

MATH 3323: Matrix Algebra (ONLINE)

CRN: 11286

Fall 2020

3 credit hours

Instructor: Dr. Art Duval

Internet: aduval@utep.edu, <http://www.math.utep.edu/Faculty/duval/home.html>

Phone:

(915)747-6846/office: I'm not there this semester, but you can leave a message any time of day or night, and it will be sent to me by email.

(915)747-6502/fax: Probably not effective while we are all working remotely.

(915)545-1788/home: 9am-9pm only, please; the line has a lot of static now, but we are trying to fix it.

Office hours: at <http://tinyurl.com/ArtDuvalFall20>

Please visit me at the above link any time during scheduled office hours:

- Tuesdays, 10:00-11:00
- Wednesdays, 1:30-2:30
- Thursdays, 1:00-2:00
- Fridays, 10:30-11:30

I am also available at other times, so you are welcome to ask to meet with me at a time that is more convenient to you. You can make an appointment simply by calling me, or by sending e-mail. You can just propose a time, and I will respond either by agreeing to that time, or, if I cannot make it then, I will propose different times.

You may also ask any questions directly via phone or e-mail. If I'm not in when you call, please leave a message on the voice mail or answering machine with your name, number, and a good time for me to call you back. I will try to respond to your phone or e-mail message as soon as possible.

Prerequisite: Calculus II (MATH 1312)

This is entirely a mathematical maturity requirement, as we will use no calculus in this course.

Course Description

MATH 3323 is concerned with matrices and vectors. In one setting, matrices and vectors merely serve as efficient devices for storing the coefficients and solutions of systems of linear equations. That soon leads us to a different point of view, where a matrix is a linear transformation, which is a function that transforms one vector into another in a nice way. We will spend most of our time working with matrices from this point of view. By the end of the course, we will come full circle, and use the language of linear transformations to describe solution sets of systems of linear equations in a more efficient and unified way.

Course Objectives

Upon successful completion of this course, you will be able to solve and analyze systems of linear equations. You will be able to perform algebraic operations (addition and multiplication) on matrices and vectors. You will be able to compute the eigenvalues, eigenvectors, and the determinant of a matrix, and you will know what these are good for. You will be able to find and describe the various vector spaces associated to a matrix, and you will be prepared to study more abstract vector spaces.

Required Materials



Textbook: Linear Algebra with Applications, by W. Keith Nicholson. We will discuss Sections 1.1-3, 2.1-6, 3.1-3, 4.1-3, 5.1-2. This book will be available as a downloadable .pdf file from the course Blackboard site, at the link for Lyryx. Follow the link (which will be given directly in an announcement I will send from Blackboard), and enter your UTEP student ID carefully when prompted, as it will be used to assign your grades. If you need any assistance regarding Lyryx, please contact student-support@lyryx.com.

The cost of the textbook is \$39.95. When you enter the Lyryx site the first time, you will be prompted to pay, via credit card, debit card, or PayPal. If you need to pay a different way, please let me know as soon as possible, and I will help you. (I am working on a way where you can buy access to the textbook at the UTEP Bookstore, but this is not yet complete.)

The textbook also comes with a student solution manual, and an online homework system (more details about the homework assignments are below). Therefore, you will need to buy the textbook in order to see the homework problems and submit your solutions.

Technology Requirements

Blackboard: Course content is delivered via the Internet through the Blackboard learning management system (LMS). Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Mozilla Firefox and Google Chrome are the most supported browsers for Blackboard; other browsers may cause complications with the LMS. When having technical difficulties, update your browser, clear your cache, or try switching to another browser. Check for announcements on Blackboard, or via your UTEP e-mail account (where announcements will also be sent), at least once per day.

Scanning: You will probably want to be able to upload your handwritten work during exams, and maybe for the discussion questions (see below). To do this, you will need to be able to scan your work, and upload it to your computer. If you don't have access to a scanner (they are sometimes built into all-in-one printers), you can use phone apps such as GeniusScan, TinyScanner, CamScanner, and AdobeScan.

Please upload your work as a .pdf file. (Using your phone camera to take a picture leaves the document in a format that is harder for me to work with.)

Communication: You can communicate with me during office hours via text chat, but it will probably be easier with audio and perhaps video. For audio, your computer will need at least a built-in microphone. To reduce feedback, it will be helpful (but not necessary) to have headphones, and sound quality is even better if those headphones also have a microphone.

