

Discrete Structures in Computer Science

<http://www.cse.msu.edu/~cse260/001/>

Updated: Mar 24, 2008

Catalog Course Description

Propositional and first order logic. Equivalence and methods of proof. Basics of counting. Set operations, relations, functions. Grammars and finite state automata. Discrete probability. Applications to computer science and engineering.

Course Objectives

The role of discrete mathematics in computer science is analogous to the role of calculus in physics and in engineering: it provides the mechanisms that allow computer scientists to define and reason about complex systems. Complex systems of interest include software, algorithms, data structures, and hardware. The objectives of this course are to introduce the mathematical concepts that provide the basis for much of computer science and to develop the ability to describe and analyze problems in a logical and systematic fashion. This course focuses primarily on:

- Logic and mathematical reasoning
- Set theory and functions
- Induction and recursion
- Mathematical relations
- Grammars and finite state machines

To achieve these objectives, we study broad, general concepts in these areas. Applications in computer science and in computer engineering are discussed to illustrate concepts.

Course Information

Lecture: Mon, Wed 10:20a – 11:40a 1234 EB
Recitation: Fri 10:20a – 11:10a 2243 EB

Instructor

Joyce Chai
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2138 432-9239
Office Hours: Mon, Wed, 1:15p – 2:45p or by appointment
<http://www.cse.msu.edu/~jchai>

Teaching Assistants

Bryndin, Dmitriy: Recitation & consulting
bryndind@msu.edu
Office Hours: Thursday 12:00-1:00pm, Friday
2:00-3:00pm, EB3322

Textbook

Discrete Mathematics and its Applications, sixth edition (Kenneth H. Rosen; 2007)
<http://www.mhhe.com/rosen>

Course Grades

Examinations 70%
Quizzes 30%

The grades reported to the University are based on the following table:

Total percentage	Grade
90%	4.0
85%	3.5
80%	3.0
75%	2.5
70%	2.0
65%	1.5
60%	1.0

The table indicates the minimum percentage necessary to receive the grade on the same row; the threshold **may** be lowered, but will not be raised.

Examinations and Quizzes

Exams will be closed book, closed notes **except** for one $8\frac{1}{2} \times 11$ sheet of notes that you may prepare and bring to the exams. You are **not** allowed a sheet of notes for quizzes. Calculators are not necessary for this class, and will **not** be allowed during quizzes or exams. There will be **NO** make-up exams except under extremely exceptional circumstances which must be documented and discussed with the instructor ahead of time, if at all possible. Exams will be on the following dates:

Exam 1 15% Fri, Feb 8
Exam 2 15% Fri, Mar 14
Exam 3 15% Fri, Apr 11
Final Exam 25% As scheduled by the University (Friday, May 2, 10:00a – 12:00)

There will be 7 quizzes; six of them will count 5% each toward your final grade (the lowest score of 7 will be dropped). Quizzes will be given during the Friday recitation section, on the following dates: Jan 18, Jan 25, Feb 15, Feb 22, Mar 21, Mar 28, Apr 18.

NOTE: There are no makeup quizzes! If you miss a quiz, you can drop the zero score and use the other 6 quizzes for your grade.

Homework/Problem Solving

Homework will be assigned, but not be graded. We will provide solutions so you can check your own work. The surest way to succeed in this course is to work a **lot** of problems. Some of the assigned homework will be discussed in class (during recitation), and you will have the opportunity to ask questions. You are encouraged to attend recitation session every Friday. If you do not attempt the problems on your own BEFORE they are discussed in class, you will likely not be able to tackle problems on the exams and quizzes. You should work as many problems as you can on your own in order to practice the problem solving skills you'll need to attack new ones.

Academic Honesty

Michigan State University adheres to the policies on academic honesty as specified in General Student Regulations 1.0, Protection of Scholarship and Grades and in the All-University Policy on Integrity of Scholarship and Grades. These policies are included in *Spartan Life: 1999 Student Handbook and Resource Guide*. See www.msu.edu/unit/ombud/honesty.html. Any student found guilty of academic dishonesty may receive a 0.0 for the course. In all such cases, a letter will be sent to the dean of the college in which the student is enrolled.

Tentative Schedule of Topics

Week	Mon	Wed	Fri	Topic	5th ed.
1	1/7	1/9	1/11	Logic	1.1
				Propositional Equivalences	1.2
2	1/14	1/16	1/18	Meet TA	
				Predicates & Quantifiers	1.3,1.4
3	1/21	1/23	1/25	Methods of Proof	1.5
				Quiz 1	
4	1/28	1/30	2/1	Martin Luther King Day (No class)	
				Methods of Proof (cont)	1.6, 1.7
5	2/4	2/6	2/8	Quiz 2	
				Sets	2.1
6	2/11	2/13	2/15	Set Operations	2.2
				Review	
7	2/18	2/20	2/22	Functions	2.3
				Sequences and Summations	2.4
				Exam 1	
8	2/25	2/27	2/29	Divisibility and and Modular arithmetic	3.4, 3.5
				Divisibility and and Modular arithmetic cont.	3.4, 3.5
9	3/3	3/5	3/7	Quiz 3	
				Integer representation	3.6
10	3/10	3/12	3/14	Matrices	3.8
				Quiz 4	
11	3/17	3/19	3/21	Mathematical induction	4.1, 4.2
				Recursive Definitions	4.3
				Review	
				Spring Break (No class)	
12	3/24	3/26	3/28	Review	
				Binary relations and their properties	8.1
				Exam 2	
13	3/31	4/2	4/4	Representing relations	8.3
				Closure of relations	8.4
14	4/7	4/9	4/11	Quiz 5	
				Closure of relations (2)	8.4
15	4/14	4/16	4/18	Equivalence relations	8.5
				Quiz 6	
16	4/21	4/23	4/25	Graphs	9.1, 9.2
				Graphs cont	9.3, 9.4
17	4/28	4/30	5/2	Review	
				Languages and grammars	12.1
				Finite state machines	12.2
				Exam 3	
18	4/28	4/30	5/2	Finite state automata	12.2
				Finite state automata cont.	12.3
19	5/5	5/7	5/9	Quiz 7	
				Language Recognition	12.4
				Review	
				Review	
				Final Exam - as scheduled by Univ. 10:00a-12:00	

Notes.

The instructor reserves the right to modify course policies and the course calendar according to the progress and needs of the class.