Discrete Mathematics for Computer Science
CS 311

Fall 2018

Sections 51225, 51230, 51235, 51240, 51245: TTh 9:30–11:00 am, GDC 2.216

Instructor: Dr. William C. (Bill) Bulko
Office: GDC 4.308
Email: bulko@cs.utexas.edu
Phone: 512-471-7021

Office Hours: Posted at http://www.cs.utexas.edu/~bulko/

TA: Andrew Russell (andrew.russell001@gmail.com)
Office Hours: Tue 11:00-12:00
Wed 1:00-1:50
Thu 1:00-2:00
in GDC 1.302 Desk 1

Course Website: http://www.cs.utexas.edu/~bulko/2018fall/311.html

Course Prerequisites: CS 312 or 312H; M 408C, 408K, or 408N, or registration for Mathematics 408C; with a grade of at least C- in each.


University Calendar: Key dates are listed at http://registrar.utexas.edu/calendars/18-19.

Course Objectives:

This course discusses discrete mathematics, the part of mathematics devoted to the study of distinct or unconnected elements. Discrete mathematics provides the mathematics foundations for many computer science classes, including data structures, algorithms, database theory, automata theory, formal languages, compilers, security and operating systems.

The tentative list of topics we will cover in this course include:

1. Propositional and Predicate Logic
2. Quantifiers
3. Rules of Inference and Satisfiability
4. Proof Techniques
5. Sets
6. Functions
7. Induction
8. Big-O Notation and Algorithmic Complexity
9. Introduction to Graph Theory
10. Introduction to Algorithms
Class Attendance and Participation Policy:

- **Class attendance is mandatory.** Most of the material you will learn will be covered in the lectures, so it is important that you not miss any of them. You are expected to show up on time for class, and stay for the whole lecture.

- **Cell phones must be silenced and put away for the entire lecture unless use is specified by the instructor.** You may not make or receive calls on your cell phone, or send or receive text messages during lectures.

- **You are responsible for all material posted to the web site and sent as email.** Ignorance of such material is no excuse. You are responsible for all material presented in the lectures.

- **Religious Holy Days:** by UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, I will give you an opportunity to complete the missed work within a reasonable time after the absence.

- **Your conduct in class should be conducive towards a positive learning environment for your classmates as well as yourself.**

Grading Procedures:

Your performance in this class will be evaluated using your scores for 10 homework assignments and three tests. **There are no planned extra credit projects or assignments to improve your grade.**

Homework and exams will be graded by the TA, and the scores will be entered on Canvas. Check your scores regularly on Canvas to make sure that we have entered them correctly. If you wish to dispute a grade, you have one week from the date the grade is posted to do so. Send your TA an e-mail and see if you can resolve your differences. If you cannot resolve your differences, you may send me an e-mail explaining the situation. **We will not entertain any grade disputes after one week.**

Homework (40%):

There will be 10 homework assignments, roughly one per week. (No homework will be given the week of an exam, or during Spring Break.) The assignment will be posted on the class website by Friday night, and it will be typically be due the following Friday at 11:59 pm. This means you will have approximately one week to complete each assignment. **You can only turn in an assignment late with prior agreement with your TA;** if your TA does not have your assignment, and you have not spoken to your TA in advance, **you will get a zero for the assignment.**

To turn in your homework, scan or take (high-quality) photographs of your homework, save the image(s) as one PDF file with all images rotated in a normal upright position, and attach it to the appropriate assignment document in Canvas before the deadline. **Remember to keep a copy of your original PDF, unedited after you submit it.** This will be useful in cases where your file gets lost or corrupted, and the timestamp on the file can be used to prove you completed the assignment on time.

Exams (60%):

There will be three midterms, each worth 20% of your total grade. The three exams will take place during the regular lecture session, in the same room. The third exam will take place on the last day of class. **There is no final exam for this course.**

Make-up tests will be given only for the following reasons. **In all cases you must provide some form of documentation.**

- Ill health
- Family emergency
• Official UT conflict (Having three tests on the same day is not an official UT conflict!)

Questions concerning test grades should be given to me in writing along with your test within the next class day that the test is handed back. We will not entertain any disputes after that time.

Final Grades:
A standard plus/minus system will be used to calculate final grades:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>94.0+</td>
</tr>
<tr>
<td>A-</td>
<td>90.0 - 93.9</td>
</tr>
<tr>
<td>B+</td>
<td>87.0 - 89.9</td>
</tr>
<tr>
<td>B</td>
<td>84.0 - 86.9</td>
</tr>
<tr>
<td>B-</td>
<td>80.0 - 83.9</td>
</tr>
<tr>
<td>C+</td>
<td>77.0 - 79.9</td>
</tr>
<tr>
<td>C</td>
<td>74.0 - 76.9</td>
</tr>
<tr>
<td>C-</td>
<td>70.0 - 73.9</td>
</tr>
<tr>
<td>D+</td>
<td>67.0 - 69.9</td>
</tr>
<tr>
<td>D</td>
<td>64.0 - 66.9</td>
</tr>
<tr>
<td>D-</td>
<td>60.0 - 63.9</td>
</tr>
<tr>
<td>F</td>
<td>0 - 59.9</td>
</tr>
</tbody>
</table>

Academic Integrity:

University of Texas Honor Code: the core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community. Each student in this course is expected to abide by this code. Any work submitted by a student in this course for academic credit will be the student's own work.

