 9) To study construction and working of Multiple Venturi Carburetor:
- 10) To study the construction and working of Fuel Injector
- 11) To study the construction and working of Electronic Fuel Injection System
- 12) To study the construction and working of Multi-Point Fuel Injection (MPFI) System
- 13) To study the construction and working of Electronic Diesel Injection System (CRDI)
- 14) To study Important Qualities of SI & CI Engine Fuels

SCC10302003T

Minor: - AUT/Mn/T/ 200

Fundamentals of Automobile Engine

Total Credits: 2	Teaching Time / Week: 2 Hours (30 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

The course "Fundamentals of Automobile Engine" provides an in-depth study of internal combustion (IC) engines, focusing on their classification, working principles, key components, and systems like ignition, carburetion, lubrication, and cooling. The course covers the design and functioning of various engine systems, offering insights into the major components that drive the operation of modern automobile engines.

Course Objectives:

- 1) To introduce students to the classification, principles, and components of internal combustion engines (IC engines).
- 2) To provide knowledge about the working, design, and components of ignition, carburetion, and fuel systems.
- 3) To explore the lubrication and cooling systems used in automotive engines.
- 4) To understand the fuel supply mechanisms for both petrol and diesel engines.
- 5) To lay a foundation for analyzing and diagnosing engine performance issues.

Course Outcomes:

- 1) Identify and explain the key components and functions of an automobile engine.
- 2) Understand the working principles of ignition, lubrication, cooling, and fuel supply systems.
- 3) Analyze and compare different fuel systems used in petrol and diesel engines.
- 4) Evaluate various engine technologies and their application in real-world vehicles.
- 5) Apply learned concepts to diagnose engine performance problems.

Unit I: Ic Engine Construction: Structural Components

(10 Hrs.)

- Classification of IC Engines
- Two-Stroke vs. Four-Stroke Engines
- Petrol vs. Diesel Engines
- Air-Cooled vs. Water-Cooled Engines
- Working Principles & Differences of 2-Stroke and 4-Stroke Engines
- Components of an Engine: Cylinder Block, Cylinder Head
- Cylinder Liner (Or Sleeve), Crankcase, Oil Pan
- Manifolds, Exhaust System, Engine Mounting
- Bearings, Main Bearings
- Fasteners, Vibration Damper
- Crankshaft, Connecting Rod
- Piston, Piston Rings
- Camshaft, Valve Train Mechanism

Unit II: Carburetion , Ignition , Cooling Systems

(10 Hrs.)

- Carburetion System: Function and Types
- Components: Fuel Tank, Fuel Pump, Air Cleaner
- Working of a Carburetor
- Ignition Systems: Battery Ignition, Magneto Ignition
- Components: Battery, Coil, Distributor, Spark Plug
- Ignition Timing and Its Importance
- Common Ignition System Faults
- Cooling Systems: Air-Cooled vs. Liquid-Cooled
- Components: Radiator, Water Pump, Thermostat
- Forced Circulation and Pressure Cooling
- Importance of Proper Lubrication and Cooling

Unit III: Lubrication & Fuel Supply Systems

(10 Hrs.)

- Petrol Engine Fuel System: Components and Working
- Carburetors and Fuel Supply Control
- Diesel Engine Fuel System: Components and Working
- Fuel Injection Pumps, Injectors, and Filters
- High-Pressure Fuel Injection in Diesel Engines
- Lubrication System: Function and Types (Wet Sump, Dry Sump)
- Oil Pumps and Filters

References:

- 1) "Automobile Engineering" by Kripal Singh, Standard Publishers Distributors.
- 2) "Automobile Engineering" by R.K. Rajput, S. Chand Publishing.
- 3) "Internal Combustion Engines" by V. Ganesan, McGraw Hill Education.
- 4) "Automobile Engineering Volume 1" by K.M. Gupta, Umesh Publications.

SCC10302013T
Minor: - AUT/Mn/T/ 201
Workshop Tools-1

Total Credits: 2	Teaching Time / Week: 2 Hours (30 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

The course "Workshop Tools-1" is designed to provide students with an understanding of the various tools used in automobile workshops. It covers the essential tools, their usage, importance, and functioning, alongside special tools and measuring devices. The practical application of these tools will help students gain hands-on experience for automotive repairs and maintenance.

Course Objectives:

By the end of this course, students will be able to:

- 1) Understand the fundamental role of various workshop tools in automobile servicing and repairs.
- 2) Identify and categorize different types of general and special tools used in automotive workshops.
- 3) Master the usage of essential hand tools, measuring instruments, and testing machines used for diagnosing and maintaining vehicles.
- 4) Gain hands-on expertise in handling workshop tools and equipment, ensuring safety and precision in operations.
- 5) Apply the knowledge of tools and their functions to real-world automotive problems, enhancing troubleshooting and repair efficiency.

Course Outcomes:

Upon successful completion of this course, students will be able to:

- 1) Identify and explain the purpose of common and specialized tools in the automotive industry.
- 2) Demonstrate proficiency in using both hand tools and high-precision measuring instruments such as vernier calipers, micrometers, and tachometers.
- 3) Effectively apply workshop tools for routine automobile repairs and maintenance tasks, ensuring operational efficiency.
- 4) Evaluate and maintain automotive tools and equipment, ensuring their longevity and optimal performance.
- 5) Develop a comprehensive understanding of testing machines, including how they function and their critical role in diagnosing automotive issues.

Unit-I: General Tools

(10 Hrs.)

