

# KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

## Department of Mathematics & Statistics

### MATH 571 - Numerical Analysis of Ordinary Differential Equations Course Syllabus

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**Textbook:** Numerical Methods for Ordinary Differential Equations 3rd 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.

**Assessment:**

- Exam 1: 30%
- Homework and other Assignments: 30%
- Final Exam: 40% (Comprehensive; Date and Location: To Be Announced)

**Instructor:**

Dr. Manal Alotibi ([manal.alotibi@kfupm.edu.sa](mailto:manal.alotibi@kfupm.edu.sa))

**Office hours:**

Sunday and Tuesday: 11:30 am -2:30 pm (or set an appointment if needed)

Topics	Number of weeks
Chapter 1: Differential and Difference Equations	3
Chapter 2. Numerical Differential Equation Methods	3
Chapter 3. Runge–Kutta Methods	3
Chapter 4. Linear Multistep Methods	3
Chapter 5. General Linear Methods	3