

MTHK 4332-110, 10210 ABSTRACT ALGEBRA

Spring 2021 rev. 01.20.2021

Texas A&M University - Central Texas

COURSE DATES, MODALITY, AND LOCATION

Jan 1 2021 - May 14, 2021

The instructional method is online: “Fully online courses have no on-campus, classroom, or synchronous activity. All course activity is done online. These courses may require virtual proctored exams” The course uses the A &M-Central Texas Canvas Learning Management System [<https://tamuct.instructure.com/>].

Available online resources include:

- the A&M-Central Texas Canvas Learning Management System [<https://tamuct.instructure.com/>].
- Online interactive textbook (<http://sl2x.aimath.org/book/aafmt/>)
- pdf text (free) and print textbook (optional): available at abstractalgebra.altervista.org
- Youtube video playlist (<https://www.youtube.com/playlist?list=PL2uooHqQ6T7PW5na4EX8rQX2WvBBdM8Qo>)
- Online course notes (https://1drv.ms/u/s!AkJvchoc82-qgTaZVI_kSk0RYiWK)

INSTRUCTOR AND CONTACT INFORMATION

Instructor: Chris Thron

Office: 320J Heritage Hall

Google Hangouts This is the best way to reach me quickly. My Google Hangouts is open most of the day. My ID is chris.thron@gmail.com. You will need a Google account to log in to Hangouts. If you don't have gmail and you don't want a gmail address, you can link your Google account to a different email.

WebEx Pre-scheduled online sessions will be held at: <https://tamuct.webex.com/meet/thron>

Office hours: Rather than having fixed office hours, I am making myself widely available via Hangouts (see below). I also check my email every morning, afternoon, and evening.

Google Hangouts. Go ahead and message me any time! If I am available I will answer right away.

Email: Please use the Canvas email for course issues.

Phone: 585 204 0314. You can message me here any time. It goes to my email.

WARRIOR SHIELD

Emergency Warning System for Texas A&M University-Central Texas

Warrior Shield is an emergency notification service that gives Texas A&M University-Central Texas the ability to communicate health and safety emergency information quickly via email, text message, and social media. All students are automatically enrolled in Warrior Shield through their myCT email account.

Connect to Warrior Shield by [911Cellular](https://portal.publicsafetycloud.net/Account/Login) [https://portal.publicsafetycloud.net/Account/Login] to change where you receive your alerts or to opt out. By staying enrolled in Warrior Shield, university officials can quickly pass on safety-related information, regardless of your location.

COVID-19 SAFETY MEASURES

To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, Texas A&M University-Central Texas has adopted policies and practices to minimize virus transmission. All members of the university community are expected to adhere to these measures to ensure their own safety and the safety of others. Students must observe the following practices while participating in face-to-face courses, course-related activities (office hours, help sessions, transitioning to and between classes, study spaces, academic services, etc.) and co-curricular programs:

- Self-monitoring—Students should follow CDC recommendations for self-monitoring. Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction. Students required to quarantine must participate in courses and course-related activities remotely and must not attend face-to-face course activities. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities.
- Face Coverings— Face coverings must be worn inside of buildings and within 50 feet of building entrances on the A&M-Central Texas Campus. This includes lobbies, restrooms, hallways, elevators, classrooms, laboratories, conference rooms, break rooms, non-private office spaces, and other shared spaces. Face coverings are also required in outdoor spaces where physical distancing is not maintained. The university will evaluate exceptions to this requirement on a case by case basis. Students can request an exception through the Office of Access and Inclusion in Student Affairs.
 - If a student refuses to wear a face covering, the instructor should ask the student to leave and join the class remotely. If the student does not leave the class, the faculty member should report that student to the Office of Student Conduct. Additionally, the faculty member may choose to teach that day's class remotely for all students.
- Physical Distancing—Physical distancing must be maintained between students, instructors, and others in the course and course-related activities.
- Classroom Ingress/Egress—Students must follow marked pathways for entering and exiting classrooms and other teaching spaces. Leave classrooms promptly after course activities have concluded. Do not congregate in hallways and maintain 6-foot physical distancing when waiting to enter classrooms and other instructional spaces.
- The university will notify students in the event that the COVID-19 situation necessitates changes to the course schedule or modality.

