Government Polytechnic Kullu at Seobagh Distt Kullu H.P. 175138

Department of Automobile Engineering

Lesson Plan w.e.f 01-08-2025 to 26-11-2025

Name of Subject:-	**Basics of Thermodynamics, Hydraulics and Pneumatics**	Session:-	**Aug-Nov 2025**
Name of Teacher:-	**Er Maneet Guleria**	Semester:-	**3rd Semester**
Designation:-	**Workshop Supdt. (Automobile Engg)**	Scheme:-	**N-2022**

Sr No	Month	Week	Contents	Remarks
1	August	Week 1	**Unit-1.Principles of Thermal Engineering**: Introduction. Thermodynamics properties -intensive and extensive, Property, path, process, system, surroundings	
		Week 2	Heat and work Enthalpy and internal energy. **Gas Laws**: Boyle's law, Charle's law. Joule's law,	
		Week 3	Characteristic gas equation, gas constant, universal gas constant. Simple numerical problems.	
		Week 4	Modes of heat transfer, conduction, convection, radiation, Fourier's Law. **Unit-II: Law of Thermodynamics and Air Cycles:** Zeroth law of thermodynamics Irreversible process.	
		Week 5	First law of thermodynamics (concept only),Second law of thermodynamics (concept only),	
2	September	Week 1	Thermal efficiency and heat pump, heat engine and heat sink Concept of entropy,	
		Week 2	**Class Test I**	
		Week 3	Constant volume, constant pressure, isothermal, adiabatic, polytropic throttling and free expansion processes (concept only).	
		Week 4	Air Cycles: Camot cycle, Otto cycle,Diesel cycle.	
		Week 5	Dual combustion cycle.	
3	October	Week 1	**Unit-III: Air Compressors**: Reciprocating air compressor, Centrifugal compressor.	
		Week 2	working of single stage and double stage compressor and applications,	
		Week 3	**Class Test II**	
		Week 4	Rotary air compressor and supercharger. **Unit-IV: Hydraulics:** Types of fluid, Properties of fluid,	
		Week 5	Pascal Law, Components of hydraulic systems.	
4	November	Week 1	Function of each componet in hydraulic circuit ,oil reservoir .filter, hydraulic jack, Hydraulic Press.	
		Week 2	**House Test**	
		Week 3	**Unit-V: Pneumatics**: Basic components and their function,air cylinders-function.	
		Week 4	single acting and double acting,Air filter, regulator, different types of control valves,	
		Week 5	concept of automation.	

Signature of Teacher
(Er Maneet Guleria)

Signature of H.O.
(Er Vivek Singh

Government Polytechnic Kullu at Seobagh Distt Kullu H.P. 175138					
Department of Automobile Engineering					
Lesson Plan w.e.f 01-08-2025 to 26-11-2025					
Name of Subject:-			Basics of Thermodynamics, Hydraulics and Pneumatics Lab	Session:-	Aug-Nov 2025
Name of Teacher:-			Er Maneet Guleria	Semester:-	3rd Semester
Designation:-			Workshop Supdt. (Automobile Engg)	Scheme:-	N-2022

Sr No	Month	Week	Contents	Remarks
1	August	Week 1	To find flash point and fire point of given fuel.	
		Week 2	To find flash point and fire point of given fuel.	
		Week 3	To find viscosity of given fuel.	
		Week 4	To find viscosity of given fuel.	
		Week 5	To study air compressor.	
2	September	Week 1	To study air compressor.	
		Week 2	To analyze exhaust gases by exhaust gas analyzer.	
		Week 3	To analyze exhaust gases by exhaust gas analyzer.	
		Week 4	To analyze exhaust gas for diesel engine through smoke meter.	
		Week 5	To analyze exhaust gas for diesel engine through smoke meter.	
3	October	Week 1	To conduct Morse test of multi-cylinder petrol engines.	
		Week 2	To conduct Morse test of multi-cylinder petrol engines.	
		Week 3	To prepare heat balance sheet of an IC engine.	
		Week 4	To prepare heat balance sheet of an IC engine.	
		Week 5	Identification of components in air conditioning system.	
4	November	Week 1	Identification of components in air conditioning system.	
		Week 2	To develop hydraulic circuit using different components.	
		Week 3	To develop hydraulic circuit using different components.	
		Week 4	Revision	
		Week 5	Revision	