- Spanners: Adjustable Spanners, Open-Ended, Ring, and Box
- Screw Drivers: Different Types
- Pliers: Cutting Pliers, Circlip Pliers, Combination Pliers
- Wrenches: Different Types
- Hammers: Mallet, Brass, Plastic, Copper, etc.
- Allen Key
- Files: Various Types
- Chisel, Punches, Vice, etc.

Unit-II: Special Tools

(10 Hrs.)

- Box Spanner Set
- Feeler Gauge, Thread Gauge
- Vernier Caliper, Micrometer, Depth Gauge
- Piston Ring Compressor and Expander
- Valve Spring Compressor Tester
- Clutch Center Guide, Spark Plug Spanner
- Stud Extractor, Tap Extractor
- Valve Spring Lifters

- Pullers: Different Types, Sliding Hammer, Magneto Pullers
- Toeing Equipment

Unit-III: Gauges & Meters

(10 Hrs.)

- Vacuum Gauge, Compression Gauge
- Injection Pressure Gauge, Oil Pressure Gauge
- Temperature Gauge, Air Pressure Gauge
- Multimeter, Tachometer, Dwell Tester
- Timing Light
- Dial Gauge

Reference Textbooks:

- 1) Automobile Engineering by C.P. Nakra, Dhanpat Rai Publishing Company
- 2) Automobile Engineering Volume 2 by K.M. Gupta, Umesh Publications
- 3) Automobile Engineering Volume 1 by K.M. Gupta, Umesh Publications

SDC10302003T
Generic / Open Elective: - AUT/GE/OE/T/200
Three-Wheeler Servicing

Total Credits: 2	Teaching Time / Week: 2 Hours (30 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

This course provides a comprehensive understanding of three-wheeler vehicles, covering their types, advantages, and components. It focuses on general and major servicing procedures along with essential safety measures. The course equips students with hands-on experience in servicing, troubleshooting, and maintaining three-wheelers for optimal performance.

Course Objectives:

- 1) Understand different types of three-wheelers and their advantages.
- 2) Learn about the key components and working mechanisms.
- 3) Gain knowledge of general and periodic servicing techniques.
- 4) Develop skills to perform major servicing and repairs.
- 5) Follow proper safety protocols while servicing three-wheelers.

Course Outcomes:

- 1) Identify various three-wheeler types and explain their advantages.
- 2) Describe key components and their functions.
- 3) Perform general servicing and periodic maintenance.
- 4) Carry out major repairs and servicing of critical systems.
- 5) Follow standard safety practices while servicing three-wheelers.

UNIT I: General Servicing

(10 Hrs.)

- Types of three-wheelers: Passenger, Goods Carrier, Electric, Hybrid
- Advantages of three-wheelers in urban and rural transport
- Major components: Chassis, Engine, Transmission, Suspension, Brakes, Electrical Systems
- Routine inspection and maintenance
- Checking engine oil, coolant, and transmission oil
- Battery maintenance and electrical system checks
- Brake system inspection and adjustment
- Tire pressure and wheel alignment check

UNIT II: Major Servicing

(10 Hrs.)

- Engine tuning and troubleshooting common issues
- Transmission system servicing (gearbox, clutch)
- Suspension and steering system maintenance
- Brake system overhaul
- Fuel system maintenance (carburetor, fuel injection, CNG/LPG systems)

UNIT III: Safety While Servicing

(10 Hrs.)

- Importance of safety in servicing workshops
- Safe handling of fuel, oils, and lubricants
- Personal protective equipment (PPE) usage
- Fire prevention and first aid in a workshop
- Environmental considerations in servicing

Reference Books (Indian Authors):

- 1) "Automobile Engineering" – Kirpal Singh
- 2) "Automobile Mechanics" – N.K. Giri
- 3) "Automobile Engineering Vol. I & II" – K.M. Gupta
- 4) "A Textbook of Automobile Engineering" – R.K. Rajput

SEC10302003T
VSC (Vocational Skill Course)
AUT/VSC/T/200:- Machine Drawing

Total Credits: 1	Teaching Time / Week: 1 Hours (15 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

The Machine Drawing course introduces students to the fundamental principles of technical drawing, focusing on threads, fastening arrangements, and various machine components. It covers national and international drawing standards, fastening techniques such as welding and riveting, and the preparation of assembly drawings. The course also includes an introduction to computer-aided drafting (CAD), highlighting its applications, advantages, and future scope. By the end of the course, students will be able to interpret, standardize, and create industrial-quality machine component drawings.

Course Objective

- 1) The student will acquire knowledge of threads, fastening arrangements, different styles of attachment for shaft.
- 2) To understand and apply national and international standards while drawing machine component.
- 3) The student will acquire knowledge of fastening arrangements such as welding, riveting.
- 4) The student also is enabled to prepare the assembly of various machine or engine components and miscellaneous machine components.

Course Outcomes

- 1) Students will get good interpretation of machine components
- 2) Students will understand standardization of drawings.
- 3) Student will understand the Indian and International standard components.
- 4) Student will be able to create drawings to industrial standard.
- 5) Learn what tolerance and fits and assembly

Unit I: Screw Fastenings

(5 Hrs.)

- Types of Nuts: Hexagonal & Square Nut, Types of nuts of special purpose
- Bolts & Forms of Bolts (All Types), Set Screw, Washer
- Locking Arrangement of Nuts, Foundation Bolts
- Conventional representation of Nuts and Bolts

Unit II: Cotter and Pin Joints , Gearing

(5 Hrs.)

- Cotter and Cotter joints (All Types),
- Pin Joint or Knuckle joints
- Introduction, Types of Pulleys : C.I. Belt Pulley, Fast and loose Pulley,
- Introduction, Definitions (various Parts of Spur Gear),

Unit III: Computer Aided Drafting

(5 Hrs.)

