



MAS 3105-003 – Spring 2018
Linear Algebra – 3 credit hours

Instructor: Dr. Dmytro Savchuk

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Course Meeting Times: TR 2:00pm – 3:15pm, CMC 13

Co-Prerequisite(s): MAC 2283 or MAC 2313 (Calculus III) and MGF 3101 (Bridge to Abstract Mathematics). The three-dimensional vectors and determinants studied in Calculus III are helpful examples. I do not recommend taking this course before completing Calculus III, regardless of the minimum requirements. We will be doing proofs, so Bridge to Abstract Mathematics will be helpful.

Text: *Linear Algebra and Its Applications, 5/E* by David C. Lay, Steven E. Lay, and Judi J. McDonald. Published by Pearson. ISBN-10: 032198238X; ISBN-13: 9780321982384.

The content of the 4th edition is very similar, but you will need access to MyMathLab for the current edition (which includes the corresponding e-book).

Course Topics: Linear systems, matrix algebra, linear transformations and matrix representations, vector spaces, linear independence, determinants, eigenvalues, the Gram-Schmidt algorithm, and inner product spaces.

Course Objectives: This course is required of mathematics majors and minors. The goals are to learn to utilize major algorithms and tools to work with matrix algebra and its abstraction to linear transformations.

Student Learning Outcomes: Given a system of linear equations, a student will be able to decide if it has no solution, a unique solution, or infinitely many solutions and be able to describe all solutions. A student will know how to use row reduction to solve a matrix equation, to invert a matrix, and to describe the column and null spaces of a matrix. A student will understand the correspondence between matrices and linear transformations and the role of coordinates in this correspondence. A student will recognize vector spaces in other areas of mathematics, and be able to find a basis for a vector space. A student will be able to compute eigenvectors and eigenvalues of a matrix. A student will be able to use the Gram-Schmidt process to find orthonormal bases of a vector space.

Course Grades: The university's +/- grading policy will be used in assigning course grades. If your overall percentage of total points falls into the following range, you will receive the corresponding grade:

97-100 (A+), 93-96 (A), 90-92 (A-), 87-89 (B+), 83-86 (B), 80-82 (B-),
77-79 (C+), 73-76 (C), 70-72 (C-), 67-69 (D+), 63-66 (D), 60-62 (D-), 0-59 (F).

Homework: Will consist of two parts. The online MyMathLab homework (see the section below) and paper homework. It will be normally due two class meetings after the section was covered (see the tentative schedule below). Every student will have one chance to submit the online homework late. To use this opportunity, email your extension request before the homework deadline. Students are expected to work independently on all homework assignments.

Homework format (paper):

The following format is designed to facilitate grading. If the grader can't find a problem, you can't get credit.

- All pages must be stapled (paper clips, dog ears, may not hold multiple pages together).
- All edges must be trimmed neatly (no spiral notebook edges)
- On each page: Your name, problem set, my name should appear in the top right corner:
Math Student
Problem set 3.2
Dr. Savchuk
- Each problem:
 - Must appear in the order in which it was listed.
 - Must be labeled with section and problem number, e.g., 3.3 - #5. This label must be very easy to find. Some possibilities: use different color ink, highlight it, place it further to the left, preceded by a large gap.
- Skipped problems should still be labeled in your submission with a word noting that you have no solution (skipped, omitted, couldn't do, etc).
- If reasonable, restate the problem. At least summarize the problem. It will be very useful for your future reference as well.
- Leave a one line space between problem statement and its solution.
- **Show your work.** Unsupported solutions may receive no credit.
- You must present an organized solution. If this means rewriting the solution, then rewrite it.
- A small portion of each assignment grade will be given for completeness.

MyMathLab Homework: You must purchase MyMathLab access (do not buy a plain MyMathLabPlus code). You can either purchase the access code bundled with a text book from the bookstore (best price to my understanding) or you can purchase the access code online with a credit card. If you must use financial aid, you will need to purchase the bundle from the bookstore. Student options include: ebook+MyMathLab or unbound text+MyMathLab available in the USF bookstore or additionally hardcover text + MyMathLab from the publisher. The **course ID** that you will have to enter to get access to the homework assignments is:

savchuk76746

Student registration instructions are also posted in Canvas.

