Lesson Plan

Department of Metallurgical Engineering

UGIE Rourkela

Session: 2022-23

UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA Session: 2022-23		
Discipline: **Metallurgical Engineering**	Semester: 5th	Name of the Teaching Faculty: **SUMEETA RANI SARAP**
Subject: Heat transfer fluid flow and furnaces**(TH-03)**	No. of days/per week class allotted:**4**	Semester from Date: **15. 09. 2022** to Date: **21.01.2023** No. of weeks: 15

Week	Class No.	Module	Lecture Topics
1	1	Chapter - 1: Fluid Flow	Introduction to fluid
	2		Different properties of fluid
	3		Types of fluid(Real & Ideal)
	4		Newtonian and Non Newtonian fluid
2	5		Types of fluid flow(Steady & unsteady flow etc…)
	6		Streamline and turbulent flow
	7		Rate of flow or Discharge & Continuity equation
	8		-do-
3	9		Bernoulli equation(state & explain)
	10		Application of Bernoulli equation-Venturimeter
	11		Orifice meter
	12		Pitot tube
4	13		Introduction to head loss,Types of head loss
	14		Darcy Weishbach equation and chezys equation
	15		Minor loss-Due to Sudden contraction
	16	Chapter-2:Heat flow	Minor loss-Due to Sudden Enlargement
5	17		-do-
	18		Introduction to heat flow and heat transfer
	19		Modes of heat transfer-Conduction
	20		Derive Fourier law
6	21		-do-
	22		Calculation of steady state heat conduction through flat walls
	23		-do-
	24		-do-

7	25		Differentiation between convection ,Force convection& Natural convection
	26		-do-
	27		-do-
	28		State natural and forced heat transfer Co-efficient
8	29		-do-
	30		-do-
	31		Introduction to Radiation –Stefan Boltzmann law
	32		-do-
9	33		Introduction to Emissivity & properties of heat radiation
	34		-do-
	35		Blackbody & Grey body
	36		-do-
10	37		Heat conduction in hollow cylinder
	38		-do-
	39		Introduction ,Uses & classification
	40	Chapter-3: Furnaces	Furnace based on heat source
11	41		Furnace based on material movements
	42		Introduction to metallurgical furnace & Soaking pit
	43		-do-
	44		Reheating Furnace & Heat treatment Furnace
12	45		-do-
	46		Melting Furnace
	47		Smelting Furnace
	48		Refining Furnace
13	49		-do-
	50		Principle of heat generation in Electric Furnace
	51		Principle in Electric Arc furnace, Resistance & Induction(Coreless)
	52		-do-
14	53		-do-
	54		Heat losses & Heat balance
	55		-do-
	56		Furnace efficiency
15	57		Types of waste heat recovery system-Regenerators & Recuperates
	58		-do-
	59		Revision class
	60		Important question discussion

Suresh Kr Sahu
Lect in metallurgy