MATH 1365, Fall 2019 Syllabus

Course Title: Introduction to Mathematical Reasoning

Time/Location: MWR, 1:35–2:40 pm, Hastings 109

Office Hours: M 3–4 pm, TW 12–1 pm, or by discovery, Nightingale Hall 532

Instructor: Vance Blankers, `blankersv@northeastern.edu`

Textbook: *Mathematics: A Discrete Introduction* - 3$^{\text{rd}}$ Edition, E. Scheinerman, Brooks/Cole, 2012

Content: This course covers the basics of mathematical reasoning and problem solving, with a focus on writing logically sound mathematical arguments and analyzing such arguments. The goal is to prepare students for higher math courses which involve proofs and rigor, such as theoretical linear algebra, group theory, and real analysis. We plan to cover the following topics:

- Fundamentals of mathematical arguments including definitions, elements of logic/Boolean algebra, quantifiers, theorems, proofs, counterexamples

- Sets and set-theoretic proofs

- Relations and graphs

- Functions, compositions, and bijections

- Counting, binomial coefficients, and combinatorial proofs

- Mathematical induction, smallest counter-examples

Grading: The following items will contribute to your final grade.

- Final exam (40%) - There is a 2-hour cumulative final exam during the final exam week.

- Homework (8%) - Assignments will be given most weeks, posted on Blackboard one week before the due date.

- Proof presentation (4%) - Each student will come to my office once to present a proof to me. If you are not satisfied with your performance, you may come a second time.

- Tests (40%) - There will be three in-class, one-hour tests (see schedule). Whichever exam you do worst on will be worth 10%; the other two will be worth 15% each.

- Attendance and participation, in-class exercises (8%)

Academic Integrity: Don't cheat. Check out `https://northeastern.edu/osccr/academic-integrity-policy/` for more details. While many things in life operate on the "better to ask forgiveness than permission" principle, this is not one of them. When in doubt, ask me ahead of time.

Groupwork, unless specified otherwise, is *not* considered cheating in this class, and is very strongly *encouraged*. However, you are expected to write up your solutions individually unless otherwise noted; word-for-word reproductions look fishy at best, so please make sure to write things in your own words.

DRC: Have a Disability Resources Center (DRS) situation? No problem; just let me know as soon as possible.

Late Homework: In general, no late work will be accepted. You'll be asked to turn in homework at the beginning of class on whichever day it is due, though you can always turn it in early. Exceptions for extreme circumstances and emergencies, accompanied by written documentation of proof, will be considered but not guaranteed.

Exam Conflicts: If you are going to miss an exam for a university-sponsored event, provide the appropriate documentation at least a week ahead of time. Encourage your grandparents to stay healthy, as exam-season seems to be an extremely dangerous time for them.

TRACE: Every student is expected to complete the online TRACE survey at the end of the semester.

Other Expectations: Treat your classmates and me with respect: silence cell phones when you get to class, don't cause distractions during lecture, don't eat delicious-smelling food without sharing, etc. Homework must be presented legibly and separate sheets must be stapled, with no fringes; points will be docked for failing to meet these requirements. If your handwriting is atrocious, either practice or type up your solutions. Finally, I expect you to give an honest effort and have a good attitude. The number one cause of poor performance in a math class is an "I can't do it" mentality.

Leftovers: Extra stuff that didn't fit any of the categories above:

- As the instructor, I reserve the right to alter this syllabus at any time. I'll announce any such changes in class, in as timely a manner as possible.

- If you have any issues at all, please do not hesitate to contact me. Pretty much every (non-homework) problem can be resolved via communication. If you do not feel comfortable talking to me directly, you are able to contact the Course Coordinator, Lee-Peng Lee (`lp.lee@northeastern.edu`).

- This is a fast-paced course. *Do not get behind.* This class will require a significant chunk of out-of-class time; make sure you respect the amount of work needed.

- Technology is a double-edged sword in learning mathematics. You should attempt to use technology to enhance your understanding without using it as a crutch.

- Related to the above, patience is your biggest ally. You will get stumped from time to time. Resist the urge to immediately ask for help or to right away Google the answer. Instead, try different things; see what you can do with the tools and techniques you have. Draw a picture. Attempt to do the stupidest, most straight-forward thing possible, and work from there. The process of exploring questions and actively struggling with them will be the most helpful aspect of the class. Don't be Flanders Sr.: