

LESSON PLAN

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| Name of Faculty | Sh. ARUN SYAN |
| Discipline | Automobile Engineering |
| Semester | 1st |
| Subject | BAE |
| Lesson plan Duration | 15 Weeks |
| Work Load per week | Theory(02) |

| WEEK | THEORY | |
|-----------------|-------------|---|
| | Lecture Day | TOPIC |
| 1 st | 1 | Introduction Definition of automobile, Applications of automobiles, Classification of automobiles according to purpose, load capacity, fuel used, number of wheels, side of the drive, drive wheels, engine location & transmission; |
| 2 nd | 2 | Leading manufacturers of scooter, motorcycles, car, bus and truck in India. |
| 3 rd | 3 | Layout of two wheeler and four wheeler, Name and functions of their major assemblies, |
| 4 th | 4 | assemblies, Types of drives – rear wheel drive, front wheel drive and four wheel drive. |
| 5 th | 5 | Their merits and demerits. Chassis frame types - Conventional, semi-integral and integral. |
| 6 th | 6 | Internal Viva Voce – 1 |
| 7 th | 7 | Automobile body and its types. Requirements of body, |
| 8 th | 8 | Nomenclature of vehicle according to body. Types of car body, Constructional details of car body, |

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| 9 th | 9 | Body streamlining, Interior fittings -Rear view mirror, floor mats, upholstery, glove box, emergency flasher, air ventilators and Instrument panel. |
| 10 th | 10 | Internal Viva Voce – 2 |
| 11 th | 11 | Introduction to power system, Various types of fuels, Internal and external combustion engines, |
| 12 th | 12 | Major components of engine and their functions – cylinder, piston, connecting rod, crank shaft, piston pin, crank shaft pin, cylinder head, valves. |
| 13 th | 13 | Engine terminology including bore, stroke,dead centres - TDC/BDC & ODC/IDC, engine capacity, Introduction to four stroke SI engine |
| 14 th | 14 | Need of safety system, Active and passive safety, Various types of safety devices like helmet, seat belt, and air bags, |
| 15 th | 15 | Definition of road safety, Road signs and signals. Road markings, Traffic light, Traffic police signals, Traffic rules, Tips for safe driving. Internal Viva Voce – 3 |

LESSON PLAN

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|-----------------------------|----------------------------|
| Name of Faculty | Sh.VISHRUT / VIRENER NEHRA |
| Discipline | Automobile Engineering |
| Semester | 1st |
| Subject | ENGINEERING GRAPHICS |
| Lesson plan Duration | 15 Weeks |
| Work Load per week | Theory(06) |

| WEEK | THEORY | |
|-----------------|-------------|---|
| | Lecture Day | TOPIC |
| 1 st | 1 | <p>1. Introduction to Engineering Drawing and Graphics</p> <p>1.1 Introduction to use and care of drawing instruments, drawing materials, layout and sizes of drawing sheets and drawing boards.</p> |
| 2 nd | 2 | <p>1.2 Symbols and conventions</p> <p>a) Conventions of Engineering Materials, Sectional Breaks and Conventional lines.</p> <p>b) Civil Engineering Sanitary fitting symbols</p> <p>c) Electrical fitting symbols for domestic interior installations.</p> |
| 3 rd | 3 | <p>1.3 Geometrical construction-geometrical figures such as triangles, rectangles, circles, ellipses and curves, hexagons, pentagons bisecting a line and arc, division of line and circle with the help of drawing instruments.</p> |
| 4 th | 4 | <p>2. Technical Lettering of Alphabet and Numerals</p> <p>Definition and classification of lettering, Free hand (of height of 5,8,12 mm) and instrumental lettering (of height 20 to 35 mm) : upper case and lower case, single and double stroke, vertical and inclined (Gothic lettering) at 75 degree to horizontal and with suitable height to width ratio 7:4</p> |
| 5 th | 5 | <p>3. Dimensioning</p> <p>3.1 Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions).</p> <p>3.2 Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., countersunk holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches.</p> |
| 6 th | 6 | Internal Viva Voce – 1 |

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| 7 th | 7 | <p>4. Scales</p> <p>4.1 Scales –Needs and importance (theoretical instructions), Type of scales, Definition of Representative Fraction (R.F.) and Length of Scale.</p> <p>4.2 To draw/construct plain and diagonal scales.</p> |
| 8 th | 8 | <p>UNIT II</p> <p>1. Orthographic Projections</p> <p>1.1 Theory of orthographic projections</p> <p>1.2 Three views of orthographic projections of different objects of given pictorial view of a block in 1st and 3rd angle.</p> <p>1.3 Projection of Points in different quadrant</p> <p>1.4 Projection of Straight Line (1st angle) i. Line parallel to both the planes. ii. Line perpendicular to any one of the reference plane and parallel to others iii. Line inclined to any one of the references and parallel to another plane.</p> |
| 9 th | 9 | <p>1.5 Projection of Plane – Different lamina like square rectangular, triangular, circle and Hexagonal pentagon. Trace of planes (HT and VT).</p> <p>1.6 Identification of surfaces</p> |
| 10 th | 10 | <p>2. Sectioning</p> <p>2.1 Importance and salient features 2.2 Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections (theoretical only).</p> <p>2.3 Orthographic sectional views of different objects.</p> <p>Internal Viva Voce – 2</p> |
| 11 th | 11 | <p>UNIT III</p> <p>1. Introduction of projection of right solids such as prism & pyramid (square, Pentagon, Hexagonal) cube, cone & cylinder (Axes perpendicular to H.P and parallel to V.P.)</p> <p>Introduction of sections of right solids- Section planes, Sections of Hexagonal prism, pentagon pyramid, cylinder and cone (Section plane parallel to anyone reference planes and perpendicular to V.P. and inclined to H.P.)</p> |
| 12 th | 12 | <p>Development of Surfaces– Development of lateral surfaces of right solids like cone, cylinder, pentagonal prism, pyramid and hexagonal pyramid (Simple problems)</p> |
| 13 th | 13 | <p>UNIT IV</p> |

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| | | 1. Fundamentals of isometric projections and isometric scale 2. Isometric views of different laminas like circle, pentagon and hexagon. |
| 14 th | 14 | Isometric views from given different orthographic projections(front, side and top view) |
| 15 th | 15 | Introduction to AutoCAD Basic introduction and operational instructions of various commands in AutoCAD. Internal Viva Voce – 3 |

