MTH 103 College Algebra

Manohar Sah
UNITED TRIBES TECHNICAL COLLEGE

COURSE INFORMATION

This course is designed to introduce the learner to critical thinking and problem solving skills in algebraic concepts, relations and functions, equations and inequalities, complex numbers; polynomial, rational, exponential and logarithmic functions and systems of equations.

Credits: 4

Pre/Corequisites:

- Prerequisite: MTH 102 or placement test

CLASS INFORMATION

Section Number:

Term: Spring Year: 2025 Start Date: 1/6/2025 End Date: 5/9/2025

INSTRUCTOR

Manohar Sah
Email: msah@uttc.edu

Office Phone: 721-221-1495
Office Location: Education Building Room 209

Office Hours:

See class schedules detail timing Location: Education Building Room 209

TEXTBOOKS

Vitalsource Rentals. (2018). Cengage Unlimited - Access (1 Term).

INSTITUTIONAL LEARNER OUTCOMES

Critical Thinking: Employ critical thinking skills in the processes used to identify and solve problems.

Quantitative & Scientific Reasoning: Develop solutions to mathematical and scientific problems.

COURSE OBJECTIVES

1. Manipulate relations and functions
2. Simplify equations and inequalities
3. Calculate with complex numbers
4. Manipulate rational and polynomial expressions

5. Compute exponential and logarithmic functions
6. Solve systems of linear equations
7. Use matrices to solve problems

A. GRADING SCALE

Grade	Percentage
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	Below 60%

B. COMMUNICATION

Email is the official means of communication at UTTC. Information Technology (IT) will assign all students an official UTTC email address. All correspondence from the College to the student will be sent to the student's UTTC email address. Students are expected to check their email regularly and are responsible for all information sent to them via their UTTC email address. Faculty expect students to use their official email address for all instructional purposes, including communicating with the faculty.

C. ATTENDANCE

Students at UTTC are expected to participate in all of their class sessions and are expected to communicate with their instructors regarding any emergencies that cause them to miss class. Regardless of the circumstances, the student is responsible for obtaining any information missed because of the absence and completing any outstanding assignments. The student may refer to the course assignments in My.UTTC.edu, contact another student enrolled in the course, or meet with the course instructor during office hours to get the missing information. Attendance is entered as "Present", "Absent-Unexcused", or "Excused" (college-sanctioned absences).

D. LATE ASSIGNMENT SUBMISSIONS

UTTC supports and fosters the student's responsibility for completing and submitting assignments on or before scheduled due dates and times. If an assignment is due, the student should make every effort to submit the assignment on time. Occasionally, a student may experience an unexpected life event that results in the submission of late work. Communication is the key. Instructors are more than willing to work with students in the event of an emergency if the student communicates with them before the date and time the assignment is due to make other arrangements.
Late assignment deadlines will vary among departments but will not exceed more than five (5) business days after which the assignment was initially due. Assignment due dates, late assignment deadlines, and late assignment penalties are outlined in course syllabi. Assignments not submitted by the initial deadline date will be reflected in the course gradebook as a zero (0) until the assignment has been submitted. The amount of points deducted for late work is at the

discretion of the instructor. Assignments submitted via E-mail will not be accepted under any circumstances and will receive a grade of zero.

E. MISSED TEST, EXAMS AND QUIZZES (FORMAL ASSESSMENTS)

Students may not make up a missed test, exam or quiz without a valid reason for their absence (illness, family emergency). It is the student's responsibility to contact their instructors before the absence, or within 24 hours after missing the formal assessment. The instructor will review the reason the student missed and determine if the circumstance justifies the student being allowed to take the formal assessment. Approved make-up assessments must be taken outside of the student's regular class schedule and during a time and location agreed upon between the student and instructor. Students are not to miss another class in order to make-up an assessment for another course. If the student fails to show on the date and time of the makeup assessment, the student will not be permitted to reschedule the makeup and the assessment and will earn a 0% grade.

