



# Math 2413.021HY Calculus I Hybrid

Course Syllabus: Spring 2023 T 11:00 – 12:50 UHS - 149

“Northeast Texas Community College exists to provide responsible, exemplary learning opportunities.”

## Doug Richey - Professor of Mathematics

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Office Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Online
	Online Appointment	8:00 -10:50 4:00 - 4:50	8:00 – 9:50 1:00 – 3:50	4:00 – 4:50	Online Appointment	Everyday

The information contained in this syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.

### Alternate Operations During Campus Closure and/or Alternate Course Delivery Requirements

In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Northeast Texas Community College to move to altered operations. During this time, Northeast Texas Community College may opt to continue delivery of instruction through methods that include, but are not limited to: online through the BlackBoard Learning Management System, online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor NTCC’s website (<http://www.ntcc.edu/>) for instructions about continuing courses remotely, BlackBoard for each class for course-specific communication, and NTCC email for important general information.

Additionally, there may be instances where a course may not be able to be continued in the same delivery format as it originates (face-to-face, fully online, live remote, or hybrid). Should this be the case, every effort will be made to continue instruction in an alternative delivery format. Students will be informed of any changes of this nature through email messaging and/or the BlackBoard course site.

**Catalog Course Description (include prerequisites).** Limits and continuity; the Fundamental Theorem of Calculus, definition of the derivative of a function and techniques of differentiation; applications of the derivative to maximizing or minimizing a function; the chain rule, mean value theorem, and rate of change problems; curve sketching; definite and indefinite integration of algebraic, trigonometric, and transcendental functions, with an application to calculation of areas. Four hours credit. Prerequisite: MATH 2412 (Precalculus) or its equivalent.

### Required Textbook(s):

Textbook: Calculus Volume 1  
OpenStax - ISBN: 978-1-938168-02-4  
Rice University  
6100 Main Street MS-375  
Houston, TX 77005

**Recommended Reading(s):**

None

**Student Learning Outcomes:**

- 2413.1 Develop solutions for tangent and area problems using the concepts of limits, derivatives, and integrals.
- 2413.2 Draw graphs of algebraic and transcendental functions considering limits, continuity, and differentiability at a point.
- 2413.3 Determine whether a function is continuous and/or differentiable at a point using limits.
- 2413.4 Use differentiation rules to differentiate algebraic and transcendental functions.
- 2413.5 Identify appropriate calculus concepts and techniques to provide mathematical models of real-world situations and determine solutions to applied problems.
- 2413.6 Evaluate definite integrals using the Fundamental Theorem of Calculus.
- 2413.7 Articulate the relationship between derivatives and integrals using the Fundamental Theorem of Calculus.

**Core Curriculum Purpose and Objectives:**

Through the core curriculum, students will gain a foundation of knowledge of human cultures and the physical and natural world; develop principles of personal and social responsibility for living in a diverse world; and advance intellectual and practical skills that are essential for all learning. Courses in the foundation area of mathematics focus on quantitative literacy in logic, patterns, and relationships. In addition, these courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.

**Program Student Learning Outcomes:**

Critical Thinking Skills

- CT.1 Students will demonstrate the ability to 1) analyze complex issues, 2) synthesize information, and 3) evaluate the logic, validity, and relevance of data.

Communication Skills

- CS.1 Students will effectively develop, interpret and express ideas through written communication.

## Empirical and Quantitative Skills

- EQS.1 Students will manipulate numerical data or observable facts by organizing and converting relevant information into mathematical or empirical form
- EQS.2 Students will analyze numerical data or observable facts by processing information with correct calculations, explicit notations, and appropriate technology.
- EQS.3 Students will draw informed conclusions from numerical data or observable facts that are accurate, complete, and relevant to the investigation.

### **Course Outline:**

Submission of homework problems will be determined on a section-by-section basis. Changes on individual problem sets may be made weekly.

### **{Students should review chapter 1 as needed}**

- Chapter 1: Functions and Graphs
- 1.1 Review of Functions
  - 1.2 Basic Classes of Functions
  - 1.3 Trigonometric Functions
  - 1.4 Inverse Functions
  - 1.5 Exponential and Logarithmic Functions

### **{The following sections and problems are for Midterm submission.}**

Sections and Problems Assigned, Multiples of 7 i.e. {7, 14, 21, ... , 77, ... , last multiple of seven}

#### Chapter 2: Limits

- 2.1 A Preview of Calculus (7-28) i.e. {7, 14, 21, 28}
- 2.2 The Limit of a function (35-77) i.e. {35, 42, 49, 56, 63, 70, 77}
- 2.3 The Limit Law (84-126)
- 2.4 Continuity (133-175)
- 2.5 The Precise Definition of a Limit (182-203)

#### Chapter 3: Derivatives

- 3.1 Defining the Derivative (7-49)
- 3.2 The Derivative as a Function (56-105)
- 3.3 Differentiation Rules (112-147)
- 3.4 Derivatives as Rates of Change (154-168)
- 3.5 Derivatives of Trigonometric Functions (175-210)
- 3.6 The Chain Rule (217-259)
- 3.7 Derivatives of Inverse Functions (266-294)
- 3.8 Implicit Differentiation (301-329)
- 3.9 Derivatives of Exponential and Logarithmic Functions (336-364)