Signature of Teacher
(Er Maneet Guleria)

Signature of H.O.D
(Er Vivek Singh)

Government Polytechnic Kullu at Seobagh Distt Kullu H.P. 175138

Department of Automobile Engineering

Lesson Plan w.e.f 01-08-2025 to 26-11-2025

Name of Subject:-	**Automotive Materials**	Session:-	Aug-Nov 2025
Name of Teacher:-	**Er Mancet Guleria**	Semester:-	3rd Semester
Designation:-	**Workshop Supdt. (Automobile Engg)**	Scheme:-	N-2022

Sr No	Month	Week	Contents	Remarks
1	August	Week 1	**Unit I: 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,	
		Week 2	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.	
		Week 3	Thermal and electrical conductivity and corrosion resistance. **Unit II: Ferrous Metals and Alloys:** Effect of alloying elements such as Aluminium, chromium, Nickel, Cobalt, Manganese, Molybdenum, tungsten, Vanadium, Silicon, Sulphur and Phosphorus.	
		Week 4	Composition, properties, grades and uses of alloy steels such as High speed steel, Stainless steel, Silicon steel, Heat resistant steel, spring steel.	
		Week 5	Composition, properties, grades and uses of alloy steels such as High speed steel, Stainless steel, Silicon steel, Heat resistant steel, spring steel. Heat Treatment: Iron-carbon diagram, objectives and practical aspects of heat treatment.	
2	September	Week 1	Description and uses of principal heat treatment processes Annealing, Normalizing, Tempering, Hardening, and Carburising, Nitriding and Cyaniding and applications. Case hardening and surface hardening,	
		Week 2	**Class Test I**	
		Week 3	Hardenability of steels, Examples in heat treating automobile engineering components.**Unit III: Non-ferrous Metals and Alloys:** Copper: Properties and uses, Composition, properties and uses of copper alloys.	
		Week 4	Class Test I, Brass: Cartridge brass, Nickel silver. Bronze: Phosphor bronze, Al-bronze, Mn-bronze, and Gunmetal ,Properties and uses of Aluminium and their grades Composition .	
		Week 5	properties and uses of Al- alloys e.g., Duralumin, Yellow metal, Magnelium and Hindalium Properties and uses of alloys of lead, tin and magnesium.	
3	October	Week 1	Bearing Metal: Requisite qualities. Composition, properties and uses of white metal bearing. Copper based bearing metals. Aluminium based bearing metals.	
		Week 2	Use of nylon/PTFE for bushes/bearings, bi- metallic and tri-metallic bushes. **Unit IV: Identification and Examination of Metals and Alloys**: Identification tests -Appearance, sound, filing, weight, magnetic, spark, bend and microstructure.	
		Week 3	**Class Test II**	
		Week 4	**Unit V: Other Important Materials**: Plastics: Definition, classification of plastics, fiberglass, reinforced plastics. Major applications of various plastics with specific mention of their uses and grades,	
		Week 5	• Heat insulating materials: Properties and uses of asbestos, glass wool, Thermocole, cork, mica.Sound insulating materials: Cork, fiberboards.	
4	November	Week 1	Fabrication materials: Wood, plywood, Rubber - natural and synthetic, Glasses - plate glass, toughened glass, safety glass	
		Week 2	**House Test**	
		Week 3	Electrical insulating materials, properties and uses of china clay, leather Bakelite, ebonite, glass wool, Refractory materials: General characteristics and uses of dolomite, ceramics.	
		Week 4	Protective coating materials: Auto paints, primers, varnishes, enamels, putti, electroplating materials.	
		Week 5	Adhesive requirements types and advantages, thread locking special solution, anti-rust solution.	

