

CS 242 - Course Syllabus – Spring 2008

Catalog Description

Lecture, 4 hours. Coverage of fundamental mathematical concepts blended with their applications in computer science. Topics to include sets, functions and relations, Boolean algebra, normal forms, Karnaugh map and other minimization techniques, predicate logic, formal and informal proof techniques, relational algebra, basic counting techniques, recurrence relations, introduction to graph theory applications to computer science. Prerequisites: CS 115 and MATH 161, or consent of instructor.

Prerequisites

CS 115 and MATH 161 (Calculus I). Basic C/C++ programming skills are required. Math 161

Instructor

Dr. Tia Watts Darwin 116E (707) 644-2807
e-mail: tiawatts@cs.sonoma.edu (Message subject MUST begin with CS 242)
Office Hours: Tuesday 1:00 - 2:00 pm Office or Lab
Thursday 2:00 - 3:00 pm Office or Lab

Class Meetings

Lecture: Tuesday/Thursday 10:00 – 11:50 am Darwin 28

Course Objectives

Upon successful completion of this course, the student will develop:

- Skills to read and comprehend mathematical arguments and proofs. The students should also be able to understand as well as develop simple proofs on their own.
- Ability to formalize a computational problem using a precise mathematical notation, model and language.
- Understanding of the basics of enumeration and counting techniques, pigeon-hole principle, and inclusion and exclusion principle.
- Understanding of various basic discrete structures that arise in software applications such as trees, permutations, graphs, relations etc.
- Algorithmic thinking: learn the skills to develop algorithmic solutions to basic problems.

Important Dates

28 January 2008	First day of classes
8 February 2008	Last day to ADD or DROP courses
18 February 2008	President's Day (No classes – University opened)
22 February 2008	Last day to WITHDRAW from courses online
28 February 2008	Test 1
24 – 28 March 2008	Spring Break (No classes – University opened)
31 March 2008	Cesar Chavez Day (University closed)
10 April 2008	Test 2
16 May 2008	Last day of classes
20 May 2008	Final Exam: Tuesday, 11:00 am – 12:50 pm

Course Materials

Text

Discrete Mathematics and Its Applications (3rd ed.)
by Kenneth H. Rosen, McGraw-Hill, 1995, ISBN 0-07-053965-0.

Other Materials

Loose Leaf Binder; Hole Punch; Small Stapler

Coursework

Lecture

The proposed outline of the topics to be covered appears in the course schedule. Students are expected to attend all lectures and to read the relevant sections of the text prior to lecture. Students are responsible for making up the missed work if they are absent.

In class problems

In class assignments provide an opportunity for students in the class to interact with each other and with the instructor, to get immediate solutions to problems, and to get advice on the process of solving problems.

Homework problems

Several homework assignments will be given during the semester. Homework assignments are designed to be completed individually

Midterms and Final Exam

The examinations are based on the assumption that each student is responsible for knowing the material covered in class and also material covered in relevant sections of the course text. All exams are closed book; however, one 8 ½ by 11 handwritten sheet of notes (front and back) will be allowed. The final exam will be comprehensive. There may be one or more unannounced quizzes given during the semester. Exams cannot be made up unless you have made arrangements with the instructor prior to the date of the exam. Quizzes cannot be made up.

Grading

Class attendance and participation	20%
Homework assignments	30%
Exams and Quizzes	50%

Grading Scale:

100...93...90...87...83...80...77...73...70...67...63...60...0
| A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- | F |

Note: You must separately earn a passing grade on the programming projects and the exams in order to pass the course.

CS Majors must take this course for a letter grade. University guidelines regarding the grade of Incomplete will be strictly adhered to. Incomplete grades will only be given for circumstances beyond a student's control; inability to keep up with the work due to an excessive course load, for example, is insufficient to warrant an Incomplete. The University also requires that, to be a candidate for an Incomplete grade, the student must currently be doing C (or better) work in the course.

