

MATH 262: Ordinary Differential Equations

Instructor: Mike O'Neil (oneil@cims.nyu.edu)
 Time and location: Mon & Wed, 9:30am - 10:45am, CIWW 312
 Office hours: Thu, 11am-12pm, (or by appt), CIWW 1119

Recitation

Instructor: Vismayie Vandanapu (vv846@nyu.edu)
 Time and location: Fri, 3:30pm - 4:45pm, CIWW 201

This is a first course in ordinary differential equations which will cover analytical solution methods, elementary numerical methods, and modeling. Topics to be covered include: first-order equations including integrating factors; second-order equations including variation of parameters; series solutions; elementary numerical methods including Euler's methods, Runge-Kutta methods, and error analysis; Laplace transforms; systems of linear equations; boundary-value problems. Some optional topics to be chosen at the instructor's discretion include: nonlinear dynamics, elementary partial differential equations, Sturm-Liouville theory, and Fourier series.

Textbook: Martin Braun, *Differential Equations and Their Applications*, 4th Edition, 1993

Available on SpringerLink for free to NYU affiliates:

<https://link.springer.com/book/10.1007%2F978-1-4612-4360-1>

Grading: An overall numerical grade for the course will be computed from weekly homework (10%), two preliminary exams (25% each), and one final exam (40%). The numerical grade will be converted to a letter grade. Any curve in the course will only adjust letter grades higher.

Academic Integrity: Students are expected to adhere to NYU's Academic Integrity Policy:

<https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/academic-integrity-for-students-at-nyu.html>

Weekly topic list

Week 1:	First order equations, integrating factors
Week 2:	Separable systems, exact equations
Week 3:	Existence, uniqueness
Week 4:	Constant coefficient 2nd order systems
Week 5:	Review and prelim exam 1
Week 6:	Variation of parameters, series solutions
Week 7:	Laplace transforms
Week 8:	Coupled linear ODEs
Week 9:	Eigenvalue/vector solution method
Week 10:	Review and prelim exam 2
Week 11:	Stability, the phase-plane
Week 12:	Phase portraits, Poincaré-Bendixson
Week 13:	Separation of variables
Week 14:	Fourier series
Week 15:	Sturm-Liouville theory