

Applied Mathematics 677 Numerical Solution of Partial Differential Equations

Explicit and implicit methods for PDE, difference equations.

Course Hours: H(3-0)

Prerequisite(s): [Applied Mathematics 311](#) and [491](#).

Syllabus

<u>Topics</u>	<u>Time</u>
Numerical methods for ODEs: multistep methods, Runge-Kutta methods, stability and accuracy, error control.	10
Finite difference methods for elliptic equations: difference operators, convergence analysis.	5
Finite element methods for elliptic equations: construction of finite element approximations, function spaces and norm equivalences, proof of convergence for the homogeneous Dirichlet boundary value problem, a posteriori error analysis and adaptivity, extensions to higher dimensions.	12
Iterative solution of sparse linear systems.	3
Partial differential equations of evolution. Stability and convergence for finite difference and finite element methods.	6
TOTAL HOURS	36
