SSB REGIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, CHITRADA, MAYURBHANJ					
LESSON PLAN					
BRANCH:MECHANICAL ENGINEERING				SESSION: WINTER	SEMESTER: 3RD
NAME OF FACULTY: KRUSHNA PRASAD BERA				SUBJECT: THERMAL ENGINEERING-I	
NO OF CLASSES/WEEK GIVEN AS PER SYLLABUS=60				DATE OF SEMESTER STARTING 01.07.2024	DATE OF SEMESTER CLOSING
NO OF CLASSES/WEEK GIVEN AS PER TIME TABLE=04				TOTAL NOS. OF WORKING DAYS AS PER SCTE&VT=	
SL. NO.	CHAPTER	NAME OF TOPIC	AS PER SYLLABUS NUMBER OF CLASSES ALLOTTED	AS PER PLAN NO. OF CLASSES REQUIRED TO COMPLETE	DETAILS CONTENT OF THIS CHAPTER
1	1	Thermodynamic concept & Terminology	12	12	1.1 Thermodynamic Systems (closed, open, isolated) 1.2 Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement). 1.3 Intensive and extensive properties 1.4 Define thermodynamic processes, path, cycle , state, path function, point function. 1.5 Thermodynamic Equilibrium. 1.6 Quasi-static Process. 1.7 Conceptual explanation of energy and its sources 1.8 Work , heat and comparison between the two. 1.9 Mechanical Equivalent of Heat. 1.10Work transfer, Displacement work
2	2	Laws of Thermodynamics	12	12	2.1 State & explain Zeroth law of thermodynamics. 2.2 State & explain First law of thermodynamics. 2.3 Limitations of First law of thermodynamics 2.4.(i)Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor) 2.4.(ii)Second law of thermodynamics (Claucius & Kelvin Plank statements). 2.5 Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical)

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BRANCH:MECHANICAL ENGINEERING		SESSION: WINTER	SEMESTER: 3RD
NAME OF FACULTY: KRUSHNA PRASAD BERA		SUBJECT:	THERMAL ENGINEERING-I
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3	3	Properties Processes of perfect gas	10	10	3.1 Laws of perfect gas: Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure, Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant. 3.2 Explain specific heat of gas (Cp and Cv) 3.3 Relation between Cp & Cv. 3.4 Enthalpy of a gas. 3.5 Work done during a non- flow process. 3.6(i) Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process) 3.6(ii) Solve simple problems on above. 3.7 Free expansion & throttling process.
4	4	Internal combustion engine	8	8	4.1 Explain & classify I.C engine. 4.2 Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM. 4.3 Explain the working principle of 2-stroke & 4-stroke engine C.I & S.I engine. 4.4 Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine.

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5	5	Gas Power Cycle	10	10	5.1 Carnot cycle 5.2 Otto cycle. 5.3 Diesel cycle. 5.4 Dual cycle. 5.5 Solve simple numerical.
6	6	Fuels and Combustion	8	8	6.1 Define Fuel. 6.2 Types of fuel. 6.3 Application of different types of fuel. 6.4 Heating values of fuel. 6.5 Quality of I.C engine fuels Octane number, Cetane number.

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BRANCH:MECHANICAL ENGINEERING					SESSION: WINTER	SEMESTER: 3RD
NAME OF FACULTY: SIBUN KUMAR NAIK					SUBJECT: ENGINEERING MATERIAL	
NO OF CLASSES/WEEK GIVEN AS PER SYLLABUS=60					DATE OF SEMESTER STARTING 01.07.2024	DATE OF SEMESTER CLOSING
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SL. NO.	CHAPTER	NAME OF TOPIC	AS PER SYLLABUS NUMBER OF CLASSES ALLOTTED	AS PER PLAN NO. OF CLASSES REQUIRED TO COMPLETE	DETAILS CONTENT OF THIS CHAPTER	
1	1	Engineering materials and their properties	5	5	1.1 Material classification into ferrous and non ferrous category and alloys 1.2 Properties of Materials: Physical , Chemical and Mechanical 1.3 Performance requirements 1.4 Material reliability and safety	
2	2	Ferrous Materials and alloys	5	7	2.1 Characteristics and application of ferrous materials 2.2 Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel 2.3 Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel 2.4 Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo,	

