



Course Name:

Computational Fluid Dynamics (CFD) and Heat Transfer

Course Number: -	Credit: 3
Program: Graduate	Course Type: General Selective
Prerequisite: -	Corequisite: -

Course Description (Objectives):

The course aims to introduce the fundamental concepts of Computational Fluid Dynamics (CFD), governing equations, numerical discretization, and the analysis of compressible and incompressible flows. Students also learn various numerical solution methods and the applications of CFD to complex problems.

Course Content (outline):

- Chapter 1: Introduction to CFD and its applications
- Chapter 2: Governing equations
- Chapter 3: Mathematical behavior of PDEs
- Chapter 4: Flow Types. Simplification and modeling governing equation
- Chapter 5: Discretization
- Chapter 6: Solution of algebraic systems of equations
- Chapter 7: Unsteady Problems- Implicit and explicit methods. Stability and Error Analysis.
- Chapter 8: Solution of Navier-Stokes, energy and scalar equations
- Chapter 9: Finite volume methods, complex grid systems

References:

- “Computational Fluid Mechanics”, J.D. Anderson, McGraw-Hill.
- “Computational Fluid Mechanics”, T.J Chung, Cambridge.
- “Computational Fluid Mechanics and Heat Transfer”, Petcher et al., CRC Press.
- “Computational Fluid Mechanics and Heat Transfer”, Tannehill et al., Taylor and Francis.