LESSON PLAN		
Discipline : Mechanical Engg.	Semester : 3rd	Name of the Teachnig Faculty : Mr Susanta Kumar Raula
Subject: Manufacturing Processes	No.of days/Per weeks Class Alloted Weeks :3	Semester from date : 01.07.2026 To Date : 05.11.2026 No.of Weeks : 15
Weeks	Class day	Theory
1st	1st	Introduction; Types of cutting fluids, Fluids and coolants required in turning, drilling, shaping, sawing & broaching
	2nd	
	3rd	Selection of cutting fluids, methods of application of cutting fluid; Classification of lubricants (solid, liquid, gaseous), Properties and applications of lubricants
2nd	1st	
	2nd	Types of lathes – light duty, medium duty and heavy duty geared lathe, CNC lathe; Specifications
	3rd	
3rd	1st	Basic parts and their functions; Operations and tools – Turning, parting off, Knurling, facing, Boring, drilling
	2nd	
	3rd	threading, step turning, taper turning, Nomenclature of single point cutting tool of lathe
4th	1st	
	2nd	Types of broaching machines – Horizontal type (Single ram & duplex ram), Vertical type, pull up, pull down, and push down
	3rd	
5th	1st	
	2nd	Elements of broach tool; broach teeth details; Nomenclature; Tool materials.
	3rd	Drilling: Classification; Basic parts and their functions
6th	1st	
	2nd	Radial drilling machine; Types of operations; Specifications of drilling machine; Types of drills and reamers
	3rd	
7th	1st	
	2nd	Welding: Classification; Gas welding techniques; Types of welding flames; Arc Welding – Principle, Equipment, Applications; Shielded metal arc welding; Submerged arc welding
	3rd	
8th	1st	
	2nd	TIG / MIG welding; Resistance welding - Spot welding, Seam welding, Projection welding; Welding defects; Brazing and soldering: Types, Principles, Applications.
	3rd	Milling: Introduction; Types of milling machines: plain, Universal, vertical; constructional details – specifications
9th	1st	
	2nd	Milling operations: simple, compound and differential indexing; Milling cutters – types; Nomenclature of teeth; Teeth materials; Tool signature of milling cutter; Tool & work holding devices
	3rd	
10th	1st	

	2nd	Gear Making: Manufacture of gears – by Casting, Moulding, Stamping, Coining Extruding, Rolling, Machining; Gear generating methods: Gear Shaping with pinion cutter & rack cutter; Gear hobbing
	3rd	
11th	1st	
	2nd	Description of gear hob; Operation of gear hobbing machine; Gear finishing processes; Gear materials and specification; Heat treatment processes applied to gears.
	3rd	Press working: Types of presses and Specifications, Press working operations - Cutting, bending, Drawing, punching, blanking, notching, lancing
12th	1st	
	2nd	Die set components- punch and die shoe, guide pin, bolster plate, stripper, stock guide, feed stock, pilot; Punch and die clearances for blanking and piercing, effect of clearance
	3rd	
13th	1st	
	2nd	Principles of metal removal by Grinding; Abrasives – Natural & Artificial; Bonds and binding processes: Vitrified, silicate, shellac, rubber, Bakelite; Factors affecting the selection of grind wheels
	3rd	
14th	1st	size and shape of wheel, kind of abrasive, grain size, grade and strength of bond, structure of grain, spacing, kinds of bind material; Standard marking systems: Meaning of letters & numbers sequence of marking, Grades of letters
	2nd	
	3rd	Grinding machines classification-: Cylindrical, Surface, Tool & Cutter grinding machines; Construction details; Principle of centerless grinding; Advantages & limitations of centerless grinding; Finishing by grinding: Honing, Lapping, Super finishing; Electroplating: Basic principles, Plating metals, applications; Hot dipping: Galvanizing
15th	1st	
	2nd	Tin coating, Parkerizing, Anodizing; Metal spraying: wire process, powder process and applications; Organic coatings: Oil base Paint, Lacquer base, Enamels, Bituminous paints, rubber base coating; Finishing specifications.
	3rd	

