

MATH 230 – Introduction to Discrete Mathematics

Course Description from Bulletin: Sets, statements and elementary symbolic logic; relations and digraphs; functions and sequences; mathematical induction; basic counting techniques and recurrence. Credit will not be granted for both CS 330 and MATH 230. (3-0-3)

Enrollment: Required for AM majors; MATH 230 or CS 330 is required for CS majors. Elective for other majors.

Textbook(s): Sandy Irani, *Discrete Math*, zyBooks.com. Or, Kenneth H. Rosen, *Discrete Mathematics and Applications* 7th ed, McGraw-Hill (2011), ISBN 0-07-338309-0.

Other required material: None

Prerequisites: None

Objectives:

1. Students will express real-life concepts and mathematics using formal logic and vice-versa; they will manipulate using formal methods of propositional and predicate logic; they will know set operation analogues.
2. Students will know basic methods of proofs and use certain basic strategies to produce proofs; they will have a notion of mathematics as an evolving subject.
3. Students will be comfortable with various forms of induction and recursion.
4. Students will understand algorithms and time complexity from a mathematical viewpoint.
5. Students will know a certain amount about: functions, number theory, counting, discrete probability, and equivalence relations.

Lecture schedule: 3 50 minute (or 2 75 minute) lectures per week

Course Outline:

	Hours
1. Foundations: Expressing real-life concepts and mathematics in terms of formal logic and vice-versa. Manipulate using formal methods of propositional and predicate logic. Also, set operation analogues.	9
2. Functions, algorithms, and (mostly worst-case) complexity	7
3. Number Theory with applications	4
4. Mathematical Reasoning, Induction and Recursion	8
5. Counting: Permutations & Combinations, Binomial Coefficients, and the Pigeonhole Principle	6
6. Discrete Probability	5
7. Relations including Equivalence Relations	3

Assessment:	Homework and Quizzes	10-30%
	Exams	40-50%
	Final Exam	30-40%

Syllabus prepared by: Michael Pelsmajer and Robert Ellis

Date: Jan. 17, 2006, updated Nov. 1, 2012, Oct. 5, 2016