Math332.001 Methods of Mathematical Proof
COURSE SYLLABUS: Spring 2026

Instructor: Rebecca Dibbs, PhD
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COURSE INFORMATION

Materials

Textbook(s) Required: Coursepack: Notes for a Course on Proofs by Jacqueline A. Jensen-Vallin.

Course Description: Hours: 3

This course trains students on mathematical proof to deepen and broaden the knowledge of various aspect of discrete mathematics that will lay a foundation for further study of many fields in mathematics including topology, analysis, number theory, abstract algebra, probability, and computer science. Topics may include: functions and relations on sets, equivalence relations and partitions of sets, mathematical theorems and proofs, Peano Axiom and natural numbers, Cardinality and Cantor's theorem, the barber's Paradox and the Axiom of Choice, Countably infinite sets and Hilbert's infinite hotel paradox, algebraic, metric and topological structures on a set. Prerequisites: MATH 2414 with grade of "C" or higher.

This course may be very different from most other math courses that you have taken. High school and introductory college math courses usually focus on teaching methods of doing computations: mathematics as finding the correct answer. In this course, we are going to focus on another kind of mathematics: mathematics as a way of thinking about and trying to understand the world. We'll try to understand how people decide

what is true, and how they reason about mathematics and geometry in particular. We are going to focus on the process as much as the results of mathematical thought. Writing is an important part of this process. Contrary to what some other math courses may have led you to believe, it is virtually impossible to do mathematics without writing about it. Writing is a tool for communicating ideas to other people, but it can also be used as a tool for clarifying one's own ideas. It can be very hard to spot a flaw in a line of reasoning if you haven't written it down; conversely, writing down a line of reasoning is often the best way to expose any problems that it might have. For these reasons, practicing mathematicians invariably use writing as a vital part of their work, and writing will be an integral part of this course.

This course will require a willingness to invest significant amounts of effort grappling with developing your own ideas. In this course, as in the real world, you will be the ultimate arbiter of what you believe to be true. Deciding for yourself what is true is not easy, but it can be very rewarding.

COURSE REQUIREMENTS

Course Activities

Attendance: Attendance Policy: Students are expected to attend every class. If class must be missed, the student is expected to get the notes from a classmate, and to check the web-page for announcements and updated assignments. The professor will keep a record of attendance.

Tardiness: Students are expected to arrive to class on time. If a student is perpetually late, they will be asked to not attend class unless they arrive on time. If tardiness becomes a problem for the class as a whole, people who arrive late will not be permitted to enter the class. If this stricter policy becomes necessary, there will be an announced in class and posted on the web-page.

Class participation: Students will be asked to share their solutions to problems. During classes, I will randomly call on students to present problems assigned. You may choose to present any problem not yet presented in class. If you are not the first person chosen on a given day, you will not have your choice of all assigned problems. This means that you may not get to present your first choice problem, so you should be prepared with solutions to more than one problem. It is possible that you will be called on to present two days in a row, so you should be constantly working on problems. **You are allowed two "passes" during the course**

of the semester. These are for days when you have no problems to present. There is no penalty for using these two passes. However, once you have passed twice during the semester, you will not be allowed to pass again, and will be forced to present a problem, so use these wisely. During student presentations, the rest of the class is encouraged to ask questions, and to think critically about the solution presented by the classmate. The class is responsible for determining the validity of arguments presented, and the instructor will occasionally allow incorrect solutions to stand in class. These incorrectly presented problems will appear on quizzes and tests.

Presentations will be scored in the following way:
• Accuracy of the problem you present, including following guidelines below.
• Defense of your work, including, including following guidelines below.

Points: You will be awarded a "point" in the appropriate category every time you
  contribute in one of the following ways:
    • P - presentation points awarded
        5 pts - Correct presentation
        2-4 pts - Presentation with error(s)
    • Q - asking a good question of the presenter
    • C - an oral contribution other than the two categories above
    • I - contributing a demonstration of mathematical insight Remember that the
    presenter will always have the first chance to answer a question.

Guidelines For Your Presentation:
    • Write the problem on the board.
    • State what method/theorem/idea you will use.
    • Clearly explain each step.
    • Do not use "stupid", "trivial", "obvious", etc.

Guidelines For Defending Your Work:
    • You must answer you classmates' and professor's questions in a respectful
    manner.
    • Do not use "stupid", "trivial", "obvious", etc.
    • You must try to answer every question posed.
    • It's OK to say, "I'm not sure that I understand your question." It is not OK to say,
    "Your question doesn't make sense."
    • Talk to the class, not to the board.

Guidelines For Criticism of Classmates' Work:

• You are to ask questions about your classmates' work. Do NOT suggest another technique. In some cases, there may be more than one way to solve a problem.
• Do not use "stupid", "trivial", "obvious", etc.
• You must ask questions in a respectful manner.
• It's OK to say, "Can you explain how you got from line 3 to line 4?" It is not OK to say, "Line 4 is wrong," or "Line 4 doesn't make sense."

Homework: Homework: Homework will be assigned in class each day. Assignments can be found online at the course website. Students are not allowed to discuss problems with other members of the class, tutors, or anyone except for the instructor. Students are not to use outside references. This means that students are not allowed to access internet resources or use other textbooks for help. If you have questions about problems, you should see your instructor. Many problems will be assigned and all problems will be discussed in class. However, only problems marked with an asterisk (∗) will be collected and graded. For those to be collected, see the standards below. Every problem completed should be written on a separate sheet of paper. Problems can be submitted prior to presentations or after presentations. Problems will be collected only at the beginning of every class, and will be graded in the following way:

- **10 pts - Correct work, turned in pre-presentation**
- **1 - 9 pts - Almost correct work, turned in pre-presentation**
- **5 pts - Correct work, turned in post-presentation**

Incorrect solutions to problems which are submitted after a problem has been presented in class will not receive any points. Problems can be resubmitted if you are unhappy with your score up to three class periods after the problem has been presented in class.

