

***CSE 1400 Applied Discrete Mathematics (3 credits)***

**Primary instructor:** William Shoaff

**Supporting faculty:** Heather Crawford

**Textbooks and references:**

Class notes, see handouts in the course notebook (T)

K. H. Rosen, Discrete Mathematics and Its Application. McGraw-Hill, sixth ed., 2007. (R)

E. A. Bender and S. G. Williamson, A Short Course in Discrete Mathematics. Dover, 2005. ISBN 0-486-43946-1. (R)

**Course information:**

**2014–2015 Catalog description:** CSE 1400 Applied Discrete Mathematics (3 credits). Topics include positional and modular number systems, relations and their graphs, discrete functions, set theory, propositional and predicate logic, sequences, summations, mathematical induction and proofs by contradiction. (Requirement: Passing score on the Calculus Readiness Test, or prerequisite course.) Prerequisites: MTH 1000.

**Prerequisites by topic:** Arithmetic, algebra, precalculus

**Place in program:** Required mathematics. Prerequisite for: CSE 2010

**Course outcomes & related student outcomes:** The student will be able to

1. Understand the value of positional numbers written in various bases (e.g., 2, 8, 10, 16); Interpret the meaning of numeral strings in various contexts: Unsigned, signed (sign/magnitude, two's complement, biased), fixed-point, floating-point. (1: Fundamental knowledge)
2. Perform arithmetic with modular numbers, solve linear congruence equations, and know some applications where modular number occur. (1: Fundamental knowledge)
3. Understand naive set theory, set operations, cardinality and power sets, and the use sets to describe collections of objects. (1: Fundamental knowledge)
4. Use concepts of relations; represent relations as adjacency matrices, graphs or sets of ordered pairs; know relational properties that define equivalences and orders. (1: Fundamental knowledge)
5. Know basic functions (polynomials, logarithms and exponentials, integer functions, permutations) and some of their uses. (1: Fundamental knowledge)
6. Comprehend and use propositional and predicate logic. (1: Fundamental knowledge)
7. Know several important sequences (e.g., Fibonacci, Mersenne, triangular, binomial coefficients) their uses in counting and other applications, use functions, recurrence relations and algorithms to compute terms in these sequences. (1: Fundamental knowledge)
8. Know partial sums of several important sequences. (1: Fundamental knowledge)

9. Establish the truth of propositions using forms of mathematical proof: Induction, direct, indirect, contradiction. (1: Fundamental knowledge)

**Topics covered:**

1. Positional numbers systems (4 hours)
2. Modular numbers systems (4 hours)
3. Sets (4 hours)
4. Relations (includes graph concepts) (4 hours)
5. Functions (includes graph concepts) (4 hours)
6. Boolean logic (4 hours)
7. Sequences (4 hours)
8. Summations (2 hours)
9. Mathematical induction, contradiction, direct, indirect proofs (4 hours)
10. Quizzes (3 hours)

**Approved by:** William Shoaff, Associate Professor & Heather Crawford, Assistant Professor

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**Signature:** Heather Crawford **Date:** 02/02/2015