F. THUNDER ALERT SYSTEM

UTTC's Thunder Alert System (TAS) is a proactive, communication-driven support system that provides timely identification and interventions to work with individual students to assist in generating plans to overcome challenges to college success. The system assists UTTC students by linking them to faculty and staff who can provide and connect students to available resources and strategies. The Thunder Alert serves as an opportunity for students to take ownership of their success and empower them to accomplish academic and personal goals. The system helps faculty and academic advisors connect and communicate with students as issues arise. The additional cross-wide partnerships create a culture of collaboration focused on the best interest of UTTC students.

Academic-related concerns such as attendance, missing assignments, or classroom behavior will result in a Thunder Alert being issued by faculty. When a Thunder Alert is issued, the student will receive an email requesting them to make arrangements to follow up with the instructor and/or their academic advisor. Students receiving a Thunder Alert should make the necessary arrangements to set up and meet with faculty as soon as possible to generate a plan of success.

G. ACADEMIC HONESTY

Students are expected to complete their own work. Academic dishonesty includes plagiarism; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using course materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to dishonestly obtain grades, honors, awards, or professional endorsement; altering, forging, misrepresenting, or misusing an academic record; or fabricating or falsifying data, research procedures, or data analysis. Refer to Academic Affairs policies and procedures handbook for further information.

ARTIFICIAL INTELLIGENCE (AI) USE POLICY

Use of generative AI is subject to individual course instructor discretion. Instructors have the authority to:

- Authorize or restrict AI assistance partially or fully
- Define specific limits for individual assignments
- Establish course-wide AI usage policies
- AI use must be explicitly defined and approved by course instructors.
- Generative AI should not:
    - Replace original student work

- Compromise the evaluation of student learning outcomes
- Undermine the academic integrity of assignments

Misuse of AI will be considered plagiarism and is subject to consequences outlined in the Student Academic Honesty policy. Examples of AI misuse include:

- Generating entire writing assignments (essays, discussion posts) using AI
- Completing mathematical calculations using AI when computational skills are a learning objective
- Claiming credit for AI-generated content (art, music, program code)
- Using AI in ways not explicitly authorized by the instructor

When in doubt, students are encouraged to consult directly with their course instructors regarding the appropriate use of generative AI.

H. STUDENTS WITH DISABILITIES

United Tribes Technical College recognizes its responsibility for making reasonable accommodations to ensure there is no discrimination on the basis of a disability. The Disabilities Support Services coordinates reasonable accommodations, support services, and appropriate referrals for the purpose of removing barriers and providing an equitable learning environment. If you have a disability, please contact the Disabilities Services (DS) office at (701) 221-1456 or email at dss@uttc.edu.

I. TITLE IX STATEMENT

Title IX is a federal civil rights law that prohibits discrimination on the basis of sex, including sexual harassment, rape and sexual assault. United Tribes Technical College is committed to upholding the law and standards that promote respect and human dignity in a safe environment. Sexual misconduct and relationship violence in any form violates UTTC's mission, cultural values, Student Code of Conduct, and may also violate federal and state law. If you or someone you know has been impacted by sexual assault, dating and domestic violence, stalking, or sexual exploitation, UTTC has resources available on the Title IX website. you can find the appropriate resources on the UTTC campus and in the community

J. DIVERSITY AND EQUITY STATEMENT

United Tribes Technical College values diversity because it enriches the community and wealth of experiences that characterize a post-secondary education. Our students, faculty, and staff come from Tribal lands throughout the United States and Canada. The majority of our students come from the northern plains region of the country, with 70% representing the North Dakota tribes.

UTTC recognizes that diversity is about much more than race, ethnicity or geography. Because students from many Tribal nations are represented at UTTC, from a wide range of cultural and ethnic backgrounds, students are encouraged to share their own cultural practices, traditions, and beliefs in the classroom in an effort to build an inclusive and welcoming community for all individuals and one from which we can learn from one another. We believe engagement with diverse perspectives and ideas is critical to the education and growth of all people, and we value the unique experiences and viewpoints of all of our community members.

