

MATH 214-03 Foundations of Mathematics

FALL 2020

Instructor: Eric Swartz

Pronouns: he/him/his

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Public Office Hours: TR 2–3 PM

Office Hours: TR 11 AM – 2 PM and by appointment for private Zoom meetings. If you would like to meet privately by Zoom, send me an email with when you are available, and I'll set up a meeting!

Course Homepage: We will use **Blackboard** as our course homepage.

Important dates: August 28 (Add/drop deadline), October 12 (Withdraw deadline)

Content: Fundamentals of advanced mathematics: Propositional logic, quantifiers and methods of proof; naive set theory including mathematical induction, relations, orders, functions, and countability.

Goals: This course will give a careful examination of the integers and the real numbers, as a route toward the methods of higher mathematics. A major goal of the course is to develop logical reasoning and mathematical proof writing skills – essential for all higher mathematics studies.

The goal of this course is to help you begin to form carefully reasoned, clearly expressed mathematical arguments. Developing clear expression of your reasoning is an absolute must and is as important as arriving at a “correct answer,” and in this course will be valued as such.

Textbook: *The Art of Proof* by Matthias Beck and Ross Geoghegan.

This text is available online for free at: <http://math.sfsu.edu/beck/papers/aop.noprint.pdf>

We will cover Chapters 1–6, 8–13.

Lectures: Asynchronous lectures will be posted on Blackboard. (The pdf notes from the lecture will also be posted on Blackboard.) Lectures will be posted with a date by which you should watch them.

Public Office Hours: Public Office Hours over Zoom will be held every Tuesday and Thursday from 2–3 PM this semester. (It is anticipated that most Public Office Hours will last around 45 minutes, but some may be longer, others shorter.) You are encouraged to join and watch live, but these meetings will be recorded and posted on Blackboard for later viewing. (I will also post PDF notes from Public Office Hours on Blackboard.) During this time, I will answer questions, go through additional material, assign HW, etc.

Anonymous Questions: Questions are vital to understanding this material, and you are always encouraged to ask questions during either Public Office Hours or a private Zoom meeting. On the Blackboard page, there will be a thread on the Discussion Board (under “Discussions”) for questions, and you can ask about anything anonymously (or not)! I will answer questions in on there and often in more depth during Public Office Hours. **If you would like a question answered during Public Office Hours but cannot attend live, you can post your questions to be answered on the Discussion Board!**

Homework Overview: Homework will be assigned during each Public Office Hours. The definitive list of assigned homework will be posted on Blackboard. You are strongly encouraged to do all or most of each assignment before the next Tuesday/Thursday. However, correctness is even more critical than promptness. Incorrect proofs will be returned for you to repair, and you will not receive a grade from me until they’re completely correct. The final due date for each problem is two weeks after the problem is assigned, unless otherwise noted. Your final homework grade will be based on the number of *completely correct* proofs handed in on time, *regardless of how many incorrect versions you turned in previously*. Partial credit may be given in some circumstances, but most problems will be scored as either 0 or 1!

Don’t wait until the day before a problem is due to make your first attempt!

Especially early in the semester, as you are getting used to writing proofs, problems may take multiple tries to get completely correct! Turn in an attempt as soon as possible after it’s assigned so that you can get feedback.

Late homework will only be accepted under truly extraordinary circumstances (e.g., major surgery).

In order to be counted correct, a proof must be written in clear, correct English.

While you may discuss the problems with your classmates (and you are in fact encouraged to do so!), copying someone else’s work is strictly prohibited and will result in scores of zero for *everyone* involved. In particular, you may not use another student’s final work as a “model,” and you may not allow other students to study your final work. Everyone must hand in final proofs separately. Needless to say, copying or adapting a proof from another source (e.g., book or internet) is strictly prohibited as well.

LaTeX: Your homework assignments must be typeset using LaTeX. Being able to use this software is a useful skill to have, and the programs are available for free. Here are some sample options:

Windows: MikTeX <http://miktex.org/download>

Mac: MacTeX <http://tug.org/mactex/>

Linux: Kile (if you use Linux, I’m assuming you will know how to find it)

You may also use the online editor available at <https://www.overleaf.com/>. Simply sign up for free, start a new project, and paste the text from “sample.tex” into the source side.

It is easy to google commands/techniques that you don’t know, but a list of common symbols is available at <http://cklxxx.people.wm.edu/TeX-symbol.pdf>

Homework Policy: Merge files; either don't turn in if already graded or mark is as correct/graded

PDF files are to be emailed directly to me at easwartz@wm.edu. You should name the file you are turning in starting with "LastnameFirstname" in the filename; for example, SwartzEric_HWAug20.pdf. You should combine HW from different assignments into a single file that you turn in on a given day. HW that is turned in by 12 PM ET on a given Tuesday or Thursday will be graded that day (or very shortly thereafter). HW turned in at other times may not be graded until the next Tuesday or Thursday "batch" (but may be graded sooner, if possible). If HW is due on a given date, I will accept it if it is turned in by 11:59 PM ET that day (but I might not grade it until the next Tuesday or Thursday "batch"). **Try to turn in HW by 12 PM ET on Tuesdays and Thursdays if you can!**

Tests: There will be a midterm assigned on Thursday, October 1 that will be due on Tuesday, October 6. The final exam will be a comprehensive exam that will be assigned on Monday, November 16, by 5 PM ET and will be due on Wednesday, November 18, at 5 PM ET.

Grading:

Homework: 50%

Midterm: 20%

Final: 30%

Final letter grades are assigned using the scale: A 93–100, A- 90–92, B+ 87–89, B 83–86, B- 80–82, C+ 77–79, C 73–76, C- 70–72, D+ 67–69, D 63–66, D- 60–62, F <60

This scale is not rigid! Lower cutoffs are often used.

ADA Accommodation: William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who feels they may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2512 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please see <https://www.wm.edu/sas>

Honor Code: Students are expected to uphold the honor code in this class. Any suspected infraction will be reported. Rest assured, I am older and more experienced than you are. **I will catch you if you cheat!**