



Department of Computational, Engineering, and Mathematical Sciences

MATH 3370: Discrete Mathematics, Section 001

Spring 2025

Instructor: Dr. Qi Han

Class Meeting: MWF 9:00-9:50pm

Classroom: Classroom Hall 307

E-mail: ghan@tamusa.edu

<https://apps.tamusa.edu/course-information/my-profile/faculty-Profile.php?ID=358>

Office Hours: WF 8:00-9:00am, MF 10:00am-11:00am, and/or via email

Or by appointment via email, read regularly between 8:30am~8:30pm

Credit Hours: 3

Office Phone: (210) 784-2262

Office: Classroom Hall 314P

Course Description and Materials

Catalog Description: This course covers many topics in mathematics which are important in computer science. Some of these topics are sets, relations, functions, algorithms, graphs, monoids, lattices, Boolean algebras, and graphs.

Prerequisite: MATH 3320, MATH 3325, MATH 3340, or MATH 3415; all prerequisites require a grade of “C” or higher.

Required Textbook: Discrete Mathematics and Its Applications by Kenneth Rosen (the 8th edition), McGraw-Hill with ISBN-13: 978-1-259-67651-2.

Student Learner Objectives: Upon completion of this course, students will be able to:

1. Become familiar with key concepts and techniques in discrete mathematics.
2. Be able to formulate and solve problems requiring the application of discrete mathematics.
3. Develop a basic proficiency in explaining and interpreting discrete mathematical concepts in a variety of mathematical subject areas.

List of Topics: Topics to be covered include but are not limited to the following:

1. The foundations of propositional logic (Sections 1-1 ~ 1-3).
2. Predicates and quantifiers, and nested quantifiers (Sections 1-4 ~ 1-5).
3. Rules of inference, and proof methods and strategy (Sections 1-6 ~ 1-8).
4. Boolean Algebra (Sections 12-1 ~ 12-4).
5. Sets and set operations, and functions and their properties (Sections 2-1 ~ 2-3).
6. Sequences and summations, and cardinality of sets (Sections 2-4 ~ 2-5).
7. Algorithms (Sections 3-1 ~ 3-3).
8. Number theory (Sections 4-1 ~ 4-4).
9. Cryptography (Sections 4-5 ~ 4-6).
10. Induction, recursion, and fractals (Sections 5-1 ~ 5-3).
11. Basic counting techniques (Sections 6-1 ~ 6-5).
12. Advanced counting techniques (Sections 8-1 ~ 8-2).

The instructor reserves the right to modify/update the topics as appropriate.

Inquiry-Based Active Learning: This course implements inquiry-based active learning approaches throughout, and thus the students are strongly encouraged to preview the teaching materials and be aware of many class-participation and self/peer study activities.

NOTE. This class meets three times a week. Aside from the three hours that you spend in class each week, you should devote at least another 4~6 hours to studying on your own: reading the book and my lecture notes, working out your homework assignments, and solving some extra related problems for practice etc. You are responsible for any and all materials/topics discussed in this class.

Course Expectations and Requirements

Examinations: There will be three midterm tests during the semester and one comprehensive final exam in the end (scheduled during the Finals Week).

Students will take all examinations at regularly scheduled times. Exceptions for a legitimate reason may be granted and must be approved in advance by your instructor. Students should notify, or under certain unusual circumstances have other(s) to notify, the instructor formally that you will miss, or have missed an exam, and provide a reason with accompanying documents supporting that, for your absence within 24hrs of the scheduled exam date. Your instructor can be notified via e-mail with a written notice. Contact beforehand your instructor to make necessary arrangement, if you know in advance that you will be unable to take an exam at the regular class time. Students who fail to follow the prescribed procedure will receive a **GRADE OF ZERO** on the missed exam.

Examples of valid documented excuses are sickness documented with a doctor's note, death in the family documented with a copy of the death notice, attending university-sponsored events with a Dean's excuse, etc. Minor illness, or attending sports events and like kind (without a Dean's excuse) are not examples of emergency situations.

Test 1 covers Chapters 1 and 12 (only selected important topics).

Test 2 covers Chapters 2 and 3 (only selected important topics).

Test 3 covers Chapters 4 and 5 (only selected important topics).

Final exam covers Chapters 1~6, 8, and 12 (only selected important topics).

Final exam schedule is available at

TBA

For this class, the final exam is scheduled between **12:00pm** and **1:50pm** on **Monday, May 12, 2025**.

