Lecture Plan

Name of Institute : Ambala College of Engineering and Applied Research
Name of the Faculty member : Gurpinder Singh
Discipline : Mechanical Engineering
Semester : 5th
Subject : Heat Transfer (MCA -301)
Lesson Plan Duration : 15 weeks (from Sep 2021 to Jan 2022)
Work Load : L-3T-1 P-2

Week	Theory		Practical	
	Lecture day	Topic (including assignment/ test)	Practical day	Topic
1st	1	Definition of heat, Modes of Heat Transfer, Basic Laws of heat transfer	1st	To find out Stefan Boltzmann constant.
	2	Electrical Analogy of heat conductionn, Conduction through composite Walls		
	3	Overall heat transfer coefficient,The general conduction equation in Cartesian		
	T-1	Solve Numericals		
2nd	4	cylindrical coordinates Steady one dimensional heat conduction without internal heat generation, Spherical coordinates Steady one dimensional heat conduction without internal heat generation	2nd	To determine the thermal conductivity of insulating powder.
	5	The plane slab; The cylindrical shell, The spherical shell		
	T-2	Critical thickness of insulation,Variable thermal conductivity, Numerical Practice		
	6	Steady one dimensional heat conduction with uniform internal heat generation the plane slab, Cylindrical and spherical systems		
3rd	7	Numerical Practice	3rd	To find out the heat transfer coefficient of vertical cylinder in natural convection.
	8	Fins of uniform cross section; Governing equation		
	T-3	Numerical Practice		
	9	Temperature distribution and heat dissipation rate; Efficiency and effectiveness of fins		
4th	10	Numerical Practice	4th	Revise all Experiments
	11	Theories of thermal radiation; Absorption, Reflection and transmission		
	12	Monochromatic and total emissive power; Black body concept		
	T-4	Planck's distribution law; Stefan Boltzman law		
5th	13	Wien's displacement law; Lambert's cosine law	5th	Viva
	14	Numerical Practice		
	T-5	Kirchoff's law; Heat transfer between black surfaces		
	15	Shape factor, Numerical Practice		
6th	16	Shape factor, Numerical Practice	6th	To determine the thermal conductivity of metal road.
	17	Introduction; Classification of heat exchangers		
	18	Logarithmic mean temperature Difference; Area calculation for parallel flow heat exchangers;		
	T-6	Numerical Practice		
7th	19	Logarithmic mean temperature Difference; Area calculation for counter flow heat exchangers;	7th	To determine total thermal heat resistance and conductivity of
	20	Numerical Practice		
	T-7	Effectiveness of heat exchangers; N T U method of heat		

		exchanger design (for parallel flow heat exchangers)		composite wall.
	21	Numerical Practice		
8th	22	N T U method of heat exchanger design (for counter flow heat exchangers)Applications of heat exchangers	8th	To find out the thermal conductivity of a Insulating slab.
	23	N T U method of heat exchanger design (for counter flow heat exchangers)Applications of heat exchangers		
	24	Free and forced convection; Newton's law of cooling		
	T-8	Solve Numericals		
9th	25	Convective heat transfer Coefficient; Nusselt number	9th	Revise all Experiments
	26	Dimensional analysis of free and forced convection;		
	27	Dimensional analysis of free and forced convection;		
	T-9	Numerical Practice		
10th	28	Analytical solution to forced convection problems	10th	Viva
	29	The concept of boundary layer; Hydrodynamic and thermal boundary layer		
	30	The concept of boundary layer; Hydrodynamic and thermal boundary layer		
	T-10	Numerical Practice		
11th	31	Momentum and Energy equations for boundary layer	11th	To study temperature distribution along the length of pin fin under free and forced convection heat transfer.
	32	Momentum and Energy equations for boundary layer		
	T-11	Numerical Practice		
	33			
12th	34	Exact solution for laminar flow over an isothermal plate using similarity transformation	12th	To calculate overall heat transfer coefficient for shell and tube heat exchanger.
	35	The integral approach; Integral momentum and energy equations		
	36	The integral approach; Integral momentum and energy equations		
	T-12	Numerical Practice		
13th	37	Solution of forced convection over a flat plate using the integral method.	13th	To evaluate the performance of an automobile radiator.
	38	Analysis of free convection		
	T-13	Numerical Practice		
	39	Governing equations for velocity and temperature fields.		
14th	40	Relation between fluid friction and heat transfer	14th	Revise all Experiments
	41	Reynolds analogy Dimensionless numbers; Reynolds, Prandtl Nusselt,		
	42	Grashoff and Stanton Numbers and their significance		
	T-14	Numerical Practice		
15th	43	Heat transfer with change of phase; Nusselt theory of laminar film Condensation	15th	Viva
	44	Heat transfer with change of phase; Nusselt theory of laminar film Condensation.		
	45	Numerical Practice		
	T-15	Numerical Practice		

Gurpinder Singh

(Signature of the teacher concerned with date)