Vidyasagar University

Curriculum for
Automobile Maintenance (Major)
[Choice Based Credit System]

Semester-IV

Course	Course Code	Name of the Subjects	Course Type/ Nature	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
CC-8		**C8T:** Chassis, Frame &Body, Brake & Braking System, Wheel &Tyres.	Core Course - 8	4	0	0	6	75
		C8P: Lab		0	0	4		
CC-9		**C9T:** Engine Servicing And Tuning, Garage & Service Station, Electrical System and Motor Vehicles Act.	Core Course - 9	4	0	0	6	75
		C9P: Lab		0	0	4		
CC-10		**C10T:** Manufacturing Process and Machine Tools-ll	Core Course - 10	4	0	0	6	75
		C10P: Lab		0	0	4		
GE-4		**TBD**	Generic Elective - 4				4/5	75
							2/1	
SEC-2		**SEC2T:** Electro Magnetism and Digital Electronics	Skill Enhancement Course-2	1	1	0	2	50
Semester Total							**26**	**350**

L=Lecture, **T**= Tutorial, **P**=Practical, **CC** = Core Course, **GE**= Generic Elective, **SEC** = Skill Enhancement Course, **TBD** = to be decided

Generic Elective (GE) (Interdisciplinary) from other Department [Paper will be of 6 credits]. Papers are to be taken from following discipline: **Physics/Electronics/Mathematics/Computer Science/Economics**

Modalities of selection of Generic Electives (GE): A student shall have to choose **04** Generic Elective (GE1 to GE4) strictly from **02** subjects / disciplines of choice taking exactly **02** courses from each subjects of disciplines. Such a student shall have to study the curriculum of Generic Elective

SEMESTER-IV

Core Course (CC)

CC-8: Chassis, Frame &Body, Brake & Braking System, Wheel &Tyres.

Credits 06

C8T: Chassis, Frame &Body, Brake & Braking System, Wheel &Tyres.

Credits 04

Course Contents:

Unit-I: Chassis, Frame and Body:

Chassis layout and its main components, design features, types of chassis and frames, materials and dimensions for auto body work, method of manufacturing and space requirements.

Unit-II: Brake and braking system:

Principles of brakes, braking mechanisms, classifications, bleeding in hydraulic system, brake troubles.

Unit-III: Wheels and tyres:

Types of tyres and their specification, tubeless tyres, radial tyres, friction due to pavement and earth in relation to wear, care and maintenance of tyres and tubes, repair and retreading of tyres.

C8P: Practical **Credits 02**

1: Wheel alignment and wheel balancing: toe-in, toe-out, caster angle, camber angle, king pin, inclination, adjustment and setting and wheel balance.

2: Brake system: Over hauling master cylinder, wheel cylinder, front and rear brake, air servo unit, unloaded valve, release valve, hand brake, vacuum 2uffer, single brake chamber,

3: Brake bleeding, Relining, brake shoes, servicing air tank, servicing brake valve and disc brake, demonstration of working of ABS system, sensors.

CC-9: Engine Servicing And Tuning, Garage & Service Station, Electrical System and Motor Vehicles Act.

Credits 06

C9T: Engine Servicing And Tuning, Garage & Service Station, Electrical System and Motor Vehicles Act. **Credits 04**

Course Contents:

Unit-I: **Engine servicing and tuning:**

Basic requirements of automobiles engine servicing types and procedures.

Unit-II: **Garage and service station:**

Location and layout, equipment required in a service station, types of service.

Unit-III: **Servicing of Motor vehicles:**

Signification of servicing and its types, engine tuning and various instruments used, decarbonizing of engine parts, servicing of batteries,

Unit-IV: Electrical systems, servicing of fuel injection and ignition system, lubrication system, cooling system, braking system and other accessories.

Unit-V : Inspection and Testing of motor vehicles, types of inspection , inspection card , inspection and repair accident inspection , diagnosis of faults , Laboratory road testing of motor vehicles.

Unit-VI: Concept of Motor vehicles Act, different rules of Motor vehicles Act, Motor vehicle Act with special reference to pollution control and measure required to safe drive, Effect of pollutant.

