Texas Tech University
Department of Computer Science

CS1382 Discrete Computational Structures

Spring 2013

Instructor

- Michael Gelfond
- Office: Engineering Center, Room 313
- Office hours: 12:30 – 13:20 Tu, Th, or by appointment

TA

- Ogale Pushkar
- Office: Engineering Center, Room 201A
- Office hours: 11:00 – 12:30 M, W

Course Information

- Prerequisite: CS1411
- Meeting time and venue: 11:00 – 12:20 TT 201
- Required textbook: Discrete Mathematics and Its Applications by K. Rosen, 7th edition

Catalogue Listing: Sets, functions, counting principles, basic probability, logic, proof methods, and graphs.

Course objectives:

1. Provide foundations of mathematical reasoning
2. Provide foundations of mathematical modeling,
3. Provide basic knowledge of logic and discrete structures, combinatorics, and probability.

Key Topics:

Propositional and predicate logic; Translation between English and formal logic; Proof techniques; Recursion and induction; Basic terminology of sets, functions, relations, trees, and graphs; Combinatorics and Probability

Learning Outcomes: Students who have completed this course should

Outcome	**ABET**	**Assessment**
Understand and be able to use the notions of propositions and predicate formulae, satisfiability, and formal proof.	**A,b,f**	**Exams**
Be able to find and apply appropriate proof	**A,b,f**	**Exams**

techniques for proving simple propositions. This includes proofs by contradiction, mathematical induction, etc.		
Be familiar with the use of mathematical notions like formulae, sets, functions, etc, for precise formulations of specifications.	**A,b,f**	**Exams**
Be familiar with basic notions of probability.	**A,b,f**	**Exams**
Demonstrate skills in combinatorics and application of combinatorics to probability.	**A,b,f**	**Exams**

Grading Policy:

- Three midterm tests – 100 points each
- Final – 150 points
- Homework and class participation – 50 points

Ethical Conduct: Although students are encouraged to discuss ideas and problems with the TA, instructor and other students, academic dishonesty will not be tolerated. **It is your responsibility to educate yourself about actions that constitute academic dishonesty**. If you are not sure whether a specific action is allowed, contact the instructor and/or the TA before you indulge in it! All submitted code will be randomly checked for plagiarism. Academic dishonesty of any kind, if discovered, will result in a grade of 0 for the corresponding lab/project. Any student who is caught indulging in academic dishonesty more than once will lead to a grade of "F" in the course, and further action according to the TTU operating procedures: http://www.depts.ttu.edu/opmanual/OP34.12.pdf

Classroom Civility:

All violations of classroom civility will be reported to the Student Judicial Programs. The Texas Tech University Catalog states: "Students are expected to assist in maintaining a classroom environment that is conducive to learning." In order to ensure that all students gain from time spent in class, **students are prohibited from engaging in any form of distraction**, e.g., reading newspapers (or other articles), working on other courses, and using cell-phones or laptops for calls or messages. If you indulge in any such inappropriate behavior (without explicit consent of the instructor), you will (at the very least) be asked to leave the classroom.

Student with Disabilities:

Any student who, because of a disability, may require special arrangements in order to meet course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services Office in 335 West Hall or 806-742-2405.

Content (tentative)

01/17	Syntax and Semantics of Propositional Logic. Satisfiability.
01/22	Use of propositional logic for knowledge representation.
01/24	Syntax and semantics of First-order Logic.
01/29	Use of First-order logic for knowledge representation.
01/31	Tautologies and Rules of inference

02/05	Introduction to Proofs
02/07	Proofs methods and strategies
02/12	Review
02/14	Test1
02/19	Sets and set operations
02/21	Functions and sequences
02/26	Cardinality of sets
02/28	Mathematical Induction
03/05	Recursive definitions and structural induction
03/07	Recursive Algorithms
03/19	Recursive Algorithms
03/21	Review
03/26	Test2
03/28	Basics of counting
04/02	More complex counting problems
04/04	Permutations and Combinations
04/09	Definition of discrete probability
04/11	Properties of probability
04/16	Probabilistic reasoning
04/18	Probabilistic reasoning
04/23	Bayes' Theorem
04/25	Review
04/30	Test3
05/02	Graphs and Graph Algorithms
05/07	Graphs and Graph Algorithms