LESSON PLAN

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|-----------------------------|------------------------|
| Name of Faculty | Smt. SURBHI |
| Discipline | Automobile Engineering |
| Semester | 1st |
| Subject | FUNDAMENTALS OF IT |
| Lesson plan Duration | 15 Weeks |
| Work Load per week | Theory(02) |

| WEEK | THEORY | |
|-----------------|-------------|---|
| | Lecture Day | TOPIC |
| 1 st | 1 | Brief history of development of computers, Definition of Computer, Block diagram of a |
| | | Computer, Hardware, Software, |
| 2 nd | 2 | Booting: Cold and Hot Booting, Interaction between the CPU |
| | | and Memory with Input/Output devices, |
| 3 rd | 3 | Function of CPU and major functional parts of CPU. |
| | | Memory, Bit, Nibble, Byte, KB, MB, GB, TB, PB, Functions of memory, Use of storage devices |
| | | in a Computer, List types of memory used in a Computer, Importance of cache memory, CPU |
| | | speed and CPU word length |
| 4 th | 4 | Understanding browser, Introduction to WWW, efficient use of search engines, awareness about |
| | | Digital India portals (state and national portals) and college portals. |
| 5 th | 5 | Advantages of Email, |
| | | Various email service providers, Creation of email id, sending and receiving emails, attaching, documents with email and drive. |
| | | Internal Viva Voce – 1 |

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| 6 th | 6 | Effective use of Gmail, |
| 7 th | 7 | G-Drive, Google Calendar, Google Sites, Google Sheets, Online mode of |
| | | communication using Google Meet & WebEx |
| 8 th | 8 | Introduction to Programming, Steps involved in problem solving, Definition of Algorithm, |
| | | Definition of Flowchart, |
| 9 th | 9 | Steps involved in algorithm development, differentiate algorithm and |
| | | flowchart, symbols used in flowcharts, algorithms for simple problems, flowcharts for simple |
| | | problems, Practice logic building using flowchart/algorithms |
| 10 th | 10 | Office Tools like LibreOffice/OpenOffice/MSOffice. |
| | | Internal Viva Voce – 2 |
| 11 th | 11 | OpenOffice Writer – Typesetting Text and Basic Formatting, Inserting Images, Hyperlinks, |
| | | Bookmarks, Tables and Table Properties in Writer |
| 12 th | 12 | Introducing LibreOffice/OpenOffice Calc, Working with Cells, Sheets, data, tables, using |
| | | formulae and functions, using charts and graphics. |
| 13 th | 13 | OpenOffice Impress – Creating and Viewing Presentations, Inserting Pictures and Tables, Slide |
| | | Master and Slide Design, Custom Animation. |
| 14 th | 14 | Introduction to Digital Marketing – Why Digital Marketing, Characteristics of Digital Marketing, Tools for Digital Marketing, |
| | | Effective use of Social Media like LinkedIn, Google+, Facebook, Twitter, etc.: |
| 15 th | 15 | Features of Social media, Advantages and Disadvantages of Social Media. |
| | | Internal Viva Voce – 3 |

LESSON PLAN

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|-----------------------------|--|
| Name of Faculty | Sh. VISHRUTH |
| Discipline | Automobile Engineering |
| Semester | 3rd |
| Subject | BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING |
| Lesson plan Duration | 15 Weeks |
| Work Load per week | Theory (02) |

| WEEK | THEORY | |
|-----------------|-------------|--|
| | Lecture Day | TOPIC |
| 1st | 1 | Application and Advantage of Electricity |
| | 2 | Difference between ac and dc, various applications of electricity, advantages of electrical energy over other types of energy |
| 2 ND | 3 | Basic Electrical Quantities |
| | 4 | Definition of voltage, current, power and energy with their units, name of instruments used for measuring above quantities. |
| 3 RD | 5 | Connection of these instruments in an electric circuit. |
| | 6 | AC Fundamentals, Electromagnetic induction-Faraday's Laws, Lenz's Law; Fleming's rules. |
| 4 TH | 7 | Principles of a.c. Circuits; Alternating emf, Definition of cycle, frequency, amplitude and time period. |
| | 8 | Instantaneous, average, r.m.s and maximum value of sinusoidal wave; form factor and Peak Factor. Concept of phase and phase difference. |
| 5 TH | 9 | Concept of resistance, inductance and capacitance in simple a.c. circuit. Power factor and improvement of power factor by use of capacitors. |
| | 10 | Sessional Test-I |
| 6 TH | 11 | Concept of three phase system; star and delta connections; voltage and current relationship (no derivation). |
| | 12 | Transformers , Working principle and construction of single phase transformer, transformer ratio, emf equation. |
| 7 TH | 13 | losses and efficiency, cooling of transformers, isolation transformer, CVT, auto transformer (brief idea), applications. |
| | 14 | Distribution System |

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| 8 TH | 15 | Difference between high and low voltage distribution system, identification of three-phase wires, neutral wire and earth wire in a low voltage distribution system. |
| | 16 | Identification of voltages between phases and between one phase and neutral. |
| 9 TH | 17 | Difference between three-phase and single-phase supply. |
| | 18 | Electric Motor , Changing direction of rotation of a given 3 phase induction motor. |
| 10 TH | 19 | Description and applications of single-phase and three-phase motors. Connection and starting of three-phase induction motors by star-delta starter. |
| | 20 | Sessional Test-II |
| 11 TH | 21 | Motors used for driving pumps, compressors, centrifuge, dyers etc. Totally enclosed submersible and flame proof motors. |
| | 22 | Domestic Installation |
| 12 TH | 23 | Distinction between light-fan circuit and single phase power circuit, sub-circuits. |
| | 24 | Identification of wiring systems. Common safety measures and earthing. |
| 13 TH | 25 | Electrical Safety |
| | 26 | concept of fuses and their classification, selection and application, concept of earthing and various types of earthing, applications of MCBs and ELCBs. |
| 14 TH | 27 | Basic Electronics , characteristics and applications of stepper motors and servo motors in process control. Basic idea of semiconductors – P and N type; diodes, zener diodes and their applications. |
| | 28 | Revision |
| 15 TH | 29 | Revision |
| | 30 | Sessional Test-III |

