UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA

LESSON PLAN

SUBJECT-HEAT TRANSFER

PREPARED BY- SUBASINI JENA

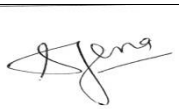
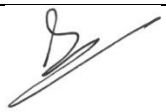
DEPARTMENT OF CHEMICAL ENGINEERING

	Topics covered
WEEK 1	Basic concept of Heat Transfer
	Heat flow concept in conduction.
	Steady state and unsteady state heat flow.
	State Fourier's law of conduction
WEEK 2	Heat flow through single material
	Solve simple numerical problems on Heat flow through single material
	Heat flow through composite walls.
WEEK 3	Solve simple numerical problems on Heat flow through composite walls.
	Heat flow through cylinder
	Solve simple numerical problems on Heat flow through cylinder
WEEK 4	Heat flow through spheres
	Solve simple numerical problems on Heat flow through spheres
	Heat flow in single and series medium
	Thermal insulation and critical radius of insulation
WEEK 5	Solve simple numerical problems on conduction
	Concept of heat flow by convection
	Natural and forced convection
	Individual and overall heat transfer coefficient
WEEK 6	Solve simple numerical problems on Individual and overall heat transfer coefficient
	Application of dimensional analysis in Convention
	Use Empirical equations for different flow regime
	Classify heat exchanger
WEEK 7	Parallels, co current and counter current flow
	Log mean temperature difference
	Solve simple numerical problems on heat exchanger
WEEK 8	Construction and working of shell and tube heat exchanger
	Multi pass and single pass heat exchanger

	Derive energy balance for shell and tube heatexchanger (simple problems)
WEEK 9	Solve simple numerical problems on heat exchanger
	Construction and operation of Finned tubeheat exchanger
	Construction and operation of Plate type heat
WEEK 10	Construction and operation of Scrappedsurface heat exchanger
	Heat transfer in agitated vessel
	Define condensation, Drop wise and film type condensation
WEEK 11	Solve simple numerical problems.
	Principle in radiation heat transfer
	Concept of black body, Gray body
WEEK 12	Absorptivity, Reflectivity and Transmissivity
	Emissive power, Emissivity, Mono chromatic emissive power, Mono chromatic emissivity
	Derivation of total emissive power
	State Kirchhoff's Law
WEEK 13	State Stefan Boltzmann's Law.
	State Wien's law and Plank's law
	Estimate heat transfer by radiation
WEEK 14	Solve simple numerical problems on heattransfer by radiation
	Objective of Evaporation
	Performance, capacity, economy of evaporator
	Differentiate among various types of evaporators
WEEK 15	Natural circulation evaporator and Forced Circulation evaporator
	Construction and operation of standard basket evaporator
	Construction and operation of long tube forced circulation type evaporator
	Elementary principle of single and multiple effect evaporators
WEEK 16	Backward feed and Forward feed evaporation
	Material and energy balance of single effect evaporators
	Solve simple problems on evaporators
	Solve simple problems on evaporators
WEEK 17	Boiling point elevation,
	Vapour recompression,
	Mechanical recompression
	Thermal recompression.

BOOKS FOR REFERENCE:

- Unit operation of Chemical Engineering by Mc Cabe & J M Smith, Tata Mc Grawhill.
- Chemical Process Industries by N Shreeve, Tata Mc Grawhill Publication

	Prepared by	**Approved by**
Signature		
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