- Introduction of CAD.
- Processor, input devices, Display, Graphic Output Devices
- Hardware Requirements, Applications, Advantages and Limitations.
- Future Scope.

Reference Books

- 1) "Machine Drawing" by K.L. Narayana & P. Kannaiah
- 2) "Engineering Drawing and Design" by N.D. Bhatt
- 3) "Machine Drawing" by R.B. Gupta

SEC10302263P
VSC (Vocational Skill Course)
AUT/VSC/P/226:- Practical's based on AUT/VSC/T/200

Total Credits: 1	Teaching Time / Week: 2 Hours (15 Practical Total)
Marks: 50	20 IA + 30 UA

Lab Practical

- 1) Draw Triangular or V Threads
- 2) Draw and Square Threads
- 3) Draw and Hexagonal Nuts
- 4) Draw and Square Nuts
- 5) Draw Foundation Bolts
- 6) Draw Cotter and Cotter joints (All Types)
- 7) Draw Pin Joint or Knuckle joints
- 8) Draw any three types of coupling
- 9) Draw Fast and loose Pulley, Stepped Pulley
- 10) Draw Construction of base circle and Approximate Construction of Teeth Profile
- 11) Study Of CAD and Applications.

SEC10302013T
VSC (Vocational Skill Course)
AUT/VSC/T/201:- Strength of Materials

Total Credits: 1	Teaching Time / Week: 1 Hours (15 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

The Strength of Materials course provides foundational knowledge of stress, strain, and material behavior under various loading conditions. Students will learn to analyze shear force and bending moment diagrams for beams and understand the distribution of bending and shear stresses. The course also includes practical applications to enhance theoretical understanding through stress-strain experiments. By the end of the course, students will be able to evaluate material strength, interpret beam stress distributions, and apply mechanical principles to real-world engineering problems.

Course Objectives:

- 1) To understand the fundamental concepts of stress, strain, and their relationship in materials.
- 2) To develop the ability to analyze shear force and bending moment diagrams for various beam structures.
- 3) To study the distribution of stresses in beams under different loading conditions.
- 4) To learn the effect of shear and bending stresses on beams and other structural components.
- 5) To gain practical knowledge through experiments involving stress-strain behavior, shear force, and bending moment analysis.

Course Outcomes:

- 1) Students will be able to calculate and interpret stress, strain, and elastic constants for different materials.
- 2) Students will be proficient in drawing shear force and bending moment diagrams for beams.
- 3) Students will understand the theory behind bending and shear stresses in beams and their distribution.
- 4) Students will be able to analyze the effects of various loads on beam structures.
- 5) Students will acquire hands-on experience in studying the behavior of materials and beams under stress and strain conditions.

Unit I: Stress and Strain

(5 Hrs.)

- Introduction to Stress and Strain, Types of Stress
- Hooke's Law and Young's Modulus
- Poisson's Ratio and Stress-Strain Diagram
- Temperature Stresses and Strains
- Elastic Constants: Relationship Between Young's Modulus, Shear Modulus, and Bulk Modulus

Unit II: Shear Force and Bending Moment

(5 Hrs.)

- Concepts of Shear Force and Bending Moment
- Shear Force and Bending Moment Diagrams for Simply Supported Beams
- Shear Force and Bending Moment Diagrams for Cantilever and Overhanging Beams
- Effect of Different Types of Loads on Shear Force and Bending Moment

Unit III: Stresses in Beams

(5 Hrs.)

- Theory of Simple Bending and Assumptions
- Sagging and Hogging Bending Moments
- Bending Stress Distribution Diagram for Various Cross-Sections
- Shear Stress Distribution for Different Beam Sections
- Comparison of Bending and Shear Stresses in Beams

Reference Books

- 1) "Strength of Materials" by R.K. Bansal
- 2) "Strength of Materials" by S. Ramamrutham
- 3) "Strength of Materials" by R.S. Khurmi

SEC10302273P
VSC (Vocational Skill Course)
AUT/VSC/P/227:- Practical's based on AUT/VSC/T/201

Total Credits: 1	Teaching Time / Week: 2 Hours (15 Practical Total)
Marks: 50	20 IA + 30 UA

Lab Experiments

- 1) Study of Stress and Strain in Materials
- 2) Study of Hooke's Law and Young's Modulus Using a UTM
- 3) Study of Poisson's Ratio Using a Tensile Testing Machine
- 4) Study of Temperature Stresses and Strains in Metals
- 5) Study of Shear Force and Bending Moment in Beams
- 6) Study of Bending Stress Distribution in a Beam
- 7) Study of Shear Stress Distribution in Different Beam Sections
- 8) Study of the Relationship Between Elastic Constants
- 9) Study of the Impact of Load Variations on Shear Force and Bending Moment Diagrams
- 10) Study of the Behavior of Beams Under Bending and Shear Forces