LESSON PLAN

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| Name of Faculty | Sh. Navneet Gupta |
| Discipline | Automobile Engineering |
| Semester | 3rd |
| Subject | BASICS OF THERMODYNAMICS, HYDRAULICS AND PNEUMATICS |
| Lesson plan Duration | 15 Weeks |
| Work Load per week | Theory (03 Hours+2 Practical) |

| WEEK | THEORY | | Practicals |
|------|-------------|---|---|
| | Lecture Day | TOPIC | |
| 1st | 1 | UNIT I- A. Thermodynamics, Introduction, Energy, work and heat, Thermodynamic state and system, boundary, surrounding, universe | Measurement of temperature by thermocouple, pyrometer and infrared thermometer. |
| | 2 | Types of thermodynamic systems: closed, open, isolated, adiabatic | |
| | 3 | Thermodynamic properties: pressure, volume, temperature, enthalpy, internal energy, entropy | |
| 2nd | 4 | Gas Laws, Definition of gas, Boyle's law, | Measurement of pressure head by piezometer tube and manometer |
| | 5 | Charle's law, Joule's law, Avogadro's law, | |
| | 6 | Regnault's law, Ideal and real gas, | |
| 3rd | 7 | Characteristics equation, gas constant, universal gas constant. | Viva & Copy Check |
| | 8 | Specific heat at constant pressure, specific heat at constant volume of gas, | |
| | 9 | Vander-Wall's equation | |
| 4th | 10 | Laws of Thermodynamic, Zeroth law of thermodynamics (concept only), | Verification of Bernoulli's theorem. |
| | 11 | First and second law of thermodynamics (concept only), | |
| | 12 | Steady flow energy equation, | |
| 5th | 13 | Various thermodynamic processes - constant volume, constant pressure, isothermal, | To study the hydraulic circuit of an |
| | 14 | and free expansion processes; P-V & T-S diagrams (No Derivation) | |

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| | 15 | Sessional test-I | automobile brake and hydraulic jack. |
| 6th | 16 | Air Standard Cycle | Demonstration of use of hydraulic press. |
| | 17 | Definition of heat engine cycle | |
| | 18 | Carnot cycle, | |
| 7th | 19 | net work done and air standard efficiency of Carnot cycle. | Dismantling and assembling of gear pump. |
| | 20 | UNIT III Hydraulics, Introduction | |
| | 21 | Fluids and non-fluids, | |
| 8th | 22 | Liquid, gas and vapour | Viva & Copy Check |
| | 23 | Properties of fluids: Mass density, | |
| | 24 | specific weight, pressure, | |
| 9th | 25 | specific volume, specific gravity, viscosity, | Demonstration of working of reciprocating air compressor. |
| | 26 | compressibility, vapour pressure, | |
| | 27 | Numerical Problems | |
| 10th | 28 | surface tension, capillarity, | Inflating and deflating of tyre, checking of air pressure in tyre. |
| | 29 | Simple Numerical Problems | |
| | 30 | SESSIONAL TEST - 2 | |
| 11th | 31 | Fluid statics , Concept of pressure, static pressure and pressure head ,Types of pressure: Atmospheric pressure, gauge pressure, vacuum, absolute pressure, Measurement of pressure: U tube manometer, Bourdon gauge ,Pascal's law and its applications | Viva & Copy Check |
| | 32 | UNIT IV,Flow of Fluids,Types of fluid flow: steady and unsteady, uniform and non - uniform, laminar and turbulent | |
| | 33 | Rate of flow and its units,Continuity equation of flow | |

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| 12th | 34 | Bernoulli's theorem (without proof) and its applications, Simple problems | Demonstration of layout of a pneumatic system/circuit used in garage. |
| | 35 | Hydraulic Devices ,Principle of working, Layout of hydraulic system, | |
| | 36 | Various components of hydraulic system and function of each component | |
| 13th | 37 | Types of hydraulic pumps – reciprocating pump, centrifugal pump, gear type pump, screw pump, | Practice on pneumatic tools like pneumatic screw driver & pneumatic wrench |
| | 38 | vane type pump and their working, Description, | |
| | 39 | operation and application of hydraulic machines – hydraulic jack, hydraulic brake, hydraulic press. | |
| 14th | 40 | UNIT V PNEUMATICS, Introduction, Basic concept of pneumatics, Layout of pneumatic system, Various components of pneumatic system and their functions, | Viva & Copy Check |
| | 41 | Construction and working of reciprocating and rotary air compressor, | |
| | 42 | Comparison of hydraulic system and pneumatic system. pneumatic system. | |
| 15th | 43 | Pneumatic tools, Construction and working of pneumatic gun, | Viva & Copy Check |
| | 44 | Application of pneumatic gun as pneumatic screw driver, pneumatic wrench and pneumatic nut runner. | |
| | 45 | SESSIONAL TEST-III | |

LESSON PLAN

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| Name of Faculty | Sh. Rohtash Nehra |
| Discipline | Automobile Engineering |
| Semester | 3rd |
| Subject | AUTOMOBILE WORKSHOP PRACTICE |
| Lesson plan Duration | 15 Weeks |
| Work Load per week | Practical (04 Hours) |

| WEEK | THEORY | |
|------|---------|--|
| | Lecture | TOPIC |
| | Day | |
| 1st | 1 | General safety procedures to be followed in automobile workshop; and familiarization to safety equipment and their uses. |
| | 2 | |
| | 3 | |
| 2nd | 4 | Identification and sketching of general tools of automobile workshop and practice to use them. |
| | 5 | |
| | 6 | |
| 3rd | 7 | Identification and sketching of special purpose tools and gauges of automobile workshop. |
| | 8 | |
| | 9 | |
| 4th | 10 | Identification of IC engine components and chassis components. |
| | 11 | |
| | 12 | Cleaning of spark plug and gap adjustment. |
| 5th | 13 | Removal and fitting of wheels and tyres of a two wheeler and repairing of punctures of Tube. |
| | 14 | |
| | 15 | SESSIONAL TEST –I |
| 6th | 16 | Removal and fitting of wheels and tyres of car/jeep, tyre pressure measurement, repair of punctures of tubeless tyres. |
| | 17 | |
| | 18 | |
| 7th | 19 | Washing, greasing, wiping and polishing of a vehicle. |