NOTE. The schedules will be announced at least a week ahead of time in class, in Blackboard, and through emails. The tests/exam will be taken completely in class. Calculators (except for scientific non-graphing, non-programmable calculators), cell phones, laptops, i-pads, kindles, and any other electronic devices are absolutely **NOT** allowed during the tests/final exam. Once found, the tests/final exam would receive a **GRADE OF ZERO**, and if this happened in a recursive manner, the instructor would report to the university as an academic dishonesty issue.

Assignments: There will be totally four homework assignments of this course that should be submitted on their due dates as indicated in the posting on Blackboard and/or as announced in class by your instructor. Problems are assigned after each section of the book covered, which will be summarized with a HW number posted online to Blackboard - Assignment as well, with its due date specified.

Your homework assignments are collected before the end of that day's class. Late homework can **NOT** be accepted. Should you have to miss that day's class, it is solely your responsibility to have your work turned in either in person or electronically before that class time in order for it to be graded. If you cannot finish all the questions, please try to finish as many problems as possible.

Your work should be legible and done neatly. If the work is not presentable or illegible, you will **NOT** receive credit for it. Please staple the sheets of your assignment together in the upper left corner and please do not use papers torn out of spiral bound notebooks. In the upper right corner of your assignment, you should write your name, the class section number, and assignment number (HW1, ..., HW4).

Discipline yourself to write clear readable solutions - they will be of great value for review. You need to show both your answer and the work leading to it. **NO** credit for merely having the right answers. You can have group/team discussions about homework problems. However, you must write up solutions on your own and truly understand the mathematics/algorithms involved. Be mindful of your academic integrity.

Presentations/Debates: Students will be expected to participate in class presentations/debates, emphasizing the most recently covered topics that are related to and complementing HWs.

Research Project: Towards the end of the semester, you will be given a book chapter to read and write a research report, along with some other work. This is to expose you first experience to mathematical research.

Evaluation of Student Performance: Every student's grade will be based entirely on his/her performance. Students will not compete against one another for grades.

Grading Policy

HWs: 10% Presentations/Debates: 6% Research Project: 15% Tests 1-3: 23% each

A = 90~100% B = 80~89.9% C = 70~79.9% D = 60~69.9% F = 0~59.9%

NOTE. The final grade utilizes a **weighted** average. Please do **NOT** simply take the average of all grades posted on the blackboard as your final grade. A helpful link is

<https://www.indeed.com/career-advice/career-development/how-to-calculate-weighted-average>

NOTE. The instructor reserves the right to modify/update the information of this syllabus as appropriate.

No Use of Generative AI Permitted

MATH 3415 assumes all students submitted work will be generated by the students themselves, working individually or in groups. Students should not have another person/entity do the writing of any portion of an assignment for them, which includes hiring a person or a company to write assignments and/or using artificial intelligence (AI) tools like ChatGPT. Use of any AI-generated content in this course qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.

IMPORTANT POLICIES AND RESOURCES

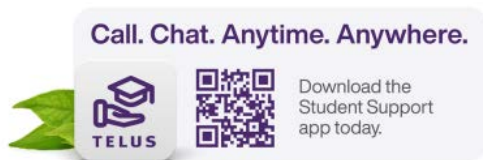
Academic Accommodations for Individuals with Disabilities: Texas A&M University-San Antonio is committed to providing all students with reasonable access to learning opportunities and accommodations in accordance with The Americans with Disabilities Act, as amended, and Section 504 of the Rehabilitation Act. If you experience barriers to your education due to a disability or think you may have a disability, Disability Support Services is located in the Central Academic Building, Suite 210. You can also contact us via phone at (210) 784-1335, visit us <https://www.tamusa.edu/Disability-Support-Services/index.html> or email us at dss@tamusa.edu. Disabilities may include, but are not limited to, attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability-related needs with Disability Support Services and their instructors as soon as possible.

Academic Learning Center: The Academic Learning Center provides free course-based tutoring to all currently enrolled students at Texas A&M University-San Antonio. Students wishing to work with a tutor can make appointments through the Brainfuse online tutoring platform. Brainfuse can be accessed in the *Tools* section of Blackboard. You can contact the Academic Learning Center by emailing tutoring@tamusa.edu, calling (210) 784-1307, or visiting the Central Academic Building, room 202.

Counseling/Mental Health Resources: As a college student, there may be times when personal stressors interfere with your academic performance and negatively impact your daily functioning. If you are experiencing emotional difficulties or mental health concerns, support is available to you through the Student Counseling Center (SCC). To schedule an appointment, call 210-784-1331 or visit Madla 120.