Quizzes: There will be a short quiz given in class every day. Most days these will be vocabulary quizzes, but might also ask for examples, counterexamples, or short proofs.

Exams: There will be three exams during the semester. They are tentatively scheduled to occur on: (insert days here). Any changes to this schedule will be announced in class and posted on the web-page. If a student misses an exam, the student will be allowed to replace that exam score with their score on the final exam if the student contacts the instructor prior to the exam and the student takes and passes the next exam at the regularly scheduled time. The final exam will be comprehensive.

The key to success in this course is regularly working with other students in the class and asking questions when you have them!!! We will discuss lab problems in class, but there will often not be enough time to discuss all of them. Please come to office hours if you have additional questions about the problem set.

Workload and Assistance: You should expect to spend **a minimum of TWO HOURS every day**, outside of class, on the course material. This includes watching the videos, labs, and studying for quizzes and exams. Some weeks (those in which an exam is scheduled, for instance) may require more of your time, other weeks may require less, but *on average*, budget 8 to 12 hours each week. **I can't stress enough that in order to be successful in this class you should spend much of this time working with other students in the class!** Please ask questions and seek assistance as needed. You may email me at any time, and I encourage you to make use of my office hours

GRADING

This class will be graded on a weighted percentage system:

Assignment	Weight
Homework/Quizzes	16%
Class Participation	16%
Exam 1	16%
Exam 2	16%
Exam 3	16%
Final Exam	20%
Total	100%

All point totals will be rounded to the nearest percent before grades are assigned:

A: 90-100
B: 80-89
C: 70-79
D: 60-69
F: Below 60

TECHNOLOGY REQUIREMENTS

Use of a graphing calculator having at least the capabilities of the TI-83 will be helpful throughout the course. TI-89 is highly recommended. A computer algebra system will be used for some problem exploration, enhanced conceptual understanding, and to engage students as active participants in the learning

process. **NOTE: There will be a portion of the midterm and final where no calculators will be permitted**.

COMMUNICATION AND SUPPORT

Interaction with Instructor Statement

My primary form of communication with the class will be through Email and Announcements. Any changes to the syllabus or other important information critical to the class will be disseminated to students in this way via your official University Email address available to me through MyLeo and in Announcements. It will be your responsibility to check your University Email and Announcements regularly.

Students who Email me outside of regular office hours can expect a reply within 24 hours M-F. Students who Email me during holidays or over the weekend should expect a reply by the end of the next regularly scheduled business day.

myLeo Support

Your myLeo email address is required to send and receive all student correspondence. Please email helpdesk@tamuc.edu or call us at 903-468-6000 with any questions about setting up your myLeo email account. You may also access information at https://leo.tamuc.edu.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures

Academic Honesty

Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including (but not limited to) receiving a failing grade on the assignment, the possibility of failure in the course and dismissal from the University. Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. In **ALL** instances, incidents of academic dishonesty will be reported to the Department Head. Please be aware that academic dishonesty includes (but is not limited to) cheating, plagiarism, and collusion.

Cheating is defined as:
- Copying another's test of assignment
- Communication with another during an exam or assignment (i.e. written, oral or otherwise)
- Giving or seeking aid from another when not permitted by the instructor
- Possessing or using unauthorized materials during the test
- Buying, using, stealing, transporting, or soliciting a test, draft of a test, or answer key

Plagiarism is defined as:
- Using someone else's work in your assignment without appropriate acknowledgement
- Making slight variations in the language and then failing to give credit to the source

Collusion is defined as:
- Collaborating with another, without authorization, when preparing an assignment

If you have any questions regarding academic dishonesty, ask. Otherwise, I will assume that you have full knowledge of the academic dishonesty policy and agree to the conditions as set forth in this syllabus.

Late Policy: Late work/Make-ups will not be accepted without a documentable and valid excuse, because the lowest grade(s) in each category is dropped. Examples of documentable and valid excuses include:

*car accident w/ police report
*illness w/ doctor's note (you or your child)
*athletic or other mandatory extra-curricular travel
*field trip for another class
*being detained upon entering the country by Homeland Security

University Specific Procedures

ADA Statement

Students with Disabilities
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a

learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library- Room 132
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
StudentDisabilityServices@tamuc.edu

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See *Code of Student Conduct from Student Guide Handbook).*

> **The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel.**

- Campus Concealed Carry (new): Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to (http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedur es/34SafetyOfEmployeesAndStudents/3 4.06.02.R1.pdf) and/or consult your event organizer). Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

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AI use policy
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 Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

 Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

13.99.99.R0.03 Undergraduate Academic Dishonesty

13.99.99.R0.10 Graduate Student Academic Dishonesty

COURSE OUTLINE / CALENDAR

Chapter 1: Weeks 1-2
Chapter 2: Week 3
Chapter 3: Week 3-4
Test 1: Week 5 (Ch. 1-Ch. 3)
Chapter 4: Week 5-8
Chapter 5: Week 8-9
Test 2: Week 10 (Ch 4-5)
Chapter 6: Weeks 10-14
Chapter 7: Week 15-16
Test 3: Week 16 (Ch 6-7)

Note: Problems 152-160 are extra credit and will be due the day of Test 3