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| | 20 | |
| | 21 | |
| 8th | 22 | Washing, greasing, wiping and polishing of a vehicle. |
| | 23 | |
| | 24 | |
| 9th | 25 | Removal, greasing and refitting of wheel bearing. |
| | 26 | |
| | 27 | |
| 10th | 28 | Replacement of clutch wire and brake wire and transmission chain adjustment of a two wheeler. |
| | 29 | SESSIONAL TEST - 2 |
| | 30 | |
| 11th | 31 | Removal and refitting of radiator and water hoses. |
| | 32 | |
| | 33 | |
| 12th | 34 | Removal and refitting of battery. |
| | 35 | |
| | 36 | |
| 13th | 37 | Revision & Viva |
| | 38 | |
| | 39 | |
| 14th | 40 | Revision & Viva |
| | 41 | |
| | 42 | SESSIONAL TEST – 3 |
| 15th | 43 | Revision & Viva |
| | 44 | Revision & Viva |
| | 45 | SESSIONAL TEST – 3 |

LESSON PLAN

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|-----------------------------|------------------------|
| Name of Faculty | Sh. Aakash Godara |
| Discipline | Automobile Engineering |
| Semester | 3rd |
| Subject | WORKSHOP TECHNOLOGY-II |
| Lesson plan Duration | 15 Weeks |
| Work Load per week | Theory (03 Hours) |

| WEEK | THEORY | |
|------|-------------|--|
| | Lecture Day | TOPIC |
| 1st | 1 | Resistance welding: Principle, advantages, limitations, working and applications of spot welding and seam welding Other Welding Processes: Principle, advantages, limitations, |
| | 2 | |
| | 3 | |
| 2nd | 4 | Working and applications of Shielded metal arc welding, submerged arc welding. Welding defects, methods of controlling welding defects and inspection of welded joints. |
| | 5 | |
| | 6 | |
| 3rd | 7 | Modern Welding Methods: Methods, Principle of operation, advantages, disadvantages and applications of, Tungsten inert gas (TIG) welding, Metal inert gas (MIG) welding, Thermit welding, Electro slag welding, Electron beam welding, Ultrasonic welding, Laser beam welding, Robotic welding |
| | 8 | |
| | 9 | |
| 4th | 10 | UNIT II, Foundry Techniques, Pattern Making, Types of pattern, Pattern material, Pattern allowances, Pattern codes as per B.I.S., Introduction ,to cores, core boxes and core materials, Core making procedure, Core prints, positioning of cores |
| | 11 | Moulding and Casting, Moulding Sand: Properties of moulding sand, their impact and control of properties viz. permeability, refractoriness, adhesiveness, cohesiveness, strength, flowability, collapsibility, Various types of moulding sand, Testing of moulding sand. |
| | 12 | |
| 5th | 13 | Mould Making: Types of moulds, Step involved in making a mould, Molding boxes, hand tools, used for mould making, Molding processes: Bench molding, floor molding, pit molding and machine molding. chamber, Centrifugal casting |
| | 14 | Casting Processes: Charging a furnace, melting and pouring both ferrous and non ferrous metals, cleaning of castings, Principle, working and applications of Die casting: hot chamber and cold chamber, Centrifugal casting |
| | 15 | SESSIONAL TEST –I |

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| 6th | 16 | Gating and Riser System: Elements of gating system, Pouring basin, sprue, runner, gates, Types of risers, location of risers, Directional solidification. |
| | 17 | Melting Furnaces: Construction and working of Pit furnace, Cupola furnace, Crucible furnace – tilting type, Electric furnace |
| | 18 | Casting Defects: Different types of casting defects, Non destructive testing (NDT) of castings: die penetration test, radiography, magnetic particle inspection and ultrasonic inspection. |
| 7th | 19 | UNIT III, Shaping, Slotting and Planing |
| | 20 | Working principle and construction of shaper, slotter and planer |
| | 21 | Type of shapers and slotters |
| 8th | 22 | Type of planers |
| | 23 | Quick return mechanism applied to shaper and planer machine. |
| | 24 | Work holding devices used on shaper and planer |
| 9th | 25 | Types of tools used and their geometry. |
| | 26 | Specification of shaper and planer. |
| | 27 | Speeds and feeds in above processes. |
| 10th | 28 | Broaching, Introduction to broaching |
| | 29 | Nomenclature of broach tools, types and material |
| | 30 | SESSIONAL TEST - 2 |
| 11th | 31 | Types of broaching machines – single ram and duplex ram horizontal type, vertical type pull up, pull down and push down. |
| | 32 | |
| | 33 | UNIT IV- Milling, Milling methods - up milling and down milling |
| 12th | 34 | Specification and working principle of milling machine |
| | 35 | Classification, brief description and applications of milling machines Details of column and knee type milling machine |
| | 36 | Milling machine accessories and attachment – Arbors, adaptors, collets, vices, circular table, indexing head and tail stock, vertical milling attachment, rotary table. |
| 13th | 37 | Identification of different milling cutters and work mandrels, Work holding devices |
| | 38 | Milling operations – face milling, angular milling, form milling, straddle milling and gang milling, Cutting parameters, |
| | 39 | |

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| 14th | 40 | UNIT V- Jigs and Fixtures, |
| | 41 | Importance and use of jigs and fixtures, difference between jig and fixture. |
| | 42 | Principal of location, Locating and clamping devices, Types of jigs – drilling jig, template jig and plate jig |
| 15th | 43 | Types of fixtures – Milling and welding fixture |
| | 44 | Revision |
| | 45 | SESSIONAL TEST – 3 |

