MATH 333
MWF 2:10–3:00, Hayes 203
Prof. D. A. Edwards
Hayes 310

Ordinary Differential Equations
Fall 2025
Office Hours: T 2–3:15, R 9–10:15 or by appointment
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# Introduction

Welcome to MATH 333! In this course you will be learning to solve various types of ordinary differential equations. The text for this course is *Differential Equations: Computing and Modeling*, 5th ed., by Edwards, Penney, and Calvis.

If you have any questions, contact me during my office hours or make an appointment.

## Technology

I use Moodle to post handouts and answer keys, and to collect feedback. Important announcements (corrections to typographical errors, etc.) will be handled by e-mail. You may use technology of your choice for visualizations and computations. If you wish to use Maple, installation instructions are posted on Moodle.

## Assessment

Your grade for the course will be determined in two stages. First your *raw score* will be calculated using as follows:

| | Points | Raw Score: Better of Two Alternatives | |
|---|---|---|---|
| Quizzes | scaled to 100 | 90% | 80% |
| In-Class Exams | 3 @ 100 | | |
| Final | 200 | | |
| Projects | 2 @ 25 | | |
| Homework | | 10% | 20% |

Therefore, performing well on the homework will not only help you learn the material, it can also directly help your grade. (The vast majority of students improve their grades by using their homework scores.) Then each of the raw scores will be scaled to determine final grades.

## Homework

In most cases, homework will be distributed on Fridays, and will be due at the beginning of class the following Friday. Homework assignments must be **handwritten**. The homework will ideally cover material up through the Monday after it is distributed. **ABSOLUTELY NO LATE HOMEWORK WILL BE ACCEPTED!** If you must miss a due date for College business, it is your responsibility to make sure the homework is submitted ***before*** the due date. However, to calculate your semester-long homework average, I will drop your two lowest homework scores.

Each homework assignment will consist of ten questions. Of those, some randomly selected problems will *not* be graded. For these questions, you will receive one point if you attempted the problem. On each graded problem you may receive up to four points, depending on the completeness and accuracy of your solution.

Quizzes and tests will largely be based on the material covered in the homework assignments. However, you are encouraged to try other problems in the book for practice.

## Quizzes

Quizzes will be administered on certain Wednesdays, and in general will cover the material on the previous homework. They will take fifteen minutes each, and you will need to bring your own paper. **ABSOLUTELY NO MAKEUP QUIZZES WILL BE ADMINISTERED!** However, to calculate your semester-long quiz average, I will drop your two lowest quiz scores.

## Exams

Exam dates are listed on the attached schedule. **NO MAKEUP EXAMS WILL BE GIVEN!** When the exams are returned, they will have a numerical score and a letter grade on them. The numerical score is your score for the exam; *the letter grade is your grade for the course* to that point, including all homework scores.

## Projects

There will be two projects during the semester. Further details will follow.

## Submission Guidelines

Written submissions should be folded like a book with the following information on the "front cover:"

Name
MATH 333—Edwards
Assignment Type/Number
Date

You will turn in your assignments this way so that I can put your grade on the inside, thus ensuring your privacy.

## Artificial Intelligence

We will be using AI regularly during the semester. Some assignments will require the use of AI. Most technology questions may be at least started with AI. (See "Academic Honesty" below.) Overreliance on AI for by-hand calculations is discouraged, as you will have no access to technology for quizzes and exams.

## Academic Honesty

Though you may not copy directly from another's paper or use someone else's ideas as your own, I encourage you to discuss the homework problems with your classmates. However, any written solutions should be yours alone. If you include ideas from an outside source, you should cite it. For the purposes of this topic, "classmate" includes online aids and AI. The College also has expectations regarding academic integrity with which you should become familiar.

## Attendance

Attendance is important so you get the full benefit of instruction. If you have to miss class one day, just get the notes from someone. However, do not let absences accumulate: any student who misses 20% of the meetings of a math course *for any reason* will be expelled from the course. If you miss 15% of the meetings, I will send you a warning so we can discuss next steps.

## Accessibility Accommodations

If you need an accessibility accommodation, contact Student Accessibility and Support Services (SASS) for approval. Also let me know so that we can implement any approved accommodations in a timely manner.

# Tentative Schedule

**Note:** This is only a tentative schedule; there may be deviations from it. If there are conflicts between this schedule and Moodle, let me know right away so I can harmonize things.

| Week | Sections | Quiz (W) | HW (F) | Other |
|---|---|---|---|---|
| August 29 | 1.3, 1.4 | | | |
| September 1 | 1.3–1.5 | ✔ | ✔ | |
| September 8 | 1.3, 1.4, 2.1, 3.1 | ✔ | ✔ | |
| September 15 | 3.1, 3.2 | ✔ | ✔ | |
| September 22 | 3.2, 3.3 | ✔ | ✔ | 9/22: Project 1 Topic Due |
| September 29 | 3.3, 3.5 | ✔ | ✔ | |
| October 6 | 3.5 | | | 10/8: Exam I (covers up through §3.3)<br>**10/10: Fall Break** |
| October 13 | 3.4–3.7 | | ✔ | 10/15: Project 1 Due |
| October 20 | 3.6, 3.7, 4.1, 5.1, Euler equations | ✔ | ✔ | |
| October 27 | 5.1–5.3 | ✔ | ✔ | |
| November 3 | 5.2, 5.3, 5.5 | ✔ | ✔ | |
| November 10 | 5.5, 5.7, 6.2 | ✔ | ✔ | 11/10: Project 2 Topic Due |
| November 17 | 6.2, 6.4, 7.1 | | | 11/19: Exam II (covers §3.5–§5.7) |
| November 24 | **Thanksgiving Break** | | | |
| December 1 | 7.1, 7.2, 7.5 | | ✔ | 12/1: Project 2 Due |
| December 8 | 7.4–7.6 | ✔ | ✔ | 12/12: Formal Review Session |
| December 16 | Final Exam, 1:30–4:30 | | | |

## Course Description

Ordinary differential equations (ODEs) arise naturally to model systems that occur in physics, biology, chemistry and economics. This course discusses techniques for finding, analyzing, and interpreting solutions of ODEs using analytic, numerical and qualitative techniques. We discuss first-and second-order ODEs, as well as first-order systems of ODEs. Applications are woven throughout the course. Other topics, as time permits. This course counts toward the computational/modeling (column D) elective requirement for the major. Prerequisite: MATH 224. Offered every other fall.

## Course Goals

(Letters pertain to the Departmental Goals Document.)

- Understand analytical and computational solution methods for ordinary differential equations (B, C, D).
- Understand model derivation and the physical interpretation of mathematical results (B, C, E, G).
- Communicate results in oral and written form, both individually and part of a group (A, F).
- Use external human- and AI-generated resources to assist understanding and computation (B, C, D, E, G).