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LESSON PLAN		
Discipline : Mechanical Engg.	Semester : 3rd	Name of the Teachnig Faculty : Mr Pradeep Kumar Padhy
Subject:Strength Of Materials	No.of days/Per weeks Class Alloted Weeks :3	Semester from date : 09.07.2026 To Date : 05.11.2026 No.of Weeks : 15
Weeks	Class day	Theory
1st	1st	Types of forces; Stress, Strain and their nature; Mechanical properties of common engineering materials;
	2nd	
	3rd	Significance of various points on stress – strain diagram for M.S. and C.I. specimens
2nd	1st	
	2nd	Significance of factor of safety; Relation between elastic constants;
	3rd	Stress and strain values in bodies of uniform section and of composite section under the influence of normal forces;
3rd	1st	Thermal stresses in bodies of uniform section and composite sections
	2nd	Related numerical problems on the above topics. Strain Energy: Strain energy or resilience, proof resilience and modulus of resilience
	3rd	Derivation of strain energy for the following cases: i) Gradually applied load, ii) Suddenly applied load, iii) Impact/ shock load; Related numerical problems.
4th	1st	
	2nd	Types of beams with examples: a) Cantilever beam, b) Simply supported beam, c) Over hanging beam, d) Continuous beam, e) Fixed beam;
	3rd	
5th	1st	Types of Loads – Point load, UDL and UVL; Definition and explanation of shear force and bending moment
	2nd	Calculation of shear force and bending moment and drawing the S.F and
	3rd	B.M. diagrams by the analytical method only for the following cases:
6th	1st	a) Cantilever with point loads, b) Cantilever with uniformly distributed load, c) Simply supported beam with point loads
	2nd	d) Simply supported beam with UDL, e) Over hanging beam with point loads, at the center and at free ends, f) Over hanging beam with UDL throughout, g) Combination of point and UDL for the above; Related numerical problems
	3rd	
7th	1st	
	2nd	Explanation of terms: Neutral layer, Neutral Axis, Modulus of Section, Moment of Resistance, Bending stress, Radius of curvature
	3rd	
8th	1st	Assumptions in theory of simple bending; Bending Equation $M/I = \sigma/Y = E/R$ with derivation
	2nd	
	3rd	Problems involving calculations of bending stress, modulus of section and moment of resistance;
9th	1st	
	2nd	Calculation of safe loads and safe span and dimensions of cross- section; Definition and explanation of deflection as applied to beams; Deflection formulae
	3rd	without proof for cantilever and simply supported beams with point load and UDL only (Standard cases only); Related numerical problems.
10th	1st	

	2nd	Definition and function of shaft; Calculation of polar M.I. for solid and hollow shafts
	3rd	
11th	1st	Assumptions in simple torsion; Derivation of the equation T/J=fs/R=Gθ/L
	2nd	
	3rd	Problems on design of shaft based on strength and rigidity; Numerical Problems related to comparison of strength and weight of solid and hollow shafts;
12th	1st	
	2nd	Classification of springs; Nomenclature of closed coil helical spring; Deflection formula for closed coil helical spring (without derivation); stiffness of spring; Numerical problems on closed coil helical spring to find safe load, deflection, size of coil and number of coils.
	3rd	
	2nd	Explanation of longitudinal and hoop stresses in the light of circumferential and longitudinal failure of shell
	3rd	
14th	1st	Derivation of expressions for the longitudinal and hoop stress for seamless and seam shells;
	2nd	
	3rd	
15th	1st	Related numerical Problems for safe thickness and safe working pressure.
	2nd	
	3rd	

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LESSON PLAN		
Discipline : Mechanical Engg.	Semester : 3rd	Name of the Teachnig Faculty : Mr. Pradeep Kumar Padhy
Subject: Material Science and Engineering	No.of days/Per weeks Class Alloted Weeks :3	Semester from date : 09.07.2026 To Date : 05.11.2026 No.of Weeks : 15
Weeks	Class day	Theory
1st	1st	Unit cell and space lattice: Crystal system: The seven basic crystal systems
	2nd	Crystal structure for metallic elements: BCC, FCC and HCP; Coordination number for Simple Cubic, BCC and FCC
	3rd	Atomic radius: definition, atomic radius for Simple Cubic, BCC and FCC; Atomic Packing Factor for Simple Cubic, BCC, FCC and HCP
2nd	1st	Simple problems on finding number of atoms for a unit cell
	2nd	Classification - primary or chemical bond, secondary or molecular bond; Typesof primary bonds: Ionic, Covalent and Metallic Bonds
	3rd	Types of secondary bonds: Dispersion bond, Dipole bond and Hydrogen bond
3rd	1st	Isomorphs, eutectic and eutectoid systems
	2nd	Iron-Carbon binary diagram; Iron and Carbon Steels; flow sheet for production of iron and steel
	3rd	Iron ores – Pig iron: classification, composition and effects of impurities on iron
4th	1st	classification, composition, properties and uses; Wrought Iron: properties, uses/applications of wrought Iron
	2nd	comparison of cast iron, wrought iron and mild steel and high carbon steel; standard commercial grades of steel as per BIS and AISI
	3rd	Alloy Steels – purpose of alloying; effects of alloying elements –Important alloysteels: Silicon steel, High Speed Steel (HSS), heat resisting, steel, spring steel,Stainless Steel (SS): types of SS, applications of SS – magnet steel – composition, properties and uses
5th	1st	Properties and uses of aluminum, copper, tin, lead, zinc, magnesium and nickel
	2nd	Copper alloys: Brasses, bronzes – composition, properties and uses
	3rd	Aluminum alloys: Duralumin, hindalium, magnelium – composition, properties and uses
6th	1st	Nickel alloys: Inconel, monel, nicPerome –composition, properties and uses.
	2nd	Anti-friction/Bearing alloys: Various types of bearing bronzes
	3rd	Standard commercial grades as per BIS/ASME
7th	1st	Introduction to failure analysis; Fracture: ductile fracture, brittle fracture; cleavage; notch sensitivity; fatigue; endurance limit
	2nd	characteristics of fatigue fracture; variables affecting fatigue life; creep; creep curve; creep fracture
	3rd	Destructive testing:Tensile testing; compression testing; Hardness testing:
8th	1st	Brinell, Rockwell; bend test; torsion test; fatigue test
	2nd	creep test. Non- destructive testing
	3rd	Visual Inspection; magnetic particle inspection; liquid penetrant test; ultrasonic inspection; radiography.