Technical difficulties: If you encounter technical difficulties beyond your scope of troubleshooting, please contact the [Help Desk](#) as they are trained specifically in assisting with technological needs of students.

Learning Modules

This course is designed using a modular format—that is, each week is “packaged” as a single module so that all the materials, videos, submission areas, and discussion posts are in one area for a given week.

Course Assignments and Grading

This course is meeting **asynchronously**, meaning that there is **no** class meeting time where everyone has to be online at the same time. You can engage with the class, and complete assignments, at whatever time of day you like. But there will be assignments throughout the week, every week, that will keep you on schedule. There will also be opportunities to interact with other students in the class.

Discussion questions (10%)

Each week, generally sometime on Friday, a new course Module will be posted on Blackboard. This module will have a reading assignment (generally one section per week) and links to related videos. The course discussion boards will also have a few questions for you to answer, based on the reading and videos. Most of the discussion questions will be posted on discussion boards for smaller groups (about 9 students), but one question each week will be on a discussion board for the whole class. I will form these groups after the first week of class, based on some introductory activities that will help you get to know your fellow classmates.

For full credit, answer each discussion question by Wednesday evening, 11:59pm, and also respond to at least one other classmate by Friday evening, 11:59pm. Do not simply repeat answers (or responses); if someone else has already said what you were going to say, think of a way to extend or expand upon what the first person said.

Discussion rubric: At the end of the semester, I will evaluate your overall contribution to the course on the discussion boards according to the following rubric.

- A: Mathematically valid statements that address the question and are supported by references to the textbook. Clear, well-organized writing. Replies to other students are helpful and related to their original posts. Focused questions when you are confused. Overall, your posts help advance the learning of the whole class.
- B: Mostly mathematically valid statements that address the question. Clear writing. Replies to other students build on their original posts, and are sometimes helpful. Questions when you are confused.
- C: Mathematically reasonable statements that are related to the question, and that show a serious attempt to understand material. Understandable writing. Replies to other students that are related to their original post. Questions when you are confused.

- D: Some attempt to address the questions. Decipherable writing. Questions when you are confused.

Note that a good question is sometimes more helpful than a correct answer. In particular, if you are confused about something, then try to describe your confusion as clearly as you can, ideally in the form of a question someone could answer that would help you.

Netiquette: Our conversations on the discussion board will be governed by the following important principles.

- Always consider audience. Remember that members of the class and the instructor will be reading any postings.
- Respect and courtesy must be provided to classmates and to instructor at all times. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a F2F situation.
- Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on in these online spaces is intended for classmates and professor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space. If students wish to do so, they have the ethical obligation to first request the permission of the writer(s).

Online homework (via Lyryx) (15%)

The Lyryx link (described above) will have weekly homework assignments, which are due each Sunday evening, 11:59pm. (These assignments are called "labs" in Lyryx.) You will have three attempts at each problem. Each attempt will change some of the details of the problem. You may receive partial credit on each problem. Your score on each problem will be the best score on each of your attempts at that problem. Your lowest homework score of the semester will be dropped.

For homework, you may consult with various sources for general help with any problem, but you must solve the particular problem by yourself. Sources you may consult include: classmates; friends, tutors; any material from the class, including the textbook or class videos; online books and videos. If you consult any sources outside of the class, you must let me know which sources you used (a short message, by email or within Blackboard, will suffice).

Exams (15% each)

There will be three exams throughout the semester.

- Exam 1, Sections 1.1-3, Wednesday, September 16
- Exam 2, Sections 2.1-4, Wednesday, October 14
- Exam 3, Sections 2.5-6, 3.1-3, Wednesday, November 18

Each of these exams will last 90 minutes (the usual 80 minutes and an extra 10 minutes to make sure you have enough time to upload your work). You may start the exam as early as 12:00am, and as late as 11:59pm, on the designated day.

For exams, you may consult only with any notes you took during class, the textbook, and class videos. No other sources are allowed. You may not consult with any person.

Final Exam (30%)

The final exam will be similar to the three earlier exams, except it will be 3 hours long (the usual 2 hours, 45 minutes and an extra 15 minutes to make sure you have enough time to upload your work), and comprehensive over all material we discuss throughout the semester, including Chapters 4 and 5. It will be on Wednesday, December 9.

