MATH 301: FUNCTIONS AND MODELING

Section: 001 **Fall Quarter, 2023** **Classroom: BOGH 318**

INSTRUCTOR: Dr. Charles Patterson **Office: BOGH 217A** **Phone: 257-3224**

Office Hours: 12:30-2:00 & 4:00-5:00 MW / 12:30-5:00 TR / Friday by appointment only

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COURSE PREREQUISITES: Math 242

COURSE GOALS: The instructor will use problem-based learning, technology, and explorations to study in-depth relationships between various areas of mathematics to strengthen and expand knowledge of the topics in secondary mathematics.

TEXTBOOK AND RESOURCE MATERIALS: Functions in Mathematics: Introductory Explorations for Secondary School Teachers by Armendariz and Daniels. A graphing calculator (TI-84) is required for this course. A portion of the course may be delivered via zoom, and thus a webcam is required. If you do not have a webcam, one may be checked out from Prescott Memorial Library. A scanner or an app with scanning capabilities will also be required to upload exams in the event that exams must be administered electronically.

ATTENDANCE REGULATIONS: Read the "Class Attendance" section of the Tech Bulletin which says in part that "Class attendance is . . . an obligation . . . and all students are expected to attend regularly and PUNCTUALLY." Attendance will be taken each day. Excuses for absences must be submitted within three class days after return to class. Students are required to wear a mask in class and will follow a seating chart made by the instructor. Respectfully pay attention for the entire period. ***Please turn off all cellular phones and pagers before entering the classroom. No text messaging during class!! No other electronic devices are to be used during class without the instructor's permission.***

HOMEWORK, TEST, AND CLASS PARTICIPATION POLICY: The inquiry-based methods used in this course require regular attendance and participation in the collaborative explorations and presentations of results. The instructor intends for tests to be administered in person in the classroom setting during the regularly scheduled class time. However, it is possible that examinations may have to be administered electronically. For electronic exams requiring the student to submit written work, a webcam, with video turned on, is **required**. If the webcam malfunctions, a makeup exam is required. Written exams will be scanned in via a scanner or an app, and uploaded as instructed. Only material in the original submission will be graded, resubmissions will not be accepted. Smart devices (phones, watches, glasses, etc.) are not to be visible during an exam. If such a device is visible at all during an exam, a student's exam will be taken immediately and will result in a zero test grade. Students will not be permitted to leave a room once a test begins. If you miss an exam, you must notify the instructor *prior* to the exam either in person, email, or by phone. When you return, it is your responsibility to arrange for a makeup exam. In the case of technical difficulties during an exam, the student must contact the instructor as soon as possible and schedule a makeup exam.

GRADE DETERMINATION PROCEDURE: The instructor will schedule 3 tests worth 100 points each. Collaborative explorations, independent exercises, VCAST assignments, and labs will count 50 points each..*In the event of a question regarding an exam grade or final grade, it will be the responsibility of the student to retain and present graded materials which have been returned for student possession during the quarter.*

GRADE SCALE: 90-100% A, 80-89% B, 70-79% C, 60-69% D, 0-59% F

LATE HOMEWORK/MISSED EXAMS: No make-ups will be allowed for homework or in-class work. Make-ups will be allowed for exams only in the case of an excused absence (generally a doctor's excuse which I have called and verified or an official university excuse). The student must contact me by the class meeting following a missed exam to discuss the reason for missing the exam and to determine the possibility of a make-up exam. Make-ups will be another exam or a comprehensive final exam as specified by me.

STUDENTS NEEDING SPECIAL ACCOMMODATIONS: Students needing testing accommodations or classroom accommodations based on a disability must discuss the need with me as soon as possible. For more details on the Office of Disability Services, refer to www.latech.edu/ods. Any issues with accessing technology, which are related to a disability, should be reported to the instructor as soon as possible. A student requesting an accommodation related to the COVID-19 pandemic should complete the student accommodation form and deliver it either in person or electronically. The preferable way to deliver the form is electronically to Testing and Disability Services (tds@latech.edu).

HONOR CODE AND ACADEMIC MISCONDUCT POLICY: In accordance with the Academic Honor Code, students pledge the following: Being a student of higher standards, I pledge to embody the principles of academic integrity. If it is determined that academic misconduct has occurred, the penalty may range from dismissal from the University to a failing grade in the course. For more details on the honor code, refer to http://www.latech.edu/current-students/student-advancement-affairs/student-conduct-integrity.

COUNSELING SERVICES: If at any point during the semester, you feel overwhelmed with your class work, feel thoughts of depression/suicide, experience sexual assault/rape, experience problems with substance abuse or relationship abuse, or have any other struggles with physical/mental health, *please seek help*! The Counseling Center Services at Louisiana Tech Universit~~y are a resourc~~e offering assistance with any issue that may arise. There is *never* any shame in seeking help. If you or someone you know is struggling with any of these issues, speak out! The Counseling Center Services website can be found at https://www.latech.edu/counseling-services/ and is located in Keeny Hall.

HAZING: In compliance with Acts 635, 637, and 640 of the 2018 Regular Session and Act 382 of the 2019 Regular Session of the Louisiana Legislature and the 2019 Board of Regents Uniform Policy on Hazing, the System reaffirms its policy that any form of hazing of any student enrolled at any institution of the System is prohibited. Violation of this Policy can result in both disciplinary action imposed by the organization and/or institution as well as criminal charges.

EMERGENCY NOTIFICATION SYSTEM (ENS): All Louisiana Tech students are strongly encouraged to enroll and update their contact information in the Emergency Notification System. It takes just a few seconds to ensure you're able to receive important text and voice alerts in the event of a campus emergency. For more information on the Emergency Notification System, please visit http://www.latech.edu/current-studnets/student-advancement-affairs/university-police. For emergency notifications, please visit http://ert.latech.edu.

MATH 301
Course Outline

Day	***Date***	***Topic or Activity***
1	Sept. 11	Syllabus and Problem Solving Conundrums
		UNIT 1: Functions and Patterns
		Definition of Function, Function Sorting Activity, Writing – Definition of Function
2	Sept. 13	3 Definitions of Function. Parabola Roots Exploration
		A qualitative look at "rate of change" of *f*. Finding Roots Problem continued.
3	Sept. 18	VCAST: Bus Stop Task
		Conic Sections
4	Sept. 20	Conic Sections continued
5	Sept. 25	Sequences. Triangular Differences Activity
		Triangular Differences continued
6	Sept. 27	VCAST: Hexagon Task
		Functions as Sequences / Function Patterns Exploration
7	Oct. 2	Exponential Growth and Decay / Rate of Change
		UNIT 2: Modeling Using Regression and Matrices
8	Oct. 4	Modeling functions from data: Thunder Storms, Charles' Law, Linear Regression
		Modeling functions from data: More regression and Residuals / Midterm Assignment
9	Oct. 9	*Test 1*
10	Oct. 11	Modeling functions from data: Data with Matrices
		Modeling functions from data: Standard Forms
11	Oct. 16	VCAST: Aphids Task
12	Oct. 18	Roller Coaster Exploration
		UNIT 3: Exploring Functions in Other Systems
13	Oct. 23	Parametric Models / Midterm Assignment Due
		Parametric Exploration Problems
14	Oct. 25	*Test 2*
15	Oct. 30	Terminal Velocity or Vector Lab
16	Nov. 1	The Golf Shot – An Exploration
17	Nov. 6	Polar Coordinate System
18	Nov. 8	Geometry of Complex Numbers
		Polar Complex – Euler Numbers
19	Nov. 13	VCAST: Bottle Filling Task
20	Nov. 15	*Test 3*