

## Course Information

Course Number: MATH 689  
Course Title: Special Topic: A Transition to Graduate Level Mathematics  
Section: 699&700  
Location: *This is an asynchronous online class.*  
Time: *All references to times in this course are in the Central Time zone.*  
Credit Hours: 3

## Instructor Details

Instructor: Oksana Shatalov  
Office: Blocker 360C  
E-Mail: [shatalov@math.tamu.edu](mailto:shatalov@math.tamu.edu)

Office Hours: *by appointment (See also the Communication Strategy section.)*

## Graders Details

Daniel Margolis <danmm@tamu.edu>

## Course Description

This course is a transitional course that is specifically designed to bridge the gap between a less rigorous undergraduate degree in math, or a bachelor's degree in some other field, and a more rigorous graduate level class. what is needed to enter a MS in mathematics program well-prepared. The course will be focused on important concepts and techniques in Linear Algebra, Real Analysis and Differential Equations. The topics covered in this course will be treated more intensively than is typical in undergraduate courses, with an emphasis on problem solving and presenting proofs.

## Course Prerequisites

*Undergraduate Linear Algebra, Calculus and Differential Equations or approval of instructor.*

## Course Learning Outcomes

1. Mastery of Linear algebra, Calculus, and some topics in Differential Equations at the undergraduate level.
2. Students not only review main concepts and methods they learned previously, but also see them from a more rigorous and/or general point of view and learn to apply those concepts and methods to a wider range of applications.
3. A Stronger command of Mathematical Analysis and Advanced Linear Algebra at the graduate level.

## Course Format, Technical Requirements and Support

This course is a 15-week asynchronous online course. Throughout the course, [Canvas](#) will be used as the primary venue for lectures, discussions, assignments, and collaboration with classmates. You will need to participate in discussions and submit all assignments and projects via [Canvas](#) (the learning management system supported by TAMU). Thus, it is necessary for you to be familiar with it. In addition to accessing [Canvas](#) through <https://canvas.tamu.edu/> you can find a link to it in the [Howdy](#) portal. To access the system, you will use your TAMU netid and password. Please contact me immediately if you are unable to access the course website. If you require more technical assistance, try Help Desk Central (<http://hdc.tamu.edu/> or 979-845-8300). Help Desk Central is open 24-hours each day, 7 days a week, 365 days a year.

## Time Frame

*The first day of the online course is August 30, 2021, and the last day is December 15, 2021. For the purposes of this class, the “online week” will reset at 8 am on Tuesdays. This means that one week of assignments will end on Tuesday at 8 am and a new week of assignments will begin. Your final grades will be posted in [Howdy](#) at the end of the course, but your individual grades on assignments will be viewable in [Canvas](#) on a regular basis. Students are expected to follow the course outline and engage and participate in the activities outlined in each weekly lesson. Students are required to keep pace with class, follow the course outline, and complete necessary reading, video lectures and assignments by the posted due dates. **Due dates are expressed in day and hour CT (Central Time).** Students are responsible for adjusting due dates to their time zone.*

## Communication Strategy

Since the class is asynchronous and majority of students are working individuals and live in different time zones, it is difficult to find time that would work for all students. Here are several ways you can communicate with your fellow classmates and myself.

- **Class Announcements:** Class announcements will be posted in [Canvas](#) and sent to your university e-mail account (Make sure to check your notification preferences to control how the course updates are sent.) In addition, some announcements will be made through a video recording called “A Weekly Message from Your Instructor” (posted typically at the beginning of each online week). It is your responsibility to check your account and the course page and get familiar with the announcements.
- **Email:** Email is the best way to contact me on an individual basis. Please use the Inbox tool in Canvas to write to me about Math 689. Other correspondence can be directed to [shatalov@math.tamu.edu](mailto:shatalov@math.tamu.edu). I will do my best to respond to you within 24 hours of your email. I hope that I can respond quicker than 24 hours, but I can’t guarantee a quick response all the time, especially on the weekends. When emailing please BE SURE to put Math 689 in the subject line.
- **Zoom Appointment:** I am available for video conferences using ZOOM. Make sure you email me your availability when scheduling an appointment.

- **Discussion Forum:** Each week on [Canvas](#) a discussion forum will be available. Use this forum to ask your classmates questions about work in the class or to clear up any confusion regarding class instructions, procedures, materials, or assignments.

## Grading Policy

*At the end of the semester, you will receive the grade you earned, according to the scale given. Due to FERPA privacy issues, I cannot discuss grades over email or phone. If you have a question about your grade, please schedule a one-on-one Zoom meeting with me.*

### ✓ Grade Breakdown

ACTIVITY	%	POLICIES, DUE DATES AND REMARKS
Homework	60	It will be assigned weekly every <b>Tuesday at 8 am</b> (13 assignments in total) and it will be due next Tuesday at 8 am. It must be turned in on time. More details are below.
Midterm Exam	20	Week 8 (Date & Time TBA)
Final Exam	20	Week 15 (Date & Time TBA)
Participation		Participation in discussions may also count up to <b>3 extra points</b> added to the final grade. Participation will only be used to help a student's grade, and it will be determined by judgment of the instructor. If class participation is insufficient, the final grade will be calculated without.

### ✓ Grading Scale

Range	Grade
[90, 100]	A
[80, 90)	B
[70, 80)	C
[60, 70)	D
[0,60)	F

- **Participation in Discussions:** Regular interaction online is strongly encouraged, and a portion of it is figured into your overall grade. Learning what other classmates know about mathematics and how they think about mathematics is a very valuable aspect in the learning process. It is good practice to log onto [Canvas](#) 4 to 5 times a week to check in and participate in discussions. A discussion board will be available for each weekly assignment and these discussion boards should be used as a platform for collaboration on assignments. There is also an option to subscribe to discussions, so you receive notifications of new posts and replies.

