CSE 1400 Applied Discrete Mathematics

2011–2012 Catalog Data: 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.

Required

Prerequisites by Topic: Arithmetic, algebra, precalculus

Textbook (T) and References (R):

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)

Class notes, slides, podcasts

Course Outcomes & Related Student Outcomes: The student will be able to

1. Comprehend positional numbers in multiple bases (e.g. 2, 8, 10, 16) and be able to interpret the meaning of numeral strings in various contexts (e.g. unsigned, sign/magnitude, two's complement, biased, floating point).(1 Fundamental knowledge)
2. Comprehend modular number systems, be able to perform arithmetic with modular numbers, and appreciate some of the applications where modular number systems occur.(1 Fundamental knowledge)
3. Comprehend sets and their basic operations form a Boolean algebra, comprehend the concept of cardinality and power sets, and be able use sets to describe collections of objects.(1 Fundamental knowledge)
4. Comprehend the concept of relations, their relationship to graphs, and important relational properties that define equivalence relations and (partial) orders.(1 Fundamental knowledge)
5. Comprehend the specialization of relations to functions and be able to use important functions that arise in computer science (e.g., log, exp, $\lfloor\rfloor$, min, χ_A).(1 Fundamental knowledge)
6. Comprehend and be able to use Boolean logic, in particular, propositional and predicate logic.(1 Fundamental knowledge)
7. Comprehend several important sequences (e.g., Fibonacci, Prime, Binomial Coefficients), understand uses in counting and other applications, comprehend that several sequences are defined by recurrence relations, some by more complex algorithms, and that some cannot be computed.(1 Fundamental knowledge)
8. Apply summation notation and be able to compute partial sums of important sequences.(1 Fundamental knowledge)

9. Be able to establish identities and proofs of propositions using forms of mathematical induction and contradiction.(1 Fundamental knowledge)

Topics Covered and Associated Time:

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 (4 hours)
10. Quizzes (3 hours)

Schedule:

Offered in Fall & Spring semesters

Three 50-minute instructor lead meetings per week

Available as a hybrid course with direct and online meetings

Prepared By: William Shoaff, Ph.D., Associate Professor and Department Head

Signature: _____ **Date** _____.