Signature of Teacher
(Er Mancet Guleria)

Signature of H.O.D
(Er Vivek Singh)

Government Polytechnic Kullu at Seobagh Distt Kullu H.P. 175138						
Department of Automobile Engineering						
Lesson Plan w.e.f 01-08-2025 to 26-11-2025						
Name of Subject:-			Automobile Chassis, Body And Transmission – I	Session:-	Aug-Nov 2025	
Name of Teacher:-			Er Rishav	Semester:-	3rd Semester	
Designation:-			Lecturer (Automobile Engg)	Scheme:-	N-2022	
Sr No	**Month**	**Week**	**Contents**			**Remarks**
1	August	Week 1	Unit I: Chassis and Body: Classification of vehicles, types of chassis, layout of conventional type of chassis, function and arrangement of major assemblies.			
		Week 2	Alternating arrangement used such as engine position, drive types, their merits and demerits.			
		Week 3	types of frame and body streamlining, cross members, brackets, materials of frame and body upholstery.			
		Week 4	Unit II: Clutch: Necessity, function and requirements of clutch, types of clutch - single plate clutch,			
		Week 5	multi plate clutch, hydraulic power assisted and wet and dry plate clutch,			
2	September	Week 1	clutch plate and lining material Constructional details and working of centrifugal, semi centrifugal clutch, diaphragm clutch and fluid coupling.			
		Week 2	**Class Test I**			
		Week 3	Unit III: Transmission: Necessity, function and types of manual transmissionSliding, constant mesh and synchromesh.			
		Week 4	Over drive, over running clutch, description and operation of transfer gear box. Common faults and remedies, trans axle construction			
		Week 5	Types of automatic transmission and their main components. Epicyclic gearbox-construction,			
3	October	Week 1	working and determination of speed ratio Torque converter. Construction, principle of working. Continuously variable transmission,			
		Week 2	Automated Manual Transmission, hydrostatic transmission systems, direct shift gear box (DSG).			
		Week 3	**Class Test II**			
		Week 4	Unit IV: Final Drive: Propeller shaft-function, construction details. Universal jointsfunctions and types. Types of final drive - hotchkiss drive, torque tube drive.			
		Week 5	Differential - principle, functions and working. Rear axles- semi floating, three quarter floating. Fully floating. Common faults and remedie			
4	November	Week 1	UNIT V: 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.			
		Week 2	**House Test**			
		Week 3	Steering mechanism, function, Ackerman's Principle of steering. Working and constructional details of steering gear, steering linkages, sector arm, center arm,			
		Week 4	drag link and tie rod, steering ratio. Front wheel geometry-castor, camber			
		Week 5	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.			

Signature of Teacher
(Er Rishav)

Signature of H.O.D
(Er Vivek Singh)

Government Polytechnic Kullu at Seobagh Distt Kullu H.P. 175138

Department of Automobile Engineering

Lesson Plan w.e.f 01-08-2025 to 26-11-2025

Name of Subject:-	**Garage Equipment**	Session:-	**Aug-Nov 2025**
Name of Teacher:-	**Er Vivek Singh**	Semester:-	**3rd Semester**
Designation:-	**H.O.D(Automobile Engg)**	Scheme:-	**N-2022**

