

Course Information

Course Number: *MATH 646*
Course Title: ***A Survey of Mathematical Problems II***
Section: 399&700
Location: *This is an asynchronous online class.*
Time: *All references to times on this course are in the Central Time zone.*
Credit Hours: 3

Instructor Details

Instructor: ***Oksana Shatalov***
Office: *Blocker 360C*
E-Mail: *shatalov@tamu.edu*
Office Hours: **Friday 12:00 p.m. - 1:00 p.m.** (Central Time) and by appointment on Zoom.
(See also the Communication Strategy section.)

Graders Details

Grader 1 **Wyatt Smith** <wsmith97@tamu.edu>
Grader 2 **Derek Wu** <dwu120@tamu.edu>

Course Description

Catalog Description: A survey of problems in various branches of mathematics such as algebra, geometry, differential equations, real analysis, complex analysis, and calculus of variations.

This course is a core part of the Distance Masters Program targeted at current and prospective teachers of mathematics at the secondary school level or higher. Our aim in the course is not to impart any specific body of knowledge but to foster the student's understanding of what mathematics is all about. The goals are:

- To increase students' mathematical knowledge and skills.
- To expose students to the breadth of mathematics and many of its interesting problems and applications.
- To encourage students to have fun with mathematics.
- To increase students' competence with open-ended questions, with questions whose answers are not known, and with ill-posed questions.
- To teach students how to read and understand mathematics.
- To give students confidence that they will either know an answer or know where to look for an answer when their students ask them questions.

Course Prerequisites

MATH 645 or approval of the instructor.

Textbook and Resource Materials

All reading materials will be posted on [Canvas](#) throughout the semester.

Course Learning Outcomes

We hope that after completing this course, students will have an expanded perspective on the mathematical endeavor and a renewed enthusiasm for mathematics that they can convey to their own students in the future.

Course Format, Technical Requirements, and Support

This course is a 10-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 Tuesday, May 30, 2023 and the last day is Tuesday, August 8, 2023. For this class, the “online week” will reset at noon on Tuesdays. This means that one week of assignments will end on Tuesday at noon and a new week of assignments will begin. Your final grades will be posted in [Howdy](#) at the end of the course, but your grades on assignments will be viewable in [Canvas](#) regularly. Students are expected to participate in the activities outlined in each weekly lesson. Students are required to keep pace with the 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 most students are working individuals in different time zones, it is difficult to find a time that would work for all students. Here are several ways you can communicate with your classmates and me.

- **Zoom Appointment:** I am available for video conferences using ZOOM. Make sure you email me your availability when scheduling an appointment if you cannot attend **Office Hours**.
- **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 Message from Your Instructor**” 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 645. Other correspondence can be directed to 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.
- **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	72	It will be assigned weekly every Tuesday at noon , and it will be due next Tuesday at noon. It must be turned in on time. More details are below.
Term Paper	28	The paper will be an expository paper on a mathematical topic and will be at least 3000 words, not including diagrams and references. The list of topics will be provided by the instructor at the beginning of the semester and the topic selection will be on a first come/first served basis. The term paper will be due Wednesday, August 9 . More details are below.
Participation		Participation in weekly non-graded discussions may also be worth up to three additional points added to the final grade. Participation will only be used to improve a student's grade, and it will be determined at the instructor's discretion. If there is insufficient class participation, the final grade will be calculated without it.

✓ Grading Scale

Range	Grade
$90 \leq \text{Average} \leq 100$	A
$80 \leq \text{Average} < 90$	B
$70 \leq \text{Average} < 80$	C
$60 \leq \text{Average} < 70$	D
$\text{Average} < 60$	F

- **Class Participation** 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 of the learning process. It is good practice to log onto [Canvas](#) 4 to 5 times a week to check in and participate in discussions [*Make sure you subscribe to discussions, so you receive notifications of new posts and replies.*] The discussion boards should be used as a platform for collaboration on assignments.
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 given problem set. For full credit on the homework, you must show all work and justify your answers. Note that some assignments may require using the discussion board during the week. When working on 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 and/or use ChatGPT or other AI composition software (see the Artificial Intelligence Policy below). 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 the Aggie Code of Honor, see the section on Academic Integrity below. Homework assignments are due on the following Tuesdays by noon (CST):

Homework	1	2	3	4	5	6	7	8
Due Date	June 6	June 13	June 20	June 27	July 11	July 18	July 25	August 1

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 your assignment is readable (i.e., the resolution is good, the 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 your homework assignments will be graded by the math department's graduate students most of the time. If you have questions about the grading of the homework assignments, you can either contact the graders directly or contact me.

