Math 21 (Linear Algebra) Syllabus
Fall 2016

Instructor: Professor Samit Dasgupta, sdasgup2@ucsc.edu, people.ucsc.edu/~sdasgup2

Class: Monday, Wednesday, Friday, 10:40-11:40 in Humanities Lecture Hall (Humanities 3, Room 206)

Office Hours: Monday, 3–4pm and Wednesdays, 2–3pm, in McHenry 4128


Grading: Weekly homework assignments, generally due every Wednesday, account for 25% of the grade. The homework assignments will be posted on the instructor’s website, listed above. The lowest two homework grades will be dropped. Graded homework can be retrieved from the TAs as follows based on the first letter of your last name: Deniz (A–H), Patrick (I–O), Liuyi (P–Z). There will be two in-class midterm exams, each accounting for 20% of the grade. The midterms will be held on Monday, October 17, and Monday, November 14. The final exam (Tuesday, December 6, 4-7pm) accounts for the remaining 35% of the grade.

Summary: In this course we will cover the basics of Linear Algebra, including discussion of the following topics: linear equations, matrices, linear transformations, matrix inverses, determinants, eigenvectors, eigenvalues, diagonalization, inner products and orthogonality, and the spectral theorem. We will cover material from Chapters 1, 2, 3, 5, 6, and 7 in this class, with details given below.

Academic Honesty: I take issues of academic integrity very seriously. Don’t Cheat. You are free to work with your classmates and to study with them, but do not copy their work. If you are ever confused about what is allowable and what is not, please ask. I will work actively with the TAs to identify incidents of cheating. Please do not fall victim to the “everyone is doing it” mentality. You are responsible for your own actions. I will punish incidents of cheating to the maximal extent possible, including reporting to college provosts. I trust all of you, so please do not abuse this trust!

Sections: Sections are not mandatory, but they are highly recommended. We cover a great deal of material in 10 weeks, and to master this material, you will need to practice and review a lot. Sections offer you the opportunity to review under the tutelage of an experienced and knowledgeable TA. In particular, the TAs will review the homework and guide you through the problems you find challenging.

TA information:

<table>
<thead>
<tr>
<th>TA</th>
<th>Deniz Yilmaz</th>
<th>Patrick Allman</th>
<th>Liuyi Zhang</th>
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</thead>
<tbody>
<tr>
<td>Office Hours</td>
<td>W 2-3:30, Th 11am-12:30, McHenry 4112</td>
<td>W 9am-10, W 3pm-4, Th 1:30-2:30, McHenry 1261</td>
<td>T 9:50am–11:10, Th 7pm–8:30 McHenry 1266</td>
</tr>
<tr>
<td>E-mail</td>
<td>deyilmaz</td>
<td>pallmann</td>
<td>lzhang19</td>
</tr>
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</table>
**LSS tutor:** The tutor for this course is Jaime Vandeveer, who is extremely experienced in tutoring for Linear Algebra. More information will be provided in class on Monday, September 26. To sign up for tutoring, please visit https://eop.sa.ucsc.edu/OTSS/tutorsignup/

**Students with disabilities:** If you qualify for classroom/exam accommodations because of a disability, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me as soon as possible, preferably within the first week of the quarter. Contact DRC by phone at 831-459-2089 or by email at drc@ucsc.edu for more information.

**Title IX Disclosure:** Please be aware that under the UC Policy on Sexual Violence and Sexual Harassment, faculty and student employees (including Teaching Assistants, Readers, Tutors, etc.) are “responsible employees” and are required to notify the Title IX Officer of any reports of incidents of sexual harassment and sexual violence (sexual assault, domestic and dating violence, stalking, etc.) involving students. Academic freedom exceptions exist for disclosures made within a class discussion or assignment related to course content; under those conditions only, a report to the Title IX Officer is not required.

The Campus Advocacy Resources and Education (CARE) Office (831) 502-2273, care@ucsc.edu can provide confidential support, resources, and assist with academic accommodations. To make a Title IX report, please contact Tracey Tsugawa, Title IX Officer, (831) 459-2462, ttsugawa@ucsc.edu.

**Planned Class Schedule** (subject to change)

9/23. Class 1: §1.1, Systems of Linear Equations
9/26. Class 2: §1.2, Row Reduction and Echelon Forms
9/28. Class 3: §1.3, Vector Equations
9/30. Class 4: §1.3 cont’d
10/3. Class 5: §1.4, The Matrix Equation $Ax = b$
10/5. Class 6: §1.5, Solution Sets of Linear Systems
10/7. Class 7: §1.7, Linear Independence
10/10. Class 8: §1.8, Introduction to Linear Transformations
10/12. Class 9: §1.9, The Matrix of a Linear Transformation
10/14. Class 10: Slack/Review
10/17. Class 11: **Midterm 1**
10/19. Class 12: §2.1, Matrix Operations
10/21. Class 13: §2.2, The Inverse of a Matrix
10/24. Class 14: §2.3, Characterizations of Invertible Matrices
10/28. Class 16: §2.8, Subspaces of $\mathbb{R}^n$
10/31. Class 17: §2.9, Dimension and Rank
11/2. Class 18: §3.1, Introduction to Determinants
11/4. Class 19: §3.2, Properties of Determinants
11/7. Class 20: §5.1, Eigenvectors and Eigenvalues
11/11: No Class, Veteran’s Day Holiday.
11/14: Class 22: **Midterm 2**
11/16: Class 23: §5.2, The Characteristic Equation
11/18: Class 24: §5.3, Diagonalization
11/21: Class 25, §6.1, Inner Product, Length, and Orthogonality
11/23: Class 26, §6.2, Orthogonal Sets
11/28: Class 27, §6.3 and 6.4, Orthogonal Projection and Gram-Schmidt
11/30: Class 28, §7.1, Diagonalization of Symmetric Matrices (Spectral Theorem)
12/2: Class 29: Slack/Review.
12/6. **Final Exam**, 4–7pm.