Sr No	Month	Week	Contents	Remarks
1	August	Week 1	**1. 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	
		Week 2	• 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.	
		Week 3	**2. Tuning and Testing Equipment Specifications and applications** of • Vacuum Gauge • Compression Gauge (Pressure Gauge)	
		Week 4	**3. Engine Repair Tools/Measuring and Testing Equipment** Specifications and applications of • Torque wrench, pneumatic wrench • Piston ring compressor • Valve lifter and valve spring tester	
		Week 5	• Piston ring files, groove cleaner • Scrappers • Piston ring remover • Cylinder Dial gauge • Smoke meter • Engine Analyser/ Scanner • Part degreasing tank	
2	September	Week 1	**4. Electrical Repair Equipment Specifications** and uses of • Electrical Test Bench • Battery Charger	
		Week 2	**Class Test I**	
		Week 3	• Head Lights Beam Aligner and Tester (Electronic and Digital type) • Growler	
		Week 4	5. Reconditioning/Testing Equipment for Chassis and Body. Use of • Brake Efficiency Tester (Chassis Dynamometer) or brake testing equipment .	
		Week 5	Clutch Fixures and Brack Line Rivetters,pop riveting gun.	
3	October	Week 1	• Crane and Chain Pulley Block • Jacks - mechanical, hydraulic, trolley type • Paint chamber • Paint Spray Gun • Paint Drying Equipment	
		Week 2	• Tools for tyres, automatic tyre remover • Trolleys • Axle/chassis stands • Steering work stands • Jib crane • Spring tester .	
		Week 3	**Class Test II**	
		Week 4	•Frame strengthening equipment • .Chassis alignment equipment • Computerized wheel balancer -static and dynamic .	
		Week 5	• Computerized wheel balancer -static and dynamic • Computerized wheel alignment equipment.	
4	November	Week 1	. Engine Reconditioning and Testing Equipment Specifications and use of Cylinder Boring Machine and Honing Machine . •Crankshaft Machine and Camshaft Grinding Machine.	
		Week 2	•Connecting Rod Aligner •Line Boring Machine and Arbor Press •Nozzle Grinding and Lapping Machine	
		Week 3	•Fuel Injection Pump Calibrating Machine •Valve Refacer, Valve Seat Cutting and Grinding .	
		Week 4	•Radiator Tester •Cylinder head leakage testing fixture .	
		Week 5	Fuel injector tester •Nozzle cleaning equipment	

Signature of Teacher
(Er Vivek Singh)

Signature of H.O.D
(Er Vivek Singh)

Government Polytechnic Kullu at Seobagh Distt Kullu H.P. 175138

Department of Automobile Engineering

Lesson Plan w.e.f 01-08-2025 to 26-11-2025

Name of Subject:-	**Production Process-I**	Session:-	**Aug-Nov 2025**
Name of Teacher:-	**Er Maneet Guleria**	Semester:-	**3rd Semester**
Designation:-	**Workshop Supdt. (Automobile Engg)**	Scheme:-	**N-2022**

Sr No	Month	Week	Contents	Remarks
1	August	Week 1	Unit I: Cutting Fluids & Lubricants: Introduction; Types of cutting fluids,Fluids and coolants required in turning, drilling, shaping, sawing & broaching;	
		Week 2	Selection of cutting fluids, methods of application of cutting fluid,Lathe Operations: cutting parameters, tool signature,	
		Week 3	Types of lathes – light duty, Medium duty and heavy duty geared lathe, CNC lathe; Specifications; Knurling, facing, Boring,	
		Week 4	drilling, threading, step turning, taper turning.**Unit II: Foundry Practice:** Pattern Making ,Types of Pattern,	
		Week 5	Pattern Materials, Pattern Allowances Introduction to Core ,Moulding: Introduction to Moulding, Types of Moulding Sand and their properties,	
2	September	Week 1	Melting and pouring, Defect in castings. Metal forming processes: Die stamping, Metal Drawing, Spinning,	
		Week 2	**Class Test I**	
		Week 3	Rolling, Extruding, Forging, and Tube Drawing. **Unit III: Modern Machining Processes**: Processes, Procedures,	
		Week 4	Advantages, LAdimitations and Applications of Electro discharge machining, Electro chemical Machining, USM, AJM and LBM. Unit-IV: Welding: Classification;Gas welding techniques.	
		Week 5	Types of welding flames.	
3	October	Week 1	Arc Welding – Principle, Equipment, Applications; Shielded metal arc welding; Submerged arc welding; TIG / MIG welding; Resistance welding - Spot welding, Seam welding, Projection welding; Welding defects;	
		Week 2	Brazing and soldering: Types, Principles, Applications. Milling: Introduction; Types of milling machines: plain, Universal, vertical; constructional details – specifications; Milling operations: simple, compound and differential indexing; Milling cutters – types; Nomenclature of teeth; Teeth materials; Tool signature of milling cutter; Tool & work holding devices	
		Week 3	**Class Test II**	
		Week 4	Unit V: Part Programming: NC part programming – methods – manual programming – conversational programming .– coordinate system – types of motion control: point-to point.	
		Week 5	Paraxial and contouring.	
4	November	Week 1	APT programming - Format: sequential and word address formats - sequence number– Datum points: machine zero, work zero, tool zero NC dimensioning – reference points – tool material – tool inserts - tool offsets and compensation - NC 17 dimensioning – preparatory functions and G codes,	
		Week 2	**House Test**	
		Week 3	miscellaneous functions and M codes – interpolation: linear interpolation and circular interpolation - CNC program procedure	
		Week 4	- tool offsets and compensation - NC 17 dimensioning – preparatory functions and G codes,	
		Week 5	miscellaneous functions and M codes – interpolation: linear interpolation and circular interpolation - CNC program procedure	

