VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY

LESSON PLAN

Semester 6th		**Year 2015**	**Contact Hours per week 4**
Heat Transfer		**Branch** **MECHANICAL ENGINEERING**	**Total Credit 4**
TEACHER		**Prof. P.K Jena**	
Period		**Jan 2015-April 2015**	
Recommended books		***Text Book:*** 1. Heat Transfer by J.P Holman, TMH (P) Ltd.	
Sl. No.	**Lecture No.**	**Topics to be covered**	
MODULE -I			
1	Lecture-01	**Introduction:** Difference between heat transfer and Thermodynamics. Modes of heat transfer, Basic laws of heat transfer.	
2	Lecture-02	Combined heat transfer mechanism, Analogy between flow of heat and electricity, Unit and dimension.	
3	Lecture-03	**Conduction** :- Derivation of three dimensional Fourier conduction equation in Cartesian coordinates.	
4	Lecture-04	Transformation of Fourier equation into polar coordinates.	
5	Lecture-05	One dimensional steady state heat conduction through slab, cylinder, sphere	
6	Lecture-06	Composite medium, Critical insulation thickness, effect of variable thermal conductivity	
7	Lecture-07	Heat transfer through rectangular and pin fins, solutions of fin equation for different boundary conditions(one boundary condition will be solved)	
8	Lecture-08	Solutions of fin equation for different boundary conditions.(Two boundary conditions)	
9	Lecture-09	Solutions of fin equation for different boundary conditions.(one boundary conditions), Fin effectiveness, Fin efficiency	
10	Lecture-10	Solution of fin problems using numerical techniques	
11	Lecture-11	Introduction to two dimensional steady state heat conduction, Analytical method for solving two dimensional heat conduction problems.	
12	Lecture-12	Problem Solving	
13	Lecture-13	Problem Solving	
14	Lecture-14	Problem Solving	
MODULE -II			
15	Lecture-15	**Convection** :- Mechanism of convection and its classifications, convection heat transfer	

		coefficient
16	Lecture-16	Convection of boundary layer, Energy equation for the laminar boundary layer.
17	Lecture-17	Boundary layer similarities, Integral solution of boundary layer equation for laminar flow over a flat plate.
18	Lecture-18	Heat transfer for laminar flow in tubes
19	Lecture-19	Mechanism of heat transfer in turbulent flow, Reynolds analogy
20	Lecture-20	Natural convection over a vertical plate and Approximate solution
21	Lecture-21	Dimensional analysis applied to forced convection
22	Lecture-22	Problem Solving
23	Lecture-23	Problem Solving
24	Lecture-24	Problem Solving
MODULE - III		
25	Lecture-25	Correlation for external laminar flow
26	Lecture-26	Correlation for external turbulent flow
27	Lecture-27	Correlation for heat transfer to liquid metals
28	Lecture-28	Correlation for free convection heat transfer
29	Lecture-29	Mechanism of film and drop wise condensation, Nusselt's theory of laminar film condensation
30	Lecture-30	Pool boiling regimes, nucleate boiling, film boiling
31	Lecture-31	Peak heat flux, Rohsenow correlation for nucleate boiling
32	Lecture-32	Problem solving
33	Lecture-33	Problem solving
MODULE - IV		
34	Lecture-34	Basic concept of radiant heat transfer. Black body and monochromatic radiation, total emissive power, Stephen Boltzmann law, grey body
35	Lecture-35	Kirchhoff's law, Wien's displacement law, Relation between two black bodies
36	Lecture-36	Shape factors for simple geometries, radiation between two grey bodies
37	Lecture -37	Electrical network method for solving radiation problems, radiation shield.
38	Lecture -38	Use of heat exchanger and its type, Overall heat transfer coefficient, Fouling factor
39	Lecture -39	LMTD, Effectiveness, NTU
40	Lecture -40	Heat exchanger design
41	Lecture -41	Problem Solving
42	Lecture -42	Problem Solving
43	Lecture -43	Problem Solving

Signature of Teacher