

# LESSON PLAN 2025(W)

**SUBJECT:- METALLURGICAL THERMODYNAMICS AND KINETICS**

**SUBJECT CODE:- TH-4**

**SEMESTER:-3<sup>rd</sup>**

**BRANCH:-METALLURGICAL**

**NAME OF FACULTY:- Sagarika Palei**

**CLASS ALLOTTED:-3P/WEEK**

WEEKS	DATE	DATE :- FROM- 14/07/2025 TO 15/11/2025	TEACHING AID
		THEORY- TOPIC/LESSON	
1	15/07/2025 TO 19/07/2025	<b>Basic Concepts of Thermodynamics</b> Introduction: Definition of thermodynamics, system, surroundings, types of systems (open, closed, isolated),	White board & Marker
2	21/07/2025 TO 26/07/2025	thermodynamic properties (intensive, extensive), state functions. Zeroth Law of Thermodynamics: Concept of thermal equilibrium, temperature measurement.	White board & Marker
3	28/07/2025 TO 02/08/2025	First Law of Thermodynamics: Conservation of energy, internal energy, enthalpy, heat and work, heat capacity, specific heat.	White board & Marker
4	04/08/2025 TO 09/08/2025	Applications: Brief idea about various processes isothermal, adiabatic, isobaric, isochoric	White board & Marker
5	11/08/2025 TO 16/08/2025	<b>Second and Third Law of Thermodynamics</b> Entropy: Concept of entropy, entropy change in reversible and irreversible processes, entropy and disorder.	White board & Marker
6	18/08/2025 TO 23/08/2025	Second Law Statements: Different statements of the second law Gibbs free energy: Definition of Gibbs free energy,	White board & Marker
7	25/08/2025 TO 30/08/2025	its significance in determining spontaneity of reactions, relationship between Gibbs free energy and equilibrium constant.	White board & Marker
8	01/09/2025 TO 06/09/2025	, Third Law of Thermodynamics, Gibbs free energy ( $\Delta G$ ) & Helmholtz free energy ( $\Delta A$ ), Maxwell relations (No Derivation)	White board & Marker
9	08/09/2025 TO 13/09/2025	<b>Phase Equilibria &amp; Metallurgical Applications</b> Solutions & Phase Rule : Ideal & non- ideal solutions,	White board & Marker
10	15/09/2025 TO 20/09/2025	Raoult's Law, Henry's Law Phase rule (Gibbs' phase rule),	White board & Marker

	22/09/2025 TO 27/09/2025	unary & binary phase diagrams, Ellingham Diagrams & Applications, Concept of Ellingham diagrams,	White board & Marker
12	08/10/2025 TO 11/10/2025	Oxide stability & reduction reactions, Predominance Area Diagram. <b>Chemical Kinetics &amp; Reaction Rate Theory</b> Fundamentals of Reaction Kinetics: Rate of reaction order & molecularity	White board & Marker
13	13/10/2025 TO 18/10/2025	Activation energy & Arrhenius equation,  Homogeneous vs. Heterogeneous reactions,	White board & Marker
14	20/10/2025 TO 25/10/2025	Electrochemical Thermodynamics : Electrochemical cells, Nernst equation (Basic Level)	White board & Marker
15	27/10/2025 TO 01/11/2025	<b>Thermodynamics in Metallurgical Processes (Basic level)</b> Application of Thermodynamics in Extraction & Refining: Ironmaking & Basics of Steelmaking thermodynamics,	White board & Marker
16	03/11/2025 TO 08/11/2025	Roasting, Smelting, Refining processes, Basic Concept of activity, & equilibrium constant	White board & Marker
17	10/11/2025 TO 15/11/2025	Revision.....	White board & Marker



Signature of HOD



Signature of Faculty