LESSON PLAN

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|-----------------------------|----------------------------------|
| Name of Faculty | Sh. Aakash Godara/ Sh. Arun Syan |
| Discipline | Automobile Engineering |
| Semester | 3rd |
| Subject | AUTO ENGINEERING DRAWING |
| Lesson plan Duration | 15 Weeks |
| Work Load per week | Practical (04 Hours) |

| WEEK | THEORY | |
|------|-------------|--|
| | Lecture Day | TOPIC |
| 1st | 1 | UNIT I, Limits and Fits, Limit, tolerance, Geometrical Tolerance, |
| | 2 | deviation, allowance, fits: clearance, interference, |
| | 3 | Transition fit, Hole and shaft basis system. |
| 2nd | 4 | Drawings of the following joints and bearings |
| | 5 | Universal joint assembly |
| | 6 | Bush bearing |
| 3rd | 7 | Ball bearing and Roller bearing |
| | 8 | |
| | 9 | |
| 4th | 10 | UNIT II, Drawing layout of the following Engine components |
| | 11 | Four Stroke Petrol Engine Piston |
| | 12 | Diesel Engine Piston |
| 5th | 13 | Connecting rod Fuel injector |
| | 14 | Cam shaft and Crank shaft – 4 cylinder Engine |
| | 15 | 1st Sessional Test |
| 6th | 16 | UNIT III, Drawing layout of following components/system |
| | 17 | Wheel cylinder and Master cylinder |
| | 18 | Leaf Spring |
| 7th | 19 | Lighting circuit of a typical car |
| | 20 | Side valve and overhead valve mechanism |
| | 21 | Revision |

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| 8th | 22 | UNIT IV, Cam Profile, Different types of cams and followers |
| | 23 | Drawing of cam profile for following motion of follower (without offset) : Uniform velocity motion |
| | 24 | |
| 9th | 25 | Simple harmonic motion (SHM) |
| | 26 | |
| | 27 | Uniformly accelerated and retarded motion. |
| 28 | | |
| 10th | 29 | Revision |
| | 30 | SESSIONAL TEST - 2 |
| | 31 | Revision |
| 11th | 32 | Uniformly accelerated and retarded motion. |
| | 33 | |
| | 34 | Revision |
| 12th | 35 | UNIT V,Gears Nomenclature of gears |
| | 36 | |
| | 37 | Profile of spur gear by 'Approximate method' |
| 38 | | |
| 13th | 39 | Profile of spur gear by "Unwin's Method' |
| | 40 | |
| | 14th | 41 |
| 42 | | Revision |
| 43 | | Revision |
| 15th | 44 | SESSIONAL TEST – 3 |
| | 45 | Revision |

Lesson Plan

Name of the Faculty : Sh. Arun Syan
 Discipline : Automobile Engg.
 Semester : 3rd
 Subject : STRENGTH OF MATERIALS
 Lesson Plan Duration : 15 weeks

Work Load (Lecture/ Practical) per week (in hours): 03 HOURS /2 HOURS

| Week | Theory | |
|------|-------------|--|
| | Lecture day | Topic (including assignment/ test) |
| 1st | 1 | UNIT I: STRESSES AND STRAINS, Introduction about subject. Stresses and Strains |
| | 2 | Basic concept of load, stress and strain |
| | 3 | Tensile, compressive and shear stresses, Linear strain, Lateral strain, Shear strain, Volumetric strain. |
| 2nd | 4 | Concept of Elasticity, Elastic limit and limit of proportionality |
| | 5 | Hook's Law and Elastic Constants |
| | 6 | Stress-strain curve for ductile and brittle materials, Nominal stress, Yield point, plastic stage |
| 3rd | 7 | Ultimate stress and breaking stress |
| | 8 | Percentage elongation |
| | 9 | Proof stress and working stress, Factor of safety, Poisson's Ratio |
| 4th | 10 | Thermal stress and strain, Longitudinal and circumferential stresses in seamless thin walled cylindrical shells. |
| | 11 | Introduction to Principal stresses |
| | 12 | UNIT II: RESILIENCE Strain Energy, Resilience, proof resilience and modulus of resilience |
| 5th | 13 | Strain energy due to direct stresses and Shear Stress |
| | 14 | Stresses due to gradual, sudden and falling load. |
| | 15 | 1st Sessional Test |
| 6th | 16 | UNIT III: MOMENT OF INERTIA Concept of moment of inertia and second moment of area |
| | 17 | Radius of gyration, Theorem of perpendicular axis and parallel axis (with derivation) |
| | 18 | Second moment of area of common geometrical sections : Rectangle, Triangle, Circle (without derivation) |

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| 7th | 19 | Second moment of area for L,T and I section |
| | 20 | Section modulus |
| | 21 | UNIT IV: Bending Moment and Shearing Force, Concept of various types of beams, forms of loading |
| 8th | 22 | Concept of various form of loading, Concept of end supports-Roller, hinged and fixed |
| | 23 | Concept of bending moment and shearing force |
| | 24 | B.M. and S.F. Diagram for cantilever subjected to concentrated load and U.D.L. |
| 9th | 25 | B.M. and S.F. Diagram for simply supported beams with overhang subjected to concentrated and U.D.L. |
| | 26 | UNIT V: Bending stresses Theory of simple bending, |
| | 27 | Derivation of Bending Equation, Using bending equation |
| 10th | 28 | Concept of moment of resistance |
| | 29 | Bending stress diagram |
| | 30 | 2nd Sessional Test |
| 11th | 31 | Section modulus for rectangular section |
| | 32 | Section modulus for circular section. Section modulus for symmetrical I section. |
| | 33 | Calculation of maximum bending stress in beams of rectangular section. |
| 12th | 34 | Calculation of maximum bending stress in beams of circular section. |
| | 35 | Calculation of maximum bending stress in beams of T section. |
| | 36 | UNIT VI: Columns-Concept of column, Types of columns, |
| 13th | 37 | modes of failure of columns, Buckling load, crushing load Slenderness ratio, Effective length |
| | 38 | End restraints, Factors effecting strength of a column, Strength of column by Euler Formula without derivation, Rankine Gourdan formula (without derivation) |
| | 39 | UNIT VII: TORSION Concept of torsion, Difference between torque and torsion. |
| 14th | 40 | Derivation of Torsion Equation, use of torsion equation for circular , shaft, (solid and hollow) |
| | 41 | Comparison between solid and hollow shaft with regard to their strength and weight. Power transmitted by shaft Concept of mean and maximum torque |
| | 42 | UNIT VIII: SPRINGS, Closed coil helical springs subjected to axial load and calculation of: stress deformation Stiffness and angle of twist and strain energy and proof resilience. |
| 15th | 43 | calculation of: Stiffness and angle of twist and strain energy and proof resilience. |
| | 44 | Problems on Helical spring, Determination of number of plates of laminated spring (semi -elliptical type only) Problems on Leaf springs |