Why MyMathLab:

MyMathLab allows multiple attempts at some types of problems with immediate feedback on each attempt. Were we to use paper, it would take a week to grade just a few problems. MyMathLab will consider only your last submitted answer for a grade. My hope is that this immediate feedback will help you learn the material. A number of problems offer assistance with videos which walks you through the (or similar) problem in small steps. Students are encouraged to use this assistance, as we will have little time to go over such problems in class. We caution students against becoming dependent upon this help, however. Because some numbers change in the problems, it is unlikely that two students will get the same problem and answer. The method for getting the answers will be the same. If you are going to get help from someone, you will need to learn the method, not just the answer. You will still need to present clear, complete and organized written work with sketches on your quizzes and exams. I encourage you to download your problem sets early (in fact you could download all of them right away). When it comes time to take the exams, you will be expected to show your work. I encourage you to carefully work out the problem on paper to better prepare for exams and quizzes.

Quizzes: There will be unannounced occasional in-class quizzes. Each quiz will include vocabulary question (asking to state a definition or a theorem) and one or two computational or conceptual problems. There will be no make up quizzes. Instead, if a student misses a quiz due to a documented emergency, the grade for this quiz will be computed as the average of the grades for other quizzes at the end of semester. One quiz grade with the lowest score will be dropped at the end of the course.

Grade Appeals: Any grade appeals will be considered only within a week after the grade is posted in Canvas.

Exams: There will be 3 in-class tests and the final cumulative exam. The *tentative* dates for the exams are:

Exam 1: February 13 (Tuesday, Week 6)

Exam 2: March 22 (Thursday, Week 10)

Exam 3: April 24 (Tuesday, Week 15)

Final Exam: May 1 (Tuesday, 12:30pm –2:30pm, CMC 13, **Cumulative**)

Makeup Exams: Make up tests will only be scheduled at the discretion of the instructor, given a documented emergency, and if the instructor is notified by email within 24 hours of the emergency. Students who must miss an exam due to a major religious observance must notify the instructor of this absence, in writing, by the end of the first week of classes. Employment schedules, family reunions, vacations and athletic training/practice schedules of students do not comprise a valid excuse for absences.

Grading:

- Homework 20% (14% MML online homework, 6% paper homework)
- Midterm Exams and the Final 20% each (the lowest grade will be dropped);
- Quizzes: 20%

Attendance: Attendance is expected and will be checked periodically.

Contingency Course Plan: In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Blackboard, Elluminate, Skype, and email messaging and/or alternate scheduling. It is the responsibility of the student to monitor the main USF website, emails and MoBull messages for important information about the closure. For information about the continuation of instruction, students are directed to their individual blackboard course sites.

Retaining Records: You should keep all of your returned homework and exams until you receive your final grade. You will need these to demonstrate that a grade was incorrectly recorded, should that happen.

Students needing special accommodation: Students in need of academic accommodations for a disability may consult with the office of Students with Disabilities Services to arrange appropriate accommodations. Students are required to give reasonable notice prior to requesting an accommodation. Contact SDS at 974-4309 or go to the website at www.sds.usf.edu.

Cell Phones, laptops, calculators: Please **mute your cell phone or turn it off** before you come into class and store it **out of sight**. No cellular phones, smart watches, or any other devices capable of storing data or connected to the internet are permitted during examinations. Calculators may or may not be allowed during certain quizzes or exams, but you should feel free to use your calculator on homework assignments. If your cell phone is not turned off and stored out of sight during class, you might be asked to leave the class, and any work that was handed in that day will count as a 0, including homework, tests, or quizzes.

Retaining Exams: You should keep all your returned exams and quizzes until you receive your final grade. You will need these exams to demonstrate that a grade was incorrectly recorded, should that happen. Any unclaimed exams and quizzes will be kept until the next exam is given, after which they will be discarded.

Academic Integrity and Disruption of Academic Process: I expect the highest standard of academic integrity from my students. Any cheating will result in a failing grade for the assignment or test in question, and possibly for the course. Cheating may result in a grade of FF for the course and may jeopardize your attendance at the University of South Florida. The university policy on Academic Dishonesty is explained at the website: <http://www.ugs.usf.edu/catalogs/0607/adadap.htm>. Students may discuss homework with each other, however, I expect each student to write up his or her own solutions.

Miscellaneous Policies:

- You are encouraged to take notes and may tape the lectures, but neither your notes nor your tapes are to be sold.
- The last day to withdraw from this course and receive a tuition refund is Friday, May 19. Students who have not registered or paid for this course by this date and time must stop attending, unless the instructor has given written permission otherwise.

