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1 CONTACT INFO

Paul Tokorcheck | 257 KAP | tokorche@usc.edu | webpage

I will hold virtual **office hours** on Zoom each **Thursday from 12-2pm PST** through the corresponding link in Blackboard. If you can't meet at that time just let me know and we can make other arrangements.

Our Teaching Assistants will run the discussions and host their own office hours through the Math Center:

Zhanhu Feng (8/9am) zhanhufe@usc.edu | Mahtab Movahhedrad (11am) movahhed@usc.edu

Last Update: January 12, 2022. I reserve the right to make necessary modifications mid-semester.

REQUIRED SETUP

Our course will use the following online systems:

- **Blackboard** as the main hub for all communication, links, and course materials
- **Zoom** for (some?) lectures, discussions, and office hours
- **Gradescope** for all written work submissions and grading

You will access the latter systems through links in our Blackboard page and none of them should require separate logins. We'll work through the initial setup in our first lecture. All are free - you should only need to purchase a textbook.

For all live **Zoom** sessions you will need a camera, microphone/speakers, and a stable internet connection. If any of this is an issue you can also use the free Zoom app for cell phones and tablets.

You'll have a lot of freedom to attend whichever lecture/discussion times that you like, but whichever you choose, you should plan to be logged in **on time** and stay for the entire hour.

You should have your **camera on** for all Zoom meetings. If you don't want us to see your messy bedroom I invite you to choose a fun virtual background.

All written assignments will be handled through the **Gradescope** link in Blackboard. Gradescope will allow you to submit either individual JPEGs for each page, or a single document in PDF format.

If for some reason you need to email us a document, it should **always** be in PDF format. There are many free phone apps that you can use to scan/combine your work, including Adobe Scan and Small PDF and others.

WEEKLY LOGISTICS

All **lectures** for at least the first **two (2)** weeks will be conducted via Zoom.

We will (very tentatively) start an in-person option for lectures on Monday 24 January. This means that I will set up our same Zoom meeting from the classroom itself and on each day you may choose whether you'd like to attend in-person, participate via Zoom, or watch the recording later. The two lectures that I give each day will be the same so you may attend either the 9am or 11am as it fits into your schedule.

The lectures will be almost entirely devoted to pure Linear Algebra topics.

The Tues/Thurs discussion sections (or **labs**) will will be conducted entirely via Zoom for now.

These discussions must be attended live because you will be asked to work both solo and in small groups. All sections on a given day will do the same work so you can choose the one that best fits in your schedule. The classwork you complete in these discussions will be due in Gradescope at **11pm PST** that same day. Late work will **not** be accepted under any circumstances and the Zoom attendance will be checked against the Gradescope submissions. However, from the $\sim$27 discussions we will drop the lowest **nine (9)** scores.

In these labs you'll be working together with our TA's on a series of guided activities to "apply" the Linear Algebra from lecture to specific problems in the subject of Ordinary Differential Equations. Some few ODE exercises will also be included in the homework for added practice.

On most Fridays we will collect a **homework** assignment for the week in Gradescope, due by **11pm PST**. Any exercises submitted after their due date will receive **half-credit**, regardless of circumstances.

Our textbook is a fairly standard introduction to Linear Algebra with a specific focus on its applications to the subject of Differential Equations. No prior knowledge of either subject is necessary. But you should have some general skill in Calculus that includes integration by substitution and by parts, and some small knowledge of power series, roughly the equivalent of a standard Calculus 2 course.

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4 WHAT YOU WILL LEARN

Matrices, systems of linear equations, vector spaces, linear transformations, eigenvalues, systems of linear differential equations. (4 units)

This corresponds to Chapters 1-9 of our textbook. Our main goals are to help you:

1. develop and practice computational tools and skills from Linear Algebra,
2. develop some knowledge and vocabulary of general vector spaces and their properties,
3. develop some knowledge and vocabulary of differential equations and their solutions,
4. learn how to apply the tools and skills from Linear Algebra to the subject of Differential Equations.

