MATH 3310 - 110, 11526, Discrete Mathematics

Spring 2022
Texas A&M University-Central Texas

COURSE DATES, MODALITY, AND LOCATION

This class begins on January 18th and ends on May 13th.

This is a 100% online course and uses the A&M-Central Texas Canvas Learning Management System https://tamuct.instructure.com/ .

Required textbook: *Discrete Mathematics with Applications*, Fifth Edition, by Susanna S. Epp

ISBN-13: 978-1337694193
ISBN-10: 1337694193

Students will need to purchase access to Webassign:
Go to https://www.getenrolled.com/ and use class code: TAMUCT24340107
(The online textbook is available here.)

Instructor: Christy Douglass
Phone: 254-371-6833
Email: cdouglass@tamuct.edu (preferred email – Canvas Inbox)

Office Hours: Tuesdays, 6 – 8 pm @ https://tamuct.webex.com/meet/cdouglass or by appt.

Student-instructor interaction

I will check messages daily on CANVAS and reply within 24 hours.

Students are expected to check their CANVAS email and announcements daily.

Emergency Warning System for Texas A&M University-Central Texas
SAFEZONE. SafeZone provides a public safety application that gives you the ability to call for help with the push of a button. It also provides Texas A&M University-Central Texas the ability to communicate emergency information quickly via push notifications, email, and text messages. All students automatically receive email and text messages via their myCT accounts.

Downloading SafeZone allows access to push notifications and enables you to connect directly for help through the app.

You can download SafeZone from the app store and use your myCT credentials to log in. If you would like more information, you can visit the SafeZone website [www.safezoneapp.com].

To register SafeZone on your phone, please follow these 3 easy steps*:*
   1. Download the SafeZone App from your phone store using the link below:
       o   iPhone/iPad: [https://apps.apple.com/app/safezone/id533054756]

2. Launch the app and enter your myCT email address (e.g. {name}@tamuct.edu)
3. Complete your profile and accept the terms of service

COURSE INFORMATION

Course Overview and description

Introduces students to the techniques and tools of reasoning, decision making, and combinational problem solving. Topics include sets and logic, combinations, probability, relations and functions, Boolean properties, and graph theory. Prerequisite(s): MATH 1314 or MATH 3309.

Student Learning Outcomes

- Evaluate and contradict logic statements, negations, converses, inverses, contrapositives, and biconditionals, and determine logical equivalences. (Ch.2 HW, Ch.2 Quiz, Midterm)
- Use rules of inferences, truth tables, and logic circuits to develop, defend, and contradict a logical argument. (Ch.2 HW, Ch.2 Quiz, Midterm)
- Use predicates and quantifiers to develop, defend, and contradict a logical argument. (Ch.3 HW, Ch.3 Quiz, Midterm)
- Translate from informal to formal logic language. (Ch.3 HW, Ch.3 Quiz, Midterm)
- Develop a direct, logical proof and disprove my means by counterexample. (Ch.4 HW, Ch.4 Quiz, Midterm)
- Use various number theorems and algorithms in direct proofs and indirect arguments. (Ch.4 HW, Ch.4 Quiz, Midterm)
- Use explicit and recursive formulas to describe sequences and series. (Ch.5 HW, Ch.5 Quiz, Final)
- Use factorials and n choose r notation to generate sequences. (Ch.5 HW, Ch.5 Quiz, Final)
- Prove mathematical algorithms by induction and use the Well-Ordering Principle. (Ch.5 HW, Ch.5 Quiz, Final)
- Solve recurrence relations by iteration and derive a technique for solving second-order homogenous recurrence relations. (Ch.5 HW, Ch.5 Quiz, Final)
- Prove and disprove a set is a subset of another, prove and disprove a set is empty, use Venn diagrams to represent sets, and partition sets. (Ch.6 HW, Ch.6 Quiz, Final)
- Prove and disprove subset relations, set equality and set identities, and perform set operations. (Ch.6 HW, Ch.6 Quiz, Final)
- Define functions acting on general sets, including Boolean functions and determine if a function is well-defined. (Ch.7 HW, Ch.7 Quiz, Final)
- Determine one-to-one and onto functions (finite and infinite), compose their inverses and find function inverses. (Ch.7 HW, Ch.7 Quiz, Final)
- Determine cardinality of countable and infinite sets and search for larger infinities. (Ch.7 HW, Ch.7 Quiz, Final)
- Use trees, paths, and circuits to graphically represent logical situations. (Ch.10 HW, Ch.10 Quiz, Final)

TExES Mathematics Exam (7-12) Standards

Domain I—Number Concepts

Competency 001—The teacher understands the real number system and its structure, operations, algorithms and representations.
The beginning teacher:

- Understands the concepts of place value, number base and decimal representations of real numbers.
- Understands the algebraic structure and properties of the real number system and its subsets (e.g., real numbers as a field, integers as an additive group).

