Intro to Discrete Math–3450:208—Fall 2021

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OFFICE HOURS: MWF 2:45-3:45. Lots more by appointment!

Text and Coverage: *Discrete Mathematics with Applications* by Epp, **Fifth** edition, E-book available already from BrightSpace. We will cover various sections from chapters 1 through 9 of this textbook.

Website for schedule, homework problems and announcements:
http://www.math.uakron.edu/~sf34/class_home/disc/discretef21.htm

GRADING POLICY:
1000 points possible. For each of these three categories the fraction of points you receive is the same fraction that you earn out of the total possible. So if you get a 49 out of 50 on Test 1 then you earn (49/50)*300 = 294 points.

100 pts: Homework, quizzes (10%)
600 pts: 2 Tests at 300 pts each. (60%)
300 pts: Final Exam (30%)

900 pts. guarantees an A
800 pts. guarantees a B
700 pts. guarantees a C
600 pts. guarantees a D
(+,- at my discretion)

Course Outline with dates:

- Aug 23: Day one.
- Chapters 1-3
- Sep 5: Last day to drop.
- Sep 6: Labor Day, no class.
- TEST 1.
- Chapter 4-8
- Oct 10: Last day to w/draw.
- TEST 2.
- Chapters 9-11
- Nov 25, 26: Thanksgiving.
- Dec 3: Last day.
- Final Exam.

Evaluation Procedure:

- When graded, quizzes and homework will be given a grade out of ten or twenty points, where full credit will be assigned when the graded problems (if any) have correct answers with all correct work shown. Points may be subtracted for each graded problem with an incorrect answer, incorrect work, or not all work shown. The quiz/homework average will be calculated by dropping a total of 15 raw quiz points which means that I'll calculate your percentage by first adding up to 15 points back on to your raw score, limited by the maximum number of hw/quiz points possible. This will have the effect of making a 100% quiz average possible despite missing a homework/quiz.
- There will be 2 in-class closed book tests and the final exam during the semester over the material from lectures, homework and the book. No test may be taken early or late.
- **No calculators, notes, formula sheets or books may be used on the Final or any test.**

Homework may not be copied, but collaboration and research are allowed. All other work is individual. Any incidence of academic dishonesty carries a minimum penalty of a non-removable zero for that work. No active cellular phones, pagers, media players, computers or other electronic communication devices are permitted during the tests. Usage of or an attempt to use any of these devices during exams carries a minimum penalty of a non-removable zero for that exam.

Learning Outcomes for 3450:208 Introduction to Discrete Mathematics

Students are expected to be able to

- communicate mathematical results through the proper use of mathematical notation and words
- use symbolic logic and various proof-writing techniques, including Mathematical Induction
- describe the basic properties and operations of sets, functions and relations
- learn the basics of logic circuits, number systems, set theory, sequences, algorithms, and probability.

Tentative Schedule.

1.1: Variables
1.2: The Language of Sets
2.1: Logical Form and Logical Equivalence
2.2: Conditional Statements
2.3: Valid and Invalid Arguments
2.4: Application: Digital Logic Circuits
2.5: Application: Number Systems and Circuits for Addition
3.1: Predicates and Quantified Statements I
3.2: Predicates and Quantified Statements II
3.3: Statements with Multiple Quantifiers
3.4: Arguments with Quantified Statements
4.1: Direct Proof and Counterexample I: Introduction
4.2: Direct Proof and Counterexample II: Rational Numbers
4.3: Direct Proof and Counterexample III: Divisibility
4.4: Direct Proof and Counterexample IV: Division into Cases and the Quotient-Remainder Theorem
4.6: Indirect Argument: Contradiction and Contraposition
4.7: Indirect Argument: Two Classical Theorems
4.8: Application: Algorithms
5.1: Sequences
5.2: Mathematical Induction I
5.3: Mathematical Induction II
5.4: Strong Mathematical Induction and the Well-Ordering Principle for the Integers
6.1: Set Theory: Definitions and the Element Method of Proof
6.2: Properties of Sets
6.3: Disproofs, Algebraic Proofs, and Boolean Algebras
9.1: Introduction (Counting and Probability)
9.2: Possibility Trees and the Multiplication Rule
9.3: Counting Elements of Disjoint Sets: The Addition Rule
9.5: Counting Subsets of a Set: Combinations
9.7: Pascal's Formula and the Binomial Theorem
• Chapter 10 : Graphs and Trees 1
• Chapter 11 : Analysis of Algorithm Efficiency

The COVID-19 pandemic is still present and serious. Before entering class, you should have completed your daily health assessment. You should not come to class if you fail your health check or feel ill. At that time, I also ask you notify me that you will be absent. When campus policies require masks to be worn indoors, all students are required to wear a mask during in-person classes. While you are in class on campus, you are required to: sit in your designated seat, always cough or sneeze into your elbow or a tissue, and adhere to other public safety protocols and directives for your specific classroom/lab/studio. Students who do not follow these health and safety requirements will be instructed to leave class immediately. Students who violate this protocol will need to leave the classroom and MAY be marked absent. Repeated violations of these health-saving protocols may lead to sanctions under the Student Code of Conduct up to and including suspension or expulsion. Current guidelines can be found at: https://www.uakron.edu/return-to-campus/.