University of Pretoria Yearbook 2020

Computational fluid dynamics 411 (MKM 411)

Qualification	Undergraduate
Faculty	Faculty of Engineering, Built Environment and Information Technology
Module credits	16.00
Programmes	BEng Mechanical Engineering
	BEng Mechanical Engineering ENGAGE
Prerequisites	(MTV 310), (MKM 321)
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

A fast review of partial differential equations, introduction to continuum mechanics, continuity equation, momentum equation, Navier- Stokes equation, energy equation, boundary conditions in thermal fluid systems, finite difference method, linear and non-linear partial differential equations, introduction to finite volume method (FVM), FVM for diffusion problems, FVM for convection-diffusion problems, introduction to pressure-velocity coupling in FVM, SIMPLE algorithm, introduction to computational fluid dynamics (CFD) software packages and their abilities, using CFD commercial software packages to solve thermal-fluid engineering problems.