

Mathematics 661.05
Numerical Differential Equations

Calendar Description: fundamentals of solving Des, numerically addressing the existence, stability and efficiency of such methods.

Prerequisites: Applied Mathematics 311 or consent of the department.

Textbook: “Numerical Analysis – Mathematics of Scientific Computing” by David Kincaid and Ward Cheney, American Mathematical Society.

(see Course Descriptions under the year applicable: <http://www.ucalgary.ca/pubs/calendar/>)

Syllabus

<u>Topics:</u>	<u>Number of Hours</u>
Introduction to initial value problem of ODE, Euler’s method	2
Explicit and implicit multistep methods, stability, convergence	3
Explicit and implicit Runge-Kutta method, stability, convergence, consistency	3
Shooting method for boundary value problem	2
Finite difference methods, stability, convergence	6
Multigrid method for linear and nonlinear partial differential equations	2
Characteristic method for first order partial differential equation	2
Finite element methods, convergence, construction of finite element approximation, basis function and norm equivalence, error analysis	6
Spectral and higher-order methods	5
Boundary element method	3
Iterative solution of sparse linear system	2
TOTAL:	36

Last modified on 2016-04-26

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