Signature of Teacher

Signature of H.O.D

Govt. Polytechnic Kullu (H.P.)
Mechanical Workshop Planning

Branch : **Automobile Engineering** Semester: **3rd**

Subject : **Mechanical Workshop (Welding Shop)** Session: **Aug. - Nov. -2025**

Teacher: **Bhupinder , WSI Welding**

Workshop	Month	Week	Detail of Contents	Reference Resources	Remarks
Welding Workshop	Aug.	Week 2 Week 3 Week 4 Week 5	i) Demonstration of different welding tools / machines.	R1,R2	
	Sep.	Week 1 Week 2 Week 3 Week 4 Week 5	One exercise on lap and butt joint each with arc welding. One exercise of vertical and overhead arc welding.		
	Oct.	Week 1 Week 2 Week 3 Week 4 Week 5	One exercise of welding and cutting. One exercise of spot welding. One exercise of TIG welding.		
	Nov.	Week 1 Week 3 Week 4 Week 5	One utility article Report Checking and evaluationReport Checking and evaluation		

Teacher's references.

R1. A Text Book Workshop Technology by Dr. R. K. Singal

R2. Advanced Welding Technology by Dr. S.P. Tewari

1/8/25 01/08/25

Signature of Teacher **Foreman** **Workshop Supdt.** **H.O.D.(Auto. Engg.)**

Government Polytechnic Kullu at Seobagh Distt Kullu H.P. 175138

Department of Automobile Engineering

Lesson Plan w.e.f 01-08-2025 to 26-11-2025

Name of Subject:-	**Automobile Workshop Practice-1**	Session:-	**Aug-Nov 2025**
Name of Teacher:-	**Er Rishav& Sh. Pushpender**	Semester:-	**3rd Semester**
Designation:-	**Lecturer (Automobile Engg) & Apprentice MMV**	Scheme:-	**N-2022**

Sr No	Month	Week	Contents	Remark
1	August	Week 1	Unit I: Chassis and Body: Classification of vehicles, types of chassis, layout of conventional type of chassis, function and arrangement of major assemblies.	
		Week 2	Alternating arrangement used such as engine position, drive types, their merits and demerits.	
		Week 3	, types of frame and body streamlining, cross members, brackets, materials of frame and body upholstery.	
		Week 4	Unit II: Clutch: Necessity, function and requirements of clutch, types of clutch - single plate clutch,	
		Week 5	multi plate clutch, hydraulic power assisted and wet and dry plate clutch,	
2	September	Week 1	clutch plate and lining material Constructional details and working of centrifugal, semi centrifugal clutch, diaphragm clutch and fluid coupling.	
		Week 2	**Class Test I**	
		Week 3	Unit III: Transmission: Necessity, function and types of manual transmissionSliding, constant mesh and synchromesh.	
		Week 4	Over drive, over running clutch, description and operation of transfer gear box. Common faults and remedies, trans axle construction	
		Week 5	Types of automatic transmission and their main components. Epicyclic gearbox-construction,	
3	October	Week 1	working and determination of speed ratio Torque converter. Construction, principle of working. Continuously variable transmission,	
		Week 2	Automated Manual Transmission, hydrostatic transmission systems, direct shift gear box (DSG).	
		Week 3	**Class Test II**	
		Week 4	Unit IV: Final Drive: Propeller shaft-function, construction details. Universal jointsfunctions and types. Types of final drive - hotchkiss drive, torque tube drive.	
		Week 5	Differential - principle, functions and working. Rear axles- semi floating, three quarter floating. Fully floating. Common faults and remedie	
4	November	Week 1	UNIT V: 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.	
		Week 2	**House Test**	
		Week 3	Steering mechanism, function, Ackerman's Principle of steering. Working and constructional details of steering gear, steering linkages, sector arm, center arm,	
		Week 4	drag link and tie rod, steering ratio. Front wheel geometry-castor, camber	
		Week 5	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.	

