

MT-514	Numerical Methods in Heat Transfer
	<p><u>Finite Difference Methods:</u> Discretisation, Approximation to derivatives, Accuracy, Finite element method, Weak form of partial differential equations, Galerkin form, Interpolations and shape functions, Matrix form, Examples.</p> <p><u>Methods of Prediction:</u> Experimental investigation and analytical methods and their limitation and strength, Equations governing transport phenomena, Energy equation, Mass conservation equation, Momentum equation, K-dissipation equation, Physical meaning of parabolic, Elliptic and Hyperbolic equations.</p> <p><u>Spectral Methods:</u> Orthogonal functions, Examples, Pseudo spectral method, Control (finite) volume method, Control volume formulation, Four basic rules, Heat conduction problems, Convection and diffusion problems.</p> <p><u>Applications in Heat Transfer:</u> Heat conduction, Heat transfer in ducts, Convective heat transfer and combustion, Steady and un- steady one dimensional conduction, Two and three dimensional problems and turbulence modelling.</p> <p><u>Reference Books:</u></p> <ol style="list-style-type: none"> <li>1. Taylor and Francis, <i>Numerical Heat Transfer: Application</i>, Hemisphere Pub. Corp., 2004.</li> <li>2. Kaviany M, <i>Principles of Heat Transfer</i>, John Wiley &amp; Sons Inc, 2002.</li> <li>3. Minkowycz W.J, Sparrow E.M and Abraham J.P, <i>Advances in Numerical Heat Transfer (Computational &amp; Physical Processes in Mechanics &amp; Thermal Science)</i>, CRC Press, 2009.</li> <li>4. Kreith F and Mark S.B, <i>Principles of Heat Transfer</i>, 6th Edition, Brooks &amp; Cole Pub Co., 2000.</li> </ol>