- Describes and analyzes properties of subsets of the real numbers (e.g., closure, identities).

- Selects and uses appropriate representations of real numbers (e.g., fractions, decimals, percents, roots, exponents, scientific notation) for particular situations.

- Uses a variety of models (e.g., geometric, symbolic) to represent operations, algorithms and real numbers.

- Uses real numbers to model and solve a variety of problems.

- Uses deductive reasoning to simplify and justify algebraic processes.

- Demonstrates how some problems that have no solution in the integer or rational number systems have solutions in the real number system.

Competency 003—The teacher understands number theory concepts and principles and uses numbers to model and solve problems in a variety of situations.
The beginning teacher:

- Applies ideas from number theory (e.g., prime numbers and factorization, the Euclidean algorithm, divisibility, congruence classes, modular arithmetic, the fundamental theorem of arithmetic) to solve problems.

- Applies number theory concepts and principles to justify and prove number relationships.

- Uses properties of numbers (e.g., fractions, decimals, percents, ratios, proportions) to model and solve real-world problems.

- Applies counting techniques such as permutations and combinations to quantify situations and solve problems.

Domain II—Patterns and Algebra

Competency 004—The teacher uses patterns to model and solve problems and formulate conjectures.
The beginning teacher:

- Recognizes and extends patterns and relationships in data presented in tables, sequences or graphs.

- Uses methods of recursion and iteration to model and solve problems.

- Uses the principle of mathematical induction.

- Analyzes the properties of sequences and series (e.g., Fibonacci, arithmetic, geometric) and uses them to solve problems involving finite and infinite processes.

- Understands how sequences and series are applied to solve problems in the mathematics of finance (e.g., simple, compound and continuous interest rates; annuities).

Competency 005—The teacher understands attributes of functions, relations and their graphs.
The beginning teacher:

- Understands when a relation is a function.

- Identifies the mathematical domain and range of functions and relations and determines reasonable domains for given situations.

- Understands that a function represents a dependence of one quantity on another and can be represented in a variety of ways (e.g., concrete models, tables, graphs, diagrams, verbal descriptions, symbols).

- Identifies and analyzes even and odd functions, one-to-one functions, inverse functions and their graphs.

- Performs operations (e.g., sum, difference, composition) on functions, finds inverse relations and describes results symbolically and graphically.

Domain V—Mathematical Processes and Perspectives

Competency 018—The teacher understands mathematical reasoning and problem solving.
The beginning teacher:

- Understands the nature of proof, including indirect proof, in mathematics.

- Applies correct mathematical reasoning to derive valid conclusions from a set of premises.

- Uses inductive reasoning to make conjectures and uses deductive methods to evaluate the validity of conjectures.

- Uses formal and informal reasoning to justify mathematical ideas.

- Understands the problem-solving process (i.e., recognizing that a mathematical problem can be solved in a variety of ways, selecting an appropriate strategy, evaluating the reasonableness of a solution).

- Evaluates how well a mathematical model represents a real-world situation.

Competency 019—The teacher understands mathematical connections both within and outside of mathematics and how to communicate mathematical ideas and concepts.
The beginning teacher:

- Understands how mathematics is used to model and solve problems in other disciplines (e.g., art, music, science, social science, business).

- Translates mathematical ideas between verbal and symbolic forms.

- Communicates mathematical ideas using a variety of representations (e.g., numeric, verbal, graphical, pictorial, symbolic, concrete).

- Understands the use of visual media, such as graphs, tables, diagrams and animations, to communicate mathematical information.

- Uses appropriate mathematical terminology to express mathematical ideas.

COURSE REQUIREMENTS

Grading Criteria Rubric and Conversion

The student will be responsible for homework assignments, a project, quizzes, discussions, a midterm exam and a final exam. The midterm and final exam are administered through Proctorio.

