Syllabus for Math 3203
(Matrix Methods in Science and Engineering)
Section 001
Spring 2022

Instructor:	Dr. Alex Bearden
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Office:	RBN 4009
Office Hours:	Monday 12:00 pm–1:15 pm, Friday 8:30 am–10:15 am, or by appointment
Preferred Method of Contact:	email or Canvas message
Lecture Time:	MoWe 9:05 am–10:00 am
Lecture Room:	RBN 2007

Course Format

In general, this course will be in-person. All exams will in-person with no exceptions. The lectures will be in-person as much as possible—if we need to move online for a day or period of time, I will clearly communicate about this via Canvas and post any lecture video(s), etc. on Canvas. If you are not able to attend class for a day or short period of time, let me know, and I will send you a Zoom link.

Catalog Description of Course

Matrices and matrix algebra, determinants, systems of linear equations, Gaussian elimination, eigenvalues and eigenvectors, linear transformations, applications in science and engineering. Prerequisite: MATH 2413. Credit will not be given for both MATH 3203 and MATH 3315.

Course Learning Objectives

At the end of the course, students should be able to do the following:

- Perform basic computations with matrices, including Gaussian elimination, matrix multiplication, and computing transposes, inverses, and determinants.

- Solve systems of linear equations using Gaussian elimination and inverse matrices.

- Compute eigenvalues and eigenvectors of matrices and understand their importance to matrix theory and its applications.

- Apply matrix techniques to real-world applications from science and engineering.

Required Textbook

Linear Algebra and Its Applications, Fifth Edition, by David C. Lay.
ISBN: 978-0-321-98238-4

Grading

Good mathematical reasoning and communication is more important to me than getting the correct answer. As such, the final answer in a problem may not be worth very many points compared to the work required to achieve the answer. In particular, I will count off for messy work and bad notation.

Reading

To maximize the amount you learn and the probability of doing well in this course, you should read the textbook. I recommend lightly reading the section once before we go over it in class (enough to be able follow what we're doing in class), and then reading carefully for details after we have covered the material in class.

Canvas

A Canvas site will be set up for the course. Notes, announcements, grades, quizzes, solutions, reviews, etc. will be posted there.

Homework

Homework problems from each section will be posted on the notes. These problems will not be taken up, but doing them is vital for your learning!

Quizzes

There will be a quiz posted on Canvas after each class. These will usually be due at 5 pm two days after they are assigned (so, for example, the quiz for a Wednesday class will be due Friday at 5 pm). There will be no make-up quizzes for any reason whatsoever. There will be 22 quizzes during the semester, each worth 10 points, and your final overall grade for quizzes will be:

$$\text{Overall Quizzes Grade} = \frac{\text{sum of points earned}}{180} * 100\%.$$

As such, it is possible to get $122\frac{2}{9}\%$ on the quiz portion of your grade. (See the section "Bonus/Extra Credit" below.) Quiz questions will usually be simpler than homework or test questions.

Exams

There will be three in-class midterm tests during the semester and a cumulative final after classes end. All midterm tests will be held in the same room at the same time as the lectures; the location and time of the final will be announced later. (Since our class is a non-standard meeting time, I will have to request a time slot and get it approved. It will probably be Friday, 4/29, 8:00am–10:00am.) The dates of the midterm tests are:

Midterm 1	Wednesday, February 9
Midterm 2	Monday, March 21
Midterm 3	Wednesday, April 20
Final	TBD

No books, notes, or calculators will be allowed on any exam. There will be no make-up exams for any reason at all, but the final can replace a midterm test score (see the section "Course Grades" below for more information).

Attendance Policy

Attendance will be expected. If you are not able to attend class on occasion, let me know, and I will send you a Zoom link.

Withdrawal

Monday, January 24:	census date; i.e., last day to withdraw without penalty
Monday, March 28:	last day to withdraw with a "W"

Calculator Policy

No calculators will be allowed on quizzes or exams.

Help/Tutoring

The Mathematics Learning Center (MLC) on the fourth floor of RBN provides free tutoring and help with math courses. I will post an announcement on Canvas with more information once the semester starts and I can find the information.

Course Grades

Your final grade in the course will be calculated with two different methods, and the highest of these will be your overall course grade. (Essentially, quizzes are 10% of your grade, and every test counts as 22.5% of your grade, but your final exam score can replace your lowest midterm test scores if that helps you.)

