

## Mathematics 302 – Spring 2009

This is a tentative syllabus as of 01/20/09. It is subject to change without notice.

**Text:** Kenneth H. Rosen, *Discrete Mathematics and Its Applications, 6th ed.*, McGraw-Hill Companies, Inc., ISBN 0073312711.

*Week 1: Jan. 19–23*

- 1.1 logic
- 1.2 propositional equivalence
- 1.3 predicates and quantifiers

*Week 2: Jan. 26–30*

- 1.4 nested quantifiers
- 1.5 methods of proof
- 1.6. introduction to proofs
- 1.7. proof methods and strategy (Optional)

*Week 3: Feb. 2–6*

- 3.1 algorithms (skip greedy algorithms, halting problem, tractability, NP-completeness).
- 3.2 the growth of functions

*Week 4: Feb. 9–13*

- 2.1 sets
- 2.2 set operations
- 2.3 functions

*Week 5: Feb. 16–20*

- 2.3 Functions, composition and inverse, Catch up and review

### **1st Test**

*Week 6: Feb. 23–27*

- 2.4 Sequences and Summations
- 4.1 mathematical induction

*Week 7: Mar. 2–6*

- 4.1 mathematical induction, continued
- 4.2 Strong induction and well-ordering

*Week 8: Mar. 9–13*

- 4.3 recursive definitions and structural induction
- 4.4 recursive algorithms
- 7.1. recurrence relations

*Spring break: Mar 16–20.*

*Week 9: Mar 23-27*

7.3 divide and conquer algorithms

Masters theorem

5.1 basics of counting

5.2 the pigeonhole principle

*Week 10: Mar 30-Apr. 3*

5.2 the pigeonhole principle, II

Catch up/Review

**2nd Test**

*Week 11: Apr. 6-13*

5.3 permutations and combinations

5.4 binomial coefficients

**Note: No class on April 10**

*Week 12: Apr. 15-22*

5.5 generalized permutations and combinations

3.8 matrices

8.1 relations and their properties

**Note: Class on April 17 is canceled.**

*Week 13: Apr. 24-29*

8.3 representing relations

8.4 closure of relations

8.5 equivalence relations

*Week 14: May. 1-5*

12.1 language and grammars

12.3 finite state machines with no output

12.4 language recognition

12.5 Turing machines, (sketch)

**Note: May 5 is a redefined FRIDAY.**

**Third exam:**

Section 502: May 11, Monday, 10:30–11:30

Section 503: May 12, Tuesday, 3:30–4:30.