

Title:- Understanding Computational Fluid Dynamics: Fundamentals and Numerical Methods

Abstract:

Computational Fluid Dynamics (CFD) is indispensable in modern engineering for simulating fluid flows and heat transfer with precision. Computational Fluid Dynamics enhances design processes, optimizes performance predictions and facilitates innovative solutions across various industries. This presentation tries to cover a comprehensive introduction to Computational Fluid Dynamics, explaining its principles and operational mechanisms. Computational Fluid Dynamics relies heavily on numerical methods, enabling it to tackle a wide range of problems, from straightforward analytical cases to complex real-world scenarios. Key numerical methods—Finite Difference, Finite Volume, and Finite Element—will be explored, accompanied by simple illustrations to have an intuitive understanding of implementation and practical significance in engineering applications.