- Students who anticipate the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to the instructor, in writing, at the beginning of the term.
- The last day to withdraw from this course and receive a grade of “W” is Saturday, June 10.
- A grade of “I” indicates incomplete work and will only be assigned when most of the coursework has already been completed with a passing grade. See the website <http://www.ugs.usf.edu/catalogs/0607/gradetc.htm#i> for further information.
- In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Canvas, Elluminate, Skype, and email messaging and/or an alternate schedule. It’s the responsibility of the student to monitor the Canvas site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.
- USF has a commitment to the safety and well-being of our students. Please be aware that educators must report incidents of sexual harassment and gender-based crimes including sexual assault, stalking, and domestic/relationship violence that come to their attention. I am required to report such incidents in order for the Office of Student Rights and Responsibilities or the Office of Diversity, Inclusion, and Equal Opportunity can investigate the incident or situation as a possible violation of the USF Sexual Misconduct/Sexual Harassment Policy and provide assistance to the student making the disclosure. If you disclose in class or to me personally, I must report the disclosure and will assist you in accessing available resources. The Center for Victim Advocacy and Violence Prevention, the Counseling Center and Student Health Services are confidential resources where you can talk about such situations and receive assistance without the incident being reported.
Center for Victim Advocacy and Violence Prevention:(813) 974-5757
<http://sa.usf.edu/advocacy/page.asp?id=72>
Counseling Center (813) 974-2831; <http://www.usf.edu/student-affairs/counseling-center/>
Student Health Services (813) 974-2331;
<http://www.usf.edu/student-affairs/student-health-services/>
- Student academic grievance procedures are explained at the following link: <http://www.ugs.usf.edu/policy/StudentAcademicGrievanceProcedures.pdf>

Tentative Schedule:

Week	Tuesday	Thursday
1	<i>Jan 9</i> First day of class; Cover §1.1, §1.2	<i>Jan 11</i> Cover §1.3, §1.4, §1.5
2	<i>Jan 16</i> Cover §1.7; Due: §1.1, §1.2	<i>Jan 18</i> Cover §1.8; Due: §1.3, §1.4, §1.5
3	<i>Jan 23</i> Cover §1.9; Due §1.7	<i>Jan 25</i> Cover §2.1, §2.2; Due: §1.8
4	<i>Jan 30</i> Cover §2.2, §2.3; Due: §1.9	<i>Feb 1</i> Cover §2.8; Due: §2.1
5	<i>Feb 6</i> Cover §2.9; Due: §2.2, §2.3	<i>Feb 8</i> Catch-up/Q&A/Review; Due §2.8
6	<i>Feb 13</i> <i>Exam 1</i>	<i>Feb 15</i> Cover §3.1, §3.2; Due: §2.9, 2S
7	<i>Feb 22</i> Cover §3.2, §3.3	<i>Feb 22</i> Cover §4.1, §4.2; Due: §3.1
8	<i>Feb 27</i> Cover §4.3; Due: §3.2, §3.3, 3S	<i>Mar 1</i> Cover §4.4; Due: §4.1
9	<i>Mar 6</i> Cover §4.5; Due: §4.2, §4.3	<i>Mar 8</i> Cover §4.6, §4.7; Due: §4.4
USF Spring Break (March 12 – March 16)		
10	<i>Mar 20</i> Catch-up/Q&A/Review; Due: §4.5	<i>Mar 22</i> <i>Exam 2</i> ; Due: §4.6, 4S
11	<i>Mar 27</i> Cover §4.7, §5.4 ¹ ; Due:	<i>Mar 29</i> Cover §5.1
12	<i>Apr 3</i> Cover §5.2; Due: §4.7, §5.4 ¹	<i>Apr 5</i> Cover §5.3, §5.4; Due: §5.1
13	<i>Apr 10</i> Cover §6.1, §6.2; Due: §5.2	<i>Apr 12</i> Cover §6.3, §6.4; Due: §5.3. 5.4 ² , 5S
14	<i>Apr 17</i> Catch-up/Q&A/Review; Due: §6.1, §6.2	<i>Apr 19</i> Review; Due: §6.3. 6.4, 6S
15	<i>Apr 24</i> <i>Exam 3</i> . Last day of class	<i>Apr 26</i> Reading Day
16	<i>Tuesday, May 1, 12:30pm – 2:30pm, CMC 13</i> <i>Final Exam</i> (cumulative):	

Homework Problems:

Details will be discussed later, but here is a list of problems. The odd-numbered problems with answer in the back of the book will not be graded. However, students are responsible for being able to do such problems on an exam. This is a minimal set of problems. Students may need to do more on their own in order to master the material.

