Details of Lecture no, contents covered in each lecture, corresponding file name and slide numbers covered in each lecture

Lecture No.	Date/Day	Contents covered	File name of the notes	Slide numbers from the notes
1	28th July 2022 Thursday	Heat Transfer – Modes of Heat Transfer, Fourier's law of conduction, Newton law of cooling, Stefan Boltzman law, Relationship of heat transfer with thermodynamics, Summary on modes of heat transfer	Conduction12021	1 - 19
2	1st August 2022 Monday	Conservation of energy, Applications of conservation of energy, Applications of heat transfer, Steady state conduction, Conduction rate equation, Thermal properties of matter (thermal conductivity, thermal diffusivity), Three dimensional heat diffusion equation in cartesian co-ordinates	Conduction12021	20 - 44
3	2nd August 2022 Tuesday	Problem on heat diffusion equation, Boundary and initial conditions for heat diffusion equation One dimensional steady state conduction without heat generation – Plane wall - Temperature distribution, Thermal resistance, Thermal resistance network	Conduction12021 Conduction22021	45 – 55 1 - 11
4	4th August 2022 Thursday	Thermal resistance network for composite walls, Thermal contact resistance, One dimensional steady state conduction without heat generation – Cylinder, Composite cylindrical wall, sphere	Conduction22021	12 – 35
5	8th August 2022 Monday	Problem on sphere, critical radius of insulation, one dimensional steady state heat conduction with heat generation – Plane wall	Conduction22021	36 – 58
6	11th August 2022 Thursday	one dimensional steady state heat conduction with heat generation – Radial systems and problems, Tutorial problems	Conduction22021 Tutorial1solutions	59 – 73 1 - 34
7	16th August 2022 Tuesday	Heat conduction from extended surfaces – Applications of fins, Limitations of fins, Different configurations of fins, A general conduction analysis of extended surfaces, Temperature distribution and heat flux for fins with various boundary conditions at the fin tip, proper length of the fin	Conduction32021	1 - 24
8	18th August 2022 Thursday	Problem on fins, fin efficiency, fin effectiveness, relationship between fin efficiency and fin effectiveness	Conduction320221	25 – 41
9	22nd August 2022 Monday	Problem on fin efficiency and fin effectivenesss Transient heat conduction, lumped system analysis, criterion for lumped system analysis, problem on lumped system analysis	Conduction32021 Conduction42021	42 – 46 1 - 12

10	23rd August 2022 Tuesday	Transient heat conduction in plane walls, long cylinders and spheres, Non-dimensionalisation of governing equation and boundary conditions, Physical significance of Fourier number, Exact solution for a plane wall, problems	Conduction42021	13 – 40
11	25th August 2022 Thursday	Transient heat conduction in semi-infinite solids along with a problem	Conduction42021	41 – 55
12	29th August 2022 Monday	Transient heat conduction in multi-dimensional systems along with a problem	Conduction42021	55 - 71
13	30th August 2022 Tuesday	Convection – Types of convection, Newton's law of cooling, Definition of heat transfer coefficient, Nusselt number, understanding of terms – internal and external flows, laminar and turbulent flows, one, two and three dimensional flows, Turbulent flow – Turbulent viscosity, Turbulent thermal conductivity, velocity boundary layer, thermal boundary layer, Prandtl number	Convection12021	1 - 23
14	1st Sep 2022 Thursday	Differential analysis of fluid flow, linear motion and deformation, Translation, linear deformation, angular motion and deformation, conservation of mass (continuity equation), conservation of momentum	Convection22021	1 – 31
15	5th Sep 2022 Monday	Conservation of energy	Convection22021	32 - 50
16	6th Sep 2022 Tuesday	Principle of similarity Governing equations in cartesian coordinates, outcomes of the governing equations, Scale analysis of laminar boundary layers, Scale analysis (order of magnitude analysis) of mass and momentum equations For flow over a flat plate	Convection22021 Convection32021	51 – 59 1 – 16
17	8th Sep 2022 Thursday	Scale analysis (order of magnitude analysis) of mass and momentum equations For flow over a flat plate (continued), scale analysis (order of magnitude analysis) of energy equation for flow over a flat plate - Pr << 1 (liquid metals – Na, Hg) thick thermal boundary layer, Pr >> 1 (Oils) thin thermal boundary layer	Convection32021	17 – 24
18	12th Sep 2022 Monday	Tutorial on convection	Tuturial1convectionsolutions	1 - 24
19	13th Sep 2022 Tuesday	Nondimensionalized convection and similarity, Reynolds analogy, Chilton-Colburn analogy (continued) Parallel flow over flat plates – friction factor and heat transfer coefficient and problems	Convection32021 Convection42021	25 – 36 1 – 9
Mid-semester examination – 14th September to 20th September 2022				
20	22nd Sep 2022	External flow over cylinders, spheres and various other shapes and problems	Convection42021	10 – 22

