

Instructor.

Rob Forsythe

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Office Hours: Monday through Friday, 8:55-9:55, and by appointment

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Course Description: An introductory course on ordinary differential equations. Methods for finding exact solutions to elementary differential equations (first-order, second- and higher-order linear, nonlinear). Methods for approximating solutions (series solutions, numerical methods). *Prerequisite:* Math 237 (Calculus II)

Materials.

Text. *Fundamentals of Differential Equations* (7th edition) by Nagel, Saff, and Snider, published by Pearson/Addison-Wesley, ISBN: 978-0-321-60434-7.

Software. You should get some software that can produce two-dimensional graphs and can sketch *direction fields* as well as numerical approximations of solutions to differential equations. One such package, called WinPlot, is available online for free downloads.

Order of Topics.

- I. First-Order Differential Equations.
 - A. Theory and Procedures for Solving.
 - B. Applications/Modeling.
 - C. Methods of Approximation (Euler, Heun, Taylor, Runge-Kutta).
- II. Second-Order Linear Differential Equations.
 - A. Equations with Constant Coefficients.
 1. Homogeneous.
 2. Non-Homogeneous.
 - B. Equations with Variable Coefficients.
- III. Higher-Order Linear Differential Coefficients.
- IV. Laplace Transforms.
- V. Series Solutions and Approximations.

Tentative Schedule by Section. (Starred sections contain optional material.)

<u>The week of</u>	<u>Section(s)/other</u>	<u>The week of</u>	<u>Section(s)/other</u>
01/24-01/28	1.1, 2.1, 2.2	03/28-04/01	6.1, 6.2, 6.3, 6.4
01/31-02/04	2.3, 2.4, 2.5*	04/04-04/08	7.1, 7.2, 7.3
02/07-02/11	Exam 1 , 2.6*, 3.1	04/11-04/15	7.4, 7.5, Exam 4
02/14-02/18	3.2, 3.3*, 3.4*	04/18-04/22	7.6, 7.7
02/21-02/25	1.4, 3.6, 3.7*	04/25-04/29	8.1, 8.2, 8.3, 8.4*
02/28-03/04	Exam 2 , 4.1	05/02-05/06	8.5*, 8.6*, Exam 5
03/07-03/11	4.2, 4.3, 4.5	05/09-05/13	8.7*, Reading Day
03/14-03/18	4.6, 4.7*, Exam 3	05/16	Final Exam 11:15-1:45
03/21-03/25	Spring Break		

Grades.

Components: Your course grade will be based on your performance on homework and exam(s).

Homework. Except for a few sections that are merely introductory, there is one homework assignment for each section of the text that we will cover. Homework assignments consist of exercises taken directly from the book. There are answers in the back of the book for most of the odd-numbered exercises but there aren't any for the even-numbered exercises. Exercises of both types will appear in each assignment. Each assigned odd-numbered exercise will be worth one point and each even-numbered one will be worth four. To receive credit for any odd-numbered exercise you must (a) get the right answer and (b) show sufficient evidence that you worked out that solution and didn't just copy it from the back of the book.

Let me suggest this approach to the odd-numbered exercises. Think of them as practice. For any one such exercise, try it first and check your answer. Rework it as many times as you need until you get the right answer. Put off working on the even-numbered exercises until after you've successfully practiced with the odd-numbered ones.

Exam(s). There will be five in-class exams and one final exam. The final exam is comprehensive.

Weights: Homework 20%, in-class exams 50%, final exam 30%.

Scale: $0\% \leq F < 60\% \leq D < 70\% \leq C < 80\% \leq B < 90\% \leq A \leq 100\%$.

Additional Requirements. In order to pass the course with at least a C you must:

1. turn in at least 75% of the homework assignments,
3. earn at least 50% overall on the homework, and
4. earn a score of at least 50% on the final exam.

NC Grades. To receive an NC grade, you must meet the three additional requirements listed above for passing with a C and miss no more than four classes. Requests for an NC grade must be made by the student in writing (email is OK) by the last day to withdraw with a W (March 18).

Policies.

Absences and Tardies: Attendance will be taken regularly, and you are expected to show up on time for all class sessions. For the instructor's purposes, a tardy is the same as an absence. Attendance affects your grade only as noted above.

Missed or Late Exams: If you know beforehand that you cannot make it to class on the day of an exam, you must contact me *in advance*. If we can agree upon other arrangements beforehand, then you will not be penalized for missing the exam; otherwise, if you miss an exam you will receive a score of zero. Please note that travel plans are not a valid reason for missing an exam, and we have an exam on the Thursday before Spring Break. If you show up late to an exam, you will not receive any additional time to finish your test.

Missed or Late Homework: These receive a score of zero and do not count as being turned in. You may give your assignments to a fellow student to turn in for you. And you may turn them in early at my office.

Academic Dishonesty: Any student found cheating is subject to University disciplinary policy in addition to action taken by the individual instructor. (This *begins* with a zero on the pertinent assignment.)

NOTE: Use of a cell phone or any other communications device during an exam counts as cheating.

Disruptive Behavior: A faculty member may require a student to leave the classroom when the student's behavior disrupts the learning environment of the class. A student found responsible for disruptive behavior in the classroom may be administratively withdrawn from the course. Some examples of behavior that will be counted as disruptive are use of a cell phone, surfing the internet, talking unnecessarily, making fun of another student, sleeping, and habitual tardiness. After receiving one warning, a student will be penalized one letter grade for each incidence of disruptive behavior.