5 EXAMS AND GRADING

Without regard to the format of lectures and discussions over the semester, all three exams will specifically be held **in-person** during our scheduled lecture periods. If you cannot be there on the date of an exam, you must contact me **before** the exam date to make other arrangements. If you no-show for an exam and attempt to contact me afterward, do not expect to be allowed a make-up exam.

Your overall course grade will be computed in Blackboard as a raw average according to the following proportions. The Lab Average column is set to automatically drop the lowest **nine** scores, though those scores will still be visible in their original columns.

Homework average	10%	
ODE lab average	15%	
Exam 1	20%	11 Feb 2022
Exam 2	20%	25 Mar 2022
Final Exam	35%	Finals Week Schedule

The (very loose but consistent) department guidance on **letter grades** is that approximately 50% of students should receive A's and B's. So, assuming the distribution is normal, the overall **class median** grade will be (approximately) the division between B's and C's. The division between D's and F's will be fixed at 50%. All other letter grade cutoffs will be chosen relative to these two points. I'll rebalance these after each exam.

LECTURE CALENDAR

We will cover the following topics on roughly the weeks listed. The numbers on the right indicate the textbook chapters that roughly correspond to the material in that week, including the ODE lab topics. This calendar is very tentative.

Week 01: Systems of equations, basic language and notation for matrices.	1, 2
Week 02: **Monday Holiday.** More matrix algebra.	1, 2
Week 03: Elementary matrices. Drop deadline is Jan 28 (with refund).	1, 2
Week 04: LU-factorization, computing determinants.	1, 2, 3
Week 05: Properties and applications of determinants. **Exam 1 on Feb 11.**	1, 2, 3
Week 06: The axioms of a vector space.	4, 8
Week 07: **Monday Holiday.** Span and dependence. Second drop deadline is Feb 25 (no refund).	4, 8
Week 08: Bases and dimension. Row and column spaces.	4, 8
Week 09: The Rank/Nullity Theorem. Introduction to inner products.	4, 5, 8
Week 10: **Spring Break.**	–
Week 11: Length and angle and some non-standard products. **Exam 2 on Mar 25**.	4, 5, 8
Week 12: Projections and least-squares approximations.	5, 9
Week 13: Linear transformations. Withdrawal deadline is Apr 08 (with a W on record).	6, 9
Week 14: Injective and surjective functions.	6, 9
Week 15: Eigenvalues and eigenvectors.	6, 7, 9
Week 16: Diagonalization and the matrix exponential.	6, 7, 9

Finals Week is 04-11 May 2022. Finals Week Schedule.

IMPORTANT POLICIES AND LINKS

Calculators: For in-person exams you may use any calculator that does not connect to the internet. Many discussion activities will specifically ask you to use Wolfram Alpha or Desmos or Mathematica.

Formula Sheets: For in-person exams you will be allowed a single 8.5×11 sheet of notes, front and back, handwritten in your own handwriting. I suggest creating such a sheet with the first homework assignment.

Academic Conduct: Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. You should familiarize yourself with the Student Conduct Code and particularly with the section on Academic Integrity.

Other forms of academic dishonesty are equally unacceptable. For example, see the university policies on scientific research misconduct.

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
`studenthealth.usc.edu/counseling`
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

Office of Student Accessibility Services - (213) 740-0776
`osas.usc.edu`
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

Any student requesting accommodations based on a disability is required to register with DSP each semester. They will provide you with a letter of verification for that semester. Please deliver this letter to me as early in the semester as possible.

Notetakers: I often have requests from DSP for well-organized students who are willing to make their class notes available to approved DSP students. The DSP Office typically pays a nominal amount to the notetaker for their trouble. If you are interested in doing this, please contact me or email DSP directly at `osasNotetaking@usc.edu`.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call

suicidepreventionlifeline.org

Free & confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship & Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call

studenthealth.usc.edu/sexual-assault

Free & confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 — Title IX – (213) 821-8298

equity.usc.edu,titleix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

usc-advocate.symplicity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity—Title IX for appropriate investigation, supportive measures, and response.

USC Campus Support and Intervention - (213) 821-4710

campussupport.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

diversity.usc.edu

Info on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

dps.usc.edu

Non-emergency assistance or information.