SEM IV

B.Sc Automobile Technology Second Year: 4th Semester

Course Type	Course Code	Examination Code (To be given by respective BoS)	Course Name	Teaching Scheme (Hrs. / Week)		Credits Assigned		Total Credits
				Theory	Practical	Theory	Practical	
Major (Core) Mandatory DSC	AUT/DSC/T/250	SAC10302504T	Automotive Tools	2		2		2+2+2+2 = 08
	AUT/DSC/T/251	SAC10302514T	Advance Automotive Engine	2		2		
	AUT/DSC/P/276	SAC10302764P	Practical based on AUT/DSC/T/250		4		2	
	AUT/DSC/P/277	SAC10302774P	Practical based on AUT/DSC/T/ 251		4		2	
Minor (Choose any two from pool of courses) It is from different discipline of the same faculty	AUT/Mn/T/250	SCC10302504T	To be chosen from other discipline of same faculty	2		2		2+2 = 04
	AUT/Mn/T/251	SCC10302514T	To be chosen from other discipline of same faculty	2		2		
Generic / Open Elective (GE/OE) (Choose any one from pool of courses) It should be chosen compulsorily from the faculty other than that of Major	AUT/GE/OE/T/250	SDC10302504T	To be chosen from other faculty	2		2		02
SEC (Skill Enhancement Courses) (Choose any one from AUT/SEC/T/250 and AUT/SEC/T/ 251) and corresponding Practical's	AUT/SEC/T/250	SEC10302504T	Mechanical Measurement	1		1		1+1 =02
	AUT/SEC/T/251	SEC10302514T	Heat Transfer	1		1		
	AUT/SEC/P/276	SEC10302764P	Practical's based on AUT/SEC/T/250		2		1	
	AUT/SEC/P/277	SEC10302774P	Practical's based on AUT/SEC/T/ 251		2		1	
AEC, VEC, IKS	AUT/AEC/T/250		Modern Indian Language (MIL-2) (Choose any one from pool of language courses)	2		2		02
OJT/ FP/CEP/CC/RP	AUT/FP/P/276		Field Project		4		2	2+2= 04
	AUT/CC/P/277		(Fine/ Applied/ Visual/ Performing Arts) (Common for all the faculty)		4		2	
				13	18	13	09	22

Exit Option : Award of UG Diploma in major and minor with 88 credits and an additional 4 credits NSQF course (related to major / minor) / Internship during summer vacation OR Continue with Major and Minor

Minor: - 1) Fundamental of Transmission 2) Workshop Tools-II
Generic / Open Elective: - Four Wheeler Servicing

SAC10302504T
Major (Core) Mandatory (AUT/DSC/T/250)
Automobile Tools

Total Credits: 2	Teaching Time / Week: 2 Hours (30 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

The Automobile Tools course provides students with a comprehensive understanding of the various tools and equipment used in automobile maintenance, repair, and diagnostics. It covers general and special-purpose tools, gauges, meters, automotive equipment, and specialized machines. Through theoretical and practical learning, students will gain proficiency in tool identification, usage, maintenance, and application in automotive service and diagnostics.

Course Objectives:

- 1) To familiarize students with the anatomy and types of automotive tools.
- 2) To understand the use and importance of different tools in automobile maintenance and repair.
- 3) To explore the functioning of various automotive tools and testing machines.
- 4) To enable students to operate and maintain specialized automotive equipment.
- 5) To provide hands-on experience with tools and machines used in automotive service and diagnostics.

Course Outcomes:

- 1) Students will be able to identify and categorize various automobile tools.
- 2) Students will gain an understanding of the practical uses of different tools and testing machines.
- 3) Students will be able to describe the operation of basic and special-purpose tools.
- 4) Students will acquire the ability to explain the working of different automotive testing machines.
- 5) Students will be proficient in using and maintaining essential automotive equipment for repair and diagnostics.

Unit:-I: General & Special Tools

(10 Hrs.)

- Spanners, Adjustable Spanners, Different Types Like Open-Ended, Ring, Box,
- Various Types Of Screw Drivers, Different Types Of Pliers, Cutting Pliers,
- Circlip Pliers, Combination Pliers, Different Types Of Wrench,
- Different Types Of Hammer, E.G. Mallet, Brass, Plastic Copper Etc.
- Allen Key, Different Types Of Files, Chisel, Punches, Vice Etc.
- Box Spanner Set, Feeler Gauge, Thread Gauge, Vernier Caliper, Micrometer, Depth Gauge
- Piston Ring Compressor And Expander, Valve Spring Compressor Tester
- Clutch Center Guide, Spark Plug Spanner, Stud Extractor, Tap Extractor,
- Valve Spring Lifter's, Toeing equipment's
- Different Types Of Pullers, Types Of Plugs, Sliding Hammer, Magneto Pullers,

Unit:-II: Gauges & Automotive Equipment's

(10 Hrs.)

- Vacuum Gauge, Compression Gauge, Injection Pressure Gauge, Oil Pressure Gauge
- Temperature Gauge, Air Pressure Gauge, Multimeter, Tachometer, Dwell Tester
- Timing Light, Dial Gauge
- Growler Machine, Engine Analyzer & Exhaust Gas Analyzer For Diesel & Petrol
- Hydrometer, Voltmeter, Ammeter, Battery High Rate Discharge Tester, Grease Gun,
- Hot Patch Clamp, Injector Tester, Chain Pulley Block Arbor Press
- Engine Lifter, Hydraulic Jack, Alternator Tester, Coil And Condenser Testing Machine
- Spark Plug Testing And Cleaning Machine, Blow Lamp, Paraffin Gun
- Pneumatic Nut And Bolt Tightener, Suzuki Scan Tools

Unit:-III: Special Purpose Machines

(10 Hrs.)

- F.I.P. Testing And Calibration Machine, Wheel Alignment Gauge, Wheel Balancing Machine
- Portable Drilling Machine, (Hand & Power), Battery Charger, Crank Shaft Grinding Machine
- Block Boring Machine, Cylinder Head Refacer,
- Valve Refacing Machine , valve seat cutter , connecting rod aligner
- Engine test rig, head light alignment set up, car washing machine
- Riveting Machine, Hydraulic press, Teflon coating machinery
- Body glazing and buffing machinery.

