MATH 250 UP Summer 2026 syllabus

Instructor: Rishabh Sarma

Contact Information

- **Email:** Through Canvas inbox (preferred)
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- **Office Hours:** Tuesdays and Wednesdays 12-1 pm via Zoom

Textbook

- *Differential Equations and Boundary Value Problems*, 6th Edition
- Authors: Edwards, Penney, and Calvis
- Publisher: Pearson

You will need both MyLab Math and the textbook (hard copy or e-text). Materials are accessible via the Access Pearson link on Canvas.

Lecture Format

- A live lecture session will be held via Zoom on Monday every week. Attendance is not mandatory.
- The session will be recorded and the recorded lecture video will be posted the very same day.
- The completed/filled lecture notes will also be posted as a PDF document the very same day.
- A live review session will be held before every exam (time announced on Canvas) and the recorded review session will be posted the very same day.

Material Covered

- Chapter 1: Sections 1.1, 1.2, 1.3, 1.4, 1.5
- Chapter 2: Sections 2.1, 2.2, 2.3
- Chapter 3: Sections 3.1, 3.3, 3.4, 3.5, 3.6
- Chapter 5: Sections 5.1, 5.2
- Chapter 7: Sections 7.1, 7.2, 7.5, 7.6

Course Goals

1. Learn basic classifications of ODEs, recognize specific types of differential equations and in particular, distinguish linear from non-linear terms.
2. Learn to use mathematics to write an ODE to describe a given physical phenomenon, i.e. the basic principles of mathematical modeling.
3. Learn the methods of writing and solving a variety of low order ODEs.
4. Learn the specific techniques used to model linear oscillators (springs and pendula), drag forces, and population dynamics.
5. Analyze both the differential equation and its solution, in particular to understand how specific terms in the equation manifest in the solution.

Grading Breakdown

- MyLab Math Homework: 10%
- Written Homework: 10%
- Discussion: 10%
- Exam 1: 20%
- Exam 2: 20%
- Final Exam: 30%

Homeworks

- The homework assignments will be posted on Canvas, generally due Monday every week unless stated otherwise. These assignments are Online Homeworks (problems from MyLab Math) and Written Homeworks (found on the "Written Homework questions" PDF on Canvas).
- The work and the solution to each problem from both the homeworks must be written out (either on paper or tablet). Convert your work to a PDF and upload it to Canvas in the appropriate assignment. Uploaded PDFs must be legible and clear, each problem numbered. Each problem will be graded for the work shown, and partial credit will be given.
- There will be a 2 point deduction for each missing problem, and for problems for which insufficient work is given. For certain problems an answer may be obvious or may be a single phrase, in which case work would not be needed. It is up to the instructor to determine if an answer is obvious, not the student.
- You can use a calculator to help you in the homeworks as a learning tool, but they will not be allowed on quizzes or exams.

Late Policy

Late HW will be accepted up to three days late date, with a 5% penalty per day.

Discussion

There will be a weekly discussion thread to discuss the week's content, due on Mondays. You must make a post to it every week to receive credit.

Exams

- Exams are proctored through Honorlock, and an external webcam that can pivot (not part of the laptop) must be used.
- If you do not use the proper set up as described in the direction given to class, you receive up to a 25% deduction in score
- If you cannot make the exam, please let the instructor know at least three days ahead of time.
- The exams are timed, but you can take it during the exam windows listed below.

Exam Dates

- Exam 1: June 6 – June 8
- Exam 2: June 27 – June 29
- Final Exam: July 22 – July 25

Website policy

Other than links and sites given on the course Canvas page, the use of online sites and artificial intelligence is prohibited. This applies to all assessments and includes - but is not limited to - Chegg, Course Hero, ChatGPT, and CoPilot.

Counseling and Psychological Services

The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. Counseling and Psychological Services at University Park: CAPS `https://studentaffairs.psu.edu/counseling` 814-863-0395.

Educational Equity/ Report Bias

Penn State takes great pride to foster a diverse and inclusive environment for students, faculty, and staff. Acts of intolerance, discrimination, or harassment due to age, ancestry, color, disability, gender, gender identity, national origin, race, religious belief, sexual orientation, or veteran status are not tolerated and can be reported through Educational Equity via the Report Bias webpage (`http://equity.psu.edu/reportbias/`).

Student Disability Resources

Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. Student Disability Resources (SDR) website provides contact information for every Penn State campus (`http://equity.psu.edu/sdr/disability-coordinator`). For further information, please visit Student Disability Resources website (`http://equity.psu.edu/sdr/`).

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: See documentation guidelines (`http://equity.psu.edu/sdr/guidelines`).

If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

Academic Integrity Statement

According to Penn State policy G-9: Academic Integrity, an academic integrity violation is "an intentional, unintentional, or attempted violation of course or assessment policies to gain an academic advantage or to advantage or disadvantage another student academically." Unless your instructor tells you otherwise, you must complete all course work entirely on your own, using only sources that have been permitted by your instructor, and you may not assist other students with papers, quizzes, exams, or other assessments. If your instructor allows you to use ideas, images, or word phrases created by another person (e.g., from Course Hero or Chegg) or by generative technology, such as ChatGPT, you must identify their source. You may not submit false or fabricated information, use the same academic work for credit in multiple courses, or share instructional content. Students with questions about academic integrity should ask their instructor before submitting work. Students facing allegations of academic misconduct may not drop/withdraw from the affected course unless they are cleared of wrongdoing (see G-9: Academic Integrity). Attempted drops will be prevented or reversed, and students will be expected to complete course work and meet course deadlines. Students who are found responsible for academic integrity violations face academic outcomes, which can be severe, and put themselves at jeopardy for other outcomes which may include ineligibility for Dean's List, pass/fail elections, and grade forgiveness. Students may also face consequences from their home/major program and/or The Schreyer Honors College.

Weekly Schedule

Week	Dates	Section	Topics
1	May 18–22	1.1	Differential equations; general solutions; IVPs; modeling; verification
		1.2	Equilibrium solutions; integral solutions; motion
		1.3	Slope fields
		1.4 (start)	Separable DEs (intro & definition)
2	May 25–29	1.4	Separable DEs; applications (cooling, radiocarbon dating)
		1.5	First-order linear DEs; integrating factor; mixing problems
		2.3	Resistive forces
3	Jun 1–5	3.1	Second-order linear homogeneous DEs
		3.3	Complex roots; general solutions
4	Jun 8–12	3.4	Undamped motion (simple harmonic motion)
		3.4	Damped motion (underdamped, overdamped, critically damped)
5	Jun 15–19	3.5	Method of undetermined coefficients
		3.6	Forced vibrations; resonance
		5.1 (start)	Matrices: operations, vectors, matrix multiplication
6	Jun 22–26	5.1	Systems of DEs; Wronskian; determinants; IVPs
7	Jun 29–Jul 3	5.2	Eigenvalues and eigenvectors (real cases)
		5.2	Complex eigenvalues; solving systems
8	Jul 6–10	7.1	Laplace transform; inverse Laplace transform
		7.2	Laplace methods; partial fractions; solving DEs
		-	Heaviside (step) functions; piecewise modeling
9	Jul 13–17	7.5	Laplace transforms with shifting; periodic inputs
		7.6	Delta (impulse) functions; solving DEs
10	Jul 20–24	-	Review and Exam Week