MATH 3000W: Introduction to Advanced Mathematics
Spring 2024

Instructor:	Samuel Walsh (`walshsa@missouri.edu`)
Optional Textbook:	*Mathematical Thinking: Problem-solving and Proofs*, John P. D'Angelo, Douglas B. West, 2nd edition, ISBN: 0-13-014412-6
Lecture:	MWF 12:00–12:50 PM in 113 Crowder Hall
Office hours:	WTh 3:00–4:00 PM in 307 Math Sci. Bldg.
Website:	Canvas

Overview. This objective of this course is to form a bridge between lower-level mathematics, which is primarily concerned with computation, to upper-level mathematics, where theoretical or conceptual understanding becomes paramount. The main focus is on reading and writing proofs, learning how to think rigorously, and developing so-called "mathematical maturity." These are the fundamental skills that distinguish trained mathematicians, and they are necessary for success in all later coursework. Specific topics to be covered include: basic logic and set theory, functions, properties of integers, basic combinatorics, the real number system, and sequences.

Prerequisites. Math 1700 or permission of instructor/department.

Textbook and Required Materials. The textbook for this class is listed above. It is optional but highly recommended.

Homework. The majority of your learning will come through completing the homework. These will be due roughly every week, with all information being posted on the Canvas site. Three of the homework assignments will be *writing intensive* (WI). For these, special emphasis will be placed on the quality of the mathematical writing. In addition, one or more revisions may be required, which will allow you to respond to feedback on your initial submission.

All homework assignments will be turned in online through Canvas. As writing is one of the focuses of this course, you are strongly encouraged to typeset the homework using LaTeX; this is *mandatory* for WI assignments. LaTeX is a markup language used

by virtually every professional mathematician when creating mathematical documents. It is not difficult, but there is a bit of a learning curve and you can expect that it will take you some time to acclimate to it fully. At the beginning of the semester, I will hold some special office hours intended to help people get off the ground with LaTeX. There are also many good tutorials online, for example:

- Learn LaTeX in 30 Minutes
- The No So Short Introduction to LaTeX.

Some people, particularly students, like to use an online LaTeX editor like Overleaf. My personal preference is to install a LaTeX distribution locally, then use a text editor. Instructions for this can be found here. Note that both of these options are free.

Exams. There will be two midterm exams and a final. All midterm exams will be held in the regular classroom. No calculators, books, or notes will be permitted. The final location will be determined at a later time. The dates are as follows:

Midterm I	Friday, February 23rd	(in class)
Midterm II	Friday, April 5th	(in class)
Final	Monday, May 6th	(10:00AM–12:00PM, location TBA)

Attendance. Attendance is vital to your success in this course. You are expected to attend all scheduled class sessions. If you are to miss class for any reason, you are responsible for any class notes or announcements given in class.

Grading. Your final grade will be determined according to the following formula:

Homework (lowest two dropped):	20%
WI Homework:	14%
Midterms:	36%
Final Exam:	30%.

There will be a curve computed at the *end of the semester*, but you will never receive a lower grade than justified by the standard MU grading scale.

Office hours. Office hours are held on Wednesday and Thursday each week, from 3PM–4PM in Math Science Building 307. This is a time when I am guaranteed to be in my office and ready to answer questions about the course. Please do not hesitate to make use of it. You can also email me to set up an appointment if you have a scheduling conflict. In addition, Xinyu Gao, who is the grader for the course, has kindly agreed to hold office hours from 10–11AM on Mondays in MSB 15 (which is in the basement).

Disabilities. If you anticipate barriers related to the format or requirements of this course, if you have emergency medical information to share with me, or if you need

to make arrangements in case the building must be evacuated, please let me know as soon as possible. If disability related accommodations are necessary (for example, a note taker, extended time on exams, captioning), please register with the Disability Center, S5 Memorial Union, 573-882-4696, and then notify me of your eligibility for reasonable accommodations. For other MU resources for students with disabilities, click on "Disability Resources" on the MU homepage.

COVID-19 Policies/Procedures. Students in this course must abide by all University COVID-19 policies and procedures.

Student Conduct. A student at the University assumes an obligation to behave in a manner compatible with the University's function as an educational institution according to the University Standard of Student Conduct. In particular, Academic Dishonesty and Disruptive Conduct are subject to the administrative sanctions.

Academic Honesty. Academic honesty is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult the course instructor.

Academic Dishonesty includes but is not necessarily limited to the following:

> *Cheating* or knowingly assisting another student in committing an act of cheating or other academic dishonesty.
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> *Plagiarism* which includes but is not necessarily limited to submitting examinations, themes, reports, drawings, laboratory notes, or other material as one's own work when such work has been prepared by another person or copied from another person.
>
> *Unauthorized possession of examinations* or reserve library materials, or laboratory materials or experiments, or any other similar actions.
>
> *Unauthorized changing of grades* or markings on an examination or in an instructor's grade book or such change of any grade report.

Students are expected to adhere to this pledge on all graded work whether or not they are explicitly asked in advance to do so:

> "I strive to uphold the University values of respect, responsibility, discovery, and excellence. On my honor, I pledge that I have neither given nor received unauthorized assistance on this work."

The University has specific academic dishonesty administrative procedures. Although policy states that cases of academic dishonesty must be reported to the Office of the Provost for possible action, the instructor may assign a failing grade for the assignment or a failing grade for the course, or may adjust the grade as deemed appropriate. The instructor also may require the student to repeat the assignment or to perform additional assignments. In instances where academic integrity is in question, faculty, staff and students should refer to Article VI of the Faculty Handbook. Article VI is also available in the M-Book. Article VI provides further information regarding the process by which violations are handled and sets forth a standard of excellence in our community.

Disruptive Conduct. Conduct that creates a substantial disruption of University operations including obstruction of teaching, research, administration, other University activities, and/or other authorized non-University activities that occur on campus.

Mental Health. The MU Counseling Center offers professional mental care and can help you find the best approach to treatment based on your needs. Call (573) 882-6601 to make an appointment. Any student in crisis may call or go to the MU Counseling Center Monday-Friday between 8:00-5:00. After hours phone support is available at (573) 882-6601. University policies regarding COVID-19, Academic Integrity, Recording in the Classroom, FERPA, Intellectual Pluralism, Netiquette, Religious Holidays and Accommodations, Nondiscrimination and Disability Accommodations can be found here.

Students may not use smart phones or any other electronic devices during class. Recording and picture taking are not allowed.

Complaints. If you have any problems or concerns regarding this course, please contact Dr. Dustin Belt, Director of Undergraduate Studies (`beltd@missouri.edu`, 573-882-4898).