GOVERNMENT POLYTECHNIC PAONTA SAHIB

AT DHAULA KUAN, DISTT. SIRMOUR (HP) - 173031

DEPARTMENT OF AUTOMOBILE ENGINEERING

LESSON PLAN

Academic Year	AUG - DEC 2025
Semester	THIRD
Course Code	AEPC 201
Course Name	Basics of Thermodynamics, Hydraulic and Pneumatic
Course Type	PROGRAMME CORE
Number of Credits	3(L: 3, DCS: 2,P: 0)
Name of Faculty	Vishal Singh Chauhan
Semester Start & End Dates	01-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	Basics of Thermodynamics, Hydraulic and Pneumatic	3	2	-	40	-	40	60	3	-	-	60	100
2.	Basics of Thermodynamics, Hydraulicsand Pneumatics Laboratory	-	-	2	-	40	40	-	-	60	3	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
	Unit-1		
11 HOURS	a) Principles of Thermal Engineering	Introduction, Thermodynamics properties – intensive and extensive, Property, path, process, system, surroundings, Heat and work Enthalpy and internal energy	
	b) Gas Laws	Boyle"s law, Charle's law, Joule's law, Characteristic gas equation, gas constant, universal gas constant. Simple numerical problems. Modes of heat transfer, conduction, convection, radiation, Fourier"s Law.	
	Unit-2		

12 HOURS	a) **Law of Thermodynamics and Air Cycles**	Zeroth law of thermodynamics Irreversible process, First law of thermodynamics (concept only),Second law of thermodynamics (concept only),Thermal efficiency and heat pump, heat engine and heat sink Concept of entropy, Constant volume, constant pressure, isothermal, adiabatic, polytropic throttling and free expansion processes (concept only).	
	b) **Air Cycles**	Carnot cycle, Otto cycle, Diesel cycle, and Dual combustion cycle	
	Unit-3		
11 HOURS	**Air Compressors**	Reciprocating air compressor, Centrifugal compressor working of single stage and double stage compressor and applications, Rotary air compressor and supercharger.	
	Unit 4		
11 HOURS	**Hydraulics**	Types of fluid, Properties of fluid, Pascal Law, Components of hydraulic systems, Function of each component in hydraulic circuit, Oil reservoir, filters, Hydraulic Jack, Hydraulic Press	
	Unit 5		
11 HOURS	**Pneumatics**	Basic components and their function, air cylinders – function, single acting and double acting, air filter, regulator, different types of control valves, concept of automation.	**CHALK-BLACKBOARD & USING TECHNOLOGICAL PADAGOGY**

	Name of Book	Author Name	Publication
Prescribed Books	Thermal Engineering	P.L. Ballaney	Khanna Publishers,2002
	Thermodynamics –I	Er. B.S. Ubhi	S.K. Kataria & Sons, Delhi

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	THIRD
Course Code	AEPC 203
Course Name	**Basics of Thermodynamics, Hydraulics and Pneumatics Laboratory**
Course Type	PROGRAMME CORE
Number of Credits	**1 (L: 0, DCS: 0, P:2)**
Name of Faculty	VISHAL SINGH CHAUHAN
Semester Start & End Dates	01-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	**Basics of Thermodynamics, Hydraulics and Pneumatics Laboratory**	-	-	4	-	4	60	-	-	60	3	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
56 HOURS	**List of Practical's:**	• To find flash point and fire point of given fuel • To find viscosity of given fuel. • To studyair compressor. • To analyze exhaust gases by exhaust gas analyzer. • To analyze exhaust gas for diesel engine through smoke meter. • To conduct Morse test of multi-cylinder petrol engines. • To prepare heat balance sheet of an IC engine. • Identification of components in air conditioning system. • To develop hydraulic circuit using different components.	