Major Topics Covered

1. Sets, functions and relations (3 weeks)
 - Set notation, finite and infinite sets
 - Functions: onto functions, one-one functions, bijections
 - Relations: equivalence, partial order, total order etc.
 - Boolean algebra, min and max terms, normal forms
 - Karnaugh map and other minimization
 - Relational algebra
2. Predicate Logic and Proof techniques (3 weeks)
 - Propositional logic
 - First-order logic
 - Validity and satisfiability
 - Resolution and application to logic programming
3. Basic Counting Techniques (4 weeks)
 - Permutations, combinations
 - Selections with and without repetitions
 - Recurrence relations
 - Application to probability theory
 - Pigeon-hole principle
 - Principle of inclusion-exclusion
4. Graph Theory (4 weeks)
 - Definitions: directed and undirected graphs, bipartite graphs, trees, paths, cycles, connectivity, Eulerian and Hamiltonian graphs
 - Graph searching: depth-first and breadth-first search
 - Shortest path and spanning tree problems
 - Maximum matching problem
 - Planarity, graph coloring, and isomorphism

Proposed Course Schedule – Spring 2008

Week of	Topic	Chapter	Activities
28-Jan	Logic and Proofs	1	In class: pgs 16-19: 1, 3, 5, 7, 9, 11; 23, 29, 31, 37 Homework: pgs 16-19: 8, 10, 30, 32, 38
4-Feb	Logic and Proofs	1	In class: pgs 28-29: 1, 3, 5, 7, 9, 13; 17, 23, 29, 31, 37 Homework: pgs 28-29: 8, 10, 18, 22, 28, 32
11-Feb	Logic and Proofs	1	In class: pgs 46-47: 5, 7, 9, 11, 15, 43; pgs 58-59: 3, 9 Homework: pgs 46-47: 10, 16, 44; pgs 58-59: 4, 8
18-Feb	Boolean Algebra and Karnaugh Maps	11	In class: pgs 72-74: 3, 9, 19; pgs 756-757: 3, 5, 25 Homework: pgs 72-74: 4, 20; pgs 756-757:
25-Feb	Boolean Algebra and Karnaugh Maps	11	Test 1 (Chapters 1 & 11)
3-Mar	Sets and Functions	2	
10-Mar	Sequences and Sums	2	
17-Mar	Algebra, Integers and Matrices	3	
24-Mar	Induction and Recursion	4	
31-Mar	Spring Break		
7-Apr	Counting	5	Test 2 (Chapters 2, 3, 4, & 5)
14-Apr	Discrete Probability	6	
21-Apr	Relations	8	
28-Apr	Lists / Trees / Graphs	9, 10	
5-May	Lists / Trees / Graphs	9, 10	
12-May	Finite State Machines	12	
19-May	Finals Week		Test 3 (Chapters 6, 8, 9, 10, & 12)

Policy on Collaboration

You are encouraged to discuss course material with other students. Don't be shy about consulting with anyone, but please understand that you, and only you, bear the responsibility for solving the problems associated with producing a successful project or solving a lab assignment. Please read the CS Department policy on plagiarism and keep the following in mind.

All material turned in for credit must be your own work (team assignments are an exception to this). You may discuss ideas and approaches but you should work out all details and write up all solutions on your own. Copying part or all of another student's assignment, with or without the student's knowledge, is prohibited. Similarly, copying old or published solutions is prohibited.

Receive help with care. Avoid working too closely with another student. Otherwise, you can unwittingly become dependent on that student's help and fool yourself into thinking that you understand things better than you really do. Always attempt to do as much as you can on your own. Then, after you do seek help, be sure to work through similar problems on your own. Also, don't forget other sources of programming help such as the your textbook, <http://www.cplusplus.com>, the debugger, and CodeWarrior and Visual C++ documentation.

Give help with care. Don't help too much. When you understand something, you may be tempted to show someone the complete solution. However, if you do this, you will rob them of the learning experience of reaching the solution on their own. Try giving a hint that will help them get "unstuck" Although you are allowed to help other students, you are never under any obligation to do so.

Violations of these restrictions carry severe penalties. Remember that you are ultimately (i.e., during an exam or quiz) responsible for understanding the material.