EQUITY STATEMENT

United Tribes Technical College (UTTC) believes that access to a high-quality education in an inclusive environment is the right of all individuals and imperative for the continued advancement of a strong democracy and workforce. Equity is

ensuring that all students receive what they need to be successful through the intentional design of the college experience.

K. TECHNOLOGY REQUIREMENTS

To ensure that you are using the recommended personal computer configurations, please refer to the minimal technology requirements.

FACE-TO-FACE

PARTICIPATION / CLASS ENGAGEMENT

UTTC prepares students for the workforce by having high expectations for skills demonstrated in the classroom that transfer into future employment. This includes students' ability to be on time for class, to refrain from external distractions (such as cell phone usage or holding side conversations with other students), by providing positive contributions to class discussions, participating in individual or group activities, and being prepared for class.

CELL PHONES and LAPTOPS

Cell phones are turned off during class times out of respect for the other students and the instructor. If a student is expecting an important phone call (e.g. case worker, Housing, clinic), the instructor must be informed ahead of time and the cell phone set to a silent ring. If the call is received during class time, the student will answer the call and quietly step out of the classroom. Students may not use class time to check social media accounts, voicemail, text messages and/or personal emails.

STUDENT BEHAVIOR

UTTC students will conduct themselves in a responsible and respectful manner at all times in the classroom, in the hallways, in the Library, the Cafeteria, and any other location on campus. Student behavior that interferes with learning in the classroom will not be tolerated. This behavior includes chronic tardiness, threatening confrontations, intoxication, inappropriate physical contact, lewd or disrespectful language or gestures directed at the instructor or at fellow students, bullying, direct or indirect intimidation, and conversations with other students that are not related to classroom topics. Faculty are expected to maintain professional management of classroom activities prior to, during and after class times. As such, if a student demonstrates behavior that disrupts or interferes with classroom activities, an instructor reserves the right to ask the student to leave the classroom, to contact campus security, to request mediation by the academic department chair or an academic/personal counselor, or to file a formal complaint subject to a student disciplinary hearing.

BASIC NEEDS

Any student who faces challenges such as having enough food to eat or adequate housing and believes this may affect their attendance or performance in their courses is urged to contact the Wellness counselors for support. You can also notify your instructor for this course if you are comfortable doing so. Your instructor may be aware of additional resources that are available for you.

COURSE CALENDAR

SPRING 2025

Module/Week	Academic Topic Instructional Strategy	Support Materials, Book chapters, etc.	Assessment (Formative – Summative)
1 **Jan 14 - 17**	1.1. Graphs of Equations • The Graph of an Equation • Intercepts of a Graph • Symmetry • Circles 1.2. Linear Equations in One Variable • Equations and Solutions of Equations • Linear Equations in One Variable • Rational Equations That Lead to Linear Equations • Finding Intercepts Algebraically	Class handouts, Cengage text	Class work, Quizzes, Homework
2 **Jan 20 - 24**	*No School 1/20 MLK 1.3. Modeling with Linear Equations • Using Mathematical Models • Mixture Problems • Common Formulas	Class handouts, Cengage text	Class work, Quizzes, Homework
3 **Jan 27 - 31**	1.4. Quadratic Equations and Applications • Solving Quadratic Equations by Factoring • Extracting Square Roots • Completing the Square • The Quadratic Formula	Class handouts, Cengage text	Class work, Quizzes, Homework
4 **Feb 3 - 7**	1.5. Complex Numbers • The Imaginary Unit i • Operations with Complex Numbers • Complex Conjugates • Complex Solutions of Quadratic Equations	Class handouts, Cengage text	Class work, Quizzes, Homework
5 **Feb 10 - 14**	2.1. Linear Equations in Two Variables • Using Slope • Finding the Slope of a Line • Writing Linear Equations in Two	Class handouts, Cengage text	Class work, Quizzes, Homework