	Thursday			
21	26th Sep 2022 Monday	Internal flow – mean velocity, bulk mean temperature, hydraulic diameter, developing and fully developed flows (hydrodynamic and thermal) for fluids with Pr < 1 and Pr > 1, General thermal analysis for heat fluid flow in a pipe with constant surface heat flux	Convection52021	1 - 13
22	27th Sep 2022 Tuesday	General thermal analysis for heat fluid flow in a pipe with constant wall temperature, concept of NTU, problem, outcomes of the mass and momentum equation, steady laminar, incompressible flow in pipes – velocity distribution, friction factor, outcomes of the energy equation	Convection52021	14 – 29
23	29th Sep 2022 Thursday	Temperature Profile and the Nusselt Number in a circular pipe with constant heat flux, constant temperature, Nusselt numbers and friction factors for other shaped ducts, problem	Convection52021	30 – 43
24	3rd Oct 2022 Monday	Turbulent internal flows, velocity distribution, friction factor, Nusselt number, Problems	Convection52021	44 – 64
25	4th Oct 2022 Tuesday	Heat Exchangers, Types of Heat Exchangers, Overall heat transfer coefficient, Fouling, LMTD approach of heat exchangers – Parallel flow HE	BasicdesignmethodsofHE1	1 – 24
26	6th Oct 2022 Thursday	LMTD approach of heat exchangers – counter flow HE, problems, LMTD-F approach, condenser and evaporator,	BasicdesignmethodsofHE1	25 – 49
27	10th Oct 2022 Monday	Effectiveness NTU approach of heat exchanger design, problems	BasicdesignmethodsofHE2	1 – 14 25 - 32
28	11th Oct 2022 Tuesday	Interpretation of all graphs of Effectiveness and NTU of heat exchangers, problems	BasicdesignmethodsofHE2	15 – 24
29	13th Oct 2022 Thursday	Thermal Radiation – Process and properties, Fundamental concepts, Electromagnetic spectrum, Description of thermal radiation – spectral and directional distribution, Radiation intensity, solid angle	Radiation12021	1 - 16
30	17th Oct 2022 Monday	Intensity of emitted radiation, Incident radiation (Irradiation), Radiosity	Radiation12021	17 – 30
31	18th Oct 2022 Tuesday	Spectral quantities of radiation, problem Blackbody radiation, Stefan Boltzman law and its historical perspective	Radiation12021 Radiation22021	31 – 35 1 – 4
32	20th Oct 2022 Thursday	Cavity as a perfect absorber and emitter, Spectral blackbody emissive power – Planck Distribution, Wein's displacement law, Band emission, Problems, Surface emission of real surfaces, Spectral directional emissivity, total directional emissivity, spectral hemispherical emissivity, Total hemispherical emissivity, average emissivity	Radiation22021	5 – 32

33	25th October 2022 Tuesday	Problem on average emissivity, temperature dependence of total, normal emissivity, emissivity of different materials, absorptivity, reflectivity and transmissivity, Spectral directional absorptivity, spectral hemispherical absorptivity, Total hemispherical absorptivity, Reflectivity, Spectral directional reflectivity, spectral hemispherical reflectivity, Total hemispherical reflectivity	Radiation22021	33 – 56
34	27th October 2022 Thursday	Problems, Kirchoff's law, Historical perspective of Kirchoff's law, Green house effect, Gray surface, Radiation exchange between surfaces, View factor	Radiation22021 Radiation32021	57 – 71 1 – 7
35	31st October 2022 Monday	Rules to compute view factors, Radiation heat transfer between black surfaces	Radiation32021	8 – 37
36	1st November 2022 Tuesday	Problem on black surfaces, Radiation heat transfer: Diffuse, Gray surfaces, net radiation heat transfer to or from the surface, reradiating surface, Net radiation heat transfer between any two diffuse, gray and opaque surfaces, Radiation heat transfer in two surface enclosures, small object in a cavity, Infinitely large parallel plates, infinitely long concentric cylinders, concentric spheres	Radiation32021	38 – 57
37	3rd November 2022 Thursday	Problems, Radiation shields	Radiation32021	58 – 76
38	7th November 2022 Monday	Radiation shields, Radiation effect in temperature measurements Natural convection – Equations of motion, similarity approach	Radiation32021 Convection62021	77 – 86 1 - 11
39	8th November 2022 Tuesday	Natural convection – similarity approach (continued), correlations and problems	Convection62021	12 - 29
40	10th November 2022	Revision of the whole course		

Holidays because of which classes got missed

9th August 2022 - Tuesday – Muharram

15th August 2022 - Monday – Independence day

24th October 2022 – Monday – Deepavali

8th November 2022 – Tuesday – Gurunanak's Birthday