Method 1: All midterms count

Quizzes:	10%
Midterms 1–3:	67.5% (22.5% for each midterm)
Final Exam:	22.5%

Method 2: Lowest midterm grade replaced by final exam grade

Quizzes:	10%
Best Two of Midterms 1–3:	45% (22.5% for each of your two best midterms)
Final Exam:	45%

Your final letter grade will be determined by the following scheme:

greater than or equal to 89.5%	A
greater than or equal to 79.5% and less than 89.5%	B
greater than or equal to 69.5% and less than 79.5%	C
greater than or equal to 59.5% and less than 69.5%	D
less than 59.5%	F

Bonus/Extra Credit

There are two (and *only two*) ways to achieve bonus or extra credit in the course:

1. Score above 100% on your overall quizzes grade. (See the section "Quizzes" above.) This could yield a maximum of $2\frac{2}{9}\%$ extra credit on your final course grade.

2. Every mathematical mistake you find in a solution I post on Canvas or in something I write in class will earn you 0.2% (two-tenths of a percent) on your final course grade. (Disclaimers: It has to be a *mathematical* mistake, and you have to let me know about it before I have communicated that I'm aware of it.)

Course Content

We will plan on covering the following sections from the textbook (adjustments may be made during the semester however):

1.1	Systems of Linear Equations
1.2	Row Reduction and Echelon Forms
1.3	Vector Equations
1.4	The Matrix Equation $A\mathbf{x} = \mathbf{b}$
1.5	Solution Sets of Linear Systems
1.6	Applications of Linear Systems
1.7	Linear Independence
1.8	Introduction to Linear Transformations
1.9	The Matrix of a Linear Transformation
1.10	Linear Models in Business, Science, and Engineering
2.1	Matrix Operations
2.2	The Inverse of a Matrix
2.3	Characterizations of Invertible Matrices
2.7	Applications to Computer Graphics
3.1	Introduction to Determinants
3.2	Properties of Determinants
3.3	Cramer's Rule, Volume, and Linear Transformations
5.1	Eigenvectors and Eigenvalues
5.2	The Characteristic Equation
5.3	Diagonalization

Schedule

The following is a tentative schedule for the course. (The sections covered are a rough guess, but the exams and everything else will not change unless announced well in advance.)

Monday		Wednesday		Friday	
1/10	Syllabus, Section 1.1	**1/12**	Section 1.2	**1/14**	
1/17	**NO CLASS** (MLK Day)	**1/19**	Section 1.3	**1/21**	
1/24	Section 1.4 Last day to withdraw without penalty	**1/26**	Section 1.5	**1/28**	
1/31	Section 1.6	**2/2**	Section 1.7	**2/4**	
2/7	Flex/Review	**2/9**	**Midterm 1**	**2/11**	
2/14	Section 1.8	**2/16**	Section 1.9	**2/18**	
2/21	Section 1.10	**2/23**	Section 2.1	**2/25**	
2/28	Section 2.2	**3/2**	Section 2.3	**3/4**	
3/7	**NO CLASS** (Spring Break)	**3/9**	**NO CLASS** (Spring Break)	**3/11**	**NO CLASS** (Spring Break)
3/14	Section 2.7	**3/16**	Flex/Review	**3/18**	
3/21	**Midterm 2**	**3/23**	Section 3.1	**3/25**	
3/28	Section 3.2 Last day to withdraw with "W"	**3/30**	Section 3.3	**4/1**	
4/4	Section 5.1	**4/6**	Section 5.2	**4/8**	
4/11	Section 5.3	**4/13**	Applications	**4/15**	
4/18	Applications	**4/20**	**Midterm 3**	**4/22**	
4/25	**NO CLASS** (Study Day)	**4/27**		**4/29**	Final Exam?

(All of the following is standard, UT Tyler-wide, official stuff required to be on the syllabus.)

UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please go to this website: http://www.uttyler.edu/wellness/rightsresponsibilities.php

Campus Carry

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at http://www.uttyler.edu/about/campus-carry/index.php

UT Tyler a Tobacco-Free University

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Grade Replacement/Forgiveness and Census Date Policies

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at http://www.uttyler.edu/registrar. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar. Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract. The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.

- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)

- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)

- Being reinstated or re-enrolled in classes after being dropped for non-payment

- Completing the process for tuition exemptions or waivers through Financial Aid

State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, #3150 or call 903.566.7079

Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester

Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed

Social Security and FERPA Statement

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically

Emergency Exits and Evacuation

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services

Student Standards of Academic Conduct

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

   i. "Cheating" includes, but is not limited to:

- copying from another student's test paper;
- using, during a test, materials not authorized by the person giving the test;
- failure to comply with instructions given by the person administering the test;
- possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
- using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
- collaborating with or seeking aid from another student during a test or other assignment without authority;
- discussing the contents of an examination with another student who will take the examination;
- divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
- substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
- paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
- falsifying research data, laboratory reports, and/or other academic work offered for credit;
- taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
- misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

ii. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.

iii. "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.

iv. All written work that is submitted will be subject to review by plagiarism software.

UT Tyler Resources for Students

- The Mathematics Learning Center, RBN 4021. This is an open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.

- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu

- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu

- UT Tyler Counseling Center (903.566.7254)