Discussions (5 x 10 pts each)	(50 points)	5%
Homework assignments (6 x 25 pts each)	(150 points)	15%
Quizzes (5 x 40 pts each)	(200 points)	20%
Midterm Exam	(300 points)	30%
Final Exam	(300 points)	30%
TOTAL	**(1000 points)**	**100%**

A = 900 - 1000, B = 800 – 899, C = 700 – 799, D = 600 – 699, F = 500 - 599

Posting of Grades

Students will receive instant feedback on homework assignments via Webassign. Grades will be posted in Canvas within one week of due dates. Please monitor grades regularly to ensure accuracy. Contact me immediately if discrepancies arise.

Grading Policies

LATE ASSIGNMENTS WILL NOT BE ACCEPTED IN THIS CLASS.
COURSE OUTLINE AND CALENDAR

Complete Course Calendar

Week #	Topics	What's due? (by midnight)
1	Introductions	Discussion #1 – Jan 23rd
2	Ch.2 Conditional Statements & Argument Validity	Ch.2 HW – Jan 30th
3	Ch.3 The Logic of Quantified Statements	Discussion #2 – Feb 6th
4	Ch.3 Arguments with Quantified Statements	Ch. 3 HW – Feb 13th
5	Ch.3 & Ch.4 Clarifications	Ch. 2/3 Quiz – Feb 20th
6	Ch.4 Elementary Number Theory & Methods of Proof	Ch. 4 HW – Feb 27th
7	Ch.4 Clarifications	Discussion #3 – Mar 6th Ch. 4 Quiz – Mar 6th
8	Midterm Review	**Midterm Exam – Mar 11th**
SPRING BREAK: MARCH 14 - 18		
9	Ch.5 Explicit Sequences & Proofs	Discussion #4 – Mar 27th
10	Ch.5 Recursive Sequences & Algorithms	Ch. 5 HW – Apr 3rd
11	Ch.5 Clarifications	Ch. 5 Quiz – Apr 10th
12	Ch.6 Set Theory	Discussion #5 – Apr 18th Ch. 6 HW – Apr 18th
13	Ch.7 Properties of Functions	Ch. 6 Quiz – Apr 24th Ch. 7 HW – Apr 24th
14	Ch.7 Clarifications	Ch. 7 Quiz – May 1st
15	Ch.10 Theory of Graphs & Trees	Ch. 10 HW – May 8th
16	Final Review	**Final Exam – May 13th**

Important University Dates

https://www.tamuct.edu/registrar/academic-calendar.html

TECHNOLOGY REQUIREMENTS AND SUPPORT

Technology Requirements

This course will use the A&M-Central Texas Instructure Canvas learning management system. **We strongly recommend the latest versions of Chrome or Firefox browsers. Canvas no longer supports any version of Internet Explorer.**

Logon to A&M-Central Texas Canvas https://tamuct.instructure.com/ or access Canvas through the TAMUCT Online link in myCT https://tamuct.onecampus.com/ . You will log in through our Microsoft portal.

   Username: Your MyCT email address. Password: Your MyCT password

Office hours will be held through Webex. Please click on this link to access my office hours: https://tamuct.webexcom/meet/cdouglass .

Canvas Support

Use the Canvas Help link, located at the bottom of the left-hand menu, for issues with Canvas. You can select "Chat with Canvas Support," submit a support request through "Report a Problem," or call the Canvas support line: 1-844-757-0953.

For issues related to course content and requirements, contact your instructor.

Online Proctored Testing

A&M-Central Texas uses Proctorio for online identity verification and proctored testing. This service is provided at no direct cost to students. If the course requires identity verification or proctored testing, the technology requirements are: Any computer meeting the minimum computing requirements, plus web camera, speaker, and microphone (or headset). Proctorio also requires the Chrome web browser with their custom plug in.

Other Technology Support

For log-in problems, students should contact Help Desk Central, 24 hours a day, 7 days a week

   Email: helpdesk@tamu.edu
   Phone: (254) 519-5466
   Web Chat: [http://hdc.tamu.edu]
   Please let the support technician know you are an A&M-Central Texas student.