Note that, in general, we are not going to be posting solutions. However, 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 them to the discussion board or email the graders and/or instructor.

Homework Grading Scheme The grading scheme is normally 2 points per problem, or per section of the problem if the problem is divided into parts. Some parts of the problems may be quite brief, so they are only worth one point. For any 2-point questions:

- 2/2 points for a correct solution, or a solution with only minimal errors where the student demonstrated a strong grasp of the concepts.
- 1/2 points for a partially correct solution, some knowledge of the concepts demonstrated.
- 0/2 points for no solution or for a solution that does not demonstrate any understanding of the concepts.

For multiple choice questions with justification, I would award 1 point for the correct answer and 1 point for the correct justification (so if their reasoning was nearly perfect but it led to the wrong answer choice, the student would get 1/2 point. To get 2/2 points, you would have to have chosen the correct answer choice as well as included proper justification).

Note that we are not going to be posting solutions. 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 them to the discussion board or to email graders and/or the instructor.

- **Writing Project Pay attention to the following due dates** as they may be different from the due dates for weekly assignments.

Writing Stage	Project	%	Due Date	Comments
Topic Selection			Friday, June 9	Instructions and a list of topics will be provided on the Canvas course page.
Paper Proposal		8	Friday, June 16	
Term Paper Draft			Friday, July 7	The draft must meet the main term paper requirements and should be as close to your final paper idea as possible. It does not, however, need to be a polished presentation of the topic. If a student submits a poorly written draft, they may lose up to 10 % of the total term paper grade.
Editorial Work		16	Friday, July 14	To do editorial work, a student must submit the draft.
Final Term Paper		68	Wednesday, August 9	

Artificial Intelligence (AI) Policy

Intellectual honesty is vital to an academic community and for my fair evaluation of your work. All work submitted in this course must be your own, completed in accordance with the University's Academic Integrity Policy (see below). You may not engage in unauthorized collaboration or make use of ChatGPT or other AI composition software. We strongly advise against having ChatGPT write text for you and trying

to pass it off as your own work. This is academically dishonest and is widely considered plagiarism. It will usually result in an automatic fail, as well as other potential consequences.

Learning Support

The University Writing Center (UWC) is a resource to help you develop and refine the communication skills vital to success in college and beyond. Currently, you can choose to work with a trained UWC peer consultant via web conference or email. You can schedule an appointment to discuss any kind of writing project. Their consultants can work with you at any stage of your process. To schedule an appointment or to view their handouts, videos, or interactive learning modules, visit <https://writingcenter.tamu.edu/>

Course Schedule

WEEK	TOPICS
1&2	Rational and Irrational Numbers. The Concept of Limit. The Mathematical Analysis of Infinity. Infinite Series and Infinite Products (optional). Writing Project [Topic Selection and Paper Proposal]
3-5	Complex Numbers: History, Properties, and Applications. Transformations of Euclidean Plane. Fundamental Theorem of Algebra. Solution of Cubic and Quartic Equations. Writing Project [Paper Draft]
6&7	Writing Project [Peer Editing] Factoring Polynomials. Geometrical Constructions. Impossibility Proofs and Algebra. Constructible Numbers and Number Fields. Irreducible Polynomials and Constructability. Insolvability of Three Classical Greek Problems.
8&9	Geometrical Transformations. Inversion and its Applications. Projective Geometry. Cross Ratio. Conic Sections: Metric and Projective Properties.
10	Writing Project [Final Stage]

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.

University Policies

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" ([Student Rule 7, Section 7.4.1](#)).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

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.

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 the Disability Resources office on your campus (resources listed below) 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.

Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu.

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, a person who is subjected to the alleged conduct 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 healthy self-care by utilizing available resources and services on your campus

Students who need someone to talk to can contact Counseling & Psychological Services (CAPS) or 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](#).