SYNERGY SCHOOL OF ENGINEERING,DHENKANAL

LESSON PLAN

Session (2023-2024)

Discipline: Mechanical **Engineering**	**Semester: 6th , Summer/2024**	**Name of the Faculty: Mr Girish Chandra Swain** Lecturer **Email ID:** kousalyadebraj@gmail.com
Subject: Composite Materials, Theory4(a)	**No. of Days/week:** 04	**Start Date:16/01/2024** **End Date: 26/04/2024**

Week	Class Day	Theory Topics
1st	1st	Classifications of Engineering Materials
	2nd	Concept of composite materials.
	3rd	Matrix materials, Functions of a Matrix,
	4th	Desired Properties of a Matrix
2nd	1st	Polymer Matrix (Thermosets and Thermoplastics)
	2nd	Metal matrix, Ceramic matrix, Carbon Matrix, Glass Matrix etc.
	3rd	Types of Reinforcements/Fibers: Role and Selection or reinforcement materials.
	4th	Types of Reinforcements/Fibers: Role and Selection or reinforcement materials.
3rd	1st	Types of fibers
	2nd	Glass fibers, Carbon fibers, Aramid fibers , Metal fibers
	3dr	Alumina fibers, Boron Fibers
	4th	Silicon carbide fibers, Quartz and Silica fibers,
4th	1st	Multiphase fibers, Whiskers, Flakes etc
	2nd	Mechanical properties of fibers
	3rd	Assignment-1
	4th	Classification based on Matrix Material: Organic Matrix composites, Polymer matrix composites (PMC), Carbon matrix Composites or Carbon-

		Carbon Composites
5th	1st	Metal matrix composites (MMC), Ceramic matrix composites (CMC).
	2nd	Classification based on reinforcements: Fiber Reinforced Composites, Fiber Reinforced Polymer (FRP) Composites,
	3rd	Laminar Composites, Particulate Composites
	4th	Laminar Composites, Particulate Composites
6th	1st	Comparison with Metals, Advantages & limitations of Composites
	2nd	Comparison with Metals, Advantages & limitations of Composites
	3rd	Doubt Clearing Class
	4th	Geometrical aspects – volume and weight fraction.
7th	1st	Geometrical aspects – volume and weight fraction.
	2nd	Geometrical aspects – volume and weight fraction.
	3rd	Geometrical aspects – volume and weight fraction.
	4th	Unidirectional continuous fiber, discontinuous fibers
8th	1st	Short fiber systems, woven reinforcements
	2nd	Mechanical Testing.
	3rd	Numerical problem
	4th	Determination of stiffness and strengths of unidirectional composites; tension, compression, flexure and shear.
9th	1st	Determination of stiffness and strengths of unidirectional composites; tension, compression, flexure and shear.
	2nd	Numerical problem
	3rd	Assignment-2/Quiz Test
	4th	Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Computation of Stresses.
10th	1st	Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Computation of Stresses.
	2nd	Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Computation of Stresses.
	3rd	Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Computation of Stresses.
	4th	Numerical problem
11th	1st	Types of Laminates - Symmetric Laminates, Antisymmetric Laminate,.
	2nd	Balanced Laminate, Quasi-isotropic Laminates,
	3rd	Cross-ply Laminate, Angle ply Laminate.
	4th	Orthotropic Laminate

12th	1st	Laminate Moduli, Hydrothermal Stresses
	2nd	Laminate Moduli, Hydrothermal Stresses
	3rd	Assignment-3/SURPRISE TEST
	4th	Joining –Advantages and disadvantages of adhesive joints.
13th	1st	Joining –Advantages and disadvantages of adhesive joints.
	2nd	Joining –Advantages and disadvantages of mechanically fastened joints.
	3rd	Joining –Advantages and disadvantages of mechanically fastened joints.
	4th	Typical bond strengths and test procedures
14th	1st	Typical bond strengths and test procedures
	2nd	Typical bond strengths and test procedures
	3rd	NUMERICAL PROBLEM
	4th	Assignment-4/Quiz test
15th	1st	Discussion of Previous year questions
	2nd	Discussion of Previous year questions
	3rd	Discussion of Previous year questions
	4th	Discussion of Previous year questions

Signature of Concerned Teacher