9th	1st	Nature of corrosion and its causes; Electro chemical re-actions
	2nd	Electrolytes; Factors affecting corrosion: Environment, Material properties and physical conditions
	3rd	Types of corrosion; Corrosion control: Material selection, environment control and design
10th	1st	Surface engineering processes: Coatings and surface treatments; Cleaning and mechanical finishing of surfaces
	2nd	Organic coatings; Electroplating and Special metallic plating; Electro polishing and photo- etching
	3rd	Conversion coatings: Oxide, phosphate and chromate coatings; Thin film coatings: PVD and CVD; Surface analysis; Hard-facing, thermal spraying and high- energy processes; Process/mate-rial selection. Pollution norms for treating,effluents as per standards
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LESSON PLAN		
Discipline : Mechanical Engg.	Semester : 3rd	Name of the Teachnig Faculty : Mrs Puja Swain
Subject: Fluid Mechanics & Fluid Power	No.of days/Per weeks Class Alloted Weeks :3	Semester from date : 01.07.2026 To Date : 05.11.2026 No.of Weeks : 15
Weeks	Class day	Theory
1st	1st	Definition of a fluid, classification of fluids, various fluid properties such as density, specific weight, specific gravity, viscosity and surface tension and state the units
	2nd	
	3rd	
2nd	1st	fluid pressure, total pressure (hydrostatic force) and location of centre of pressure on vertical, horizontal
	2nd	inclined and curved surfaces by fluid
	3rd	
3rd	1st	working of various measuring devices for pressure, the principle of manometers of simple, differential and inverted types, principle of buoyancy and floatation. Simple numericals on Manometer
	2nd	
	3rd	
4th	1st	Various types of flow, circulation and vorticity, stream-line, path line and streak-line, various energies of fluid
	2nd	
	3rd	law of conservation of mass, energy equation -Bernoulli's theorem, the limitations of same-application of Bernoulli's equation, the working of venturimeter
5th	1st	
	2nd	pitot tube, equation of flow rate and velocity with respect to venturimeter and pitot tube respectively, the working of flowmeter: current meter, Simple numericals
	3rd	
6th	1st	Definition –orifice
	2nd	orifice coefficient such as Cc, Cv, Cd, Relationship between orifice coefficients, weir and notch, Discharge over rectangular notch and weir, triangular notch. Simple numericals
	3rd	
7th	1st	Definition of a pipe. laws of fluid friction, Equation of loss of head through pipe due to friction, Darcy's formula and Chezy's formula, hydraulic gradient and total energy line, Nozzle and its application
	2nd	
	3rd	
8th	1st	Power transmission through nozzle
	2nd	The condition of maximum power transmission through nozzle, Expression for diameter of nozzle for maximum power transmission
	3rd	
9th	1st	Classification of hydraulic turbines, Selection of turbine on the basis of head and discharge available,
	2nd	
	3rd	Construction and working principle of Pelton wheel, Francis and Kaplan turbines