Reference Text Books

- 1) Automobile Engineering by C.P. Nakra, Dhanpat Rai Publishing Company
- 2) Automobile Engineering Volume 2 by K.M.Gupta, Umesh Publications
- 3) Automobile Engineering Volume 1 by K.M.Gupta, Umesh Publications

SAC10302764P
Major (Core) Mandatory
Automobile Tools

AUT/DSC/P/276:- Lab Practical (Practical based on AUT/DSC/T/250)

Total Credits: 2	Teaching Time / Week: 4 Hours (15 Practical Total)
Marks: 50	20 IA + 30 UA

Lab Practical

- 1) To study Various Types Of Screw Drivers
- 2) To study Different Types Of Pliers
- 3) To study Different Types Of Wrench & Hammers
- 4) To study Vernier Caliper, Micrometer, Depth Gauge
- 5) To study construction and working Stud Extractor, Tap Extractor
- 6) To study construction and working Toeing equipment's
- 7) To study construction and working Dwell Tester
- 8) Practical on Engine Analyzer For Diesel & Petrol
- 9) Practical on Exhaust Gas Analyzer For Diesel & Petrol
- 10) Practical on Hydraulic Jack
- 11) Practical on F.I.P. Testing And Calibration Machine
- 12) Practical on Wheel Alignment Gauge, Wheel Balancing Machine
- 13) Practical on Engine test rig
- 14) Practical on Hydraulic press
- 15) Practical on different car washing machine

SAC10302514T
Major (Core) Mandatory (AUT/DSC/T/251)
Advance Automotive Engine

Total Credits: 2	Teaching Time / Week: 2 Hours (30 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

The Advance Automotive Engine course provides in-depth knowledge of modern engine technologies, including mechanical and electronic fuel injection systems, ignition mechanisms, lubrication methods, and performance analysis. Students will explore conventional fuels, advanced ignition systems, and lubrication additives to enhance engine efficiency and durability. The course emphasizes performance parameters, efficiency measures, and techniques for improving engine performance.

Course Objectives:

- 1) To provide a comprehensive understanding of the anatomy and components of advanced automotive engines.
- 2) To study the mechanical and electronic fuel injection systems and their functioning in SI and CI engines.
- 3) To explore modern ignition systems and their impact on engine performance and efficiency.
- 4) To understand the advanced lubrication systems, including the properties and additives used in engine oils.
- 5) To analyze performance parameters and characteristics of engines, focusing on efficiency and performance enhancement methods.

Course Outcomes:

- 1) Students will be able to identify and explain the function of various automotive engine components.
- 2) Students will understand the working of modern fuel injection systems and ignition mechanisms in engines.
- 3) Students will gain knowledge about conventional and alternative fuels and their effects on engine performance.
- 4) Students will be able to assess engine performance through different efficiency parameters and characteristics.
- 5) Students will be equipped to study and improve engine performance using advanced lubrication and ignition systems.

Unit:-I: Mechanical Injection systems & Fuels

(10 Hrs.)

- Functional Requirement of an Injection System, Classification of Mechanical Injection System, Fuel Feed Pump
- Injection Pump, Fuel Injector, Nozzle, Injection in SI & CI Engine
- Types of Electronic Injection System
- MPFI, CRDI
- Electronic Control System, Injection Timing
- Introduction, Solid Fuel, Gaseous Fuel, Liquid Fuel, Chemical Structure of Petroleum
- Paraffin Series, Olefin Series, Naphthenic Series, Aromatic Series
- Petroleum Refining Process
- Important Qualities of Fuels, Rating of SI Engine & CI Engine Fuels

Unit:-III: Modern Ignition & Lubrication Systems:

(10 Hrs.)

- Introduction, Transistorized Coil Ignition (TCI) System
- Capacitive Discharge Ignition (CDI) System
- Firing Order
- Ignition Timing and Engine Parameters, Engine Speed, Mixture Strength, Part Load Operation
- Spark Advance Mechanism, Centrifugal Advance Mechanism, Vacuum Advance Mechanism, Ignition
- Timing and Exhaust Emissions

- Properties of Lubricants, Viscosity, Flash and Fire Points, Cloud and Pour Points out to, Oiliness or Film
- Strength, Corrosiveness, Detergency, Stability, Foaming
- SAE Rating of Lubricants, Single-grade, Multi-grade
- Additives for Lubricants, Anti-oxidants and Anticorrosive Agents
- Detergent-Dispersant, Extreme Pressure Additives, Pour Point Depressors

Unit:-III: Performance Parameters and Characteristic:

(10 Hrs.)

- Introduction, Engine Power, Indicated Mean Effective Pressure (PIM) fox,
- Indicated Power (IP), Brake Power (BP)
- Brake Mean Effective Pressure (BMEP),
- Engine Efficiencies, Air-Standard Efficiency, Indicated and Brake Thermal Efficiencies
- Mechanical Efficiency, Relative Efficiency, Volumetric Efficiency
- Scavenging Efficiency, Charge Efficiency, Combustion Efficiency,
- Engine Performance Characteristics, Variables Affecting Performance Characteristics
- Combustion Rate and Spark Timing, Air-Fuel Ratio, Compression Ratio, Engine Speed,
- Mass of Inducted Charge, Heat Losses, Methods of Improving Engine Performance

Reference Text Books

- 1) Internal Combustion Engines by V Ganesan, Mc Graw Hill Education
- 2) Automobile Engineering by C.P. Nakra, Dhanpat Rai Publishing Company
- 3) Automobile Engineering Volume 1 by K.M.Gupta, Umesh Publications
- 4) Automobile Engineering Volume 2 by K.M.Gupta, Umesh Publications

SAC10302774P
Major (Core) Mandatory
Advance Automotive Engine

AUT/DSC/P/277:- Lab Practical (Practical based on AUT/DSC/T/251)

