
COURSE SYLLABUS

Course Description

Discrete math is a fun and exciting branch of mathematics that is often overlooked in high school curricula, which tend to focus primarily on continuous math building up to calculus. Nevertheless, discrete math is accessible to anyone with a basic grade school background in math. This introductory course will focus on some of the fundamentals of discrete math (logic, combinatorics, number theory, and graph theory) with an emphasis on proof techniques and creative problem solving. In addition to content knowledge on these subjects, this course aims to develop students' ability to communicate mathematics and articulate logical arguments.

Instructor

Elizabeth (Lizard) Reiland, ereiland@jhu.edu

Office: Whitehead 211E

Office Hours: Mon/Tues/Weds/Thurs 4-5 pm or by appointment

Meetings

Mon/Tues/Weds/Thurs 1:00 - 3:30 pm, Room TBD

Textbook

Scheinerman, E.R. *Mathematics: A Discrete Introduction*, 3rd ed., Brooks Cole (2012)
ISBN: 978-0840049421

Website

We will use the blackboard site (<http://blackboard.jhu.edu>) for this course. If you find you do not have access to this course on blackboard, notify the professor immediately.

Course Outline

Below is a rough plan for topics that will be covered. I reserve the right to alter these due to time constraints or for other reasons.

- *Combinatorics*: Basic counting principles, combinations, permutations, stars and bars, the Principle of Inclusion-Exclusion, Pascal's triangle
- *Number Theory*: Divisibility, prime numbers, greatest common divisor, Euclidean algorithm, modular arithmetic, Fermat's Little Theorem, Euler's Theorem, Wilson's Theorem
- *Graph Theory*: Basic definitions, Ramsey numbers, trees, minimum spanning tree algorithms (Kruskal's and Prim's), graph coloring, planar graphs
- *Proof Techniques*: Direct proof, proof by contradiction, proof by contrapositive, induction, Pigeonhole Principle, counting arguments, bijections

Grading

There will be problem sets assigned as homework roughly every class, two midterm exams, and a final exam. Grading breakdown is as follows:

- Homework: 20%
- Midterm exams: 20% each
- Final exam: 20%
- The final 20% of your grade will be based on class participation and the maximum of your homework and exam scores

Percentages above 90%, 80%, 70%, and 60% are guaranteed grades of A, B, C, and D respectively, but I reserve the right to lower these thresholds to reflect the difficulty of the exams and assignments at the end of the course.

Homework Guidelines

- Homework will be assigned on a regular basis and due at the beginning of class on the day due. You are responsible for making sure your homeworks have your name, are stapled or paper clipped, and are legible; if they are not, you may not receive credit for your work.
- Homework write-ups should be neat and to the standards on the writing hand-out from the first day of class. Failure to explain your work will result in loss of points. In particular (unless noted otherwise), a correct answer with no explanation will be eligible to receive at most 60% of the possible points for that problem.
- Late homework assignments will *NOT* be accepted. In the case of exceptional circumstances such as a medical or family emergency, official documentation will be required.
- Sources beyond your class notes and the textbook should not be used; if you are stuck, come to office hours!
- I encourage you to work on the homework sets with others in the class. The ability to collaborate on mathematical (or any other) pursuits is incredibly valuable. If you work with others, you *must* cite your collaborators and you must write up your final solution on your own. You should not write down any notes while working with peers (or at office hours); this will ensure that you truly understand the material yourself.

Attendance

Attendance and active contribution during class count towards the participation portion of your grade. If for some reason you are unable to attend class, you are responsible for obtaining notes for any missed classes and ensuring your homework is turned in on time.

Ethics

Cheating and plagiarism will not be tolerated. Any instances will be dealt with in accordance with the JHU code of ethics. For elaboration, see

<http://e-catalog.jhu.edu/undergrad-students/student-life-policies/>

If you have any questions or concerns, please contact the instructor.

Students with disabilities

If you have or believe you might have a disability requiring accommodations in this course, please contact Student Disability Services at 385 Garland Hall, (410) 516-4720, and/or studenthealthservices@jhu.edu.