Math 334: Ordinary Differential Equations

Fall 2020

(Section 1 & 2)

Instructor: Tuan Pham
Course Credits: 3
Time and Location:

- Section 1: 12:30 - 1:45 PM on Tuesday and Thursday at JKB 3108.

- Section 2: 5:00 - 6:15 PM on Tuesday and Thursday at JKB 3108.

Email: tuan.pham@mathematics.byu.edu
Couse website:
http://math.byu.edu/~tpham/Courses/F20-Math-334/F20-Math-334.html
Learning Suite:

- Section 1: https://learningsuite.byu.edu/.UK71/cid-KpJAfbHuqOdp/home

- Section 2: https://learningsuite.byu.edu/.UK71/cid-9pckLxyko6AV/home

Office: TMCB 367, **phone:** 801-422-7873
Office Hours: held on Zoom on MWF 11:30 - 1:00 PM and TTh 2:00 - 3:30 PM with

Meeting ID: **442 950 6864**
Password: 12345

Textbook: "*Elementary Differential Equations*", 11th Edition, by Boyce, Diprima and Meade.
Note: There is another version of the book with title "Elementary Differential Equations and Boundary Value Problems" by the same authors. This textbook is the same as the previous one, except that it has two more chapters (10 and 11). Because we will only cover Chapters 1-7, either textbook will work for this course.

Other Learning Resources:

1. Math Lab is open for online and in-person service. You can ask questions or request tutoring there. Please check out this website to know how: https://math.byu.edu/?page_id=193.

2. If you would like to interact with other students taking the same class (maybe from different sections), please go to this website: `piazza.com/byu/fall2020/math334` and enroll yourself as a student.

Course Description: Students will be introduced to differential equations. These equations can model various phenomena in real-life, including the mass-spring motion, the electrical circuits, the population growth, the heat transfer, and more. Students will learn basic techniques to solve differential equations, visualize and interpret the solutions. In case an equation is too hard to solve, students will learn how to infer some properties of the equation (without solving it). These properties include existence, uniqueness, asymptotic behaviors (i.e. behavior after a long time), boundedness, and periodicity. Understanding an differential equation leads to an understanding of the phenomenon it describes. This course is suitable for all who are interested in science, engineer, or economics. The prerequisite is Math 113 and 213 (or 313).

Learning Outcomes: Upon completion, a successful student will be able to:

1. Write mathematical models of certain phenomena such as mass-spring motion, heat transfer, radiation time, and so on.
2. Know how to solve linear differential equations with constant coefficients.
3. Know how to solve some differential equations with non-constant coefficients using Variation of Parameter method, Laplace transform, or power series.
4. Know how to solve systems of linear differential equations using eigenvectors and eigenvalues.
5. Identify certain behaviors of solutions, for example asymptotic behaviors, boundedness, and stability of the solutions under slight variation of input parameters.

Grading:
Written homework: 30%
Midterm 1: 20%
Midterm 2: 20%
Final Exam: 30%

Written homework: due at 11:59 PM on Gradescope almost every Wednesday and Friday. A schedule of written homework assignments was posted on the course website and Learning Suite.
Policy: Homework must be submitted on Gradescope. You can work on their own paper, then take a picture (making sure that your name is readable) and upload it on Gradescope. Typing would be great, but not required. Students are encouraged to work together. However, homework must be written individually in your own words and reflect your own understanding.

Each homework set is worth 30 points. The lowest four scores will be dropped. Only a few selected problems will be graded in detail. The rest will be given credit based on

completion. There will be a bonus problem to some homework sets, given during the course, that helps students earn extra points. The bonus problem is always graded.

If you experience extended illness, injury, hospitalization, or other major disruption during the semester and cannot complete your work please speak to your instructor. Special accommodations may be able to be arranged on a case by case basis.

Requirements for written work: to obtain full credit for your work, you must write coherently, in complete sentences, with attention to your audience.

Midterm Exam: there will be two midterm exams submitted through Gradescope.

- Midterm 1: Oct 7 – 9
- Midterm 2: Nov 11 – 13

Policy: Calculators are not allowed.

Final exam: Dec 12 – 17, submitted through Gradescope.
Policy: Final exam is comprehensive.

Grade lines: the course grades will not be harder than: A 100-90%, B 89-80%, C 79-70%, D 69-60%, and F 59% and under.

Preventing Sexual Harassment: Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education and pertains to admissions, academic and athletic programs, and university-sponsored activities. Title IX also prohibits sexual harassment of students by university employees, other students, and visitors to campus. If you encounter sexual harassment or gender-based discrimination, please talk to your professor; contact the Equal Employment Office at 801-422-5895 or 1-888-238-1062 (24-hours), or http://www.ethicspoint.com; or contact the Honor Code office at 801-422-2847.

Students with Disabilities: BYU is committed to providing reasonable accommodation to qualified persons with disabilities. If you have any disability that may adversely affect your success in this course, please contact the University Accessibility Center at 422-2767. Services deemed appropriate will be coordinated with the student and instructor by that office.