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	THIRD
Course Code	AEPC 205
Course Name	Automotive Materials
Course Type	PROGRAMME CORE
Number of Credits	**2(L: 2, DCS: 1, P: 0)**
Name of Faculty	DEEPAK SANDHU
Semester Start & End Dates	01-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	**Automotive Materials**	2	1	-	40	-	40	60	3	-	-	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
	Unit-1		
12 HOURS	**Properties of Materials:**	Classification: Metals and non-metals, Ferrous and non-ferrous metals and their alloys, Names of common metals, their alloys and non-metals used in Automobile Industry, Properties of metals and alloys, Physical properties - Appearance, luster, color, density and melting point, Mechanical Properties: Strength, stiffness, elasticity, plasticity, toughness, ductility, malleability, brittleness, hardness, fatigue and creep. Thermal and electrical conductivity and corrosion resistance.	
	Unit-2		
12 HOURS	a) **Ferrous Metals and Alloys:**	Effect of alloying elements such as Aluminium, chromium, Nickel, Cobalt, Manganese, Molybdenum, tungsten, Vanadium, Silicon, Sulphur and Phosphorus. Composition, properties, grades and uses of alloy steels such as High speed steel, Stainless steel, Silicon steel, Heat resistant steel, Spring steel.	
	b) **Heat Treatment:**	Iron-carbon diagram, objectives and practical aspects of heat treatment. Description and uses of principal heat treatment processes Annealing, Normalizing, Tempering, Hardening, Carburising, Nitriding and Cyaniding and applications. Case hardening and surface hardening. Hardenability of steels, Examples in heat treating automobile engineering components.	
	Unit-3		

11 HOURS	**Non-ferrous Metals and Alloys:**	Copper: Properties and uses, Composition, properties and uses of copper alloys. Brass: Cartridge brass, Nickel silver. Bronze: Phosphor bronze, Albronze, Mn-bronze, and Gunmetal. Properties and uses of Aluminium and their grades Composition, properties and uses of Al-alloys e.g., Duralumin, Yellow metal, Magnelium and Hindalium Properties and uses of alloys of lead, tin and magnesium. Bearing Metal: Requisite qualities. Composition, properties and uses of white metal bearing. Copper based bearing metals. Aluminium based bearing metals. Use of nylon/PTFE for bushes/bearings, bi-metallic and tri-metallic bushes	**CHALK-BLACKBOARD & USING TECHNOLOGICAL PADAGOGY**
	Unit 4		
10 HOURS	**Identification and Examination of Metals and Alloys:**	Identification tests - Appearance, sound, filing, weight, magnetic, spark, bend and microstructure.	
	Unit 5		
11 HOURS	**Other Important Materials:**	Plastics: Definition, classification of plastics, fibre glass, reinforced plastics. Major applications of various plastics with specific mention of their uses and grades, Heat insulating materials: Properties and uses of asbestos, glass wool, thermocole, cork, mica. Sound insulating materials: Cork, fiberboards. Fabrication materials: Wood, plywood, Rubber - natural and synthetic, Glasses - plate glass, toughened glass, safety glass. Insulating materials: Asbestos, mica Electrical insulating materials, properties and uses of china clay, leather Bakelite, ebonite, glass wool, rubber felt Refractory materials: General characteristics and uses of dolomite, ceramics. Protective coating materials: Auto paints, primers, varnishes, enamels, putti, electroplating materials. Adhesive requirements types and advantages, thread locking special solution, anti-rust solution.	

	Name of Book	Author Name	Publication
Prescribed Books	Material Science	GBS Narang	Khanna Publishers, New Delhi
	Material Science	Metallurgy by RB Choudary	Khanna Publishers, New Delhi

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	THIRD
Course Code	AEPC 207
Course Name	Automotive Chassis,Body&Transmission-1
Course Type	PROGRAMME CORE
Number of Credits	3(L: 3, DCS: 2, P: 0)
Name of Faculty	DEEPAK SONI
Semester Start & End Dates	01-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	**Automotive Chassis,Body&Transmission-1**	3	1	-	40	-	40	60	3	-	-	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
	Unit-1		
12 HOURS	**Chassis and Body:**	Classification of vehicles, types of chassis, layout of conventional type of chassis, function and arrangement of major assemblies. Alternating arrangement used such as engine position, drive types, their merits and demerits., types of frame and body streamlining, cross members, brackets, materials of frame and body upholstery	
	Unit-2		
11 HOURS	**Clutch:**	Necessity, function and requirements of clutch, types of clutch - single plate clutch, multi plate clutch, hydraulic power assisted and wet and dry plate clutch, clutch plate and lining material Constructional details and working of centrifugal, semi centrifugal clutch, diaphragm clutch and fluid coupling.	
	Unit-3		

