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Differential Equations

MATH-232*

This course is intended for any student who has taken a first year calculus course and wishes or is required to learn more about differential equations *and* is not specifically required to take MATH-231*.

Textbook: *Elementary Differential Equations*, 4th Edition
by Edwards and Penney (Prentice-Hall)

Prerequisite: First year calculus *and* some knowledge of linear algebra (eigenvalues, eigenvectors).

Instructor: A. Ableson

Evaluation: Quizzes (5% per quiz, best 10 scores out of 11 quizzes) 50%
Final examination 50%

Outline:

This course will introduce the fundamentals of creating and solving differential equations. Students will be able to recognize important types of differential equations as they occur in a variety of applications, and will have the skills to solve homogeneous and non-homogenous linear equations and systems. This course will be helpful for students intent on working in computational biology, environmental science, economics, and other fields involving the quantitative study of dynamic processes.

Areas of study:

- Direction fields
- Solving DEs by direct integration
- Separable equations
- First order linear equations
- Linear DEs w/ constant coefficients
- Non-homogeneous linear DEs w/constant coefficients
- Solving DEs and systems of DEs using Laplace transforms
- Solving systems of DEs using eigenvectors
- Direction fields for linear systems
- Linearization and stability of non-linear DEs