UNIVERSITY RESOURCES, PROCEDURES, AND GUIDELINES

Drop Policy

If you discover that you need to drop this class, you must complete the Drop Request Dynamic Form through Warrior Web.

[https://dynamicforms.ngwebsolutions.com/casAuthentication.ashx?InstID=eaed95b9-f2be-45f3-a37d-46928168bc10&targetUrl=https%3A%2F%2Fdynamicforms.ngwebsolutions.com%2FSubmit%2FForm%2FStart%2F53b8369e-0502-4f36-be43-f02a4202f612].

Faculty cannot drop students; this is always the responsibility of the student. The Registrar's Office will provide a deadline on the Academic Calendar for which the form must be completed. Once you submit the completed form to the Registrar's Office, you must go into Warrior Web and confirm that you are no longer enrolled. If you still show as enrolled, FOLLOW-UP with the Registrar's Office immediately. You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the drop deadline or fail to follow the procedure, you will receive an F in the course, which may affect your financial aid and/or VA educational benefits.

Academic Integrity

Texas A&M University-Central Texas values the integrity of the academic enterprise and strives for the highest standards of academic conduct. A&M-Central Texas expects its students, faculty, and staff to support the adherence to high standards of personal and scholarly conduct to preserve the honor and integrity of the creative community. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. All academic misconduct concerns will be referred to the Office of Student Conduct. When in doubt on collaboration, citation, or any issue, please contact your instructor before taking a course of action.

For more information regarding the Student Conduct process, [https://www.tamuct.edu/student-affairs/student-conduct.html].

If you know of potential honor violations by other students, you may submit a report, [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0].

Academic Accommodations

At Texas A&M University-Central Texas, we value an inclusive learning environment where every student has an equal chance to succeed and has the right to a barrier-free education. The Warrior Center for Student Success, Equity and Inclusion is responsible for ensuring that students with a disability receive equal access to the university's programs, services and activities. If you believe you have a disability requiring reasonable accommodations, please contact the Office of Access and Inclusion, WH-212; or call (254) 501-5836. Any information you provide is private and confidential and will be treated as such.

For more information, please visit our Access & Inclusion Canvas page (log-in required) [https://tamuct.instructure.com/courses/717]

Important information for Pregnant and/or Parenting Students

Texas A&M University-Central Texas supports students who are pregnant and/or parenting. In accordance with requirements of Title IX and related guidance from US Department of Education's Office of Civil Rights, the Dean of Student Affairs' Office can assist students who are pregnant and/or parenting in seeking accommodations related to pregnancy and/or parenting. Students should seek out assistance as early in the pregnancy as possible. For more information, please visit Student Affairs [https://www.tamuct.edu/student-affairs/pregnant-and-parenting-students.html]. Students may also contact the institution's Title IX Coordinator. If you would like to read more about these requirements and guidelines online, please visit the website [http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf].

Title IX of the Education Amendments Act of 1972 prohibits discrimination on the basis of sex and gender–including pregnancy, parenting, and all related conditions. A&M-Central Texas is able to provide flexible and individualized reasonable accommodation to pregnant and parenting students. All pregnant and parenting students should contact the Associate Dean in the Division of Student Affairs at (254) 501-5909 to seek out assistance. Students may also contact the University's Title IX Coordinator.

Tutoring

Tutoring is available to all A&M-Central Texas students, both virtually and in-person. Student success coaching is available online upon request.

If you have a question, are interested in becoming a tutor, or in need of success coaching contact the Warrior Center for Student Success, Equity and Inclusion at (254) 501-5836, visit the Warrior Center at 212 Warrior Hall, or by emailing WarriorCenter@tamuct.edu.

To schedule tutoring sessions and view tutor availability, please visit Tutor Matching Services [https://tutormatchingservice.com/TAMUCT] or visit the Tutoring Center in 111 Warrior Hall.

Chat live with a remote tutor 24/7 for almost any subject from on your computer! Tutor.com is an online tutoring platform that enables A&M-Central Texas students to log in and receive online tutoring support at no additional cost. This tool provides tutoring in over 40 subject areas except writing support. Access Tutor.com through Canvas.

