
CS 210: Discrete Structures (Fall 2010)

Instructor: Djamel Bouchaffra, Associate Professor of Computer Science

Class Time: Tuesday and Thursday from 8:00 to 9:20 am, Room: 281 Carver Hall

Office: 133 Carver Hall

Office Hours: Monday and Wednesday from 9 to 10 am, from 1 to 3 pm
Tuesday and Thursday from 9:30 to 11 am.

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Textbook: Kenneth H. Rosen, *Discrete Mathematics and its Applications*, Sixth Edition, Mc Graw-Hill, © 2007, ISBN-13 9780073229720

Course Description:

The Discrete Mathematics course will be taught from a Computer Science perspective. Chapters were selected to match the needs of students majoring in Computer Science.

We present in chapters 1 and 2 an introduction to both propositional, predicate logic, rules of inference, basics proof methods, as well as to sets and functions. We introduce in chapter 3, the concept of an algorithm, its properties and some fundamental concepts from number theory, including the division algorithm, prime factorization and congruences. We will cover mathematical reasoning, induction and recursion in chapter 4. We will learn in this chapter various strategies for proving theorems. We will highlight the roles of conjecture and counterexamples. We will show throughout chapter 6 how to develop basic concepts of discrete probability, including conditional probability and expected values. We will show how to use these concepts to study the average case complexity of an algorithm. In chapter 8, we will cover an important discrete structure, namely: *the relation*. Finally, basic concepts of graph theory (such as graph coloring and planar graphs) and its applications will be studied in chapter 9.

Link to course materials (slides hand-out, homework assignments, tasks schedule...):

<http://www.djamel-bouchaffra.info>

Objectives:

By the end of the semester, students enrolled in this course should:

- grasp the foundations of Logic (propositions, predicates, quantifiers...)
- capture the concepts of set theory and functions
- understand what an algorithm is and the different ways algorithms are expressed
- be capable to express the complexity of an algorithm
- be able to relate number theory to major applications in Computer Science such as cryptography, pseudo-random numbers generators
- should be able to prove some theorems using various forms of mathematical induction and equivalent techniques
- capture the role of discrete probability theory to study the average case complexity of an algorithm
- have a good grasp of the concept of relation with its transitive closure
- be familiar with fundamental elements of graph theory and its applications

Class Topics Schedule (TENTATIVE!):

Date	Topics	Assignments & Exams
Week 1 (08/24):	The foundations: Logics and Proofs	
Week 2 (08/31):	The foundations: Logics and Proofs	
	Basic Structures: Sets, Functions, Sequences and Sums	
Week 3 (09/07):	Basic Structures: Sets, Functions, Sequences and Sums	
Week 4 (09/14):	Class Exercises	Homework #1 Chapters 1 & 2 assigned
Week 5 (09/21):	The Fundamentals: Algorithms, the Integers, and Matrices	Homework #1 Chapters 1 & 2 due on Thursday 09/23
Week 6 (09/28):	The Fundamentals: Algorithms, the Integers, and Matrices	
	Induction & Recursion	
Week 7 (10/05):	Induction & Recursion	Homework #2 Chapters 3 & 4 assigned
Week 8 (10/12):	Class Exercises on Tuesday	Mid-Term Exam (Thursday 10/14)
Week 9 (10/19):	Discrete Probability	Homework #2 Chapters 3 & 4 due on Thursday 10/21
		Programming assigned
Week 10 (10/26):	Relations	Homework #3 Chapters 6 & 8 assigned
Week 11 (11/02):	Relations	
Week 12 (11/09):	Graphs	Homework #3 Chapters 6 & 8 due on Tuesday 11/09
Week 13 (11/16):		Programming Presentations (11/16,11/18)
Week 14 (11/23):	Graphs	Tuesday 11/23: Written report due
	<i>No Class on Thursday 11/25 (Thanksgiving)</i>	
Week 15 (11/30)	<i>Last Day of class Tuesday 11/30</i>	Oral Presentations (11/30)
Final Exam: Thursday December 9th 2010 from 8 to 10 am		

Grading:

- Final Exam (20%) (1 page of notes permitted)
- Mid-Term Exam (25%) (1 page of notes permitted)
- Programming Assignment (20%)
- Written/Oral Report (10%)
- Homeworks (25%)

Grading scale:

A: 90-100
 B: 80-89
 C: 70-79
 D: 60-69
 F: below 60

Plagiarism or cheating on any test or exam results in a course grade of F, and expulsion from the classroom.

