

CSE 2315 – Discrete Structures
Fall 2016

Instructor: Darin Brezeale, ERB 648
Office Hours: Tuesday and Thursdays, 1:30pm–3pm (or anytime my door is open)
Contact: darin.brezeale@uta.edu (best way to contact me)
I don't have a phone in my office, but in case of an emergency you can call the CSE department at 817-272-3785.
Website: <http://omega.uta.edu/~darin>
Section: 001: MoWeFr, 11:00am–11:50am, ERB 131
002: MoWeFr, 1:00pm–1:50pm, ERB 129
Software: We may have assignments requiring MATLAB

Course Description: Propositional and predicate logic, mathematical proof techniques, sets, combinatorics, functions and relations, graphs, and graph algorithms. Prerequisites: CSE 1310 and MATH 1426.

Learning Outcomes: These are the learning outcomes proposed by the CSE department. Note that I have mapped these topics to the textbook referenced below.

1. Create truth tables for well-formed formulas. 1.1
2. Manipulate wff using equivalence and inference rules. 1.2
3. Translate between English and both propositional and predicate wff. 1.3, 1.4
4. Prove arguments valid for both propositional and predicate wff. 1.3, 1.4
5. Demonstrate the relationship between various proof techniques and under what circumstances a particular proof technique is appropriate. 2.1
6. Perform direct proofs and proofs by contraposition and contradiction. 2.1
7. Perform proofs by induction. 2.2
8. Create and use recursive definitions for sequences, sets, and operations. 3.1
9. Solve a first order recurrence relation. 3.2
10. Manipulate sets and power sets using union, intersection, set difference, complement, cross product and set identities. 4.1
11. Demonstrate the difference between countable and uncountable sets. 4.1
12. Count sets using multiplication and addition principle, $P(n,r)$ and $C(n,r)$. 4.2
13. Use the principle of inclusion and exclusion. 4.3
14. Test relations for reflexivity, symmetry, antisymmetry and transitivity. 5.1
15. Prove a relation is an equivalence relation and find its equivalence classes. 5.1
16. Prove a relation is a partial order and draw its Hasse diagram. 5.1
17. Prove whether a function is or is not onto or one-to-one. 5.1
18. Find the inverse of a function. 5.4

19. Represent permutation functions and form their compositions. 5.4
20. Demonstrate understanding of the graph concepts of: path, cycle, connected, complete, bipartite, planar, tree, etc. 6.1
21. Prove two graphs isomorphic. 6.1
22. Show how to represent a general graph and a tree in the computer. 6.1
23. Perform inorder, preorder and postorder traversal of trees. 6.2
24. Create expression trees. 6.2
25. Perform breadth-first and depth-first searches of graphs. 7.4

Reference Textbook: Judith L. Gersting. *Mathematical Structures for Computer Science*. W. H. Freeman and Company, New York, NY, 7th edition, 2014. While I will assign homework, I don't plan to assign specific problems from the book so you are not bound to this particular edition. Note that if you choose to use an earlier edition, it's your responsibility to identify any differences in the editions.

Homework Policy: I'm a strong believer that the best way to learn math is by doing, so you should expect plenty of homework. Calculators will not be allowed on exams, so you probably should not become dependent on them when doing your homework. Using a calculator to check your work is fine; having the calculator do all of the work isn't.

Grading Policy: There will be four exams plus weekly homework assignments. Your final grade will be calculated as $\min(\text{homework average}, \text{exam average})$ where the homework average is the arithmetic mean of the homework grades and the exam average is the arithmetic mean of the exam grades.

If your lowest exam grade is one of the first three exams, then I will replace that exam grade with the grade you receive on the final exam. This will only be applied to one exam (in case of a tie) and will not be applied if you receive a grade of zero on an exam due to cheating.

No make-up exams will be given except for emergencies (in the instructor's opinion). Poor planning or forgetfulness on your part won't be considered an emergency. I never give extra credit work nor will any grades be dropped. Final grades are based on the ranges of A: 88–100, B: 78–87, C: 68–77, D: 58–67, F: 0–57. I round to the nearest integer, so 87.4 is a B and 87.5 is an A.

As someone taking an engineering course, I assume that you can 1) keep up with the grades I provide to you and 2) can calculate your current grade in the course.

Important Dates:

Friday, August 26	first day of class
Monday, September 26	exam 1
Monday, October 17	exam 2
Monday, November 7	exam 3
Friday, November 25	no class, Thanksgiving
see schedule	exam 4 (you must take the exam at the time for your section)

Attendance: At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students academic performance, which includes establishing course-specific policies on attendance. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients begin attendance in a course. UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

As the instructor of this section, I will not take attendance except when required to determine if you have attended the class. While attendance of the lectures is not required, you should not expect me to catch you up if you choose not to come to class nor is not attending the lectures necessarily good for your grade.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://www.uta.edu/aao/fao/>).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act. All instructors at UT Arlington are required by law to provide reasonable accommodations to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

- The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.
- Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy: The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic

information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.

Title IX: The University of Texas at Arlington (University) is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlingtons tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents Rule 50101, 2.2, suspected violations of universitys standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the students suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>.

Electronic Communication Policy: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

I send out a lot of emails, so check your email regularly. Note that while I am fine with communicating via email in general, I don't like receiving emails asking for grades and probably won't respond to any emails asking for grades.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each students feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlingtons effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs> .

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to

allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit; there are exits located east and west of this room. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at <http://www.uta.edu/universitycollege/resources/index.php>.

Schedule: This is tentative and therefore likely to change.

week	section	topics
1		Chapter 1: Formal Logic
2		Chapter 1: Formal Logic
3		Chapter 2: Proofs, Induction, and Number Theory
4		Chapter 2: Proofs, Induction, and Number Theory
5		Chapter 2: Proofs, Induction, and Number Theory
6		Chapter 3: Recursion, Recurrence Relations, and Analysis of Algorithms
7		Chapter 3: Recursion, Recurrence Relations, and Analysis of Algorithms
8		Chapter 3: Recursion, Recurrence Relations, and Analysis of Algorithms
9		Chapter 4: Sets, Combinatorics and Probability
10		Chapter 4: Sets, Combinatorics and Probability
11		Chapter 4: Sets, Combinatorics and Probability
12		Chapter 5: Relations, Functions and Matrices
13		Chapter 5: Relations, Functions and Matrices
14		Chapter 6: Graphs and Trees
15		Chapter 7: Graph Algorithms