11 HOURS	**Transmission:**	Necessity, function and types of manual transmission- Sliding, constant mesh and synchromesh. Over drive, over running clutch, description and operation of transfer gear box. Common faults and remedies, trans axle construction. Types of automatic transmission and their main components. Epicyclic gearbox-construction, working and determination of speed ratio Torque converter. Construction, principle of working. Continuously variable transmission, Automated Manual Transmission, hydrostatic transmission systems, direct shift gear box (DSG).	
	Unit 4		
11 HOURS	**Final Drive:**	Propeller shaft-function, construction details. Universal joints-functions and types. Types of final drive - hotchkiss drive, torque tube drive. Differential - principle, functions and it"s working. Rear axles- semi floating, three quarter floating. Fully floating. Common faults and remedies	
	Unit 5		
11 HOURS	**Front Axle & Steering:**	Types - Stub double drop, fully dropped, load distribution, effect of braking on axle shape, steering head, Elliot and reverse elliot, steering knuckle. Steering mechanism, function, Ackerman's Principle of steering. Working and constructional details of steering gear, steering linkages, sector arm, center arm, drag link and tie rod, steering ratio. Front wheel geometry-castor, camber, steering axis inclination, toe in and toe out. Cornering force, cornering power and self-righting torque. Over steering and under steering. Traction control system, Power steering- necessity, types, Construction features and working of hydraulic and electronic power steering systems ,four wheel steering, adjustable steering -rake and telescopic type, Common steering systems troubles and remedies	**CHALK-BLACKBOARD & USING TECHNOLOGICAL PADAGOGY**

	Name of Book	Author Name	Publication
Prescribed Books	Automobile Engineering	Vol. I- II by Dr. Kirpal Singh,	Standard Publishers
	Chassis, Body and Transmission-I	G.S.Aulakh,	Eagle Prakashan, Jalandhar.

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	THIRD
Course Code	AEPC 209
Course Name	Garage Equipment
Course Type	PROGRAMME CORE
Number of Credits	**2(L: 2, DCS: 1, P: 0)**
Name of Faculty	NISHAL SINGH CHAUHAN
Semester Start & End Dates	01-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	**Garage Equipment**	2	1	-	40	-	40	60	3	-	-	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
	Unit-1		
12 HOURS	**General Equipment Specifications and applications of:**	Drilling machine (portable) along with set of drills Bench grinder Air compressor and pneumatic gun Hydraulic and electric hoists High pressure washing equipment (Car washer, Car vacuum cleaner, Buffing tool) Oil sprayers Grease Guns-manual and bucket type, pneumatic Tyre inflation gauge (Manual and Digital type automatic) Tyre Changer (Manual and Automatic) Creepers Fire extinguisher First aid box	
	Unit-2		
12 HOURS	**Tuning and Testing Equipment Specifications and applications of:**	Vacuum Gauge, Compression Gauge (Pressure Gauge) Distributor Tester, Cam (dwell) angle tester, r.p.m. tester. Battery Tester Spark plug cleaner and tester Ignition timing light Fuel injector tester Fuel consumption tester.	
	Unit-3		
12 HOURS	**Engine Repair Tools/Measuring and Testing Equipment Specifications and applications of:**	Torque wrench, pneumatic wrench Piston ring compressor Valve lifter and valve spring tester Piston ring files, groove cleaner Scrappers Piston ring remover Cylinder Dial gauge Smoke meter Engine Analyser/Scanner Part degreasing tank	

	Unit 4		
10 HOURS	**Electrical Repair Equipment Specifications and uses of:**	Electrical Test Bench Battery Charger Head Lights Beam Aligner and Tester (Electronic and Digital type) Growler	
	Unit 5		
10 HOURS	**Reconditioning/ Testing Equipment for Chassis and Body Use of:**	Brake Efficiency Tester (Chassis Dynamometer) or brake testing equipment Clutch Fixtures and Brake Line Rivetters, pop riveting gun Crane and Chain Pulley Block Jacks mechanical, hydraulic, trolley type Paint chamber Paint Spray Gun Paint Drying Equipment Tools for tyres, automatic tyre remover Jib crane Spring tester Frame strengthening equipment Chassis alignment equipment Computerized wheel balancer -static and dynamic Computerized wheel alignment equipment Valve Refacer, Valve Seat Cutting and Grinding Radiator Tester Cylinder head leakage testing fixture Fuel injector tester Nozzle cleaning equipment.	**CHALK-BLACKBOARD & USING TECHNOLOGICAL PADAGOGY**