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3	3	Iron – Carbon system	8	8	3.1 Concept of phase diagram and cooling curves 3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	
4	4	Crystal imperfections	10	10	4.1 Crystal defines, classification of crystals, ideal crystal and crystal imperfections 4.2 Classification of imperfection: Point defects, line defects, surface defects and volume defects 4.3 Types and causes of point defects: Vacancies, Interstitials and impurities 4.4 Types and causes of line defects: Edge dislocation and screw dislocation 4.5 Effect of imperfection on material properties 4.6 Deformation by slip and twinning 4.7 Effect of deformation on material properties	
5	5	Heat Treatment	10	10	5.1 Purpose of Heat treatment 5.2 Process of heat treatment: Annealing, normalizing, hardening, tampering, stress relieving measures 5.3 Surface hardening: Carburizing and Nitriding 5.4 Effect of heat treatment on properties of steel 5.5 Hardenability of steel	
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6	6	Non-ferrous alloys	10	10	6.1 Aluminum alloys: Composition, property and usage of Duralmin, y- alloy. 6.2 Copper alloys: Composition, property and usage of Copper- Aluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel 6.3 Predominating elements of lead alloys, Zinc alloys and Nickel alloys 6.4 Low alloy materials like P-91, P-22 for power plants and other high temperature services. High alloy materials like stainless steel grades of duplex, super duplex materials etc.
7	7	Bearing Material	3	3	7.1 Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials
8	8	Spring materials	3	3	8.1 Classification, composition, properties and uses of Ironbase and Copper base spring material
9	9	Polymers	3	3	9.1 Properties and application of thermosetting and thermoplastic polymers 9.2 Properties of elastomers
10	10	Composites and Ceramics	3	3	10.1 Classification, composition, properties and uses of particulate based and fiber reinforced composites 10.2 Classification and uses of ceramics

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BRANCH:MECHANICAL ENGINEERING					SESSION: WINTER	SEMESTER: 3RD
NAME OF FACULTY: SAUBHAGYA MOHANTY					SUBJECT: PRODUCTION TECHNOLOGY	
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1	1	Metal Forming Processes	7	7	1.1 Extrusion: Definition & Classification 1.2 Explain direct, indirect and impact extrusion process. 1.3 Define rolling. Classify it. 1.4 Differentiate between cold rolling and hot rolling process. 1.5 List the different types of rolling mills used in Rolling process.	
2	2	Welding	16	16	2.1 Define welding and classify various welding processes. 2.2 Explain fluxes used in welding. 2.3 Explain Oxy-acetylene welding process. 2.4 Explain various types of flames used in Oxy-acetylene welding process. 2.5 Explain Arc welding process. 2.6 Specify arc welding electrodes. 2.7 Define resistance welding and classify it. 2.8 Describe various resistance welding processes such as butt welding, spot welding, flash welding, projection welding and seam welding. 2.9 Explain TIG and MIG welding process 2.10 State different welding defects with causes and remedies.	
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3	3	Casting	16	16	3.1 Define Casting and Classify the various Casting processes. 3.2 Explain the procedure of Sand mould casting. 3.3 Explain different types of molding sands with their composition and properties. 3.4 Classify different pattern and state various pattern allowances. 3.5 Classify core. 3.6 Describe construction and working of cupola and crucible furnace. 3.7 Explain die casting method. 3.8 Explain centrifugal casting such as true centrifugal casting, centrifuging with advantages, limitation and area of application. 3.9 Explain various casting defects with their causes and remedies.	
4	4	Powder Metallurgy	7	7	4.1 Define powder metallurgy process. 4.2 State advantages of powder metallurgy technology technique 4.3 Describe the methods of producing components by powder metallurgy technique. 4.4 Explain sintering. 4.5 Economics of powder metallurgy.	

