**CSCI 190 OUTLINE**

DISCRETE MATHEMATICS APPLIED TO COMPUTER SCIENCE

TEXT: Discrete Mathematics and Its Applications 6th Edition Rosen (2007)

Approved: October 2010 Effective: Winter 2011

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| **Topics** | **Sections** | **Time** |
| Truth tables, tautologies, the fundamental theorem of propositional calculus. Predicates and quantifiers. Satisfiability, models. Rules of inference. Methods of proofs. | 1.1 - 1.7 | 9 Hours |
| Sets and set operations, characteristic functions, cardinality, countable sets. Functions, bijections. Sequences and summation. | 2.1 - 2.4 | 3.67 Hours |
| Algorithms, growth of function, complexity of algorithms. Integers, factorization. The Euclidian algorithm. Applications of number theory to encryption. Matrices and matrix arithmetic, coordinates, similarity.\* | 3.1 - 3.8 | 6.33 Hours |
| Mathematical induction. Recursive definitions. Recursive algorithms. Program correctness. | 4.1 - 4.5 | 4 Hours |
| Basics of counting, sum rule, product rule, tree diagrams. Permutations, combinations, the Pigeonhole Principle. Binomial coeffecients and the Binomial theorem. Pascal's triangle. Discrete probability. Expected value and variance. Bayes' Theorem.\*\* | 5.1 - 5.66.1 - 6.2, 6.4, 6.3\*\* | 9 Hours |
| Advanced counting techniques. Recurrence relations, solving recurrence relations. Divide and conquer relations. Inclusion-Exclusion and applications. Relations, n-ary relations, equivalence relations, partial orderings. | 7.1 - 7.68.1 - 8.6 | 6.67 Hours |
| Graphs: introduction and terminology. Connected graphs, Eulerian path, Hamiltonian cycles, shortest path problems, planar graphs, graph coloring. Trees and their applications, tre traversals, spanning trees, minimum spanning trees. | 9.1 - 9.810.1 - 10.5 | 5 Hours |
| Boolean algebra, boolean functions and logical gates. Languages and grammars. Finite state machines. Turing machines. | 11.1 - 11.412.1 - 12.5 | 8.33 Hours |

\* Supplemental handout

\*\* Optional

Submitted by: Pop

Notes:

* 1 hour = 1 hour of face time
* This outline allows for 4 hours review and exams.

Math Department Policy can be found at: https://mtsac.instructure.com/courses/33990/files?preview=1988385