10th	1st	Draft tubes – types and construction, Concept of cavitation in turbines, Calculation of Work done, Power, efficiency of turbines. Simple numericals
	2nd	Centrifugal Pumps: Principle of working and applications, Types of casings and impellers, Concept of multistage, Priming and its methods
	3rd	
11th	1st	Manometric head, Work done, Manometric efficiency, Overall efficiency. Simple numericals
	2nd	
	3rd	Reciprocating Pumps: Construction, working principle and applications of single and double acting reciprocating pumps
12th	1st	
	2nd	Concept of Slip, Negative slip, Cavitation and separation. Simple numerical
	3rd	
13th	1st	Definition of fluid power, classification – hydraulic power and pneumatic power
	2nd	
	3rd	Hydraulic Systems -Basic principle of enclosed hydraulic system – Pascal's law, Oil hydraulic system – reservoir
14th	1st	
	2nd	filter pressure limiting valves, direction control valves, flow control valves, actuators (linear and rotary), accumulator, pipes and fittings, various positive displacement pumps-gear, vane, piston
	3rd	
15th	1st	
	2nd	drawing of hydraulic circuits - extension and retraction of linear actuator, motion of rotary actuator, holding a job, hydraulic press etc
	3rd	
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LESSON PLAN		
Discipline : Mechanical Engg.	Semester : 3rd	Name of the Teachnig Faculty : Mr Sarat Kumar Biswal
Subject: Thermal -I	No.of days/Per weeks Class Alloted Weeks :3	Semester from date : 01.07.2026 To Date : 05.11.2026 No.of Weeks : 15
Weeks	Class day	Theory
1st	1st	Introduction to thermodynamics:Thermodynamic Systems (closed, open, isolated)
	2nd	
	3rd	Thermodynamic Systems ; Thermodynamic properties of a system , Define thermodynamic processes, path, cycle , state, path function, point function
2nd	1st	
	2nd	
	3rd	Thermodynamic Equilibrium ; Quasi-static Process ; Laws of thermodynamics
3rd	1st	Sources of Energy: Brief description of energy Sources: Classification of energy sources: Renewable, Non-Renewable.
	2nd	Definitions of Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy; Biogas, Biomass, Bio-
	3rd	diesel; Hydraulic Energy, Nuclear Energy; Fuel cell.
4th	1st	
	2nd	Assumptions air standard cycle analysis; description of Carnot, Otto and Diesel cycles with P-V and T-S diagrams
	3rd	
5th	1st	
	2nd	Internal and external combustion engines; advantages and classification of I.C. engines;I.C. engine component parts.
	3rd	Function of each part and materials used for the component parts - Cylinder, crank case, crank pin, crank, crank shaft, connecting rod, wrist pin, piston, cooling pins cylinder heads, exhaust valve, inlet valve;
6th	1st	Working of four-stroke and two stroke petrol and diesel engines;
	2nd	Comparison of two stroke and four stroke engines; Comparison of C.I. and S.I. engines;
	3rd	Valve timing and port timing diagrams for four stroke and two stroke engines.
7th	1st	Fuel system of Petrol engines; Principle of operation of simple and Zenith carburettors; Fuel system of Diesel engines;
	2nd	Types of injectors and fuel pumps; Cooling system: air cooling, water cooling system with thermo siphon method of circulation and water cooling system with radiator and forced circulation (description with line diagram).
	3rd	Comparison of air cooling and water cooling system; Ignition systems – Battery coil ignition and magneto ignition
8th	1st	Types of lubricating systems used in I.C. engines with line diagram;
	2nd	Types of governing of I.C. engines – hit and miss method, quantitative method, qualitative method and combination methods of governing :their application.
	3rd	
9th	1st	
	2nd	
	3rd	Objective of super charging.

10th	1st	**Performance of I.C. Engines:** Brake power; Indicated power; Frictional power;
	2nd	
	3rd	
11th	1st	Brake and Indicated mean effective pressures; Brake and Indicated thermal efficiencies; Mechanical efficiency;Relative efficiency;
	2nd	
	3rd	Performance test; Morse test
12th	1st	Heat balance sheet; Methods of determination of B,P., I.P. and F.P.
	2nd	
	3rd	Simple numerical problems on performance of I.C. engines.
13th	1st	Functions of air compressor; Uses of compressed air; Types of air compressors;
	2nd	Single stage reciprocating air compressor - its construction and working (with line diagram) using P-V diagram
	3rd	Multi stage compressors – Advantages over single stage compressors;
14th	1st	Rotary compressors: Centrifugal compressor, axial flow type compressor and vane type compressors.
	2nd	**Refrigeration & Air-conditioning:** Refrigeration; Refrigerant; COP; Air Refrigeration system: components, working & applications;
	3rd	Vapour Compression system: components, working & applications;
15th	1st	Air conditioning; Classification of Air- conditioning systems; Comfort and Industrial Air-Conditioning;
	2nd	Window Air- Conditioner; Summer Air-Conditioning system, Winter Air-Conditioning system, Year-round Air-Conditioning system.
	3rd	

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