



AL IMAM MOHAMMAD IBN SAUD ISLAMIC UNIVERSITY
COLLEGE OF ENGINEERING
Department of Mechanical Engineering

Course Information	
Course Code and Name:	ME 473 Computational Fluid Dynamics
Credit Hours:	3 (3 Lecture + 1 Tutorial)
Prerequisites:	MATH 345 Numerical Methods, ME 324 Heat Transfer

Course Description
Physical and mathematical foundations of computational fluid mechanics with emphasis on applications. Solution methods for model equations and the Euler and the Navier-Stokes equations. The finite volume formulation of the equations. Classification of partial differential equations and solution techniques. Truncation errors, stability, conservation, and monotonicity. Computer projects.

Textbook			
Title	An Introduction to Computational Fluid Dynamics: The Finite Volume Method		
Authors	Henk Kaarle Versteeg, Weeratunge Malalasekera.		
Publisher	Pearson Education Limited	Year and Edition	2007, 2nd edition

Course Contents
Introduction, what is CFD, how does CFD code works, problem solving with CFD
Conservation laws of fluid motion and boundary conditions
Navier-Stoke equations for a Newtonian fluid
The finite volume method for convection-diffusion problems
Solution algorithms for pressure-velocity coupling in steady flows
The finite volume method for unsteady flows
Implementation of boundary conditions
Truncation errors, stability and monotonicity
Turbulence and its modelling
Tr Computer projects

Academic Coordinator Dr. Syed M. Fakhir Hasani	Signature 
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