SYLLABUS

COURSE INFORMATION

Course Number:	MATH 300 (3 credit hours)
Course Title:	Foundations of Mathematics
Time:	Section 903: TR 2:20 – 3:35pm
	Section 904: TR 3:55 – 5:10pm
Location:	BLOC 148

INSTRUCTOR DETAILS

Instructor:	Justin Cantu
Office:	Blocker 301A
E-Mail:	justincc@tamu.edu (*preferred method of communication*)
Office Hours:	Held in BLOC 605AX
(tentative)	W 2:20pm – 4:20pm
	F 10:30am – 12:00pm & 2:00pm – 3:15pm
	And by appointment (in-person and Zoom)

COURSE DESCRIPTION

Foundations of mathematics including logic, set theory, combinatorics, and number theory.
Prerequisite: MATH 148/152/172, or equivalent

SPECIAL COURSE DESIGNATION

This is a W (writing intensive) course, which means that close attention will be paid to students' ability to write mathematical statements and proofs mathematically and grammatically correctly. About one third of the grade will depend on the writing. Since this is a W course, no student can pass the course without a passing grade on the writing portion.

TEXTBOOK AND/OR RESOURCE MATERIALS

TEXTBOOK: The Tools of Mathematical Reasoning, Tamara J. Lakins, American Mathematical Soc., 2016, ISBN 1470428997, 9781470428990. A pdf/eBook version of the textbook is available for free at library.tamu.edu.

Gradescope: Gradescope is a web-based application that may be used to grade lab assignments, quizzes as well as the workout portions of the exams. You will need to scan and upload some of your written work as a PDF (this can be achieved with a cell phone or other technology).

Course Learning Outcomes

The purpose of the course is to provide students with important foundational skills that will prepare them to be successful in higher level courses. Upon successful completion of the course, students will:

- Be able to construct and organize their mathematical reasoning.
- Develop skills for reading and writing mathematical proofs.
- Recognize and identify frequently used types of proofs.
- Master several mathematical concepts from logic and set theory.
- Identify concrete situations where the newly learned techniques can be applied.
- Recognize and recall the main definitions and results explained in the course.
- Be expected to present simple proofs, definitions, and statement of theorems.

Grading Policy

Activity	Percentage	Policies and Remarks
Term Paper*	15%	This is to be an expository paper on a mathematical topic written for a reader with a similar background as your fellow students. I will have a list of suggested topics, but feel free to come up with your own. The instructor must approve the topic. More details to be posted on Canvas. *You may not use a paper previously submitted from another class.*
Writing Assignments*	10%	A series of *Writings Assignments* will be assigned throughout the semester. This may include watching videos and giving your thoughts, choosing a term paper topic, outlining your term paper, initial draft of paper, etc.
Homework*	15%	Homework will be due each week on Friday. Work must be clear and well-organized. Group work is encouraged, but please write up your solutions independently. You may submit homework 1 day late for a 15% penalty.
Quizzes	8%	There will be occasional in-class quizzes, usually covering the lectures from the previous week.
Two Midterm Exams	30%	There will be two proctored exams administered during published class time. You will need to have your ID available at each exam. • Highest Midterm Exam – 16%, Lowest Midterm Exam – 14% • Exam I: Thursday, February 22 • Exam II: Thursday, April 4
Final Exam	22%	The final exam is **cumulative** and **required** for all students. • Section 903: Tuesday, May 7, 1:00 – 3:00pm in BLOC148 • Section 904: Monday, May 6, 1:00 – 3:00pm in BLOC148

**As this is a writing-intensive course, no student can pass this course without a passing grade on the writing portion, which comprises the Writing Assignments, Term Paper, and 2/3 Homework. In particular, you need 3/7*TP + 2/7*WA + 2/7*HW to be a passing grade.*

Range	Grade
90 ≤ Average ≤ 100	**A**
80 ≤ Average < 90	**B**
70 ≤ Average < 80	**C**
60 ≤ Average < 70	**D**
Average < 60	**F**

Appeal Policy

Students have one week 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. Note that Gradescope has a regrade request feature.

Attendance and Make-up Policies

Excused Absences: University student rules concerning excused and unexcused absences, as well as makeups, can be found at http://student-rules.tamu.edu/rule07. In particular, make-up exams and late homework will NOT be allowed unless a **university approved reason is given to me**. Notification *before* the absence is **required** when possible. Otherwise (e.g. accident, or emergency), you must notify me **within two business days** of the missed exam or assignment to arrange a makeup.

Working with friends: In this course, students can discuss homework, quizzes, and their solutions. However, it is NOT permissible to copy solutions from another student. It is NOT permissible to discuss any aspect of any exam until ALL students have completed the exam. The penalties for violating these policies will range from an F on an assignment, to failing the course.