**Netiquette:** Be sure to participate in a responsible and respectful way that is consistent with good academic practice. Violation of netiquette will result in your withdrawal from the class.

- **Homework:** Each week throughout the course there will be individual assignments whereby each student will turn in their own solutions to a give problem set. For full credit on the homework, you must show all work and justify your answers. When working on the individual assignments, you may email me, discuss with classmates via the discussion board, or look things up on the web or in a book, but you may not copy answers. You must write up your solutions in your own words, notation, and/or symbols; copying a solution from a source and referencing the source is still considered a violation of academic integrity because you are submitting work for a grade that is not your own work. If you use resources to complete your assignments, you must cite the source. For more information on plagiarism and Aggie Code of Honor, see the section on Academic Integrity below. Weekly assignments are due on Tuesdays by 8 am (CST).

You may choose one of two ways to **turn-in your assignments:**

- ◆ Type your solutions to the assignment in an electronic format of your choosing (Latex, Word, etc.), convert to a PDF, and then submit the PDF.
- ◆ Write your assignment on paper and then scan the paper(s) as a merged PDF document. Then submit the merged PDF document.

After submitting each assignment, be sure you check the submitted document to make sure the format in which you are turning in your assignment is readable (i.e., resolution is good, scan quality is clear, etc.). If it is not easily readable, your assignment **will not be accepted**. It is the responsibility of the student to turn in work that is readable by the grader.

*Note that most of the time your homework assignments will be graded by the math department's graduate student. If you have questions on the grading of the homework assignments, you can either contact the graders directly or contact me.*

Note that we are not going to be posting solutions. Since this is a graduate class, it is hard to create new problems for such type of and so we don't want solution keys floating around on the Internet. We will try to give as much feedback as possible on graded assignments to show where a solution might have gone wrong. If even after the feedback, you do have any more questions about how to solve a particular problem, feel free to add it to the discussion board or to email graders and/or instructor.

- **Exams:** There will be two take-home exams (midterm and final). The exams will be placed in Canvas on the scheduled day and will go live for 24 hours. You will work the exams on your own paper and then submit your work. The duration of each exam will be about 3 hours. Additional instructions will be announced before each exam.

## Late Work Policy

*Late work will NOT be accepted unless you have a University approved reason and contact me (not graders) within two business days of the missed assignment.*

## Appeal Policy

Students have 3 business days upon the return of individual grades to notify the instructor of any inaccuracies in their graded work. Students should bring all grade disputes to their instructor in an individual Zoom meeting. Due to FERPA privacy issues, grade disputes will not be discussed over email.

## Tentative Course Schedule

Week	TOPIC
1-7	Real and complex vector spaces. Subspaces, linear independence, bases, dimension. Linear transformations and matrices. Kernel. Image. Determinant. Rank. Nullity- Rank theorem. Applications to systems of linear equations. Change of basis. Similarity. Eigenvalues and eigenvectors and their computation. The characteristic polynomial. Inner product spaces: real and complex inner products, orthonormal bases, Gram- Schmidt orthogonalization, orthogonal and unitary transformations, symmetric and Hermitian matrices, quadratic forms.
8-14	<b>Midterm Exam.</b> Functions and their representation (formula, graph, table). Topology of the real line. Limits. Continuity. Existence of extrema. Intermediate value theorem. Functions of one variable: differentiation, monotonicity and extrema, convexity and inflection, differential, linearization, Taylor's formula, anti-derivative (indefinite integration), definite (Riemann) integration, fundamental theorem of calculus, mean-value theorem. Sequences and series of numbers and functions, convergence. Ordinary differential equations (separable, exact, first order linear, second order linear with constant coefficients), applications. Multivariable calculus: partial derivatives, multiple integrals, line and surface integrals, vector calculus, inverse and implicit function theorems.
15	<b>Final Exam</b>

## Academic Integrity Statement and Policy

*"An Aggie does not lie, cheat or steal, or tolerate those who do."*

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" ([Section 20.1.2.3, Student Rule 20](#)).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at [aggiehonor.tamu.edu](http://aggiehonor.tamu.edu).

## Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability,

please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit [disability.tamu.edu](http://disability.tamu.edu). Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

## Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

The incident is reasonably believed to be discrimination or harassment.

The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, you will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services](#) (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

## Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at [suicidepreventionlifeline.org](http://suicidepreventionlifeline.org).

## Statement on the Family Educational Rights and Privacy Act (FERPA)

FERPA is a federal law designed to protect the privacy of educational records by limiting access to these records, to establish the right of students to inspect and review their educational records and to provide

guidelines for the correction of inaccurate and misleading data through informal and formal hearings. Currently enrolled students wishing to withhold any or all directory information items may do so by going to [howdy.tamu.edu](http://howdy.tamu.edu) and clicking on the "Directory Hold Information" link in the Student Records channel on the MyRecord tab. The complete [FERPA Notice to Students](#) and the student records policy is available on the Office of the Registrar webpage.

Items that can never be identified as public information are a student's social security number, citizenship, gender, grades, GPR or class schedule. All efforts will be made in this class to protect your privacy and to ensure confidential treatment of information associated with or generated by your participation in the class.

Directory items include name, UIN, local address, permanent address, email address, local telephone number, permanent telephone number, dates of attendance, program of study (college, major, campus), classification, previous institutions attended, degrees honors and awards received, participation in officially recognized activities and sports, medical residence location and medical residence specialization.