LESSON PLAN

Name of Faculty Sh. Navneet Gupta
Discipline Automobile Engineering
Semester 5th
Subject Chasis Body and Transmission-II
Lesson plan Duration 15 Weeks
Work Load per week Theory (03 Hours)

| WEEK | THEORY | |
|------|---------|--|
| | Lecture | TOPIC |
| | Day | |
| 1st | 1. | UNIT-1 : Suspension System |
| | | Functions of suspension system, |
| | | Definition of sprung weight, unsprung weight, spring rate |
| | 2. | Types of suspension springs – coil spring, leaf spring, torsion bar, air spring |
| | 3. | Constructional details of leaf spring, |
| 2nd | 4. | Function and construction of variable rate spring and helper spring |
| | 5. | Spring materials and their characteristics |
| | 6. | Function of shock absorber, Principle, construction and working of telescopic shock absorber, concept of gas filled shock absorber |
| 3rd | 7. | Types of suspension systems – Rigid axle & Independent suspension system, |
| | 8. | Independent suspension system – types and advantages Camber grading and nippling spring seats, Stabilizer bar |
| | 9. | Pneumatic suspension system |
| 4th | 10. | Diagnosis of common faults and their rectifications |
| | 11. | UNIT-II: Wheels and Tyres- Introduction to wheel assembly, Wheels – function, requirement and types |
| | 12. | Constructional details of various types of wheels;wheel materials |
| 5th | 13. | Types of rim, Wheel specification, |
| | 14. | Tyre – purpose & classification of tyres |
| | 15. | Sessional test-I |
| 6th | 16. | Constructional details of tubed tyre and tubeless tyre & their comparison |
| | 17. | Types of carcass – Cross ply, Radial ply and Mixed ply; |
| | 18. | Comparison of cross- ply and radial-ply tyres |

| | | |
|-------------|----|--|
| 7th | 19 | Run flat tyres; Tyre materials, tyre dimension & specification |
| | | Inflation pressure, under – inflation & over – inflation, Factors affecting excessive tyre wear |
| | 20 | Concept of balancing; Wheel balancing - Static and dynamic |
| | 21 | Tyre care & maintenance, Retreading of tyres. |
| 8th | 22 | Hand brake or parking brake – Purpose, layout & working |
| | | UNIT III: Braking System – I |
| | 23 | Purpose of Brakes; Principle of braking; stopping time & stopping distance |
| | | Requirements of good braking system; Classification of brakes |
| | 24 | Drum brakes - Construction & working, leading & trailing shoes |
| 9th | 25 | Disc brakes – Construction & working; Materials of brake shoe, brake drum, brake pad & brake lining |
| | 26 | Mechanical braking system – Layout & working, Hydraulic brakes – Principle, layout & working; |
| | 27 | Constructional details of master cylinder and wheel cylinder; Tandem master cylinder |
| 10th | 28 | Brake fluid – specification and characteristics, Bleeding of brakes, |
| | 29 | Pedal travel; Heat generation and dissipation; brake fade |
| | 30 | SESSIONAL TEST - 2 |
| 11th | 31 | UNIT IV: Braking System – II Power brakes – definition, requirement & classification Vacuum Brakes – Principle, layout & working, Air Brakes – layout, components & working |
| | 32 | Air Hydraulic brakes – Layout, components & working |
| | | Anti-skid & anti-lock devices; Brake tests |
| | 33 | Common braking system faults, their causes & rectification |
| 12th | 34 | UNIT V: Automotive Safety |
| | 35 | Meaning of automotive safety; Active safety systems - Preventive design, |
| | 36 | Antilock Brake System, Electronic brake force distribution |
| 13th | 37 | Electronic vehicle stability (EVS), |
| | 38 | Traction Control System |
| | 39 | Smart cruise control, Rear detection system |
| 14th | 40 | Night vision system, Pedestrian protection system |
| | 41 | Rear detection system, Night vision system |
| | 42 | Passive safety systems – Design of vehicle for minimum injury, Seat belts |
| 15th | 43 | Air bag; Crash test for safety, Burglar alarm & Immobilizer system for vehicle theft control |
| | 44 | Revision |
| | 45 | SESSIONAL TEST-III |

LESSON PLAN

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|-----------------------------|---|---------------------------------|
| Name of Faculty | : | Sh. Rohtash Nehra |
| Discipline | : | Automobile Engineering |
| Semester | : | 5th |
| Subject | : | Chasis Body and Transmission-II |
| Lesson plan Duration | : | 15 Weeks |
| Work Load per week | : | Practical (03) |

| WEEK | Lecture | Practicals |
|------|---------|---|
| | Day | |
| 1st | 1 | 1. Study and sketching of independent suspension system. 2. Checking and servicing of telescopic shock absorber. |
| | 2 | |
| | 3 | |
| 2nd | 4 | 3. Removal, dismantling, servicing, assembling and refitting of leaf spring assembly |
| | 5 | |
| | 6 | |
| 3rd | 7 | 4. Wheel balancing using computerized wheel balancing machine and tyre rotation |
| | 8 | |
| | 9 | |
| 4th | 10 | 5. Replacement of brake shoe and adjustment of brake shoe clearance |
| | 11 | |
| | 12 | |
| 5th | 13 | 1st Sessional Test |
| | 14 | |
| | 15 | |
| 6th | 16 | 6. Servicing of mechanical brakes, adjustment of brake pedal free play. |
| | 17 | |
| | 18 | |
| 7th | 19 | 7. Servicing and repair of hydraulic brake system, bleeding of brakes. |
| | 20 | |
| | 21 | |
| 8th | 22 | 8. Study of mechanical hand brake system and required adjustments. |
| | 23 | |
| | 24 | |
| 9th | 25 | Viva & Copy Check |
| | 26 | |
| | 27 | |
| 10th | 28 | 2nd Sessional Test |
| | 29 | |

