Course: COMS W3203 Discrete Mathematics
Semester: Spring 2015, Columbia University
Instructor: Ilia Vovsha

Syllabus:

1) Logic and Proofs

- Propositional logic
- Predicates and quantifiers
- Axioms
- Proof methods

2) Set Theory

- Sets
- Sequences & Summations
- Relations
- Cardinality

3) Algorithms

- Growth of functions
- Complexity
- Induction
- Recursion

4) Number Theory

- Divisibility
- Greatest Common Divisor
- Prime numbers
- RSA public key encryption

5) Counting

- Sums, products
- Sequence, permutations, combinations
- Binomial coefficients
- The Pigeonhole principle

6) Probability

- Events and spaces
- Conditional probability
- Bayes' Theorem

7) Recurrences

- Solving recurrence relations
- Generating functions

8) Graph Theory

- Directed graphs
- Simple graphs
- Planar graphs

Text:

1) K. H. Rosen, Discrete Mathematics and its Applications, 7th Edition, McGraw-Hill -- (OPTIONAL)

2) Mathematics for Computer Science by Eric Lehman, F. Thomson Leighton, Albert R. Meyer, revised 2013 -- (freely available online).