Policy on Incomplete Grade

It is the policy of the Computer Science Department that a grade of Incomplete (I) shall be assigned only when the instructor concludes that a clearly identifiable portion of course requirements cannot be met within the academic term for unforeseen, but fully justified, reasons; and that there is still a possibility of earning credit.

An incomplete shall NOT be assigned when:

- the request is made before the thirteenth week of instruction
- it is necessary for the student to attend a major portion of the class when it is next offered (i.e., if a student needs to repeat a class, an incomplete should not be given)
- the student is not passing the course with a C- or better at the time of the request
- the student is unable to keep up with course work due to an excessive course load

The condition for removal of the Incomplete shall be entered on the "Request for Incomplete" form and a copy filed in the department office prior to listing an "I" on the Grade Roster. The student must retain the grades for any coursework that was due prior to the incomplete being assigned. The incomplete cannot be removed on the basis of work taken at another institution nor by re-enrolling in the course.

An incomplete must be made up within one calendar year immediately following the end of the term in which it was assigned. This limitation prevails whether or not the student maintains continuous enrollment. Failure to complete the assigned work will result in an incomplete "I" being converted to a "NC" which will affect the grade point average.

Spring 2008 University Calendar

January 2008						
SU	MO	TU	WE	TH	FR	SA
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

- 14-18 Second Registration (fees due February 8th)
- 15 Scholarship Application deadline for Fall 2008
- 22-23 No Registration or Add/Drop activity (Financial Aid Processing)
- **21 Martin Luther King Jr. Birthday (campus closed)**
- 24 University Convocation
- 24 Faculty Retreat (afternoon)
- 24-25 Open Registration (no appointment needed) - for New and Continuing Students. FEES due Feb. 8th.
- 25 Orientation and Advising
- 25 Last day to cancel registration with full refund of fees
- **28 Instruction Begins**
- 28-Feb 8 Late Registration, Add/Drop continues (fees due Feb 8th)
Note: Contract Courses submitted by February 8th will be added to schedule by Census

February 2008						
SU	MO	TU	WE	TH	FR	SA
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

- 8 Last day to Add or Register Late
- 8 Last day to Drop
- 8 Last day to submit Contract Course
- 8 Last day to change from Full-time to Part-time fee status
- 9-22 Drop with a 'W' - done on-line
- 11-22 Petition to Add with \$20 Administrative Fee class (*adding classes permitted because of serious and compelling reasons only*)
- 15 Final deadline for graduation applications to be submitted for Spring 2008
- 15 Graduation Application Priority Filing date for December 2008
- **18 Presidents Day - campus closed**
- 22 Last day to add Special Studies/Independent Studies/Internships. *Contract courses submitted after February 8th will appear on the student schedule in mid March.*
- 22 Last day to petition to add
- 22 Last day to change grade mode - *done on-line*

- 22 Last day to drop with a 'W' - *done on-line*
- 11-22 Petition to Add with \$20 Administrative Fee class (*adding classes permitted because of serious and compelling reasons only*)
- 25 Census date
- 25-March 14 REGISTRATION FREEZE - *no processing*
- 25-April 18 Petition to late withdraw from a class with \$20 administrative fee begins (*dropping classes permitted because of serious and compelling reasons only*)

March 2008						
SU	MO	TU	WE	TH	FR	SA
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

- **24 - 28 Spring Break (no classes, campus open)**
- 28 ERD due for First Registration eligibility Fall 2008
- **31 Cesar Chavez Birthday (campus closed)**

April 2008						
SU	MO	TU	WE	TH	FR	SA
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

- 1 Final deadline for graduation applications to be submitted for August 2008
- TBA Summer 2008 Registration*
- 3 Last day to withdraw and receive pro-rated cancellation of fees
- 18 Last day to withdraw (no refund)
- 21-May 16 Withdrawing from the semester or University at this point follows same requirements as retroactive withdrawal (*requires Petition form and documentation*)
- 28 - May 2 Registration for Fall 2008 - by appointment only

May 2008						
SU	MO	TU	WE	TH	FR	SA
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

- 16 Last day of instruction
- 19-23 Final Exams
- 24 Commencement