C9P: Practical Credits 02

1. Specifications of drilling machine. Types of drills and reamers
2. Basic parts and their functions – Pillar drilling machine & Radial drilling machine.
3. drilling, boring, reaming, Counter boring, countersinking, chamfering, Spot facing, Trepanning
4. Arc Welding – working Principle, component, working Applications
5. Principle & Application of Shielded metal arc welding, Submerged arc welding. TIG / MIG welding
6. Principle & Application of process Resistance welding.(Principle & Application) - Spot welding, Seam welding, Projection welding
7. Types of Brazing and soldering application process**,** Inspection of Welding defects.

CC-10: Manufacturing Process and Machine Tools-ll Credits 06

C10T: Manufacturing Process and Machine Tools-ll Credits 04

Course Contents:

Unit-I: Casting process, Permanent mould casting, semi permanent mould casting, die casting ,centrifugal casting , investment casting, continuous casting , defect in casting ,inspection of casting ,cleaning of casting.

Unit-II: Definition and concept of smithy and forging, sheet metal work, rivets and screws,

Unit-lll ; Machine Shops:- Elementary ideas about different machines like Slotting machine ,planning machine , boring machine , broaching machine , press machine.

Unit- lV: Elementary ideas about different non-traditional machine like Ultrasonic machining (USM) , Electro chemical machining (ECM) , Electrical discharge machining (EDM) , Laser beam machining (LBM)

Unit-V : Definition and concept of N.C Machine tools and C.N.C Machine tools.

C10P: Practical Credits 02

1. Transmission system: Over hauling universal joint, differential, remove and refitting propeller shaft over hauling slip joint.

2. Cutting tool nomenclature & tool signature of single point cutting tool.Orthogonal & oblique cutting, chip formation & type of chips
3. Types of lathes – Centre lathe, Capstan & Turret Lathe, CNC Lathe Specification of Centre lathe. Basic parts and their functions of centre lathe.

4. Operations and tools Centering, facing, Turning, parting off, undercutting, grooving, Knurling, boring, thread cutting

Skill Enhancement Course (SEC)

SEC-2: Electro Magnetism and Digital Electronics Credits 02

SEC2T: Electro Magnetism and Digital Electronics

Course Contents:

Unit-1: Steady electric current: Current density, equation of continuity, condition for the steady current, Kirchhoff's laws and analysis of multi loop circuits.
Unit-2: Magneto statics: Force on a moving charge, Lorentz force and definition of B, force on a straight current carrying conductor in a uniform magnetic field, torque on a current loop. Biot-Savart law, Ampere's circuital law, determination of magnetic fields (B) due to a straight current carrying conductor, a circular coil, a solenoid, magnetic field due to a small current loop, concept of magnetic dipole as a tiny current loop.

Unit-3: Magnetic fields in matter- magnetization (M), relation between B, H, and M, magnetic susceptibility and permeability, diamagnetic, paramagnetic and ferromagnetic materials, Curie's law, hysteresis in ferromagnetic material.

Unit-4: Electromagnetic induction and Maxwell's Equations: Faraday's law (both the integral and the differential forms), self and mutual inductances, transformers, energy stored in a coil of self inductance L, displacement current, Maxwell's equations.

Unit-5: Transients in DC: Growth and decay of current in LR circuit, charging and discharging of capacitor in CR circuit, time constants.

Unit-6: Alternating current: LR and CR circuits, complex number and their applications in AC circuits, impedance and reactance, series and parallel resonances, Q– factor, power dissipation in AC circuit, power factor.

Unit-7: Digital Electronics - binary number system, conversion from decimal to binary and vice versa. Logic gates- OR, AND, NOT gates, truth tables, de Morgan's theorem, NOR and NAND universal gates.
Combinational logic - Half adder, full adder, digital comparator, decoder, encoder (ROM), digital to analog conversion, analog to digital conversion, multiplexer.
Sequential logic - Flip - Flops - RS, D, JK, JKMS, edge triggering and locked operation, shift registers, ripple counter (binary and decade).