

MATH 214-01 Foundations of Mathematics

SPRING 2021

Instructor: Eric Swartz

Pronouns: he/him/his

E-mail: easwartz@wm.edu

Public Office Hours: T 9–10 AM, F 10–11 AM

Private Office Hours: T 10 AM – 12:30 PM, 1:30 – 3 PM; F 11 AM – 12 PM, 1 – 3 PM

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

Important dates: February 5 (Add/drop deadline), March 29 (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 1–13.

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 from 9–10 AM and Friday from 10–11 AM this semester. (It is anticipated that most Public Office Hours will last 30–45 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.

Here is the link for Public Office Hours:

<https://cwm.zoom.us/j/99958051189?pwd=ZWxEaG44THdRWc9BS1dSN2o3TGFlUT09>

You must be using a William & Mary Zoom account to access these meetings.

Private Office Hours: I will hold private office hours this semester on Tuesdays from 10 AM – 12:30 PM and 1:30 – 3 PM and on Fridays from 11 AM – 12 PM and 1 – 3 PM. Private Office Hours will not be recorded, and there will be a Waiting Room so that people can meet one at a time. **If you would like a private meeting, please send me an email ahead of time, and I will confirm the meeting time.** I will assume that you would like to meet for 15 minutes, unless you specify otherwise. The link for Private Office Hours will be my personal

Zoom link: <https://cwm.zoom.us/my/easwartz>

Anonymous Questions: Questions are vital to understanding this material, and you are always encouraged to ask questions during Public Office Hours, a private Zoom meeting, or explicitly in your homework. 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 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/Friday. 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: 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`. (Name the file whatever you want, but *always* start with

“LastnameFirstname”!) **You should combine HW from different assignments into a single file that you turn in on a given day, and you should either omit or mark as graded/correct problems that you have already gotten correct.** HW that is turned in by 12 PM ET on a given weekday will be graded that day (or very shortly thereafter). HW turned in at other times may not be graded until the next “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 day’s “batch”). **Try to turn in HW by 12 PM ET on weekdays if you can!**

Calendar: During most weeks, there will be Public Office Hours on Tuesdays and Fridays and lectures to watch on Mondays, Wednesdays, and Thursdays. There are scheduled Spring Break days this semester on Friday February 12, Thursday March 4, Wednesday March 17, Tuesday April 6, Wednesday April 7, and Monday April 26. There will be no assignments due or lectures/Public Office Hours on these days, and no HWs will be graded on these days. **In addition to the scheduled Spring Break days, there will be no Public Office Hours on Friday, March 5, and Tuesday, April 27.**

Tests: There will be a midterm assigned on Friday, March 19, that will be due on Tuesday, March 23. The final exam will be a comprehensive exam that will be assigned on Friday, May 14 and will be due on Tuesday, May 18, by 10 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!**