	Name of Book	Author Name	Publication
Prescribed Books	Automobile Engineering	Vol. 1- II by Dr. Kirpal Singh,	Standard Publishers
	Garage Equipment	G.S.Aulakh,	Eagle Prakashan, Jalandhar.

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	THIRD
Course Code	**AEPC 211**
Course Name	**Production Process**
Course Type	PROGRAMME CORE
Number of Credits	**2(L: 2, DCS: 2, P: 0)**
Name of Faculty	ANSHUL SHARMA
Semester Start & End Dates	01-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	**Production Process**	2	2	-	40	-	40	60	3	-	-	60	100

HOURS	Unit & Topic of Discussion	Topic Details	Remarks
	Unit-1		
12 HOURS	**Manufacturing Processes:**	General machine Tools, Description and functions of main parts, Cutting Parameters, Principles of Turning, Drilling, Boring, Shaping, Plaining, Slotting and Grinding, Milling and Super finishing.	
	Unit-2		
11 HOURS	**Foundry Practice:**	Pattern Making ,Types of Pattern, Pattern Materials, Pattern Allowances Introduction to Core ,Moulding: Introduction to Moulding, Types of Moulding Sand and their properties, Melting and pouring, Defect in castings, Simple Arc & Gas Welding	
	Unit-3		
11 HOURS	**Metal forming processes & Powder Metallurgy::**	Metal forming processes & Powder Metallurgy:	
	Powder Metallurgy:	Methods of metal formation, Advantages and disadvantages of Power Metallurgy, Applications.	
	Unit 4		
11 HOURS	**Modern Machining Processes:**	Processes, Procedures, Advantages, Limitations and Applications of Electro discharge machining, Electro chemical Machining, USM, AJM and LBM.	

	Unit 5		
11 HOURS	**Numerical Control of Machine Tools:**	Introduction to Numerical control of machine tools, NC Machines, CNC machines, Direct numerical control, Advantages and disadvantages of CNC machines, Fundamentals of Part Programming, Manual part Programming, Computer aided part programming.	**CHALK-BLACKBOARD & USING TECHNOLOGICAL PADAGOGY**

	Name of Book	Author Name	Publication
Prescribed Books	Workshop Technology	Vol-I & II by Hazara & Chowdery	Asia Publishing House
	Workshop Technology	B.K. Manchanda	H. Tata Publications, Delhi.

Faculty

HOD

GOVERNMENT POLYTECHNIC PAONTA SAHIB

AT DHAULA KUAN, DISTT. SIRMOUR (HP) - 173031
DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Academic Year	AUG - DEC 2025
Semester	FIFTH
Course Code	AEPC 301
Course Name	**Elements of Design & Mechanics of Vehicles**
Course Type	PROGRAMME CORE
Number of Credits :	**3(L: 3, DCS: 3, P: 0)**
Name of Faculty	VISHAL SINGH CHAUHAN
Semester Start & End Dates	04-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	**Elements of Design & Mechanics of Vehicles**	3	3	-	40	-	40	60	3	-	-	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
	Unit-1		
11 HOURS	**Introduction:**	Design considerations, design procedure, Basic requirements, and classifications of design and principles of good economic design. Standardization, interchangeability of Automobile parts with reference tolS- specifications, Limits, fits and tolerances.	
	Unit-2		
12 HOURS	**Design of keys, couplings and Engine Parts:**	Concept of Sunk Keys, Rectangular Keys, Square, Parallel, Crosshead, Woodruff Key Design of rectangular key, Coupling: Flange coupling, Muff coupling, Clamp coupling, Engine Parts: Cylinder liner and cylinder head, Piston, Connecting Rod, Clutch-Single Plate and Multi plate Clutch, Brakes- Internal Expanding shoe brake.	
	Unit-3		