All mental health services provided by the SCC are free and confidential (as the law allows). The Student Counseling Center provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services. For more information on SCC services visit tamusa.edu/studentcounseling

Crisis support is available 24/7 by calling the SCC at 210-784-1331 (after-hours select option '2'). Additionally, the TELUS Student Support App provides a variety of mental health resources to include support for in the moment distress, an anonymous peer to peer support network, mental health screenings, podcasts, and articles to improve your mental wellbeing.



Emergency Preparedness: JagE Alert is Texas A&M University-San Antonio's mass notification. In the event of an emergency, such as inclement weather, students, staff and faculty, who are registered, will have the option to receive a text message, email with instructions and updates. To register or update your information visit: <https://tamusa.bbcportal.com/>.

More information about Emergency Operations Plan and the Emergency Action Plan can be found here: <https://www.tamusa.edu/about-us/emergency-management/>.

Download the SafeZone App (<https://safezoneapp.com/>) for emergencies or call (210) 784-1911. Non-Emergency (210) 784-1900.

Financial Aid and Verification of Attendance: According to the following federal regulation, 34 CFR 668.21: U.S. Department of Education (DoE) Title IV regulation, a student can only receive Title IV funds based on Title IV eligibility criteria which include class attendance. If Title IV funds are disbursed to ineligible students (including students who fail to begin attendance), the institution must return these funds to the U.S. DoE within 30 days of becoming aware that the student will not or has not begun attendance. Faculty will provide the Office of Financial Aid with an electronic notification if a student has not attended the first week of class. Any student receiving federal financial aid who does not attend the first week of class will have their aid terminated and returned to the DoE. Please note that any student who stops attending at any time during the semester may also need to return a portion of their federal aid.

Writing, Language, and Digital Composing Center: The Writing, Language, and Digital Composing Center supports graduate and undergraduate students in all three colleges as well as faculty and staff. Tutors work with students to develop reading skills, prepare oral presentations, and plan, draft, and revise their written assignments. Our language tutors support students enrolled in Spanish courses and students composing in Spanish for any assignment. Our digital studio tutors support students working on digital projects such as eportfolios, class presentations, or other digital multimedia projects. Students can schedule appointments through JagWire under the Student Services tab. Click on "Writing, Language, and Digital Composing Center" to make your appointment. The Center offers face-to-face, synchronous online, and asynchronous digital appointments. More information about what services we offer, how to make an appointment, and how to access your appointment can be found on our website at <https://www.tamusa.edu/academics/>.

Meeting Basic Needs: Any student who has difficulty affording groceries or accessing sufficient food to eat every day or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to submit a CARE referral (<https://www.tamusa.edu/university-policies/Student-Rights-and-Responsibilities/file-a-report.html>) for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to direct you to available resources.

Military Affairs: Veterans and active-duty military personnel are welcomed and encouraged to visit the Office of Military Affairs for any question involving federal or state VA Education Benefits. Visit the Patriots' Casa building, room 202, or to contact the Office of Military Affairs with any questions at military.va@tamusa.edu or (210)784-1397.

Religious Observances: Texas A&M University-San Antonio recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or course work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes.

The Six-Drop Rule: Students are subject to the requirements of Senate Bill (SB) 1231 passed by the Texas Legislature in 2007. SB 1231 limits students to a maximum of six (6) non-punitive course drops (i.e., courses a student chooses to drop) during their undergraduate careers. A non-punitive drop does not affect the student's GPA. However, course drops that exceed the maximum allowed by SB 1231 will be treated as "F" grades and will impact the student's GPA.

Statement of Harassment and Discrimination: Texas A&M University-San Antonio is committed to the fundamental principles of academic freedom, equal opportunity, and human dignity. To fulfill its multiple missions as an institution of higher learning, A&M-San Antonio encourages a climate that values and nurtures collegiality and the uniqueness of the individual within our state, nation, and world. All decisions and actions involving students and employees should be based on applicable law and individual merit. Texas A&M University-San Antonio, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, gender identity, gender expression, or pregnancy/parenting status. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the appropriate offices within their respective units.

Texas A&M University-San Antonio faculty are committed to providing a safe learning environment for all students and for the university as a whole. If you have experienced any form of sex- or gender-based discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking, know that help and support are available. A&M-San Antonio's Title IX Coordinator can support those impacted by such conduct in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The university strongly encourages all students to report any such incidents to the Title IX Coordinator. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and trained victim advocates) are required to report information about such discrimination and harassment to the university. This means that if you tell a faculty member about a situation of sexual harassment, sexual violence, or other related misconduct, the faculty member must share that information with the university's Title IX Coordinator (titleix@tamusa.edu, 210-784-2061, CAB 439K). If you wish to speak to a confidential employee who does not have this reporting requirement, you can contact the Student Counseling Center at (210) 784-1331 or visit them in Madla 120.

