

King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics
Math 571 – Syllabus
2015 (151)
Instructor: Dr. Faisal A. Fairag

Title: Numerical Analysis of Ordinary Differential Equations

Credit: 3-0-3

Textbook: Numerical Methods for Ordinary Differential Equations 2nd Edition by John C. Butcher.

Description: Theory and implementation of numerical methods for initial and boundary value problems in ordinary differential equations. One-step, linear multi-step, Runge-Kutta, and extrapolation methods; convergence, stability, error estimates, and practical implementation, Study and analysis of shooting, finite difference and projection methods for boundary value problems for ordinary differential equations.

Topics	# of weeks
Chapter 2. Numerical Differential Equation Methods	12
Chapter 3. Runge–Kutta Methods	12
Chapter 4. Linear Multistep Methods	12
Chapter 5. General Linear Methods	12
Brief introduction to: <ul style="list-style-type: none"> • Numerical Solution of Stochastic Differential Equations • Numerical Solution of Differential-Algebraic Equations • Numerical solution of fractional differential equations 	3

Grading Policy:

Homework	25
Mini-project	15
Exam 1	12
Exam 2	12
Final Exam	26
Presentation of selected sections*	10

* In this task you are expected to read, understand and explain the material of selected sections of the textbook to you classmates. This is a 100 minutes presentation in about one and a half class meetings.