11 HOURS	**Simple Mechanism:**	Definition of link, kinematic pair, kinematic chain, Mechanism, inversions and machines, Simple examples of mechanism with: Lower pairs, Four bar chain, Slider crank chain, Double slider crank chain, Higher pairs.	
	Unit 4		
11 HOURS	**Motion and Turning Moment:**	Displacement, velocity and acceleration of piston Angular velocity and angular acceleration of connecting rod, Calculations of piston effort and crank effort at different angles, Fly wheel: types, weight and moment of inertia, Fluctuation of energy for fly wheel, Turning moment diagrams with reference to internal combustion engines.	
	Unit 5		
11 HOURS	**Power Transmission:**	Flat belt, V-belt and chain drives, Ratio of tension of two sides of the belt with and without centrifugal tension, Horse power transmitted and condition for maximum horse power transmitted, Velocity ratios transmitted by Belts, Simple, compound and Epicyclic gear box	**CHALK-BLACKBOARD & USING TECHNOLOGICAL PADAGOGY**

	Name of Book	Author Name	Publication
Prescribed Books	Theory of Machines	D.R. Malhotra	Satya Parkashion
	PL Balaney	Pandya & Shah.	Khanna Publishers, Delhi

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	FIFTH
Course Code	AEPC 303
Course Name	Auto Electrical & Electronic Equipment
Course Type	PROGRAMME CORE
Number of Credits :	**2 (L: 2, DCS: 2, P: 0)**
Name of Faculty	DEEPAK SANJHU
Semester Start & End Dates	04-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1	**Auto Electrical & Electronic Equipment**	2	2	-	40	-	40	60	3	-	-	60	100
2.	**Auto Electrical & Electronic Equipment**	-	-	2	-	40	40	-	-	60	3	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
	Unit-1		
12 HOURS	a) **Introduction & Batteries:**	Various Electrical components/systems in Automobile. Their functions and demands, earths return system, types of earthing, 6V, 12V & 24V system.	
	b) **Lead Acid Batteries:**	Construction, working, elements, types, materials used, electrolyte and its strength, effect of added plate area and temperature, rating, capacity, efficiency, temperature characteristics, terminal voltages, charging and discharging. Battery Testing: Electrolyte testing by hydrometer, voltage test, high discharge and cadmium test (voltage), Battery Charging: Constant potential and constant current, initial charging, normal charging, trickle charging, intermittent charging, boost charging. Battery Defects: Sulphation, plates decay, working, erosion, cracking, sedimentation, separator defects, short circuits, overcharging.	
	Unit-2		
11 HOURS	a) **Charging System & Starting system:**	Circuits, function and various components of alternator, types, construction, working, advantages and disadvantages of alternators, drives, cut out relay.	

12 HOURS	**b) Starting System:**	Function of various components, torque terms, principle and constructional details of starter motor, switches, types, starter to engine drive and their types, Starter alternators.	**CHALK-BLACKBOARD & USING TECHNOLOGICAL PADAGOGY**
	Unit-3		
11 HOURS	**a) Ignition System**	Constructional details of coil, distributor, condenser, meaning of cam angle, ignition timing, ignition advancing mechanisms, centrifugal and vacuum type, transistorized ignition system, construction and working details of magneto ignition system.	
	b) Spark Plugs:	Constructional details of spark plugs, classification as per reach, heat range, diameter, and effect of leaded fuels, care and maintenance of spark plug.	
	Unit 4		
11 HOURS	**a) Lighting System:**	Various lighting circuits, head lamp, type and constructional details, sealed beam, double filaments, fog light, side light, brake light, instrument light, indicator lights, reversing light.	
	b) Wiring:	HT and LT, their specifications, cable colour codes, wiring Harness, Wiring diagrams of cars and two wheeler, Fuses, faults and rectification.	
	Unit 5		
11 HOURS	**a) Electrical Accessories:**	Fuel gauges:- bimetallic and balancing coil type, Air pressure gauges, temperature gauges, warning light, wind screen wipers, horns, horn relay, electric fuel pump, Faults and rectification.	
	b) Miscellaneous Electrical Equipment:	Impulse Speedometer, tachometer, heaters, defrosters and Electric door locks, window actuation. C	
	c) Computer Controlled Sensors:	Principle and application of sensor in engine management: Air flow sensor, manifold pressure sensor, speed sensor, throttle position sensor, oxygen sensor, temperature sensor.	