Study Groups

• You are encouraged to form study groups of 4-5 students to meet regularly (weekly is recommended) to discuss the course. Typically, you will review the lectures, do the reading, and attempt the homework independently before your weekly meeting with your study group. **Studying for tests together is permitted and encouraged.**

• While you are free to discuss the course material with your classmates and are encouraged to form study groups for the exams, collaboration on homework or programming assignments is **not** permitted. Helping a friend understand the intent of a homework or programming assignment specification is permitted.

• Students who work together too closely (e.g. design their solution together) should be aware that this is a form of cheating called collusion and is subject to academic penalties. Cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, a diskette, or a hard copy.

• If you are unsure about how to work together with your friend in a legal, helpful manner, do come and talk with us. Remember, it is always okay to "work together" with your professor or TA!

• You are responsible for turning in your own work on all assignments. **Unauthorized** collusion is not allowed and constitutes a violation of the university's policies on academic integrity.

• You are responsible for protecting your work from being copied by others. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.
During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

Do not post solutions to any problems on Piazza.

The homework and exams must be the work of students turning them in. University policy (see Dean of Students' policies on academic integrity) will be followed strictly. If we do detect any cases of academic dishonesty, we will assign a grade of F to all students involved and refer the cases to the Dean of Students.

Acts that exceed the bounds defined by the approved collaboration practices will be considered cheating. Such acts include:

- Copying solutions from someone else, or giving someone else your solutions
- Participating in a discussion group that develops a solution that everyone copies
- Posting your solutions to homework problems on Piazza or Facebook
- Employing someone to write the solutions for you on homework assignments or exams.

I urge everyone in the class to take appropriate measures for protecting your work. You should protect your files, homework solution sheets, etc. as deemed reasonable.

General University Notices and Policies

Use of E-mail for Official Correspondence to Students: All students should become familiar with the University's official e-mail student notification policy. It is the student's responsibility to keep the University informed as to changes in his or her e-mail address. Students are expected to check e-mail on a frequent and regular basis in order to stay current with University-related communications, recognizing that certain communications may be time-critical. It is recommended that e-mail be checked daily, but at a minimum, twice per week. The complete text of this policy and instructions for updating your e-mail address are available at [http://www.utexas.edu/its/help/utmail/1564](http://www.utexas.edu/its/help/utmail/1564).

Documented Disability Statement: Any student with a documented disability who requires academic accommodations should contact Services for Students with Disabilities (SSD) at (512) 471-6259 (voice) or 1-866-329-3986 (video phone). Faculty are not required to provide accommodations without an official accommodation letter from SSD.

- Please notify me as quickly as possible if the material being presented in class is not accessible (e.g., instructional videos need captioning, course packets are not readable for proper alternative text conversion, etc.).
- Please notify me as early in the semester as possible if disability-related accommodations for field trips are required. Advanced notice will permit the arrangement of accommodations on the given day (e.g., transportation, site accessibility, etc.).
- Contact Services for Students with Disabilities at 471-6259 (voice) or 1-866-329-3986 (video phone) or reference SSD’s website for more disability-related information: [http://www.utexas.edu/diversity/ddce/sss/ocespants.php](http://www.utexas.edu/diversity/ddce/sss/ocespants.php)

Behavior Concerns Advice Line (BCAL): If you are worried about someone who is acting differently, you may use the Behavior Concerns Advice Line to discuss by phone your concerns about another individual’s behavior. This service is provided through a partnership among the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee
Assistance Program (EAP), and The University of Texas Police Department (UTPD). Call 512-232-5050 or visit http://www.utexas.edu/safety/bcal.

**Q drop Policy:** The State of Texas has enacted a law that limits the number of course drops for academic reasons to six (6). As stated in Senate Bill 1231:

> “Beginning with the fall 2007 academic term, an institution of higher education may not permit an undergraduate student a total of more than six dropped courses, including any course a transfer student has dropped at another institution of higher education, unless the student shows good cause for dropping more than that number.”

**Emergency Evacuation Policy:** Occupants of buildings on the UT Austin campus are required to evacuate and assemble outside when a fire alarm is activated or an announcement is made. Please be aware of the following policies regarding evacuation:

- Familiarize yourself with all exit doors of the classroom and the building. Remember that the nearest exit door may not be the one you used when you entered the building.
- If you require assistance to evacuate, inform me in writing during the first week of class.
- In the event of an evacuation, follow my instructions or those of class instructors.

Do not re-enter a building unless you’re given instructions by the Austin Fire Department, the UT Austin Police Department, or the Fire Prevention Services office.