Grading scale

All graded items will be graded on, or converted to, a scale where 4 is the minimum score for an A, 3 is the minimum score for a B, 2 is the minimum score for a C, and 1 is the minimum score for a D.

Late work

Discussion questions: The discussions will work better when everyone is engaged with the conversation. Please submit your posts by the deadlines. Your classmates cannot respond to your posts if you haven't posted them yet! But I would rather get your answers late than not at all. On the other hand, you cannot get full credit for this part of the course if your answers are more than occasionally late.

Homework: Extensions on homework deadlines will only be given under unusual circumstances, and with an explanation. (Too much work in other classes is not a sufficient explanation.) It is generally better to submit an incomplete assignment than a late assignment. Remember, too, that the lowest homework score of the semester will be dropped, and this is usually the best solution for that one week in the semester when everything in your life goes wrong.

Exams: Make-up exams will only be given under extraordinary and unavoidable circumstances, and with advance notice if possible. You will need to provide written documentation. If you anticipate a conflict with any exam date, please contact me as soon as possible. Otherwise, please make space on your calendar right now for all exams.

Alternative means of submitting work in case of technical issues

I strongly suggest that you submit your work with plenty of time to spare in the event that you have a technical issue with the course website, network, and/or your computer. I also suggest you save all your work (discussion posts, homework, and exams) in a separate document as a back-up. This way, you will have evidence that you completed the work and will not lose credit. If you are experiencing difficulties submitting your work through the course website, please contact the UTEP Help Desk. You can email me your back-up document as a last resort.

Drop Policy

To drop this class, please contact the [Registrar's Office](#) to initiate the drop process, by the deadline of Friday, October 30, 2020. After this date, you will not be able to drop the class (as per the Dean's office). Furthermore, a grade of incomplete is only for extraordinary circumstances, such as a missed exam.

I hope everyone will complete the course successfully, but if you are having doubts about your progress, I will be happy to discuss your standing in the course to help you decide whether or not to drop. You are only allowed three enrollments in this course, and only six withdrawals in your entire academic career, so please exercise the drop option judiciously.

Exceptional Circumstances

If you anticipate the possibility of not being able to participate in the course due to exceptional circumstances such as military service and/or training, childbirth, etc., please let me know as soon as possible.

Accommodations Policy

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. If you have, or suspect you have, a disability and need an accommodation, you should contact [UTEP Center for Accommodations and Support Services \(CASS\)](#) at (915)747-5148 or cass@utep.edu, or apply for accommodations online via the [CASS portal](#). You are responsible for presenting to me any CASS accommodation letters and instructions.

Scholastic Integrity

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. I report all suspected violations of academic integrity to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for investigation and possible disciplinary action. To learn more, see [HOOP: Student Conduct and Discipline](#).

Copyright Statement for Course Materials

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated.

Student Resources

UTEP provides a variety of student services and support:

- [Math Tutoring Center \(MaRCS\)](#): Ask a tutor for help and explore other available math resources.
- [UTEP Library](#): Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- [Help Desk](#): Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.
- [University Writing Center \(UWC\)](#): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.

- [Military Student Success Center](#): UTEP welcomes military-affiliated students to its degree programs, and the Military Student Success Center and its dedicated staff (many of whom are veterans and students themselves) are here to help personnel in any branch of service to reach their educational goals.

COVID-19 Precautions

Even though our course is meeting entirely online, it benefits the entire UTEP community if we are all aware of the following precautions.

You must STAY AT HOME and REPORT if you (1) have been diagnosed with COVID-19, (2) are experiencing COVID-19 symptoms, or (3) have had recent contact with a person who has received a positive coronavirus test. Reports should be made at screening.utep.edu. If you know of anyone who should report any of these three criteria, you should encourage them to report. If the individual cannot report, you can report on their behalf by sending an email to COVIDaction@utep.edu.

For each day that you attend campus—for any reason—you must complete the questions on the UTEP screening website (screening.utep.edu) prior to arriving on campus. The website will verify if you are permitted to come to campus. Under no circumstances should anyone come to campus when feeling ill or exhibiting any of the known COVID-19 symptoms. Students are advised to minimize the number of encounters with others to avoid infection.