

PROFESSOR'S NAME	Prof. Ashoke De
DEPARTMENT	Department of Aerospace Engineering
INSTITUTE	Indian Institute Of Technology Kanpur
COURSE OUTLINE	<p>Introduction; Governing equations and general scalar transport equation; Mathematical classification of PDEs</p> <p>Mesh terminology and types; Discretization methods; Solution of discretization equations;</p> <p>Accuracy, consistency, stability and convergence</p> <p>2D steady and unsteady problems, BC; Errors and stability analysis; Diffusion in orthogonal and non-orthogonal meshes; Gradient calculation and discussion</p> <p>Direct Vs Iterative solvers; Data-structures; TDMA, Jacobi and gauss-seidel methods; General iterative solvers; Multigrid methods</p>

COURSE DETAILS

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1	M1_L1	Introduction & Mathematical description Part-1
2	M1_L2	Introduction & Mathematical description Part-2
3	M1_L3	Introduction & Mathematical description Part-3
4	M1_L4	Introduction & Mathematical description Part-4
5	M2_L5	Numerical Methods Part-1
6	M2_L6	Numerical Methods Part-2
7	M2_L7	Numerical Methods Part-3
8	M2_L8	Numerical Methods Part-4
9	M2_L9	Numerical Methods Part-5

10	M2_L10	Numerical Methods Part-6
11	M3_L11	Diffusion Equation Part-1
12	M3_L12	Diffusion Equation Part-2
13	M3_L13	Diffusion Equation Part-3
14	M3_L14	Diffusion Equation Part-4
15	M3_L15	Diffusion Equation Part-5
16	M3_L16	Diffusion Equation Part-6
17	M3_L17	Diffusion Equation Part-7
18	M3_L18	Diffusion Equation Part-8
19	M4_L19	Linear Solvers Part-1
20	M4_L20	Linear Solvers Part-2
21	M4_L21	Linear Solvers Part-3
22	M4_L22	Linear Solvers Part-4
23	M5_L23	Convection Equation Part-1
24	M5_L24	Convection Equation Part-2
25	M5_L25	Convection Equation Part-3
26	M5_L26	Convection Equation Part-4
27	M5_L27	Convection Equation Part-5
28	M5_L28	Convection Equation Part-6
29	M5_L29	Convection Equation Part-7
30	M5_L30	Convection Equation Part-8
31	M6_L31	Fluid Flow problems Part-1
32	M6_L32	Fluid Flow problems Part-2
33	M6_L33	Fluid Flow problems Part-3
34	M6_L34	Fluid Flow problems Part-4
35	M6_L35	Fluid Flow problems Part-5

36	M6_L36	Fluid Flow problems Part-6
37	M6_L37	Fluid Flow problems Part-7
38	M6_L38	Fluid Flow problems Part-8
39	M7_L39	Advanced topics Part-1
40	M7_L40	Advanced topics Part-2

Reference :

1. Patankar, S. V. , ***Numerical Heat Transfer and Fluid Flow***, McGraw-Hill, NewYork, 1980.
2. Chung, T. J., ***Computational Fluid Dynamics***, Cambridge University Press, 2002.
3. Ferzziger, J.H., and Peric, M., ***Computational Methods for Fluid Dynamics***, Springer, 2002.
4. Versteeg, H. K., and Malalasekera, W., ***An Introduction to Computational Fluid Dynamics***, Longman Scientific and Technical, 1995.

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