COURSE INFORMATION

Course Overview and description: Important basic examples and ideas of abstract algebra, including: complex numbers, modular numbers, symmetries; permutations; group axioms and basic properties; equivalence classes; normal subgroups, cosets, and Lagrange's theorem; group actions; and topics in coding theory.

Student Learning Outcomes:

Upon successful completion of MATH 4332, students will be able to:

- a) State and contextualize fundamental mathematical definitions
- b) Recognize and compare properties of mathematical structures
- c) Recognize and interpret hypotheses and conclusions of theorems.
- d) Evaluate the truth of mathematical statements based on definitions and theorems.
- e) Perform standard computations related to the material, and interpret the results of those computations.
- f) Compose and critique mathematical proofs using sound logical argument and appropriate notation.
- g) Demonstrate the use of the theoretical results and computational aspects on required applications; and
- h) Connect the material to concepts in other courses.

Competency Goals Statements (certification or standards):

The student will gain competency in the following Mathematics 7-12 TEKS skills:

1. Competency 001. B. 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). (*mastery*)
2. Competency 001.C. Describes and analyzes properties of subsets of the real numbers (e.g., closure, identities). (*mastery*)
3. Competency 001.G. Uses deductive reasoning to simplify and justify algebraic processes. (*mastery*)
4. Competency 001. H. Demonstrates how some problems that have no solution in the integer or rational number systems have solutions in the real number system. (*practice*)
5. Competency 002.A. Demonstrates how some problems that have no solution in the real number system have solutions in the complex number system.
6. Competency 002.B. Understands the properties of complex numbers (e.g., complex conjugate, magnitude/modulus, multiplicative inverse).
7. Competency 002.C. Understands the algebraic structure of the complex number system and its subsets (e.g., complex numbers as a field, complex addition as vector addition).
8. Competency 002.D. Selects and uses appropriate representations of complex numbers (e.g., vector, ordered pair, polar, exponential) for particular situations.
9. Competency 002.E. Describes complex number operations (e.g., addition, multiplication, roots) using symbolic and geometric representations.
10. Competency 003.A. 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.

11. Competency 003.B. Applies number theory concepts and principles to justify and prove number relationships.

COURSE REQUIREMENTS

- Homework (50%) will be assigned on a weekly or bi-weekly basis. Solutions will be provided. Students are expected to self-check. Selected homework questions will be graded.
- Tests (50%). There are 2 tests of weight 25%. Test questions will be similar to the homework questions.

Grading Criteria Rubric and Conversion

Homework	50% (200 points)	90- 100%= A
Test 1	25% (100 points)	80- 89%= B
Test 2	25% (100 points)	70- 79%= C
TOTAL	100% (400 points)	60- 69%= D
		Below 60 % F

Partial credit for homework, quiz and test questions will be awarded according to the following guidelines:

- 100% Perfect
- 90% Minor careless or technical mistakes
- 80% Minor procedural error
- 70% Major conceptual or procedural error.
- 60% Makes beginning steps towards a solution
- 30% Some relevant information supplied.

Please note: If your overall grade (on a scale from 0 to 100) is within 1 point of the next highest grade level, I will increase your grade if you have done all of the quizzes. Otherwise you will be graded strictly according to the numbers. That means that if your average is 89.99 and you didn't do all the quizzes, then you still get a B.

Posting of Grades

- Quiz grades will be posted on Canvas when graded. Cumulative grades will be posted on TAMUCT canvas after each test.

COURSE OUTLINE AND CALENDAR

Complete Course Calendar

***NOTE: Although the following should be fairly close to the actual schedule, some adjustments may be made to the schedule to accommodate the students' learning speed.