#### Chapter 4: Applications of Derivatives

- 4.1 Related Rates (7-42)
- 4.2 Linear Approximations and Differentials (49-84)
- 4.3 Maxima and Minima (91-147)
- 4.4 The Mean Value Theorem (154-189)

**{Midterm Homework and Examination Due March 7th, 2023}**

**{The following sections and problems are for Final submission.}**

- 4.5 Derivatives and the Shape of a Graph (196-245)
- 4.6 Limits at Infinity and Asymptotes (252-308)
- 4.7 Applied Optimization Problems (315-350)
- 4.8 L'Hopital's Rule (357-399)
- 4.9 Newton's Method (406-462)
- 4.10 Antidetrivatives (469-518)

Chapter 5: Integration

- 5.1 Approximating Areas (7-56)
- 5.2 The Definite Integral (63-140)
- 5.3 The Fundamental Theorem of Calculus (147-203)
- 5.4 Integration Formulas and the Net Change Theorem (210-252)
- 5.5 Substitution (259-315)
- 5.6 Integrals Involving Exponential and Logarithmic Functions (322-385)
- 5.7 Integrals Resulting in Inverse Trigonometric Functions (392-434)

Chapter 6: Applications of Integration

- 6.1 Areas between Curves (7-56)
- 6.2 Determining Volumes by Slicing (63-112)
- 6.3 Volumes of Revolution: Cylindrical Shells (119-161)
- 6.4 Arc Length of a Curve and Surface Area (168-217)

**{Final Homework and Examination Due May 9th, 2023}**

**Evaluation/Grading Policy:**

Two major 150 point examinations, a midterm and a final, will be given to comprise 75% of the final grade. The average of a series of special assignments, online engagements, and homework exercises totaling 100 points will be worth 25% of the final grade.

2 Major Exams	75%
Weekly Grade	25%
TOTAL	100%

Make-up exams will not be given unless the student has coordinated with the instructor at least two days prior to the exam. Late work will incur a penalty of 10 points per day for whatever reason for the absence, unless otherwise indicated by the instructor.

"A"	90-100%
"B"	80-89%
"C"	70-79%
"D"	60-69%
"F"	< 60%

### **Other Course Requirements**

A textbook and graphing calculator are required for this course.

### **Student Responsibilities/Expectations:**

Regular and punctual attendance at all scheduled classes is expected. Attendance is necessary for successful completion of course work. Excused absences may be permitted at the discretion of the instructor for illness, official college activities, or personal emergencies. The student is responsible for initiating procedures for make-up work. All other missed assignments will not be accepted unless otherwise stated and is completed to the satisfaction of the instructor. Students absent on an exam day must have informed the instructor prior to missing the exam. If the instructor is not informed prior to missing the exam, the exam will not be made up and have a zero placed in the gradebook.

### **NTCC Academic Honesty Statement:**

"Students are expected to complete course work in an honest manner, using their intellects and resources designated as allowable by the course instructor. Students are responsible for addressing questions about allowable resources with the course instructor. NTCC upholds the highest standards of academic integrity. This course will follow the NTCC Academic Honesty policy stated in the Student Handbook."

### **Academic Ethics**

The college expects all students to engage in academic pursuits in a manner that is beyond reproach. Students are expected to maintain complete honesty and integrity in their academic pursuit. Academic dishonesty such as cheating, plagiarism, and collusion is unacceptable and may result in disciplinary action. Refer to the student handbook for more information on this subject.

### **ADA Statement:**

It is the policy of NTCC to provide reasonable accommodations for qualified individuals who are students with disabilities. This College will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to request accommodations. An appointment can be made with Shannin Garrett, Academic Advisor/Coordinator of Special Populations located in the College Connection. She can be reached at 903-434-8218. For more information and to obtain a copy of the Request for Accommodations, please refer to the [NTCC website - Special Populations](#).

### **Family Educational Rights And Privacy Act (FERPA):**

The Family Educational Rights and Privacy Act (FERPA) is a federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education. FERPA gives parents certain rights with respect to their children's

educational records. These rights transfer to the student when he or she attends a school beyond the high school level. Students to whom the rights have transferred are considered “eligible students.” In essence, a parent has no legal right to obtain information concerning the child’s college records without the written consent of the student. In compliance with FERPA, information classified as “directory information” may be released to the general public without the written consent of the student unless the student makes a request in writing. Directory information is defined as: the student’s name, permanent address and/or local address, telephone listing, dates of attendance, most recent previous education institution attended, other information including major, field of study, degrees, awards received, and participation in officially recognized activities/sports.

**Other Course Policies:**

There will be no cell phone usage in the classroom. Students will be warned if caught using a phone during class. A student will be removed from class if the disruption continues. An appropriate mask or face covering will be worn at all times in the classroom. Students violating this policy will be immediately sent to Student Services for relocation into another class more suited to their needs.

The college’s official means of communication is via your campus email address. I will use your campus email address, but mainly Blackboard course messages to communicate with you outside of class. Make sure you keep your campus email cleaned out and below the limit so you can receive important messages. Check your Blackboard course messages daily. Students are expected to be respectful to classmates and professor at all time.