MATH300: Introduction to Advanced Mathematics – FALL 2021

Instructor: Dr. Harbir Lamba

E-mail: `hlamba@gmu.edu` (only email me from your official GMU email account please!)

Office: Exploratory Hall, Room 4459 (not that I will be there much!)

Office Hours: These may vary from week to week but I will try to make them on Fridays at 9am.

Webpage: `http://math.gmu.edu/~harbir/m300/` .

Textbook: *A Transition to Advanced Mathematics* by Smith, Eggen and St. Andre (Eighth Edition). The course will cover most of Chapters 1–5. The list of homework questions on the course webpage will tell you which sections we are skipping.

COVID-19 arrangements

Every week there will be video lectures and for the later chapters some printed notes as well. It is your responsibility to study these AND read the textbook as much as necessary. A lot of this material is HARD!

The class is half/half and we will only meet once a week but zoom attendance is mandatory. During this time I will go over homework questions and answer any questions about the material. You MUST have read the material and attempted the homework questions properly beforehand to get any substantial benefit from them.

The videos will be made available through the Blackboard course page (go to the Media Gallery) but that is pretty much all I will be using Blackboard for. Check the course webpage and your GMU email reglarly for any announcements.

EXTREMELY IMPORTANT:

While the classes are online the tests and final exam are not! You must be on campus to take the tests in person on September 21, October 26 and November 23 and the final exam on Sunday December 12 (1.30-3.30). If you have any issues with this arrangement you must contact me by September 3rd at the very latest. After that time no accommodations can or will be considered.

Of course, a significant change in the COVID situation might make in-person testing impossible in which case we'll have to do the tests online...

Introduction

MATH 300 is designated as a Scholarly Inquiry course within the Students as Scholars initiative (for general information on this initiative, see http://oscar.gmu.edu/). It is a structured introduction to writing mathematical proofs and the set-theoretic foundations of mathematics and, as such, is a transition course into upper level mathematics courses.

The goal of the course is to give students the ability to precisely state and answer mathematical questions and to write careful, correct mathematical proofs. Along the way you will become more familiar with the nature of mathematical research, how proofs are created and communicated, and the typical working tools of the mathematical community. You will also be introduced to some elementary concepts of advanced mathematics including elementary propositional logic, set theory, relations, functions, and cardinality.

This course has been designated by the Mathematics Department as a writing-intensive course. Therefore a lot of emphasis emphasis will be put on correct grammar, good organization/typesetting and clarity of thought as well as correct logic in all graded work.

Writing Assignments

Your writing assignments will be your solutions to a selection of the weekly homework sets. These assignments MUST be typed up using some flavour of the mathematical typesetting software TeX — LaTeX is recommended. Links to help with learning LaTeX can be found on the course webpage. I will tell you which weeks you will be asked to submit after the course has started. No late assignments will be accepted under any circumstances.

Briefly the idea is that you write up your solutions as professionally as possible — as if they were appearing in the textbook itself! There are some pointers to basic mathematical writing style in Section 1.6 of the textbook. Your grade for these assignments will be based on the correctness of your proofs and clarity and correctness of your writing. You may discuss how to solve the problems with other students (I strongly encourage you to form study groups) but the writing and typesetting etc must be all your own work.

Grading and Exams

Homework solutions will not be collected or graded unless it is one of those weeks where you have to submit a writing assignment — but even in the other weeks it is strongly recommended that you write out your solutions in full detail. You are encouraged to discuss these problems amongst yourselves and to make use of the office hours. I will go through many of the homework questions in the next class and/or post them on the web, but you will not benefit from this unless you have attempted them properly beforehand. Note that the homework questions are the ABSOLUTE MINIMUM you should be doing each week (also note that the asterisked questions in the book have solutions in the back).

The writing assignments will contribute 20% towards the final grade. There will be three 1-hour tests during the semester. These will take place IN PERSON during the regular classtimes on September 21, October 26 and November 23. Your 2 best results (relative to the class average for that test) will each contribute 20% towards the evaluation and 40% will come from a (cumulative) final exam IN PERSON ON SUNDAY DECEMBER 12. I shall explain the grading system in more detail in the first lecture[1].

If you miss more than one of the in-class tests then you will need to provide very good (and fully-documented) reasons for missing EACH of them. There will be NO make-up tests, alternative test dates, or 'extra-credit' assignments. You are expected to abide by the University Honor Code and all suspected violations will be reported to the Honor Committee. No outside materials will be allowed during any of the examinations.

Additional Remarks

1) If you are a student with a disability and you need academic accommodations, please see me as soon as possible and contact the Office of Disability Resources at 703 993 2474. All academic accommodations *must* be arranged through that office.

2) It is YOUR responsibility to regularly check the course webpage and your official university email address for announcements.

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[1]NOTE: I DO NOT GRADE ON A CURVE. The formula I use to rank you involves the class average but the grade boundaries are determined by absolute, not relative, performance! If you all deserve an A grade then you will all get an A grade. If you all deserve to fail then you will all fail. I only take the class average into account to cancel out any differences in the difficulty of the tests.