Week # (Mon.)	New Material, with associated Student Learning Outcomes (SLO's)
#1(1/18)	Basic algebra bootcamp (SLO's a-h and 001.B,C,G,H)
#2(1/25)	Basic algebra bootcamp (SLO's a-h and 001.B,C,G,H)
#3(2/1)	Complex numbers (SLO's a-e,h and 002.A,B,C,D)
#4(2/8)	Complex numbers (SLO's a-e,h and 002.A,B,C,D)

#5(2/15)	Modular arithmetic (SLO's a-e,h and 003A,B)
#6(2/22)	Modular arithmetic and divisibility (SLO's g and 003A,B)
#7(3/1)	Sets and functions (SLO's a-f,h)
#8(3/8)	TEST 1
#9 (3/15)	SPRING BREAK
#10 (3/22)	Summation notation and polynomials (SLO's a-e,h)
#11 (3/29)	Symmetries (SLO's a-e,g)
#12 (4/5)	Permutations (SLO's a-e,g)
#13 (4/12)	Permutations (SLO's a-e,g)
#14 (4/19)	Abstract groups (SLO's a-h)
#15 (4/26)	Equivalence relations (SLO's a-h)
#16 (5/6)	Normal subgroups and cosets (SLO's a-h)
#17 (5/12)	TEST #2

INSTRUCTOR GRADING POLICIES

Late work will be accepted only in case of medical or family emergency: in this case, written verification is required, and the maximum makeup grade is 70%. At most 2 late assignments will be accepted.

Missed exams: If you cannot make an exam session, you must schedule an alternative period beforehand. Missed exams must be taken within a week of the actual exam.

Appeals: If the student wishes to appeal a grade, he/she must do so *within 1 week* of receiving the graded paper. Students should save all their work to ensure that no clerical errors are made in grade reporting. Periodically during the semester, I will release a complete record of your grades so far in the class. If I have made a recording error, you may bring the paper to me and I will record it correctly.

The following material is generic for all TAMUCT courses, and does not contain specific information for this course.

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

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): [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. Academic integrity is defined as a commitment to honesty, trust, fairness, respect, and responsibility. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. Academic misconduct is any act that improperly affects a true and honest evaluation of a student's academic performance and includes, but is not limited to, working with others in an unauthorized manner, cheating on an examination or other academic work, plagiarism and improper citation of sources, using another student's work, collusion, and the abuse of resource materials. All academic misconduct concerns will be referred to the university's Office of Student Conduct. Ignorance of the university's standards and expectations is never an excuse to act with a lack of integrity. 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),
[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),
[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 Office of Access 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](https://tamuct.instructure.com/courses/717) 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/index.html) [https://www.tamuct.edu/student-affairs/index.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, on a remote online basis. Visit the Academic Support Community in Canvas to view schedules and contact information. Subjects tutored on campus include Accounting, Advanced Math, Biology, Finance, Statistics, Mathematics, and Study Skills. Student success coaching is available online upon request.

If you have a question regarding tutor schedules, need to schedule a tutoring session, are interested in becoming a tutor, success coaching, or have any other question, contact Academic Support Programs at (254) 501-5836, visit the Office of Student Success at 212F Warrior Hall, or by emailing studentsuccess@tamuct.edu.

Chat live with a 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

The University Writing Center (UWC) at Texas A&M University—Central Texas (TAMUCT) is a free service open to all TAMUCT students. For the Spring 2021 semester, all services will be online as a result of the COVID-19 pandemic. The hours of operation are from 10:00 a.m.-5:00 p.m. Monday thru Thursday with satellite hours Monday thru Thursday from 6:00-9:00 p.m. The UWC is also offering hours from 12:00-3:00 p.m. on Saturdays.

Tutors are prepared to help writers of all levels and abilities at any stage of the writing process. 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. While tutors will not write, edit, or grade papers, they will assist students in developing more effective composing practices. 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 [WCOonline](https://tamuct.mywconline.com/) [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 and/or need any assistance with scheduling.

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 250,000 eBooks and 82,000 journals, in addition to the 85,000 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 on Skype or in-person at the library. 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) [http://tamuct.libguides.com/index].

For Spring 2021, all reference service will be conducted virtually. Please go to our [Library website](http://tamuct.libguides.com/index) [http://tamuct.libguides.com/index] to access our virtual reference help and our current hours.

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 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) [<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](https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2) online [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2].

Anonymous referrals are accepted. Please see the [Behavioral Intervention Team](https://www.tamuct.edu/student-affairs/bat.html) website for more information [<https://www.tamuct.edu/student-affairs/bat.html>]. If a person's behavior poses an imminent threat to you or another, contact 911 or A&M-Central Texas University Police at 254-501-5800.