San Francisco State University  
Computer Science Department  
Fall 2013  
Course Syllabus

Course Number: CSC 230  
Course Title: Discrete Mathematical Structures for Computer Science  
Number of Credits: 3  
Instructor: Anagha Kulkarni (ak@sfsu.edu) (Office phone: 338-2539)  
Grader: Bianca Uy (uy.biancamarie@gmail.com)  
Class hours: MWF 12:10 to 1pm  
Class location: TH 331  
Office Hours: Wed 10am to noon in TH 970

Prerequisites: Grades of C or better in CSC 210 and MATH 226. May take MATH 227 concurrently.

Textbook: Discrete Mathematics and Its Applications (Ed 7) by Kenneth H. Rosen

Course Objectives: To introduce students to the ideas and techniques from discrete mathematics that are widely used in Computer Science.

Course Topics:
Sets, relations, and functions: Sets (set operations, complements, Venn diagrams, membership table, Cartesian products, power sets, cardinality); Relations (reflexivity, symmetry, transitivity, compositions, closures, equivalence relations, equivalence class, partitions); Functions (injections, surjections, bijections, inverses, compositions);

Basic logic: Propositional logic; Logical connectives; Truth tables; Normal forms (conjunctive and disjunctive); Validity; Predicate logic; Logical inference for deductive proofs; Modus ponens and modus tollens; Universal and existential quantification;

Proof techniques: The structure of formal proofs; Direct proofs; Proof by Cases; Proof by contraposition; Proof by contradiction; Mathematical induction; Strong induction; Recursive mathematical definitions; Deductive proof;

Basics of counting: Counting arguments; Sum and product rule; Inclusion-exclusion principle; Arithmetic and geometric progressions; The pigeonhole principle; Set countability; Permutations and combinations; Pascal's identity; The binomial theorem; Fibonacci numbers;

Trees and Graphs: Graphs; Graph operations; Graph types; Handshaking theorem; Graph representation (adjacency matrix and adjacency list); Isomorphism; Shortest path problem; Dijkstra’s algorithm; Trees; Spanning trees; Traversal strategies;
**Introduction to Analysis of Algorithms:** Big Oh Notations; Solving recurrence relations; Computability theory (Halting problem); Number theory; Prime number; Modular arithmetic; Euclidean algorithm;

**Grading:**
- 14 In-class quizzes: 14%
- 7 Homework assignments: 46%
- Midterm exam: 20%
- Final exam: 20%

**Course Policies:**

**Attendance:** Has a grade indirectly associated with it, in the form of in-class quizzes.

**Late assignment:** Every homework will be due by 12:10pm (before class) of the due date. Every late day will incur 10% penalty.

**Missed exam:** Only allowed in highly selective and pre-approved cases. If any of the scheduled exam dates are in conflict with your religious observances, you must notify the instructor, in writing, at least two weeks in advance of the exam.

**Cheating and plagiarism:** Any form of cheating or plagiarism will incur very serious consequences. Stay away from it.

**Students with disabilities:** Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in the Student Service Building and can be reached by telephone (voice/TTY 415-338-2472) or by email (dprc@sfsu.edu).