M325K – Discrete Mathematics (IBL)
Weekdays 2:30-4p, online via Zoom (85501)

Instructor: Dr. Zachary Miner
E-mail: zminer@math.utexas.edu.
Website: Accessible from Canvas, https://utexas.instructure.com.
Zoom office hours: Weekdays 10-10:45a, and by appointment
Course Texts: Notes and problem sets provided by instructor; and
The 5 Elements of Effective Thinking, by Burger and Starbird.

Course objectives.
This course carries the Independent Inquiry flag and will be held in an Inquiry Based Learning (IBL) format. In this instructional method, students are required to prove theorems as we need them and present them to the class. During the Zoom sessions, you will present proofs that you have written and see proofs that your classmates have written. The course will cover logic, proof techniques, set theory, elementary number theory, functions, and relations. Class attendance is mandatory and will be recorded. If you are unable to be online during our usual class time, a recording will be made available on Canvas for you to view at any time.

Prerequisites.
This course is designed for students who have done well in a calculus course, for example M408D or 408L, and to introduce them to the basic techniques of mathematical proof. Please see me if you have questions about your readiness for this class.

Homework.
Assignments are made up of proving theorems, answering questions, and working exercises in the notes. There will be assignments due every day and submitted through Canvas. Late homework will not be accepted. Both the quality and correctness of your work will be graded. In particular, proofs should be written in complete sentences. This helps you organize your thoughts, leads to clearer and more correct proofs, and is much easier to explain to others. Using technical symbols should be avoided when writing assignments.

You should write your solutions up neatly before the class in which the homework is due, and upload the work to Canvas before each Zoom session begins.

The lowest 2 homework scores will be dropped. You should still write up proofs from homework assignments you miss, for your own benefit and to have as a resource for you as you continue your mathematical studies.

Presentations and Participation.
On each class day, I will ask you to present proofs of theorems or answer exercises that you have submitted via Canvas. I will assign small groups of people to specific exercises so you can write up particularly well those that you will present via Zoom. I will show your written work via Zoom while you explain it. Please attend each Zoom session prepared to present the exercises and theorems scheduled for that day. If you proved one theorem that you thought was particularly interesting or difficult, you should let us know so we all can see your proof.

Keep in mind that explaining a proof is a bit different from writing a proof. The act of talking about a proof gives you the opportunity to show people how the ideas of the proof fit together, and what issues you had to deal with when working on the problem. One thing I want you to develop in this course, besides your proving skills, is your ability to communicate mathematics to others.

When your classmates are presenting, it is your responsibility to follow their line of reasoning. Keep in mind that their argument may be different from yours. If you see something in a proof that you don't understand, please ask about it. If you see a possible mistake, please ask about it. If there is something about the proof that you thought was interesting or clever, feel free to comment on it! In each case, please be considerate of the person presenting, and treat him/her the way you'd like to be treated when it's your turn to present.

Class rules.
Most of the problems that we will prove in this course can be readily found in any good Discrete Mathematics textbook or on the internet. This semester, you may not use these sources, because one of the main goals of the course is to help you to learn to think independently. Therefore, for purposes of this class, turning in a solution to a homework problem that you obtained from an outside source is considered plagiarism, just like writing a report that consists entirely of quotes from other books or papers would be considered plagiarism in another course.

I encourage you to work with your classmates when working on homework for this class, but please use the following method in doing so. First work on the problem on your own. If you get stuck, one source for help is to ask me for a hint. Alternatively, you may work with other students who have not solved the problem. If you ask a student in the class who has solved the problem, that is OK; however, the student who knows the answer should not simply tell the answer. Instead, the person who knows should give helpful guidance so that you can solve the problem on your own. As a general rule, everything you turn in for this class should represent your own work; it should not be something that somebody else gave you without any work on your part, and it should, of course, never be copied from someone else's paper. If you do learn a substantial part of the idea of a problem from someone else, then please note that fact on your paper.

Oral exams.
I will have each student give a short presentation of their proofs to a few exam problems not covered during the regular sessions of class. I will post these problems on Canvas roughly one week in advance of each oral exam date.
Tentative Exam schedule:
Exam I: Saturday-Monday, June 20-22;
Exam II: Sunday-Monday, July 5-6;
Final Exam: Friday-Sunday, July 10-12.

Grades.
On all work, your grade will be computed as a percentage: the number of points you earned divided by the number of points possible. It is unlikely that any grade will be curved. The percentages of each type of work that will be used to compute your final grade are
Homework: 15%
The 5 Elements of Effective Thinking response: 5%
Presentations and participation: 30%
Midterms (Oral Exams): 25%
Final (Oral Exam): 25%
Grades will be assigned in a standard manner:
93-100 A ; 90-92 A- ; 87-89 B+ ; 83-86 B ; 80-82 B- ; 77-79 C+ ; 73-76 C ; 70-72 C- ; etc...

Deadlines for dropping a course
If you drop a class on or before June 9th, the class will not show up on your transcript. If you drop a class after that date, the course will show up on the transcript with a Q grade. After July 9th, it is not possible to drop a course except for extenuating (usually non-academic) circumstances.

Students with disabilities.
The University of Texas provides, upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the office of the Dean of Students at 471-6259, TTY 471-4641.

Counseling and Mental Health Center
Student Services Bldg (SSB), 5th Floor
Hours: M–F 8a–5p
Phone: 512-471-3515 (appointments) 512-471-CALL (crisis) E-mail: `www.cmhc.utexas.edu`

One more thing!
I am committed to doing everything I can to help you make the most of this course. If you have questions, comments, or suggestions regarding our class, please do not hesitate to contact me.