Total Credits: 2	Teaching Time / Week: 4 Hours (15 Practical Total)
Marks: 50	20 IA + 30 UA

Lab Practical

- 1) To study the construction and working of Fuel Injector
- 2) To study the construction and working of Electronic Fuel Injection System
- 3) To study the construction and working of Multi-Point Fuel Injection (MPFI) System
- 4) To study the construction and working of Electronic Diesel Injection System (CRDI)
- 5) To study Important Qualities of SI & CI Engine Fuels
- 6) To study characteristics of Compressed Natural Gas (CNG) as a alternate fuel
- 7) To study characteristics Liquefied Petroleum Gas (LPG) as a alternate fuel
- 8) To study the construction and working of Transistorized Coil Ignition (TCI) System
- 9) To study the construction and working of Capacitive Discharge Ignition (CDI) System
- 10) Practical on Spark Advance Mechanism
- 11) Practical on Ignition Timing and Exhaust Emissions
- 12) To study Single-grade, Multi-grade Lubricants and its effect on engine performance
- 13) To study the different performance parameter on engine on engine test rig.
- 14) Practical on Methods of Improving Engine Performance

SCC10302504T
Minor: - AUT/Mn/T/ 250
FUNDAMENTALS OF TRANSMISSION

Total Credits: 2	Teaching Time / Week: 2 Hours (30 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

This course provides an in-depth understanding of the transmission system in automobiles. It covers the working principles, construction, and servicing of key transmission components such as the clutch, gearbox, final drive, differential, suspension, brakes, and steering. The course also includes hands-on practical's to enhance students' skills in diagnosing and maintaining these critical automotive systems.

Course Objectives:

- 1) Understand the construction and working of clutch, transmission, final drive, differential, and wheels.
- 2) Gain knowledge of suspension, shock absorbers, brakes, and steering systems.
- 3) Identify various transmission components and their functions.
- 4) Develop practical skills for troubleshooting and servicing transmission systems.
- 5) Understand design aspects and safety measures related to transmission components.

Course Outcomes:

- 1) Identify and explain the working of various transmission components.
- 2) Perform maintenance and troubleshooting of clutches, gearboxes, and final drives.
- 3) Diagnose and repair suspension and braking system issues.
- 4) Demonstrate knowledge of steering systems and their alignment.
- 5) Apply safety and design principles in handling transmission components.

UNIT I: Transmission System & Final Drive

(10 Hrs.)

- Function and necessity of clutch
- Types of clutches: Single plate, Multi-plate, Centrifugal, Cone, Hydraulic, and Torque Converter
- Operating mechanisms: Mechanical, Hydraulic, Vacuum-assisted, Air pressure-assisted
- Principles of gears, gear ratios, and types of gears (Spur, Helical, Bevel)
- Types of gearboxes: Sliding mesh, Constant mesh, Synchromesh, Automatic Transmission
- Gear selection mechanisms and Epicyclic gear train
- Propeller shaft: Function, material, and construction
- Types of universal joints and slip joints
- Hotchkiss and Torque Tube drive
- Types of final drives and rear axles

UNIT II: Differential & Suspension

(10 Hrs.)

- Function, necessity, and construction of the differential
- Functions and necessity of the suspension system
- Types of suspension: Rigid and Independent
- Leaf spring, Coil spring, Torsion bar, McPherson strut, and Air suspension systems
- Lubrication of suspension systems
- Shock absorbers: Types (Telescopic, Hydraulic, Gas-filled, Column, Struts) and working

UNIT III: Brake & Steering System

(10 Hrs.)

- Introduction and necessity of the braking system
- Types of brakes: Disc, Drum, Mechanical, Hydraulic, Pneumatic, Electric, and Vacuum-assisted
- Parking brake and factors affecting brake efficiency
- Steering system: Function and types
- Steering geometry: Caster, Camber, Toe-in, Toe-out, and Ackerman principle

- Power steering: Electronic and Hydraulic
- Understeer, Oversteer, and Wheel alignment principles

Reference Books

- 1) "Automobile Engineering" – C.P. Nakra, Dhanpat Rai Publishing Company
- 2) "Automobile Engineering Vol. 1 & 2" – K.M. Gupta, Umesh Publications
- 3) "Automobile Mechanics" – N.K. Giri
- 4) "A Textbook of Automobile Engineering" – R.K. Rajput

SCC10302514T
Minor: - AUT/Mn/T/ 251
Workshop Tools-2

Total Credits: 2	Teaching Time / Week: 2 Hours (30 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

This course provides an in-depth understanding of various workshop tools and special-purpose machines used in automobile maintenance and repair. Students will learn about the structure, functionality, and application of essential automotive tools and testing equipment.

Course Objectives:

- 1) Understand the anatomy of various automobile workshop tools.
- 2) Identify the importance and applications of different tools.
- 3) Operate and analyze the functioning of various testing machines.
- 4) Gain hands-on experience in handling specialized automotive equipment.

Course Outcomes:

- 1) Identify and describe different workshop tools used in automobile maintenance.
- 2) Explain the purpose and working principles of various automotive testing machines.
- 3) Operate different workshop tools and specialized automotive equipment.
- 4) Perform basic troubleshooting and maintenance using appropriate tools.

Unit I: Automotive Equipment (10 Hrs.)

- Growler Machine, Engine Analyzer for Diesel & Petrol, Exhaust Gas Analyzer for Diesel & Petrol
- Hydrometer, Voltmeter, Ammeter, Battery High Rate Discharge Tester, Grease Gun, Hot Patch Clamp, Injector Tester
- Chain Pulley Block, Arbor Press, Engine Lifter, Hydraulic Jack, Alternator Tester
- Coil and Condenser Testing Machine
- Spark Plug Testing and Cleaning Machine, Blow Lamp, Paraffin Gun
- Pneumatic Nut and Bolt Tightener, Suzuki Scan Tools
- Pneumatic Equipment for Accidental Repairs

Unit II: Special Purpose Machines I (10 Hrs.)

