



FOUNDATION OF COMPUTATIONAL FLUID DYNAMICS

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COURSE OUTLINE :

This is an introductory course in CFD. In this course, students will be exposed to basics of CFD. Students will gain knowledge on FD/ FV strategy, formulation of the problem and solution techniques. Students at the end of the course will get to experience a simple and sample working CFD code and thus develop confidence.

ABOUT INSTRUCTOR :

Prof. Vengadesan did B.E (Hons.) in Mechanical Engineering from NITT, MS (by Research) from IITM and PhD from Kobe University, Japan. He has been teaching various UG and PG courses related to Fluid Mechanics at IITM since 2003. His areas of research interests are CFD, Turbulent flows and modeling, Application of these techniques for different theoretical and industry problems, insect aerodynamics and biofluid dynamics. He had so far guided 3 PhD and 13 MS and currently guiding 5 PhD and 5 MS.

COURSE PLAN :

Week 1: Introduction, Review of basic fluid mechanics, Review of equations and importance of terms, Review of equations (contd.) and non-dimensionalization, Vorticity-Stream function equation, classification of equation and the solution nature, Classification of equations (contd.), types of boundary conditions and description about standard test cases.

Week 2: Steps involved in CFD, Information about Computational domain and grid with illustration

Week 3: Different Approximation Methods

Week 4: FV formulation for diffusion equation 1D

Week 5: Illustration on the performance by different approximation for convection terms

Week 6: Introduction to Turbulent flows

Week 7: Matrix inversion Direct, Iterative procedure

Week 8: Demonstration of a test case with a display of working CFD code and details