University Writing Center

University Writing Center: Located in Warrior Hall 416, the University Writing Center (UWC) at Texas A&M University–Central Texas (A&M–Central Texas) is a free service open to all A&M–Central Texas students. For the Spring 2022 semester, the hours of operation are from 10:00 a.m.-5:00 p.m. Monday thru Thursday in Warrior Hall 416 (with online tutoring available every hour as well) with satellite hours available online only Monday thru Thursday from 6:00-9:00 p.m. and Saturday 12:00-3:00 p.m.

Tutors are prepared to help writers of all levels and abilities at any stage of the writing process. While tutors will not write, edit, or grade papers, they will assist students in developing more effective composing practices. By providing a practice audience for students' ideas and writing, our tutors highlight the ways in which they read and interpret students' texts, offering guidance

and support throughout the various stages of the writing process. In addition, students may work independently in the UWC by checking out a laptop that runs the Microsoft Office suite and connects to WIFI, or by consulting our resources on writing, including all of the relevant style guides. Whether you need help brainstorming ideas, organizing an essay, proofreading, understanding proper citation practices, or just want a quiet place to work, the UWC is here to help!

Students may arrange a one-to-one session with a trained and experienced writing tutor by making an appointment via WCOnline [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu if you have any questions about the UWC, need any assistance with scheduling, or would like to schedule a recurring appointment with your favorite tutor by making an appointment via WCOnline [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu if you have any questions about the UWC, need any assistance with scheduling, or would like to schedule a recurring appointment with your favorite tutor.

University Library

The University Library provides many services in support of research across campus and at a distance. We offer over 200 electronic databases containing approximately 400,000 eBooks and 82,000 journals, in addition to the 96,000 items in our print collection, which can be mailed to students who live more than 50 miles from campus. Research guides for each subject taught at A&M-Central Texas are available through our website to help students navigate these resources. On campus, the library offers technology including cameras, laptops, microphones, webcams, and digital sound recorders.

Research assistance from a librarian is also available 24 hours a day through our online chat service, and at the reference desk when the library is open. Research sessions can be scheduled for more comprehensive assistance, and may take place virtually through WebEx, Microsoft Teams or in-person at the library. Schedule an appointment here [https://tamuct.libcal.com/appointments/?g=6956]. Assistance may cover many topics, including how to find articles in peer-reviewed journals, how to cite resources, and how to piece together research for written assignments.

Our 27,000-square-foot facility on the A&M-Central Texas main campus includes student lounges, private study rooms, group work spaces, computer labs, family areas suitable for all ages, and many other features. Services such as interlibrary loan, TexShare, binding, and laminating are available. The library frequently offers workshops, tours, readings, and other events. For more information, please visit our Library website [http://tamuct.libguides.com/index].

OPTIONAL POLICY STATEMENTS

A Note about Sexual Violence at A&M-Central Texas

Sexual violence is a serious safety, social justice, and public health issue. The university offers support for anyone struggling with these issues. University faculty are mandated reporters, so if someone discloses that they were sexually assaulted (or a victim of Domestic/Dating Violence or

Stalking) while a student at TAMUCT, faculty members are required to inform the Title IX Office. If you want to discuss any of these issues confidentially, you can do so through Student Wellness and Counseling (254-501-5955) located on the second floor of Warrior Hall (207L).

Sexual violence can occur on our campus because predators often feel emboldened, and victims often feel silenced or shamed. It is incumbent on ALL of us to find ways to actively create environments that tell predators we don't agree with their behaviors and tell survivors we will support them. Your actions matter. Don't be a bystander; be an agent of change. For additional information on campus policy and resources visit the Title IX webpage [https://www.tamuct.edu/compliance/titleix.html].

Behavioral Intervention

Texas A&M University-Central Texas cares about the safety, health, and well-being of its students, faculty, staff, and community. If you are aware of individuals for whom you have a concern, please make a referral to the Behavioral Intervention Team. Referring your concern shows you care. You can complete the referral online [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2].

Anonymous referrals are accepted. Please see the Behavioral Intervention Team website for more information [https://www.tamuct.edu/bit]. If a person's behavior poses an imminent threat to you or another, contact 911 or A&M-Central Texas University Police at 254-501-5805.

OTHER POLICIES

Copyright Notice

Students should assume that all course material is copyrighted by the respective author(s). Reproduction of course material is prohibited without consent by the author and/or course instructor. Violation of copyright is against the law and Texas A&M University-Central Texas' Code of Academic Honesty. All alleged violations will be reported to the Office of Student Conduct.