# MATH 3336 - 03 (23711) - Discrete Mathematics - Fall 2019
## Syllabus

**Instructor**: Dr. Gordon Heier
**Contact Information**:
      Office: 666 PGH
      Office Hours: T 3pm-4pm, or by appointment
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**TA**: Anjun Niu
**Contact Information**: Office Hours: F 1pm-3pm in Fleming 11 (MUSL)
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**Lecture**: TTh 11:30am-1pm, in CBB 120

**Exams**: Midterm exam: Tuesday, October 22, 2019, in-class (subject to change)
          Final exam: Tuesday, Dec. 10, 2019, 11am-2pm (subject to change)

**Textbook**: K. H. Rosen, Discrete Mathematics and Its Applications, 8th Edition,
          ISBN: 978-1-259-67651-2

**Prerequisites**: Math 2331 (Linear Algebra) or instructor consent

**Course Description**: This course gives an introduction to selected topics from logic, set theory, combinatorics, and graph theory. See below for a list of sections in the textbook likely to be covered.

**Homework** will be assigned every Thursday on my web site and will be due the following Thursday. Late homework will not be accepted.

**Quizzes:** Several unannounced in-class pop-quizzes will be given throughout the semester.

**Attendance**: Attending classes and exams is mandatory for all students. Missing class makes a student liable to missing important information, pop-quizzes etc. Substantial documentation is necessary to receive any kind of excuse or make-up privilege.

**Grades**: The homework and pop-quizzes will each account for 20 percent of your grade. The mid-term exam will account for 25 percent, and the final exam will account for 35 percent. Your two lowest homework scores and your two lowest pop-quiz scores will be dropped.

**Disability**: If you think or know that you have a disability that needs special accommodation, please see me at the beginning of the semester so that the proper steps can be taken.

**UH CAPS Statement**: Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the "Let's Talk" program, a drop-in consultation service at convenient locations and hours around campus. http://www.uh.edu/caps/outreach/lets_talk.html

**Academic Dishonesty** will not be tolerated and dealt with appropriately.

**Tentative List of Sections to be Covered:**

The Foundations: Logic and Proofs
1.1 Propositional Logic
1.2 Applications of Propositional Logic
1.3 Propositional Equivalences
1.4 Predicates and Quantifiers
1.5 Nested Quantifiers
1.6 Rules of Inference
1.7 Introduction to Proofs
1.8 Proof Methods and Strategy

Basic Structures: Sets, Functions, Sequences, Sums, and Matrices
2.1 Sets
2.2 Set Operations
2.3 Functions
2.4 Sequences and Summations
2.5 Cardinality of Sets
2.6 Matrices

Number Theory and Cryptography
4.1 Divisibility and Modular Arithmetic
4.2 Integer Representations and Algorithms
4.3 Primes and Greatest Common Divisors
4.4 Solving Congruences
4.5 Applications of Congruences
4.6 Cryptography

Induction and Recursion
5.1 Mathematical Induction
5.2 Strong Induction and Well-Ordering
5.3 Recursive Definitions and Structural Induction

Counting
6.1 The Basics of Counting
6.2 The Pigeonhole Principle
6.3 Permutations and Combinations
6.4 Binomial Coefficients and Identities
6.5 Generalized Permutations and Combinations

Advanced Counting Techniques
8.1 Applications of Recurrence Relations
8.2 Solving Linear Recurrence Relations

Relations
9.1 Relations and Their Properties
9.3 Representing Relations
9.5 Equivalence Relations
9.6 Partial Ordering

Graphs
10.1 Graphs and Graph Models
10.2 Graph Terminology and Special Types of Graphs
10.3 Representing Graphs and Graph Isomorphism
10.4 Connectivity
10.5 Euler and Hamilton Paths

Trees
11.1 Introduction to Trees