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| | 30 | |
| 11th | 31 | 9. Visit to local motor market to learn retreading of tyres |
| | 32 | |
| | 33 | |
| 12th | 34 | 10. Study of various safety systems i.e. seat belt, air bag etc. of a vehicle. |
| | 35 | |
| | 36 | |
| 13th | 37 | Viva & Copy Check |
| | 38 | |
| | 39 | |
| 14th | 40 | |
| | 41 | |
| | 42 | |
| 15th | 43 | 3rd Sessional Test |
| | 44 | |
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LESSON PLAN

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|-----------------------------|---|----------------------------------|
| Name of Faculty | : | Sh. Aakash Godara |
| Discipline | : | Automobile Engineering |
| Semester | : | 5th |
| Subject | : | AUTO ENGINE - II |
| Lesson plan Duration | : | 15Weeks |
| Work Load per week | : | Theory (03 Hours+ 02 Practicals) |

| WEEK | THEORY | | Practical's |
|------|---|--|--|
| | Lecture | TOPIC | |
| | Day | | |
| 1st | 1 | UNIT-1. Combustion in I.C. Engines | Study & servicing of fuel feed system of diesel engine |
| | | Phenomenon of combustion in S.I. engine: | |
| | 2 | Phases of combustion – Ignition lag, flame propagation and after burning; | |
| | 3 | Turbulence, Abnormal combustion, | |
| 2nd | 4 | Pre ignition and Detonation; | Replacing fuel filter, inspection of fuel feed pump |
| | 5 | Octane rating | |
| | 6 | Phenomenon of combustion in C.I. engines: | |
| 3rd | 7 | C.I. engines: phases of combustion; | Revision & Evaluation, Viva-Voce |
| | 8 | Ignition delay, uncontrolled combustion, | |
| | 9 | controlled combustion, after burning | |
| 4th | 10 | Methods of producing air movements namely squish and swirl | Study & sketching of common rail direct injection (CRDI) fuel system |
| | 11 | Various types of combustion chambers for diesel engine | |
| | | Diesel knock, cetane rating | |
| 12 | UNIT-II: Fuel Supply System in Diesel Engine | | |
| 5th | 13 | Layout of fuel supply system in diesel engine and their types | Phasing and calibration of fuel injection pump |
| | 14 | Modern common rail direct injection (CRDI) system and individual pump system | |
| | 15 | Sessional Test-I | |
| 6th | 16 | Fuel filters – primary and secondary, | Revision & Evaluation, Viva-Voce |
| | 17 | Fuel feed pumps; priming | |
| | 18 | Fuel injection pumps – plunger and barrel type, distributor type | |
| 7th | 19 | Fuel injectors and their working | |

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|------|----|---|--|
| | 20 | Governing and types of governors | Cleaning and testing fuel injectors used in petrol engines |
| | 21 | Supercharging of engines – function, advantages and disadvantages; types and location of superchargers | |
| 8th | 22 | Turbochargers – types, function, working and advantages | Servicing of air cleaner – wet type and dry type |
| | 23 | | |
| | 24 | UNIT III: Specialized Types of Engine , Wankel engine, Opposed piston opposed cylinder (OPOC) engine; | |
| 9th | 25 | Fuel cell engine/ hydrogen engine; | Revision & Evaluation, Viva-Voce |
| | 26 | Homogeneous Charge Compression Ignition (HCCI) engine; Camless engine; CNG/LPG engine | |
| | 27 | Electrical / hybrid system/plug-in hybrid system, | |
| 10th | 28 | Electric vehicle battery thermal Management system; Electric wheel motor; | Study of turbochargers |
| | 29 | Alternative automotive fuels (bio fuels) - fundamentals and future. | |
| | 30 | Sessional Test-II | |
| 11th | 31 | Unit -IV . Engine faults and their rectifications Causes and rectification of: High oil consumption, | Analysis of exhaust gases of diesel engine using smoke meter Exhaust gas analyser. |
| | 32 | Causes and rectification of: Engine starting troubles, Causes and rectification of Engine overheating, engine misfiring | |
| | 33 | UNIT V: Emission Control ,Exhaust pollutants from petrol engines, Exhaust pollutants from diesel engines | |
| 12th | 34 | Pollutants' effects on human beings and other materials, Sources of automotive emission | Revision & Evaluation, Viva-Voce |
| | 35 | Methods of emission control : improvement in engine design, exhaust gas treatment, | |
| | 36 | positive crankcase ventilation, exhaust gas recirculation, catalytic converters for petrol and diesel engines | |
| 13th | 37 | | Analysis of exhaust gases of petrol engine using exhaust gas analyser |
| | 38 | Particulate filter, selective catalytic reduction technique, NOX absorbers, | |
| | 39 | Emission norms (Bharat Stage). | |
| 14th | 40 | UNIT VI: Miscellaneous Topics | Evaluation, Viva-Voce |
| | 41 | Technologies to improve engine economy and output | |
| | 42 | Alternative automotive fuels; Engine specifications of an Indian car | |
| 15th | 43 | Camless engine, Opposed piston opposed cylinder (OPOC) engine | Evaluation, Viva-Voce |
| | 44 | Revision | |
| | 45 | Sessional Test-III | |

LESSON PLAN

Name of Faculty : Sh. Ravinder Sai
Discipline :Automobile Engineering
Semester :5th
Subject :AUTO ELECTRICAL SYSTEMS & ELECTRICAL VEHICLES
Lesson plan Duration :15 Weeks
Work Load per week : Theory (03 Hours)

| WEEK | THEORY | | |
|------|---------|--|---|
| | Lecture | TOPIC | |
| | Day | | |
| 1 | 1 | Unit-I Introduction- Various Electrical and Electronics equipment components/systems in automobile, their functions and demands | |
| | 2 | | |
| | 3 | | Earth return system, types of earthing, 6V, 12V and 48 V systems |
| 2 | 4 | Batteries - Lead Acid Batteries: construction working; elements, materials used | |
| | 5 | | |
| | 6 | | Electrolyte and its strength, Effect of added plate area and temperature, rating, |
| 3 | 7 | Battery capacity, battery efficiency, temperature characteristics, terminal voltages charging and discharging | |
| | 8 | | Battery Testing: Electrolyte testing by hydrometer, voltage test, high rate discharge and cadmium test |
| | 9 | | Battery Charging: Constant potential and constant current, initial charging, normal charging |
| 4 | 10 | trickle charging, intermittent charging, boost charging | |
| | 11 | | Battery Defects, Alkaline Batteries: Basic description, types, merits and demerits. |
| | 12 | | Lithium ion battery: Construction and working |
| 5 | 13 | Concept of less maintenance and maintenance-free batteries | |
| | 14 | | Fuel cells- Principle of working and types of fuel cell |
| | 15 | | Sessional Test-I |
| 6 | 16 | Unit-II Charging System, Circuits, function and various components- Types, construction, working, advantages and disadvantages of dynamo and alternators; cut out relay | |
| | 17 | | |
| | 18 | | Types, construction, working, advantages and disadvantages of alternators, Charging system drives, cut out relay |
| 7 | 19 | Regulation: Need of regulation; working of regulators for dynamo and alternator. | |
| | 20 | | Starting System, Function of various components, torque terms- Principle and constructional details of starter motor, Switch types, Starter to engine drive and their types, Integrated starter generator. |
| | 21 | | |
| 8 | 22 | Unit-III Lighting System, Various lighting circuits- head lamp: types and constructional details; sealed beam, | |