Makeup exams will only be allowed due to excused absences and the makeup must be taken as soon as possible after the missed exam. If you know ahead of time you will be absent during an exam, please notify me in advance.

Tentative Course Topics and Calendar of Activities

Week	Topics	Sections
Week 1: 1/15 – 1/19	Language and Logic	1.1
Week 2: 1/22 – 1/26	Language and Logic cont'd; Proofs	1.1, 1.2 & 2.1
Week 3: 1/29 – 2/2	Proofs cont'd	1.2 & 2.1
Week 4: 2/5 – 2/9	Indirect Proofs	2.2
Week 5: 2/12 – 2/16	Induction; Strong Induction	3.1-3.2
Week 6: 2/19 – 2/23	The Language of Sets; **EXAM I**	4.1
Week 7: 2/26 – 3/1	Operations on Sets	4.2
Week 8: 3/4 – 3/8	Arbitrary Unions and Intersections	4.3
Spring Break (3/11 – 3/15)		
Week 9: 3/18 – 3/22	Functions; Function Composition	5.1-5.2
Week 10: 3/25 – 3/29	Injective and Surjective Functions	5.3
Week 11: 4/1 – 4/5	Invertible Functions; **EXAM II**	5.4
Week 12: 4/8 – 4/12	Functions and Sets	5.5
Week 13: 4/15 – 4/19	The Division Algorithm and the Well-Ordering Principle; Greatest Common Divisors and the Euclidean Algorithm	6.1, 6.2
Week 14: 4/22 – 4/26	(Relatively Prime Integers; Congruences; Congruence Classes); Relations; Equivalence Relations	(6.3-6.5 if time allows), 7.1-7.2
Week 15: 4/29 – 4/30	Partitions; (Finite and Infinite Sets); **FINAL EXAM**	7.3, (8.1 if time allows)
5/2 -5/7	**FINAL EXAM**	

Other Important Dates:

January 22:	Last day for adding/dropping courses for the spring semester
March 11 - 15:	Spring Break
March 29:	Reading Day, no classes
April 16:	Last day to Q-drop
May 1:	Reading Day, no classes

Other Course Information

Technology Support

If you have a technology issue, consider seeking help from the 24/7 TAMU IT Help Desk.

HELP SESSIONS (MATH LEARNING CENTER)

Help sessions are an opportunity for you to ask questions and get help with your assignments. These sessions are led by students, where you may come and go, as your schedule allows. Once determined, the schedule will be announced in class, posted on our course webpage, and additionally posted at

https://mlc.tamu.edu/Online-Help-Services/MLC-Help-Sessions

UNIVERSITY WRITING CENTER (UWC)

The University Writing Center (UWC) is a resource to help you develop and refine your communication and writing skills. You can schedule an appointment to discuss any kind of writing project. See

https://writingcenter.tamu.edu/.

ARTIFICIAL INTELLIGENCE (AI) POLICY

Limited use of artificial intelligence assistants (chatbots), such as ChatGPT and Google Bard, is allowed in this course. Here are some guidelines about the parameters of acceptable use.

The general principle is that you may use a chatbot as a tool to improve your writing skills (just as you may in the past have used a spell checker). But submitting work entirely generated by AI is considered to be plagiarism, a major academic violation. You should familiarize yourself with Honor System Rule 20.1.2.3.5, according to which plagiarism includes the failure to acknowledge "electronic resources if they are utilized ... in an academic exercise."

You should create a draft of written work by yourself, based on your own ideas and knowledge. Then you may use AI to help edit the draft. Be aware that AI can produce nonsense that sounds authoritative, and you are responsible for verifying the accuracy of the end product.

When you write a research paper, you include a bibliography to credit the sources that you consulted. In the same spirit, when you get help from an AI assistant in this course, you should include a statement about what prompts you used and how they were helpful in completing the assignment.

Please consult your instructor if you have questions about appropriate use of AI in this course.

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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

"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 healthy self-care by utilizing available resources and services from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the Texas A&M Helpline (979-845-2700) from 4 p.m. to 8 a.m. weekdays and 24 hours on weekends. Emergency help is also available 24 hours through the 988 Suicide & Crisis Lifeline (988) or 988lifeline.org.

Campus Safety Measures

To help protect Aggieland and stop the spread of COVID-19, Texas A&M University urges students to be vaccinated and to wear masks in classrooms and all other academic facilities on campus, including labs. Doing so exemplifies the Aggie Core Values of respect, leadership, integrity, and selfless service by putting community concerns above individual preferences. COVID-19 vaccines and masking — regardless of vaccination status — have been shown to be safe and effective at reducing spread to others, infection, hospitalization, and death.

LaTeX

LaTeX is a typesetting system designed for the production of technical and scientific documentation. Although handwritten work is perfectly acceptable in this course, it could be a good idea to start getting minimal practice using LaTeX. Here is a link to Overleaf Documentation for an intro to LaTeX for anyone interested.