§	MML	Paper
1.1	1, 3, 6, 7, 9, 12, 16, 17, 19, 23, 24, 29	25, 26, 28
1.2	2, 3, 5, 7, 11, 13, 15, 18, 19, 21, 22, 23, 24	26, 28, 29, 30, 31
1.3	1, 3, 6, 7, 9, 11, 14, 15, 17, 19, 21, 22, 23, 24, 25	32, 33, 34
1.4	1, 4, 6, 8, 9, 11, 14, 15, 17, 18, 19, 21, 23, 24, 31, 32	34, 35, 36
1.5	1, 5, 7, 10, 11, 13, 15, 17, 19, 23, 24, 26, 29, 32, 33, 35	25, 38, 39, 40
1.7	1, 3, 6, 7, 9, 13, 15, 17, 21, 22, 23, 26, 27, 31	33, 35, 36, 38, 40
1.8	1, 4, 5, 7, 8, 9, 11, 13, 15, 17, 19, 21, 22, 28, 31	24, 26, 33, 34, 36
1.9	1, 3, 5, 14, 15, 17, 19, 21, 23, 24, 25, 27, 29, 30	33, 35, 36
2.1	2, 3, 6, 7, 9, 12, 13, 15, 16, 27, 39	22, 23, 24, 25, 29, 30, 32
2.2	1, 3, 6, 7, 8, 9, 10, 13, 31, 32, 33	21, 22, 23, 24, 25, 26
2.3	1, 3, 6, 8, 11-16, 19, 25, 34	27, 38, 39
2.8	1, 5, 7, 9, 11, 13, 15, 17, 19, 21, 22, 23, 25, 32, 33	27, 29, 30, 35
2.9	1, 3, 5, 8, 9, 12, 13, 14, 15, 17, 18, 19, 21	22, 24, 27, 28
2S	- (chapter supplementary) Due with 2.9	16, 17
3.1	7, 9, 13, 16, 19, 22, 23, 24, 25, 28, 31, 32, 35, 39, 40	31, 32, 41
3.2	1, 3, 4, 6, 8, 12, 14, 15, 18, 19, 21, 23, 25, 27, 29, 39	28, 31-36, 42
3.3	5, 7, 11, 15, 23, 25, 27	17, 18
3S	- (chapter supplementary) Due with 3.3	1, 9, 14
4.1	1, 2, 5, 7, 8, 9, 11, 12, 13, 15, 17, 21, 22, 24, 25, 26	29, 31, 32, 33, 34
4.2	1, 3, 6, 8, 11, 13, 15, 17, 18, 21, 23, 26, 27, 32	29, 30, 33, 35, 36
4.3	1, 3, 5, 9, 11, 13, 16, 19, 22, 23, 25, 33	29, 30, 31, 32, 35
4.4	1, 3, 5, 7, 9, 11, 13, 16, 17, 18, 28, 32	19, 23, 24, 25, 26
4.5	1, 3, 8, 9, 10, 11, 13, 15, 17, 20, 21, 23, 29	25, 26, 27, 31, 32
4.6	1, 2, 6, 7, 9, 11, 13, 14, 18, 19, 22, 24	21, 27, 28, 29, 30
4.7	1, 3, 4, 6, 8, 11, 12, 13	15, 16, 20a
4S	- (chapter supplementary) Due with 4.7	10, 11
5.4¹	1, 3, 5, 8, 9, 11	28, 29
5.1	2, 4, 7, 9, 12, 15, 17, 18, 19, 21, 22, 24, 29	25, 26, 27, 29
5.2	1, 4, 7, 9, 11, 15, 17, 21, 22	18, 19, 20, 24, 26
5.3	1, 4, 5, 7, 11, 13, 21, 22, 24, 29	23, 27, 28, 31, 32
5.4²	13, 17, 20, 21, 23, 25	18, 24, 26
5S	- (chapter supplementary) Due with 5.4 ²	5-7
6.1	1, 3, 5, 7, 9, 12, 14, 15, 17, 19, 20, 23	21, 22, 29, 30, 31
6.2	2, 3, 5, 7, 10, 12, 13, 15, 17, 19, 21, 23, 24, 26	23, 24
6.3	1, 4, 5, 8, 9, 12, 13, 21, 22	23, 24
6.4	1, 3, 6, 8, 10, 17	22
6S	- (chapter supplementary) Due with 6.4	2, 5, 6