Ordinary Differential Equations MATH-UA 262
Fall 2018

Course Information:

Lectures: Tuesdays and Thursdays 9:30am - 10:45am,
TISC LC11

Recitations: Fridays 11-12:15pm
CIWW 1302

Instructor: Dr. Jennifer Crodelle
Office: WWH 923 (Courant)
Email: crodelle@cims.nyu.edu
Office Hours: Tues. 11am-12pm, Fri. 10-11am, and by appointment.

Teaching Assistant:
Tristan Leger
Office hours: Wed 3pm - 5pm in WWH 805.

Content:

Textbook: Braun, M. *"Differential Equations and Their Applications,"* **4th ed** (1993)

Prerequisites:

Completion of MATH-UA 123 Calculus III or MATH-UA 213 Math for Economics III (for Economics majors) and MATH-UA 140 Linear Algebra with a grade of C or better or the equivalent.

Assignments and Grading:

Homework and/or quizzes (15%): Homework to be assigned approximately weekly.

Two Exams (25% each)

Final Exam (35%)

Class Policies:

Disabled students that need a longer period of time for exams (as determined by the Moses Center for Students with Disabilities) should contact the instructor at the start of the course. You will not be given extra time if you present this information just before an exam.

Exams:

No computers, calculators, or cell phones are allowed during the exam (i.e., no electronic gizmos). No class notes or textbooks allowed.

Late Homework Policy:

There is no late homework policy. Homework must be submitted by the deadline on the day that it is due. If you are unable to in hand your homework on time, then you must make arrangements with me in advance and **not** after the due date. Note that three homework assignments will be dropped.

Appealing Grades:

Any disputes in grading should be made within **one week** of receiving the graded homework or exam. Stop by my office during office hours to discuss the appeal.

Academic Integrity:

At all times, students are expected to adhere to the NYU University Policy on Student Conduct. If a student is suspected of cheating, a letter will be sent to the NYU Office of Community Standards, and they will handle the issue.

In the case of problem sets, collaboration between students is encouraged. However, each student must write his/her own solutions and submit his/her own problem sets. Copying someone else's solution or Matlab code is not allowed.

In the case of exams, there is no collaboration of any kind permitted. If cheating is suspected, then an explanation will be requested. If the explanation is not satisfactory, then an exam grade of zero will be given and a report will be made to the Associate Dean of Students.

General Advice:

- Attend every class. Although there is no attendance policy, this course will become much more difficult if you fail to attend class regularly.
- Come to office hours and attend recitation. These are in place to ensure that you have plenty of opportunities to ask questions and clarify points made in class or on the homework.

Tentative Schedule:

Lecture #	Date	Topic (sections in Braun)	Section (Braun)
Lecture 1	Sept 4	Introduction and first-order ODEs	1.1, 1.2
Lecture 2	Sept 6	Integrating factors, separable eqns	1.2, 1.4
Lecture 3	Sept 11	Modeling problems	1.5, 1.8
Lecture 4	Sept 13	Exact differential equations	1.9
Lecture 5	Sept 18	Existence and uniqueness	1.10
Lecture 6	Sept 20	Existence and uniqueness	1.10
Lecture 7	Sept 25	Numerical Approximation, Euler's Method	1.13
Lecture 8	Sept 27	Error and Taylor series method	1.14
Lecture 9	Oct 2	Second-order linear eqns	2.1
Lecture 10	Oct 4	Second-order linear eons with constant coefficients	2.2
Monday schedule	Oct 9	—	
Test	**Oct 11**	**Test 1**	
Lecture 11	Oct 16	Case of equal roots	2.2
Lecture 12	Oct 18	Nonhomogeneous eqns, variation of parameters	2.3, 2.4
Lecture 13	Oct 23	Method of judicious guessing, mechanical vibrations	2.5, 2.6
Lecture 14	Oct 25	Modeling problems - tacoma bridge and electrical networks	2.6
Lecture 15	Oct 30	Series solutions	2.8
Lecture 16	Nov 1	Series solutions - regular singular points	2.8
Lecture 17	Nov 6	Systems of equations, review linear algebra	3.1-3.7 parts
Lecture 18	Nov 8	Eigenvalue/eigenvector method	3.8
Test	**Nov 13**	**Test 2**	
Lecture 19	Nov 15	Complex roots, equal roots	3.9, 3.10
Lecture 20	Nov 20	Fundamental matrix solutions	3.11

Fall break	Nov 22	—	
Lecture 21	Nov 27	Nonhomogeneous eqn - variation of parameters	3.12
Lecture 22	Nov 29	Nonlinear diff eq, qualitative theory	4.1
Lecture 23	Dec 4	Stability of linear systems	4.2
Lecture 24	Dec 6	Stability of equilibrium solutions	4.3
Lecture 25	Dec 11	Phase plane analysis	4.4
Lecture 26	Dec 13	Modeling: predator prey, epidemiology	4.10 4.12