- F.I.P. Testing and Calibration Machine
- Wheel Alignment Gauge, Wheel Balancing Machine
- Portable Drilling Machine (Hand & Power), Battery Charger
- Crankshaft Grinding Machine
- Block Boring Machine
- Cylinder Head Refacer
- Valve Refacing Machine

Unit III: Special Purpose Machines II (10 Hrs.)

- Valve Seat Cutter
- Connecting Rod Aligner
- Engine Test Rig
- Headlight Alignment Setup
- Car Washing Machine
- Riveting Machine
- Hydraulic Press
- Teflon Coating Machinery
- Body Glazing and Buffing Machinery

Reference Books:

- 1) Automobile Engineering by C.P. Nakra, Dhanpat Rai Publishing Company
- 2) Automobile Engineering Volume 2 by K.M. Gupta, Umesh Publications
- 3) Automobile Engineering Volume 1 by K.M. Gupta, Umesh Publications

SDC10302504T
Generic / Open Elective:- AUT/GE/OE/T/250
Four-Wheeler Servicing

Total Credits: 2	Teaching Time / Week: 2 Hours (30 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

This course provides a fundamental understanding of four-wheelers, covering their types, advantages, and key components. It focuses on general and major servicing techniques, troubleshooting, and maintenance procedures. The course also emphasizes safety protocols in the workshop, ensuring students acquire practical skills for efficient vehicle servicing.

Course Objectives:

- 1) Understand different types of four-wheelers and their advantages.
- 2) Learn about the essential components and working mechanisms.
- 3) Gain knowledge of general servicing, inspection, and periodic maintenance.
- 4) Develop skills to perform major servicing and repairs.
- 5) Follow proper safety procedures and environmental considerations in servicing.

Course Outcomes:

- 1) Identify various types of four-wheelers and explain their advantages.
- 2) Describe key components and their functions.
- 3) Perform general servicing and periodic maintenance.
- 4) Carry out major repairs and servicing of critical systems.
- 5) Follow standard safety practices while servicing four-wheelers.

UNIT I: General Servicing

(10 Hrs.)

- Types of four-wheelers: Passenger, Commercial, Electric, Hybrid, SUV, Sedan
- Advantages and applications of four-wheelers
- Major components: Chassis, Engine, Transmission, Suspension, Brakes, Electrical Systems
- Routine inspection and preventive maintenance
- Checking and changing engine oil, coolant, and transmission fluid
- Battery maintenance and electrical system diagnostics
- Brake system inspection and minor adjustments
- Tire pressure check, wheel balancing, and alignment

UNIT II: Major Servicing

(10 Hrs.)

- Engine tuning and diagnostics (OBD scanning)
- Transmission system servicing (manual and automatic)
- Suspension and steering system maintenance
- Brake system overhaul (disc, drum, ABS)
- Fuel system maintenance (carburetor, fuel injection, CNG/LPG systems)

UNIT III: Safety While Servicing

(10 Hrs.)

- Importance of safety in automobile workshops
- Safe handling of tools, fluids, and electrical systems
- Personal protective equipment (PPE) usage
- Fire prevention and first aid in workshops
- Environmental safety and waste disposal methods

Reference Books (Indian Authors):

- 1) "Automobile Engineering" – Kirpal Singh
- 2) "Automobile Mechanics" – N.K. Giri
- 3) "Automobile Engineering Vol. I & II" – K.M. Gupta

SEC10302504T
SEC (Skill Enhancement Courses)
AUT/SEC/T/250 :- Mechanical Measurement

Total Credits: 1	Teaching Time / Week: 1 Hours (15 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

The Mechanical Measurement course introduces students to essential principles of measurement and instrumentation in engineering applications. The course covers different measurement methods, pressure measurement techniques, and metrology fundamentals, with an emphasis on accuracy, precision, and industrial applications. Students will learn about various instruments and transducers used for mechanical measurements, enhancing their practical understanding of engineering metrology.

Course Objectives

- 1) To introduce students to fundamental concepts and principles of mechanical measurement and instrumentation.
- 2) To develop an understanding of different measurement methods, including direct and indirect measurement techniques.
- 3) To familiarize students with various mechanical, electrical, and electronic instruments used for measurement.
- 4) To enable students to analyze and interpret measurement data for practical engineering applications.
- 5) To provide knowledge about metrology and precision measurement techniques used in industry.

Course Outcomes

- 1) Students will be able to understand and explain the principles of mechanical measurement and instrumentation.
- 2) Students will demonstrate the ability to use different measurement techniques and instruments in engineering applications.
- 3) Students will analyze various pressure measurement methods and evaluate their suitability for specific applications.
- 4) Students will apply metrology principles to perform precise dimensional and angular measurements.
- 5) Students will develop problem-solving skills by selecting appropriate measurement systems for real-world scenarios.

Unit I: Measurements and Measurement Systems (5 Hrs.)

- Introduction, Significance of Measurements
- Methods of Measurement: Direct Methods, Indirect Methods, Primary, Secondary and Tertiary Measurements
- Mechanical, Electrical and Electronic Instruments
- Classification of Instruments : Absolute Instruments, Secondary Instruments
- Functions & Applications of Instruments and Measurement Systems
- Elements of a Generalized Measurement System

Unit II: Pressure Measurements (5 Hrs.)