	Name of Book	Author Name	Publication
Prescribed Books	Automotive Electrical Equipment	P.L. Kohli	
	Automobile Engineering	Dr. Kirpal Singh,	Standard Publishers and Distributor, New Delhi

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	FIFTH
Course Code	AEPC 303
Course Name	Auto Electrical & Electronic Equipment Laboratory
Course Type	PROGRAMME CORE
Number of Credits :	1 (L:0 , DCS: 0, P:2)
Name of Faculty	JEEVAN SANJAY
Semester Start & End Dates	04-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	**Auto Electrical & Electronic Equipment**	-	-	2	-	40	40	-	-	60	3	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
56 HOURS	**List of Practical's:**	• Testing of Battery with hydrometer and high rate discharge tester, charging of Batteries. • Testing and measurement of ignition timing and dwell angle with timing light and cam angle tester. • Testing, cleaning and setting of spark plug on spark plug cleaning and testing machine. • Testing of alternator rotor and stator winding for short circuit, ground and broken circuit using alternator test bench. • Testing and setting of horn and relay. • Testing and fault tracing of field winding, armature and magnetic switch for short circuit, grounding of a starter using starter test bench. • Identification of colour codes for continuity test in a wiring harness. • Study and sketching of complete wiring circuit of an Indian vehicle. • Fault tracing and diagnosis of electronic ignition system through engine car scanner. • Study and demonstration of MPFI and CRDI system. • Layout of temperature sensor circuit. • Study and layout circuit of D.C. Shunt motor and stepper motor • PLC basic circuits and control.	

FACULTY

HoD

Academic Year	AUG - DEC 2025
Semester	FIFTH
Course Code	AEPE301-III
Course Name	Mechatronics& Microprocessors
Course Type	PROGRAMME ELECTIVE
Number of Credits	3 (L: 3, DCS: 0, P: 0)
Name of Faculty	ANJALI SHARMA
Semester Start & End Dates	04-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	**Mechatronics& Microprocessors**	3	-	-	40	-	40	60	3	-	-	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Delivery Method
	Unit-1		
11 HOURS	**Introduction**	Introduction to Mechatronics, Mechatronic system, Measurement systems, Control system-open Loop, Close loop and sequential, Microprocessor based controllers, The Mechatronics approach.	
	Unit-2		
12 HOURS	**Sensors and Transducers:**	Circuits, function and various components of alternator, types, construction, working, advantages and disadvantages of alternators, drives, cut out relay.	
	Unit-3		
11 HOURS	**Data Presentation Systems:**	Displays, Data presentation elements, Magnetic recording, Data acquisition systems, Measurement systems, Testing and calibration, Simple problems.	
	Pneumatic and Hydraulic Systems:	Actuation systems, Pneumatic and hydraulic systems, Directional control valves, Pressure control valves, Cylinders, Process control valves, Rotary actuators.	

	Unit 4		
11 HOURS	**Mechanical Actuation Systems:**	Mechanical systems, Cams, Gear trains, Ratchet and pawl, Belt and chain drive.	
	Electrical Actuation System:	Electrical systems, Mechanical switches, Solid-state switches, Solenoids, D.C. motors, A.C. motors, Stepper motors.	
	Unit 5		
11 HOURS	**Microprocessors & PLC:**	Microcomputer structure, Microcontrollers, Applications, Programmable logic controller – applications, Basic structure, input/output processing	**CHALK-BLACKBOARD & USING TECHNOLOGICAL PADAGOGY**

	Name of Book	Author Name	Publication
Prescribed Books	Mechatronics	HMT	Tata McGraw Hill, New Delhi
	Automotive Electrical and Electronics	AK Babu.	

