MATH 3310.001: Differential Equations with Applications (preliminary)

TIME AND PLACE: MWF 9:00 - 9:50am RTFP135
PROFESSOR: Santiago I. Betelú
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TEXT: Elementary Differential Equations, by Boyce and Di Prima, ninth edition. OFFICE HOURS: 1:00 - 2:00 MTWR

Schedule (Week number and Content)

1-2 Classification - First order Linear Equations - Exact equations
3 Homogeneous equations - Orthogonal trajectories and Families of curves - Applications: population dynamics
4 Integrating factors - Applications: mixing problems with fluids in tanks
5 Reduction of order - Applications: Hanging chains - Pursuit curves
6 Electrical circuits, linear and nonlinear
7 Second order linear equations
8 Undetermined coefficients and variation of parameters
9 Deriving new solutions from known ones. Applications: Oscillators, free and forced
10 Newton's laws and Kepler laws of planetary motion
11 Higher order equations. Applications: coupled oscillators, beats and resonances
12 Power series solutions - Ordinary points - Application: Steady state temperature distributions
13 Regular singular points - Hypergeometric, Bessel, Legendre equations. Applications: oscillating membranes and incompressible irrotational flow
14 Calculus of variations - Applications: minimal travel times, some optimization problems
15 Isoparametric problems - Applications: Constrained minimal surfaces
16 Comprehensive review
May 11 Final Exam 8:00-10:00am

Grading: Grades will be based on three midterm exams (20 points each), a comprehensive final (30 points) and homework (10 points). To earn an A, 90 points are sufficient, 80 for a B, 70 for a C and 60 for a D.

Exams: Midterm exams will be given in class on Feb 16, March 23 and April 27. The final exam is scheduled on May 11 from 8 to 10. All midterm exams are on the same classroom during the regularly scheduled class time (these dates may change). If you miss an exam for any reason you will receive a 0. No calculators, cellphones or any electronic device are allowed in the exams.

Homework: will be assigned each class, to be completed the following class. The homework must be neat, stapled, show your name, homework assignment and show all intermediate steps. Unclear or late homework will receive zero points.

Disabilities: It is responsibility of students with certified disabilities to provide the instructor with appropriate documentation from the Dean of Students Office.

Cheating: Will not be tolerated. Anyone caught cheating will receive an F for the course.

Note: Students may only apply one of Math 3310 or Math 3410 toward a minor in mathematics.