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5	5	Press Work	7	7	5.1 Describe Press Works: blanking, piercing and trimming. 5.2 List various types of die and punch 5.3 Explain simple, Compound & Progressive dies 5.4 Describe the various advantages & disadvantages of above dies	
6	6	Jigs and Fixtures	7	7	6.1 Define jigs and fixtures 6.2 State advantages of using jigs and fixtures 6.3 State the principle of locations 6.4 Describe the methods of location with respect to 3-2-1 point location of rectangular jig 6.5 List various types of jig and fixtures.	
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NAME OF FACULTY: UTTAM KUMAR BEHERA					SUBJECT: STRENGTH OF MATERIAL	
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1	1	Simple stress& strain	10	10	1.1 Types of load, stresses & strains,(Axial and tangential) Hooke's law, Young's modulus, bulk modulus, modulus of rigidity, Poisson's ratio, derive the relation between three elastic constants 1.2 Principle of super position, stresses in composite section 1.3 Temperature stress, determine the temperature stress in composite bar (single core) 1.4 Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load 1.5 Simple problems on above.	
2	2	Thin cylinder and spherical shell under internal pressure	8	8	2.1 Definition of hoop and longitudinal stress, strain 2.2 Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain 2.3 Computation of the change in length, diameter and volume 2.4 Simple problems on above	

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3	3	Two dimensional stress systems	10	10	3.1 Determination of normal stress, shear stress and resultant stress on oblique plane 3.2 Location of principal plane and computation of principal stress 3.3 Location of principal plane and computation of principal stress and Maximum shear stress using Mohr's circle	
4	4	Bending moment& shear force	10	10	4.1 Types of beam and load 4.2 Concepts of Shear force and bending moment 4.3 Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over hanging beam under point load and uniformly distributed load	

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5	5	Theory of simple bending	10	10	5.1 Assumptions in the theory of bending, 5.2 Bending equation, Moment of resistance, Section modulus& neutral axis. 5.3 Solve simple problems.	
6	6	Combined direct & bending stresses	6	6	6.1 Define column 6.2 Axial load, Eccentric load on column, 6.3 Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 6.4 Buckling load computation using Euler's formula (no derivation) in Columns with various end conditions	
7	7	Torsion	6	6	7.0 Assumption of pure torsion 7.1 The torsion equation for solid and hollow circular shaft 7.2 Comparison between solid and hollow shaft subjected to pure torsion	

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NAME OF FACULTY: DIBYAJYOTI DAS					SUBJECT: ENVIRONMENTAL STUDIES	
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1	1	The Multidisciplinary nature of environmental studies	4	4	Definition, scope and importance, Need for public awareness	
2	2	Natural Resources	10	10	Renewable and non renewable resources: a) Natural resources and associated problems. 2.(a.i.) Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people. 2.(a.ii) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems. 2.(a.iii) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources. 2.(a.iv) Food Resources: World food problems ,changes caused by agriculture and overgrazing,effectsofmodernagriculture,fertilizers pesticidesproblems, water logging, salinity,. 2.(a.v) Energy Resources: Growing energy need, renewable and nonrenewable energy sources, use of alternate energy sources, case studies. 2.(a.vi) Land Resources: Land as a resource ,land degradation ,man induces landslides, soil erosion, and desertification. b) Role of individual in conservation of natural resources. c) Equitable use of resources for sustainable lifestyles.	

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3	3	Systems	8	8	3.1 Concept of an ecosystem. 3.2 Structure and function of an ecosystem. 3.3 Producers, consumers, decomposers. 3.4 Energy flow in the ecosystems. 3.5 Ecological succession. 3.6 Food chains, food web sand ecological pyramids. 3.7 Introduction, types, characteristic features, structure and function of the following ecosystem: 3.8 Forest ecosystem: 3.9 Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).	
4	4	Biodiversity and it's Conservation	8	8	4.1 Introduction-Definition: genetics, species and ecosystem diversity. 4.2 Biogeographically classification of India. 4.3 Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and opt in values. 4.4 Biodiversity at global, national and local level. 4.5 Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.	
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5	5	Environmental Pollution	12	12	Definition Causes, effects and control measures of: a) Air pollution. b) Water pollution. c) Soil pollution d) Marine pollution e) Noise pollution. f) Thermal pollution g) Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Disaster management: Floods, earth quake, cyclone and landslides.	
6	6	Social issues and the Environment	10	10	From unsustainable to sustainable development. 6.1 Urban problems related to energy. 6.2Water conservation, rain water harvesting, water shed management. ? Resettlement and rehabilitation of people; its problems and concern. 6.3 Environmental ethics: issue and possible solutions. 6.4 Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. 6.5 Air (prevention and control of pollution) Act. 6.6 Water (prevention and control of pollution) Act. 6.7 Public awareness	

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