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	FIFTH
Course Code	AEPE303-I
Course Name	AEPE303-I Diesel Engine Mechanics
Course Type	PROGRAMME ELECTIVE
Number of Credits	**3 (L: 3, DCS: 0, P: 0)**
Name of Faculty	Anshul Sharma, Vishal Singh Chauhan & Deepak Sandhu
Semester Start & End Dates	04-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	**Diesel Engine Mechanics**	3	-	-	40	-	40	60	3	-	-	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
	Unit-1		
11 HOURS	**Combustion in I.C. Engines:**	Phenomenon of combustion in C.I. enginesphases of combustion. Methods of producing air movements namely squish and swirl, various types of combustion chambers for diesel engine, diesel knock, and cetane rating.	
	Unit-2		
12 HOURS	**Fuel Supply System in Diesel Engine:**	Layout of fuel supply system in diesel engine and their types, Modern common rail direct injection system and individual pump system, Fuel filters – primary and secondary, priming and fuel feed pumps. Fuel injection pumps –plunger and barrel type, distributor type. Fuel injectors, governing and types of governors. Supercharging of engines – function, advantages and disadvantages, types and location ofsuperchargers, turbochargers.	
	Unit-3		
11 HOURS	**Specialized Types of Engine:**	Wankel engine, Electrical / hybrid system/plug-in hybrid system, Fuel cell engine, Homogeneous Charge Compression Ignition (HCCI) engine, Wheel motors	

	Unit 4		
11 HOURS	**Mechanical Actuation Systems:**	Mechanical systems, Cams, Gear trains, Ratchet and pawl, Belt and chain drive.	**CHALK-BLACKBOARD & USING TECHNOLOGICAL PADAGOGY**
	Performance of Engines:	Effect on engine performance due to atmospheric temperature & pressure, compression ratio, engine speed, dirt, desert, altitude and their remedial measures, Performance curves., Performance curves.	
	Unit 5		
11 HOURS	**Emission Control:**	Effects of pollutants from petrol and diesel engines on human beings and other materials, exhaust pollutants, sources of automotive emission, methods of emission control (by improvement in engine design and by exhaust gas treatment, positive crankcase ventilation, exhaust gas recirculation, catalytic converters for petrol and diesel engines, particulate filter selective catalytic reduction technique, NOX absorbers), Emission norms (Bharat Stage).	

	Name of Book	Author Name	Publication
Prescribed Books	Automobile Engineering Vol.II	Dr. Kirpal Singh	Standard Publishers, Delhi.
	Automobile Engineering	RB Gupta	Satya Prakashan, New Delhi.

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	FIFTH
Course Code	**AEPC 307**
Course Name	**Automobile Workshop Practice-III**
Course Type	PROGRAMME CORE
Number of Credits :	**2 (L:0 , DCS: 0, P:4)**
Name of Faculty	DEEPAM SANJAU
Semester Start & End Dates	04-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	Automobile Workshop Practice-I & II	-	-	4	-	4	60	-	-	60	3	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
56 HOURS	**List of Practical's:**		
	Electric vehicle & Teardown Shop:	•Study of safety equipment's for electrical vehicles. • Study of electric vehicle components (Drive chain, PDU, On board charger, • BCM) and fault findings. Study of Electric Vehicle battery system, rating and drive train system in • Electric Vehicle. Job on making the electric vehicle voltage free on two wheeler and electric • vehicle. Job on measurement and diagnosis on electric drive motor in electric vehicle • on trainer. Job on Removal of windows, replacement of window glass, fender and • window motor mechanism. Diagnosis and installation of center locking connected car system and standard • accessories. Job on removal of complete dashboard and installation	

	Auto-Reconditioning Shop	• Decarburizing of Engines: removing carbon deposits from engine combustion chamber, piston crown, and valve parts manually and by using engine decarbonizing machine. • Overhauling of Diesel engine. • Surfacing of cylinder heads, cylinder blocks and manifolds with cylinder head re- facing machine. 13 • Practice in cylinder boring machine, measuring ovality and taperness of cylinder bore, using cylinder dial gauge, inside micrometer, telescopic gauge, and use of direct reading micrometer. • Practice in honing cylinder blocks, keeping allowance of cylinder clearances. • Inspection and practice of crankshaft, crankpin, journal grinding, main journal grinding on crankshaft grinding machine. • Practice of cam shaft journals on line boring machine. • Servicing of valve and valve mechanism, replacement of valves. • Testing of fuel injector in fuel injection tester. • Calibrations of fuel injection pump on fuel calibration machine. • Practice on brake drum lathe, measuring ovality, skimming the brake drum. • Practice in nozzle grinding and lapping, setting of injection pressure and nature of spray.	

