

CSE 2315 – Discrete Structures Fall 2018

Instructor	Dr. Ming Li
Office hours	2:00pm-3:30pm Mon/Wed (by appointment)
Office	ERB 641 (temporary)
Email	ming.li@uta.edu
Time and place of class	4:00pm-5:20pm Mon/Wed, SH 330
TA	Wenqiang Jin
	Office hour: TBD
	Office: TBD
	Email: wenqiang.jin@mavs.uta.edu

Course Description: Theoretical foundations of Computer Science are built on discrete mathematics. This course will cover 8 fundamental areas:

- propositional and predicate logic
- mathematical proof techniques
- Sequences and recurrences
- set theory
- counting, combinatorics and probability
- public key encryption and Number theory
- functions and relations
- graphs and graph algorithms

Successfully completion of this course will provide students a solid theoretical foundation of computer science and enable him/her analyze many practical problems.

Important dates

August 22	first day of class
September 3	no class, Labor Day
September 26	mid-term 1
October 17	mid-term 2

November 7	mid-term 3
November 21	no class, Thanksgiving
See schedule	final exam

Grades

There will be 3 mid-terms, 1 final exam, and 8 homework assignments. Each mid-term will be one-class long. Final course grades will be determined by the following weights:

Class participation --- 5%

Homeworks --- 25%

Midterm 1--- 15%

Midterm 2--- 15%

Midterm 3--- 15%

Final Exam --- 25%

If you miss an exam due to unavoidable circumstances (e.g., health), email the instructor for an appointment or meet with her during office hours. Do NOT ask for make up exams or other components if you missed an exam or a project due to travel (except when you are required to travel to represent the university or the department). Attendance though not mandatory, but is HIGHLY encouraged. Class participation is important to your grade in the 'Class Participation' component.

Student Learning Outcomes

On completion of the course the student should:

- Understand mathematical reasoning in order to read, comprehend, and construct mathematical arguments.
- Be able to perform combinatorial analysis to solve counting problems and analyze algorithms.
- Understand how to work with discrete structures, which are the abstract mathematical structures used to represent discrete objects and relationships between these objects. These discrete structures include sets, permutations, combinations, relations, functions, matrices, graphs, trees, algebraic structures and coding theory.

- Be able to model practical applications with concepts learned in this course. This is an extremely important problem-solving skill.

Required Textbook:

Discrete Mathematics and Its Applications, by Kenneth H. Rosen (9th edition). Note that if you choose to use an earlier edition, it's your responsibility to identify any differences in the editions.

Homework assignments and deadlines:

- **All the assignments must be submitted through Blackboard.** We will not take any hardcopy or email submissions, unless the university verifies that Blackboard was malfunctioning or unavailable. If you are not able to submit through Blackboard by deadline specified due to a technical failure, you can email your assignment to us, together with a screenshot showing the technical failure. We will verify with the university.
- The assignments are due by 11:59pm on the due date. The deadline is automatically managed by Blackboard. You can still submit the assignment after the deadline. But, you automatically lose 10 points per day after the due date, till 0. (Each individual assignment is 100points).

Course schedule:

- **Lectures 1-4: Logic and Proofs**
 - ✓ Readings: Chapters #1
 - ✓ Topics: Propositional Logic, Operators, Truth Tables, Equivalences, Rules of Inference, Quantifiers, Proofs.
 - ✓ Homework 1 released
- **Lectures 5-7: Set Theory**
 - ✓ Readings: Ch. #2
 - ✓ Topics: Sets, Set operations, Sequences, Functions, Relations, Cardinality, Infinite sets.
 - ✓ Homework 2 released
- **Lectures 8-10: Induction, Recursion, and Algorithms**

- ✓ Readings: Ch. #3 and #5
- ✓ Topics: Ordinary & strong induction, Recursion, Strings, Algorithms, Big-O notation, Complexity, Recursive Algorithms.
- ✓ Homework 3 released
- **Lectures 11-14: Number Theory**
 - ✓ Readings: Ch. #4
 - ✓ Topics: Cryptography, Divisibility, Primes, Greatest Common Divisor, Euclidean Algorithm, Modular Arithmetic, Euler's totient, RSA Cryptosystem.
 - ✓ Homework 4 released
- **Lectures 15-17: Counting**
 - ✓ Readings: Ch. #6
 - ✓ Topics: Counting rules, Permutations and Combinations, Sequences, The Pigeonhole Principle, Binomial Theorem, Pascal's Identity, Combinatorial Proofs, Inclusion-Exclusion.
 - ✓ Homework 5 released
- **Lectures 18-19: Probability**
 - ✓ Readings: Ch. #7
 - ✓ Topics: Probability spaces & events, Measures, Conditional probability, Distributions, Bayes' Theorem, Random variables, Expected value, Variance.
 - ✓ Homework 6 released
- **Lectures 20-21: Relations**
 - ✓ Readings: Ch. #8 and #9
 - ✓ Topics: Recurrence systems and types, Generating functions, Relation properties, Equivalence classes, Digraphs, Partial orders.
 - ✓ Homework 7 released
- **Lectures 22-25: Graphs**
 - ✓ Readings: Ch. #10
 - ✓ Topics: Graph terminology, Graph types & representation, Isomorphism, Connectivity, Eulerian Hamiltonian and planar graphs, Coloring.
 - ✓ Homework 8 released

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>.

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 student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's 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>.