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| | 23 | |
| | 24 | double filament head lamps; Vertical and side control of lamps; |
| 9 | 25 | Fog light, side light, brake light, instrument light, indicator lights, |
| | 26 | reversing light, warning light, interior lights, LED lights. |
| | 27 | Wiring: HT and LT, their specifications, |
| 10 | 28 | Cable colour codes, wiring Harness, Cable connections, |
| | 29 | Wiring diagrams of cars Wiring diagrams of two-wheeler |
| | 30 | Sessional Test-II |
| 11 | 31 | Unit-IV Electrical & Electronics Accessories Working and functions of:- Speedometer - digital and analog, tachometer, front and rear Wind screen and rear wipers and washers, |
| | 32 | defogger and defroster, Electric door locks key less entry, |
| | 33 | Electric adjustable & foldable ORVM, parking sensor, follow me home headlamps, rain sensor.cruise control |
| 12 | 34 | Electronic Control Devices, Familiarization with automobile electronic devices, |
| | 35 | Working of ECU, Sensoring units |
| | 36 | Rectifiers, Analog and digital devices, immobilizer |
| 13 | 37 | Microprocessor and microcontroller – their applications, advance driver assistant systems (ADAS) and their levels; concept of regenerative braking system |
| | 38 | Unit-V Introduction to Electrical Vehicles |
| | 39 | Introduction to electric vehicle; Government policies for E-vehicles; types of EV- pure electrical, hybrid |
| 14 | 40 | plug-in hybrid; working principle of EV, motor controller; working of electric motor to wheel |
| | 41 | transmission system and its components; various drive modes in EV; types of batteries used in EV's,; |
| | 42 | Lithium ion battery & Nickel Metal Hydride battery – their construction and working; Fuel cells - |
| 15 | 43 | Principle of working and types of fuel cell; Charging station layout. |
| | 44 | Revision |
| | 45 | Sessional Test-III |

LESSON PLAN

| | |
|-----------------------------|---------------------------------|
| Name of Faculty | Sh. Rohtash Nehra |
| Discipline | Automobile Engineering |
| Semester | 5th |
| Subject | AUTO PROFESSIONAL PRACTICES – I |
| Lesson plan Duration | 15 Weeks |
| Work Load per week | Practical (04 Hours) |

| WEEK | THEORY | |
|------|-------------|---|
| | Lecture Day | TOPIC |
| 1st | 1 | Study of service manual of a new vehicle (Maruti/Tata/Hyundai etc.) as per manufacturer's recommendation. |
| 2nd | 2 | Removal, inspection and refitting of steering wheel, steering box, pitman arm, tie rod and knuckle joint |
| 3rd | 3 | Removal and refitting of various auto body assemblies |
| 4th | 4 | Demonstration of body repair techniques. |
| 5th | 5 | Sessional Test-I |
| 6th | 6 | Testing of battery - specific gravity test using hydrometer, voltage test, high rate discharge test;Charging of battery using battery charger |
| 7th | 7 | Testing of field winding of alternator and armature of starter motor for open circuit, short circuit and earthing. |
| 8th | 8 | Testing and setting of Ignition timing, measurement and adjustment of spark plug gap. |
| 9th | 9 | Engine testing and finding out fuel consumption |
| 10th | 10 | Sessional Test-II |
| 11th | 11 | Setting of valve timing and adjustment of tappet clearance. |
| 12th | 12 | Removal and refitting of propeller shaft and universal joints. |
| 13th | 13 | Service and repair of starter motor drive. |
| 14th | 14 | Replacement of drive axles. Demonstration of Electric Vehicle working |
| 15th | 15 | Sessional Test-III |

LESSON PLAN

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|-----------------------------|------------------------|
| Name of Faculty | Sh. Rohtash Nehra |
| Discipline | Automobile Engineering |
| Semester | 5th |
| Subject | DRIVING PRACTICE – I |
| Lesson plan Duration | 15 Weeks |
| Work Load per week | Practical (04 Hours) |

| WEEK | THEORY | |
|-------------|-------------|---|
| | Lecture Day | TOPIC |
| 1st | 1 | Knowledge of general road safety and personal safety |
| 2nd | 2 | Knowledge of Traffic rules, road signs and signals. |
| 3rd | 3 | Knowledge of penal traffic offences |
| 4th | 4 | Study of owner's manual of a vehicle |
| 5th | 5 | Sessional Test-I |
| 6th | 6 | Introducing the driving simulator & describe its features, such as steering wheel, pedals, dashboard display and screen. |
| 7th | 7 | Driving practice on simulator |
| 8th | 8 | <ul style="list-style-type: none"> • Identification of various controls of vehicle. |
| 9th | 9 | Pre- Driving Daily inspection like engine oil, brake oil, coolant, tyre Pressure, light, horn, and any leakage. |
| 10th | 10 | Sessional Test-II |
| 11th | 11 | Starting the engine and warming up. |
| 12th | 12 | <ul style="list-style-type: none"> • Operation of engaging and disengaging the clutch; Gear changing from low to high and high to low. |
| 13th | 13 | Braking and use of brakes on the road, stopping distance and following distance. |
| 14th | 14 | <ul style="list-style-type: none"> • Driving practice on road for steering control. |
| 15th | 15 | Sessional Test-III |

