UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA

LESSON PLAN

SUBJECT-CHEMICAL ENGINEERING THERMODYNAMICS

PREPARED BY- RAGHUNATH MARANDI
DEPARTMENT OF CHEMICAL ENGINEERING

WEEK	Topics covered
WEEK 1	Scope and limitations of Thermodynamics.
	Scope and limitations of Thermodynamics.
	System, processes, state, properties, and path function, heat and work
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WEEK 2	Equilibrium state and phases
	Zeroth law of Thermodynamics.
	The concept of heat reservoir, heat engine, and heat pump
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WEEK 3	Reversible and irreversible process.
	Solve simple problems.
	Solve simple problems.
WEEK 4	State and explain first law of Thermodynamics
	State and explain first law of Thermodynamics
	Concept of internal energy, Enthalpy, heat capacity.
	Concept of internal energy, Enthalpy, heat capacity.
WEEK 5	Concept of internal energy, Enthalpy, heat capacity.
	First law of thermodynamics for cyclic process, non-flow process, and flow process
	First law of thermodynamics for cyclic process, non-flow process, and flow process
	Solve numerical on application of 1ST law of thermodynamics
WEEK 6	Solve numerical on application of 1ST law of thermodynamics
	Solve numerical on application of 1ST law of thermodynamics
	P-V-T behavior of pure fluid.
	P-V-T behavior of pure fluid.
WEEK 7	Equation of state and ideal gas.
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WEEK 8	Constant volume process, constant pressure process, constant temperature process, adiabatic process, polytrophic process for ideal gases.

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WEEK 9	State and explain second law of thermodynamics.
	State and explain second law of thermodynamics.
	Concept of entropy.
	Concept of entropy.
WEEK 10	Calculate change of entropy for various conditions
	Calculate change of entropy for various conditions
	Third law of Thermodynamics.
	Third law of Thermodynamics.
WEEK 11	Classify thermodynamic properties
	Classify thermodynamic properties
	Work function and Gibb's free energy and Gibb's phase rule.
	Work function and Gibb's free energy and Gibb's phase rule.
WEEK 12	Various relationships among thermodynamic properties – maxwell equation,
	Various relationships among thermodynamic properties – maxwell equation,
	clapeyron equation, entropy-heat capacity relation, differential equation for entropy,
	clapeyron equation, entropy-heat capacity relation, differential equation for entropy,
WEEK 13	clapeyron equation, entropy-heat capacity relation, differential equation for entropy,
	clapeyron equation, entropy-heat capacity relation, differential equation for entropy,
	effect of temperature, pressure and volume on U,H and S, relationship between Cp and Cv .
	effect of temperature, pressure and volume on U,H and S, relationship between Cp and Cv .
WEEK 14	effect of temperature, pressure and volume on U,H and S, relationship between Cp and Cv .
	effect of temperature, pressure and volume on U,H and S, relationship between Cp and Cv .
	effect of temperature, pressure and volume on U,H and S, relationship between Cp and Cv .
	Gibb's-Helmhaltz equation.
WEEK 15	Gibb's-Helmhaltz equation.
	Gibb's-Helmhaltz equation.
	Fugacity co-efficient, effect of temperature and pressure on fugacity, fugacity of pure gases, solids and liquids.
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WEEK 16	Fugacity co-efficient, effect of temperature and pressure on fugacity, fugacity of pure gases, solids and liquids.
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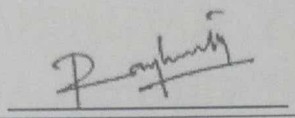
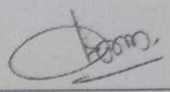
WEEK 17	Concept of activity, Effect of pressure and temperature on activity.
	Concept of Refrigeration and liquefaction process.
	Revision
	Revision

BOOKS FOR REFERENCE:

- Chemical Technology by C Dryden, Tata Mc Grawhill Publication
- Chemical Process Industries by N Shreeve, Tata Mc Grawhill Publication

	Prepared by	Approved by
Signature		
Name	RAGHUNATH MARANDI	B.K.GANTAYAT
Designation	Lecturer	HOD,Chemical.
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