Signature of Teacher
Er Rishav& Sh. Pushpender

Signature
(Er Viv

Government Polytechnic Kullu at Seobagh Distt Kullu H.P. 175138

Department of Automobile Engineering

Lesson Plan w.e.f 01-08-2025 to 26-11-2025

Name of Subject:-	**Introduction to Computer Aided Drafting**	Session:-	**Aug-Nov 2025**
Name of Teacher:-	**Er Maneet Guleria**	Semester:-	**3rd Semester**
Designation:-	**Workshop Supdt. (Automobile Engg)**	Scheme:-	**N-2022**

Sr No	Month	Week	Contents	Remarks
1	August	Week 1	Introduction to CAD: Advantages and applications, setting the drawing environment: Limits, Grid, Snap, Axis, Units, Ortho, Coordinates ON, OFF Units and Color.	
		Week 2	Setting the drawing environment: Limits, Grid, Snap, Axis, Units, Ortho, Coordinates ON, OFF Units and Color.	
		Week 3	2D Drawing entities - Point - Line - Arc- circle, Ellipse, Polygon, and Trace:	
		Week 4	Object Selection using Object Snap (OSNAP). Editing commands: Selection of entities by different methods - copy, Move, Scale,	
		Week 5	Rotate, Fillet, Chamfer, Mirror, Array-Polar, Rectangular. Measure,	
2	September	Week 1	Divide, and Erase. Drawing Display Methods: Zoom, Pan, and View. Adding Texts and Dimensions: Text, Dimension-linear, continued, angular	
		Week 2	More Learning for Productivity of Drawing: Pedit commands. Working on multiple layers Layer concepts in CAD	
		Week 3	-Various options with layer command - Hatch command - Creating line types library and user made library.	
		Week 4	Preparing the schematic drawing of a workshop building in one layer, the blocks of machines in another Layer and Electrical connection on another layer.	
		Week 5	Advanced Cad Features: Drawing 2D figure of complex shape, Extruding it into a 3D drawing	
3	October	Week 1	Understanding 3D Co-ordinate values, Creating and viewing a drawing in 3D, Rotating the drawings- Meshing 3D drawing.Turning 3D into 2D Ortho Graphic projection.	
		Week 2	Advanced 3D Features: Understanding model space and paper space.Drawing and working in UCS. • UCS icon, 3D editing-Union, Subtraction, 3D Orbit	
		Week 3	Basic 3D entities command, Box, Cylinder, Cone.	
		Week 4	Chamfer ,Revolve	
		Week 5	Drawing of Following Automobile components: •Four Stroke Petrol Engine Piston	
4	November	Week 1	•Diesel Engine Piston	
		Week 2	• Connecting rod	
		Week 3	• Fuel injector	
		Week 4	• Crank shaft -4 cylinder Engine	
		Week 5	• Crank shaft -4 cylinder Engine	

Signature of Teacher
(Er Maneet Guleria)

Signature of H.O.D
(Er Vivek Singh)