Pregnant/Parenting Students: Texas A&M-San Antonio does not require a pregnant or parenting student, solely because of that status or issues related to that status, to (1) take a leave of absence or withdraw from their degree or certificate program; (2) limit the student's studies; (3) participate in an alternative program; (4) change the student's

major, degree, or certificate program; or (5) refrain from joining or cease participating in any course, activity, or program at the University. The university will provide such reasonable accommodations to pregnant students as would be provided to a student with a temporary medical condition that are related to the health and safety of the student and the student's unborn child. These could include maintaining a safe distance from substances, areas, and activities known to be hazardous to pregnant individuals and their unborn child; excused absences because of illness or medical appointments; modified due dates for assignments; rescheduled tests/exams; taking a leave of absence; and being provided access to instructional materials and video recordings of lectures for excused absences, if these would be provided to any other student with an excused absence. Pregnant/parenting students are encouraged to contact the Title IX Coordinator with any questions or concerns related to their status (titleix@tamusa.edu; 210-784-2061; CAB 439K).

Texas A&M-San Antonio has also designated the Title IX Coordinator as the liaison officer for current or incoming students who are the parent or guardian of a child younger than 18 years of age. The Title IX Coordinator can provide students with information regarding support services and other resources.

Students' Rights and Responsibilities: The following statement of students' rights and responsibilities is intended to reflect the philosophical base upon which University Student Rules are built. This philosophy acknowledges the existence of both rights and responsibilities, which is inherent to an individual not only as a student at Texas A&M University-San Antonio but also as a citizen of this country.

Students' Rights

1. A student shall have the right to participate in a free exchange of ideas, and there shall be no University rule or administrative rule that in any way abridges the rights of freedom of speech, expression, petition and peaceful assembly as set forth in the U.S. Constitution.
2. Each student shall have the right to participate in all areas and activities of the University, free from any form of discrimination, including harassment, on the basis of race, color, national or ethnic origin, religion, sex, disability, age, sexual orientation, gender identity, gender expression, and pregnancy/parenting or veteran status in accordance with applicable federal and state laws.
3. A student has the right to personal privacy except as otherwise provided by law, and this will be observed by students and University authorities alike.
4. Each student subject to disciplinary action arising from violations of university student rules shall be assured a fundamentally fair process.

Students' Responsibilities

1. A student has the responsibility to respect the rights and property of others, including other students, the faculty, and administration.
2. A student has the responsibility to be fully acquainted with the published University Student Rules found in the Student Handbook, [Student Code of Conduct](#), on our website, and University Catalog, and to comply with them, as well as with federal, state, and local laws.
3. A student has the responsibility to recognize that student actions reflect upon the individuals involved and upon the entire University community.
4. A student has the responsibility to recognize the University's obligation to provide a safe environment for learning.
5. A student has the responsibility to check their university email for any updates or official university notifications.

We expect that students will behave in a manner that is dignified, respectful, and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation, or disability. Conduct that infringes on the rights of another individual will not be tolerated.

Students are expected to exhibit a high level of honesty and integrity in their pursuit of higher education. Students engaging in an act that violates the standards of academic integrity will find themselves facing academic and/or disciplinary sanctions. Academic misconduct is any act, or attempt, which gives an unfair advantage to the student.

Additionally, any behavior specifically prohibited by a faculty member in the course syllabus or class discussion may be considered as academic misconduct. For more information on academic misconduct policies and procedures please review the Student Code of Conduct (<https://www.tamusa.edu/university-policies/student-rights-and-responsibilities/documents/Student-Handbook-2022-23.pdf>) or visit the resources available in the OSRR website (<https://www.tamusa.edu/university-policies/student-rights-and-responsibilities/academic-integrity.html>).

Important Dates:

January 21	First class day
January 28	Last day to register
February 5	Census date
March 10-15	Spring Break – No classes
April 18	Study Day – No classes
April 21	Last day to drop with an automatic grade of “W”
April 28	Last day to withdraw from the university
May 5	Last day of classes
May 6	Study Day – No classes
May 7-13	Final examinations
May 16	All grades due by noon
May 19	Grades available in JagWire
May 20	Commencement

The complete academic calendar is available online: <https://www.tamusa.edu/academics/academic-calendar/index.html>.