- Introduction, Types of Pressure Measurement , Manometers, Types of Manometers,
- Bourdon Tube, Bellows, Diaphragms
- Electromechanical Pressure Transducers, Potentiometric Transducers, Strain Gauges,
- Linear Variable Differential Transducers LVDT, Capacitive Transducers,
- Photoelectric Transducers, McLeod Gauge, Knudsen Gauge, Thermal Conductivity Gauges
- Thermocouple Gauge Pirani Gauge, Inductive Transducers

Unit III: Metrology (5 Hrs.)

- Introduction, Dimensional Measurements, Length Standards, Line and End Standards,
- Line Standard Instruments : Vernier Caliper, Micrometer, Gauge Blocks, Use of Gauge Blocks, Dial Gauges, Comparators, Types of Comparators, Measurement of Angle, Angle Comparator

Reference Books

- 1) "Mechanical Measurements and Instrumentation" – R.K. Rajput
- 2) "Mechanical Measurements" – A.K. Sawhney
- 3) "Engineering Metrology and Measurements" – R.K. Jain

SEC10302764P
VSC (Vocational Skill Course)
AUT/SEC/P/276:- Practical's based on AUT/SEC/T/250

Total Credits: 1	Teaching Time / Week: 2 Hours (15 Practical Total)
Marks: 50	20 IA + 30 UA

Lab Practical

- 1) Study of Measurement Systems
- 2) Study of Direct and Indirect Measurement Methods
- 3) Study of Generalized Measurement System Elements
- 4) Study of Pressure Measurement Using Manometers
- 5) Study of Bourdon Tube Pressure Gauge
- 6) Study of Electromechanical Pressure Transducers
- 7) Study of Vacuum Pressure Gauges
- 8) Study of Length Measurement Using Vernier Caliper and Micrometer
- 9) Study of Precision Measurement Using Gauge Blocks and Dial Gauges
- 10) Study of Angle Comparators

SEC10302514T
SEC (Skill Enhancement Courses)
AUT/SEC/T/251:- Heat Transfer

Total Credits: 1	Teaching Time / Week: 1 Hours (15 Lectures Total)
Marks: 50	20 IA + 30 UA

Course Description:

The Heat Transfer course introduces students to fundamental principles and applications of heat and mass transfer in engineering. The course covers the three primary modes of heat transfer—conduction, convection, and radiation—along with heat exchanger design, boiling and condensation mechanisms, and mass transfer fundamentals. Emphasis is placed on real-world engineering applications, problem-solving, and analytical techniques for understanding heat and mass transfer phenomena.

Course Objectives

1. To understand the fundamental concepts and significance of heat transfer in engineering applications.
2. To explore the different modes of heat transfer — conduction, convection, and radiation — and their governing principles.
3. To study the design, working principles, and practical applications of various heat exchangers and evaporators.
4. To analyze boiling and condensation processes, including their heat transfer mechanisms and correlations.
5. To grasp the principles of mass transfer, including diffusion, convection, and the application of Fick's Law.

Course Outcomes

1. Students will be able to explain the basic principles and modes of heat transfer.
2. Students will demonstrate the ability to solve heat transfer problems involving conduction, convection, and radiation.
3. Students will understand the working and design considerations of heat exchangers and evaporators.
4. Students will apply concepts of boiling and condensation to real-world heat transfer scenarios.
5. Students will analyze and calculate mass transfer rates using fundamental laws and correlations.

Unit I: Basic Concepts of Heat Transfer

(5 Hrs.)

- Introduction to Heat Transfer and Its Importance
- Modes of Heat Transfer: Conduction, Convection, and Radiation
- Fundamental Laws Governing Heat Transfer
- Practical Applications of Heat Transfer in Engineering

Unit II: Heat Exchangers, Boiling and Condensation.

(5 Hrs.)

- Introduction to Heat Exchangers and Their Industrial Applications
- Types of Heat Exchangers and Their Working Principles
- Evaporators and Types of Evaporators
- Fundamentals of Boiling Heat Transfer and Its Applications
- Boiling Heat Transfer Mechanisms and Correlations
- Introduction to Condensation and Heat Transfer in Condensing Systems
- Film Condensation and Its Practical Applications

Unit III: Mass Transfer

(5 Hrs.)

- Introduction to Mass Transfer and Its Significance
- Modes of Mass Transfer and Applications
- Fick's Law of Diffusion and Convective Mass Transfer
- Concentration, Velocity, and Flux in Mass Transfer

Reference Books

- 1) "Heat and Mass Transfer" – R.K. Rajput
- 2) "Heat and Mass Transfer" – D.S. Kumar
- 3) "Engineering Heat and Mass Transfer" – Mahesh M. Rathore
- 4) "Heat Transfer" – J.P. Holman (adapted for Indian context)

SEC10302774P

VSC (Vocational Skill Course)

AUT/SEC/P/277:- Practical's based on AUT/SEC/T/251

Total Credits: 1	Teaching Time / Week: 1 Hours (15 Practical Total)
Marks: 50	20 IA + 30 UA

Lab Experiments

- 1) Study of Heat Transfer Modes: Conduction, Convection, and Radiation
- 2) Study of Thermal Conductivity of Different Materials
- 3) Study of Free and Forced Convection Heat Transfer
- 4) Study of Radiation Heat Transfer Using a Radiation Setup
- 5) Study of Shell and Tube Heat Exchanger
- 6) Study of Plate Type Heat Exchanger
- 7) Study of Different Types of Evaporators
- 8) Study of Boiling Heat Transfer and Boiling Correlation
- 9) Study of Condensation and Film Condensation Heat Transfer
- 10) Study of Mass Transfer Using Fick's Law Experiment