Instructions regarding assignments:

- NO LATE assignments will be accepted. Assignments should be submitted on the date and time due.
- Plagiarized assignments will result in a grade of "F."
- **Programming Assignment:**
 - Each student will be assigned a group.
 - The programming task is assigned to the whole group. It should be demonstrated in the class on the due date. The group will have ten minutes to explain briefly the code using a Powerpoint presentation and show some input/output data. Graphical user interfaces are recommended but not a must.
 - A CD containing the Powerpoint presentation as well as the source code and the results should be turned in to the instructor.
- **Written/Oral Reports:**
 The reports should be well-written and an electronic version (attached document within an E-mail) should be sent to the instructor one week earlier to the presentation of the work. The students are divided into groups of two. Each student is within the same group chosen in programming assignments. An oral presentation of the report's contents is required. Each student will have 10 minutes of oral presentation.

Policies:

All rules and regulations stipulated in the GSU Student Handbook will apply. In addition:

- Everyone is expected to conduct himself/herself in a mature and responsible manner. No eating or drinking during class. Men should remove hats.
- Class attendance is a privilege and a duty. Everyone is expected to arrive on time and remain for the entire class period. Failure to do so is considered an absence.
- Attendance will be recorded each class period. The attendance record will be routed to the registers office immediately by computer. Be on time since being late is counted as absent. The roll is used by financial aid to determine your qualifications for refunds and/or financial aid.
- It is the responsibility of a student who misses a class to find out what was missed and cover the missed work.

- **CELL PHONES MUST BE TURNED OFF** in the classrooms and faculty offices.
- **NO MAKEUP TESTS WILL BE GIVEN.** A student who knows in advance that he/she will be absent from a test with a University excuse (due to, e.g., band, athletics, or other university-related event) may petition to take the test **early**. No test is given after the scheduled date. A schedule of your extracurricular activity and verification (document signed by the sponsor) of your participation must be submitted to me by the close of registration.
- No work for extra credit will be assigned on an individual basis during or after the semester.
- Group discussions and study groups outside the classroom are strongly encouraged.
- Cheating of any kind is a very serious matter and will result in an "F" grade in the course.
- During a test the students will sit in alternate rows. Cell phones must be turned off and put away.
- Do not ask questions during a test. If you find a question ambiguous, you should write a note to that effect and proceed using your best judgment. Student whose first language is not English may ask for clarification of a word or phrase.
- During a test nobody may leave the room and return to work on the test. A student, who arrives after the first completed test has been submitted, will not be able to take the test.

Computer Laboratories:

You are at risk of forfeiting, your account's use (either temporarily or permanently) if you violate any of the following:

- NO eating or drinking in any computer labs. Drink and food containers are not to be used into the laboratory.
- Cell phones must NOT be used in lab. Turn sound off or put in vibrate mode. Exit the lab your cell phone.
- Use earphones for audio output. Audio mode should not be used without earphones.
- No loud talkin^g/group discussions in labs. Use vacant classrooms for group or team discussions.
- DO NOT allow anyone to use your password to access your computer account.
- DO NOT sit on desk or tabletops. Use the chairs for seating'
- Place backpacks and other storage/packaging items on the floor near your workstation.

Security of Exams:

During exam periods all students will be required to show a valid University ID.

Additional Instructions:

- All tests are given in the assigned classroom. The regular tests are given during class time and are consequently fifty minutes long. The test content will be representative of all classroom lectures and lab assignments.
- No student is exempt from taking the final examination.
- Please inform the instructor as early as possible if you are a graduating senior.
- Students participating in University sponsored extra curricula activities, e.g., band, football, track. etc., should submit a signed verification from the activity's director by the end of the third week of classes. Written notification of a scheduled event that conflicts with a test date should be given to the instructor at least a week before the test date so that the test can be rescheduled. The rescheduled test should be taken prior to the scheduled date or no later than three days after that date.

Computer accounts:

Each student will be assigned a computer account, which is valid for one semester. During the semester you will be able to save your files on the department file server. You may want to purchase a 3 1/2" double-sided, high-density diskette, onto which you can copy your files at the end of the semester, as the files on the server will be deleted before the beginning of the next semester.

The students in CS 210 should use the lab in Carver Hall 277 for their assignments. You may also use the computers in Carver Hall 133. If you have a Java compiler at home, please let the instructor know that you wish to do your assignment on your own computer; you are still required to attend the lab sections to learn to use the computers in the lab.

Lab rules must be obeyed!

Resolution of concerns or problems:

If you have any concerns or problems regarding any aspect of this course, please discuss it first with the instructor and then, if necessary, with the department head.

Disabilities Statement: If you need accommodation in this class/setting/facility related to a disability, please inform the instructor of the course as soon as possible.