

Course Information

Course Number:	MATH 646
Course Title:	A Survey of Mathematical Problems II
Section:	699&700
Location:	<i>This is an asynchronous online class.</i>
Time:	<i>All references to times in this course are in the Central Time zone.</i>
Credit Hours:	3

Instructor Details

Instructor:	Oksana Shatalov
Office:	Blocker 360C
E-Mail:	shatalov@math.tamu.edu
Office Hours:	<i>by appointment (See also the Communication Strategy section.)</i>

Graders Details

Grader 1	Jordan Hoffart < jordanhoffart@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, 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 rather to foster the students' 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 to many of its interesting problems and applications;
- to encourage students to have fun with mathematics;
- to exhibit the unity of diverse mathematical fields;
- 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, when their own students ask them questions, they will either know an answer or know where to look for an answer.

Course Prerequisites

MATH 645 or approval of instructor.

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 5-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 June 1, 2021 and the last day is Friday July , 2021. For the purposes of this class, the “online week” will reset at 10 am on Tuesdays. This means that one week of assignments will end on Tuesday at 10 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 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.

- **Email:** Email is the best way to contact me on an individual basis. I am easily accessible via shatalov@math.tamu.edu. I will do my best to respond to you within 24 hours of you email. I hope that I can respond quicker than 24 hours, but I can't guarantee a quick response all of the time, especially on the weekends. When emailing please BE SURE to put Math 646 in the subject line.
 - **Zoom Appointment:** I am available for video conferences using ZOOM (you can find a link to it in the [Howdy](#) portal.).
 - **Discussion Forum:** Each week on [Canvas](#) there 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.
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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 10 am and it will be due next Tuesday at 10am. 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 2000 words, not including diagrams and references. The list of topics will be provided by instructor at the beginning of the semester and the topic selection will be on the first come/first served basis. Term paper will be due Monday July 5 at noon. More details are below.
Participation		Participation may also count to 3 extra points 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 and Discussion Board** 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 10am (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.

Homework Grading Scheme The grading scheme is generally 2 points per problem, or per part of problem if it's multi-part. Some parts of problems are very short and so those are only worth 1 point each. 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 which 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 points. 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. Since this is a graduate class, it is hard to create new problems for such type of class (unlike Calculus I, we can't just change a few numbers to create a brand new problem) 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.

- **Term Paper** The term paper should be a thoughtful discussion of your topic including the appropriate mathematics and history. A superficial discussion is not sufficient. I want to know by reading the paper that you learned some things and thought seriously about the topic. The paper should be at least 2000 words long (not including diagrams and references). It is expected that you will use proper English grammar, punctuation, and spelling. Papers and other forms of communication that do not use proper English grammar, punctuation, and spelling will not be accepted. Full Term Paper description will be provided by instructor. If you have questions on the term paper grading, please contact me.

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	ASSIGNMENTS	DUE DATES
1	Rational And Irrational Numbers. The Concept Of Limit. The Mathematical Analysis Of Infinity. Infinite Series and Infinite Products (optional).	Homework 1D & 1J	Tuesday June 8 10am
2	Complex Numbers: History, Properties, Applications. Transformations Of The Euclidean Plane. Fundamental Theorem Of Algebra. Solution Of Cubic And Quartic Equations.	Homework 2D & 2J	Tuesday June 15 10am
3	Factoring Polynomials. Geometrical Constructions. Impossibility Proofs And Algebra. Constructible Numbers And Number Fields. Insolvability Of Three Greek Problems.	Homework 3D & 3J	Tuesday June 22 10am
4	Geometrical Transformations. Inversion And Its Applications. Projective Geometry. Cross Ratio. Conic Sections: Metric And Projective Properties.	Homework 4D & 4J	Tuesday June 29 10am
5	Work On Term Paper	Term Paper	Monday July 5 noon

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.

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 Disability Resources in the Student Services Building or at (979) 845-1637 or visit 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.

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 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.