	Variables • Parallel and Perpendicular Lines 2.2. Functions • Introduction to Functions and Function Notation • The Domain of a Function		
6 **Feb. 17 - 21**	No School 2/17 President's Day 2.3. Analyzing Graphs of Functions • The Graph of a Function • Zeros of a Function • Increasing and Decreasing Functions • Relative Minimum and Relative Maximum Values • Average Rate of Change • Even and Odd Functions 2.4. A Library of Parent Functions • Linear and Squaring Functions • Cubic, Square Root, and Reciprocal Functions • Step and Piecewise-Defined Functions • Commonly Used Parent Functions	Class handouts, Cengage text	Class work, Quizzes, Homework
7 **Feb 24 – 28**	2.5. Transformations of Functions • Shifting Graphs • Reflecting Graphs • Nonrigid Transformations 2.6. Combinations of Functions: Composite Functions • Arithmetic Combinations of Functions • Compositions of Functions	Class handouts, Cengage text	Class work, Quizzes, Homework
8 **Mar 3 - 7**	Midterm Grades Due 3/7 2.7. Inverse Functions • Inverse Functions • The Graph of an Inverse Function • One-to-One Functions • Finding Inverse Functions Algebraically	Class handouts, Cengage text	Class work, Quizzes, Homework

Mar 10 - 14 Spring Break – No Classes			
9 **Mar 17 - 21**	3.1. Quadratic Functions and Models • The Graph of a Quadratic Function • The Standard Form of a Quadratic Function • Finding Minimum and Maximum Values 3.2. Polynomial Functions of Higher Degree • ○ Graphs of Polynomial Functions ○ The Leading Coefficient Test ○ Real Zeros of Polynomial Functions ○ The Intermediate Value Theorem	Class handouts, Cengage text	Class work, Quizzes, Homework
10 **Mar 24 - 28**	3.3. Polynomial and Synthetic Division • Long Division of Polynomials • Synthetic Division • The Remainder and Factor Theorems 3.4. Zeros of Polynomial Functions • The Fundamental Theorem of Algebra • The Rational Zero Test • Conjugate Pairs • Factoring a Polynomial • Other Tests for Zeros of Polynomials 3.5. Mathematical Modeling and Variation • Least Squares Regression and Graphing Utilities • Direct Variation • Direct Variation as an nth Power • Inverse Variation • Combined Variation • Joint Variation	Class handouts, Cengage text	Class work, Quizzes, Homework

11 **Mar 31 - Apr 4**	4.1. Rational Functions and Asymptotes • Introduction • Vertical and Horizontal Asymptotes 4.2. Graphs of Rational Functions • Sketching the Graph of a Rational Function • Slant Asymptotes	Class handouts, Cengage text	Class work, Quizzes, Homework
12 **APR 7 - 11**	5.1. Exponential Functions and Their Graphs • Exponential Functions • Graphs of Exponential Functions • The Natural Base e 5.2. Logarithmic Functions and Their Graphs • Logarithmic Functions • Graphs of Logarithmic Functions • The Natural Logarithmic Function 5.3. Properties of Logarithms • Change of Base • Properties of Logarithms • Rewriting Logarithmic Expressions		
13 **Apr 14 - 18**	No School 4/18 Good Friday 6.1. Linear and Nonlinear Systems of Equations • The Method of Substitution • Nonlinear Systems of Equations • Graphical Method for Finding Solutions		
14 **Apr 21 - 25**	6.2. Two-Variable Linear Systems • The Method of Elimination • Graphical Interpretation of Solutions 6.3. Multivariable Linear Systems • Row-Echelon Form and Back-Substitution • Gaussian Elimination 7.1 Matrices and system of equation		

	7.2 operations with Matrices		
15 **Apr 28 – May 2**	Finals Week Review for Final week		
GRADES DUE	May 5, 2025		