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	FIFTH
Course Code	AEPC 309
Course Name	DRIVING PRACTICE-II
Course Type	PROGRAMME CORE
Number of Credits	**1 (L:0 , DCS: 2, P:2)**
Name of Faculty	ANSHUL SHARMA
Semester Start & End Dates	04-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	Automobile Workshop Practice-1 & II	-	2	2	-	4	40	-	-	60	3	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
56 HOURS	**List of Practical's:**	• Driving Techniques • Revision • Maneuver in: Passing, Merging, Diverging, Overtaking, Crossing, Turning, Cornering, Reversing, and Emergency stopping. • Use of bye pass, sub way, over bridge and flyover • Difficult driving- Night driving, Hill driving, driving under special conditions like fog, heavy rain and snow etc. • Driving on highways: lane selection & lane discipline • Public relations and dealing with police • Fire Hazards • First Aid • Vehicle Repair & Maintenance: Break down recovery • Recovery from police: accident cases • Record keeping • Accounting • Practice on road up to 60 K.M. during the semester for each student.	

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	Auto-Reconditioning Shop	• Decarburizing of Engines: removing carbon deposits from engine combustion chamber, piston crown, and valve parts manually and by using engine decarbonizing machine. • Overhauling of Diesel engine. • Surfacing of cylinder heads, cylinder blocks and manifolds with cylinder head re- facing machine. 13 • Practice in cylinder boring machine, measuring ovality and taperness of cylinder bore, using cylinder dial gauge, inside micrometer, telescopic gauge, and use of direct reading micrometer. • Practice in honing cylinder blocks, keeping allowance of cylinder clearances. • Inspection and practice of crankshaft, crankpin, journal grinding, main journal grinding on crankshaft grinding machine. • Practice of cam shaft journals on line boring machine. • Servicing of valve and valve mechanism, replacement of valves. • Testing of fuel injector in fuel injection tester. • Calibrations of fuel injection pump on fuel calibration machine. • Practice on brake drum lathe, measuring ovality, skimming the brake drum. • Practice in nozzle grinding and lapping, setting of injection pressure and nature of spray.	

Faculty

HOD

Academic Year	AUG - DEC 2025
Semester	THIRD
Course Code	AEPC 217
Course Name	Introduction to Computer Aided Drafting
Course Type	PROGRAMME CORE
Number of Credits	2 (L: 0, DCS: 0, P: 4)
Name of Faculty	VISHAL SINGH CHAUHAN
Semester Start & End Dates	04-08-2025 26-11-2025

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	Automobile Workshop Practice-I & II	-	2	2	-	4	40	-	-	60	3	60	100

HOURS	Unit , Topic of Discussion	Topic Details	Remarks
	List of Practical's:		
56 HOURS	**Introduction to CAD:**	Advantages and applications, setting the drawing environment: Limits, Grid,• Snap, Axis, Units, Ortho, Coordinates ON, OFF Units and Color. • 2D Drawing entities - Point - Line - Arc - circle, Ellipse, Polygon, andTrace. Object Selection using Object Snap (OSNAP). • Editing commands: Selection of entities by different methods - copy, Move, Scale, Rotate, Fillet, Chamfer, Mirror, Array-Polar, Rectangular. Measure, Divide, and Erase. • Drawing Display Methods: Zoom, Pan, and View. • Adding Texts and Dimensions: Text, Dimension-linear, continued, angular	
	More Learning for Productivity of Drawing:	• Pedit commands. Working on multiple layers Layer concepts in CAD • -Various options with layer command - Hatch command - Creating line types library and user made library. • Preparing the schematic drawing of a workshop building in one layer, the blocks of machines in another Layer and Electrical connection on another layer.	
	Advanced Cad Features:	• Drawing 2D figure of complex shape • Extruding it into a 3Ddrawing • Understanding 3D Co-ordinate values, Creating and viewing a drawing in3D. • Rotating the drawings- Meshing 3Ddrawing. • Turning 3D into 2D Ortho Graphic projection.	
	Advanced 3D Features:	• Understanding modelspace and paper space.	

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