



# Calculus I – Math 2413.51d

Course Syllabus: Spring 2018

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

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Office Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Online
	7:30-8:00 3:05-3:30	7:30-8:00 3:05-3:30	7:30-8:00 3:05-3:30	7:30-8:00 3:05-3:30	7:30-8:00	Available through email

*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.*

**Catalog Course Description (include prerequisites):** Calculus I is a standard first course in calculus. Topics include differentiation of algebraic and trigonometric functions, differentiation formulas, applications of the derivative, Mean Value Theorem, maxima/minima, points of inflection, curve sketching, antiderivatives, definite and indefinite integrals, upper and lower sums, and the Fundamental Theorem of Calculus. Prerequisite: MATH 2412 (Precalculus) or its equivalent.

**Required Textbook(s):** Larson/Edwards, Calculus, 11th Edition

**Publisher:** CENGAGE Learning

**ISBN Number:** 978-1337275361

**Recommended Reading(s):** None

**Recommended Videos:**

Change and Motion: Calculus Made Clear, 2<sup>nd</sup> Edition; Dr. Michael Starbird, The University of Texas at Austin (24, 30 min. lectures >> available through Mr. Miller or the WHS Library).

**Student Learning Outcomes:**

Upon successful completion of this course, students will:

- 2413.1 Determine the limit of a function graphically, numerically, and analytically.
- 2413.2 Calculate derivatives using the definition of the derivative as the limit of a difference quotient.
- 2413.3 Calculate derivatives of algebraic, trigonometric, and implicit functions.
- 2413.4 Apply methods of calculus to graph polynomial, rational, and trigonometric functions.
- 2413.5 Problem-solve a broad base of application problems involving differentiation including but not limited to Rolle's Theorem and the Mean Value Theorem.

2413.6 Calculate and apply antiderivatives of algebraic and trigonometric functions.

2413.7 Understand the relationship between antiderivative and integral by way of 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.

### **College 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.

#### **SCANS Skills:**

N/A

### Lectures & Discussions:

There will be in-class lectures for each section. It is recommended that the student read and work through the examples in the section prior to the lecture. Questions can be directed to the instructor in class or during office hours, or can be posted on a discussion thread in Blackboard for classmates to answer. Students are expected to participate in any discussion threads provided by the instructor.

### Evaluation/Grading Policy:

Four major 100-point examinations, evenly spaced throughout the semester, will be given for a total of 50% of the course grade. The average of quizzes and homework will be worth 20%. Homework assignments will consist of exercises from the textbook as well as online assignments in WebAssign. Three to four Maple assignments will be given throughout the semester and will be worth 10%. A comprehensive final examination will contribute 20% to the final grade.

4 Major Exams	50%
Homework / Quiz Grade	20%
Maple Assignments	10%
Comprehensive Final Exam	20%
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. No late work will be accepted.

### Grading System

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

### Tests/Exams:

Exam information is located above in the Evaluation/Grading Policy. Dates for the exams will be determined for each unit.

### Assignments:

Specific homework problems will be assigned in WebAssign along with problems from the text, as listed below.

#### Limits and Their Properties (Ch. 1)

##### 1. A Preview of Calculus (Ch. 1.1)

Assignment: Pg. 51 >> 1-11 all

##### 2. Finding Limits Graphically and Numerically (Ch. 1.2)

Assignment: Pg. 59-62 >> 1-19 odd, 21-28, 30, 32, 34, 40, 42, 48, 52, (63-66 W), 68, 72, (73-76 TF), (80 GR)

##### 3. Evaluating Limits Analytically (Ch. 1.3)

Assignment: Pg. 71-73 >> 1-73 odd, 77, (93, 95 odd GR), (97, 98 W), 100-104 (115-120 TF), (121 Proof), (123 GR)

##### 4. Continuity and One-Sided Limits (Ch. 1.4)

Assignment: Pg. 83-86 >> 1-57 odd, 61-69 odd, 72, 76-82 even, (83, 85, 88 W), (101, 102, 104 W), (105-110 TF), 112, 123, (126 Proof)

5. Infinite Limits (Ch. 1.5)

Assignment: Pg. 92-94 >> 1-51 odd, 54, (55-57 W), 58-62, (65-68 TF)

6. Section Project: Graphs and Limits of Trigonometric Functions (Pg. 94)

Differentiation (Ch. 2)

1. The Derivative and the Tangent Line Problem (Ch. 2.1)

Assignment: Pg. 107-109 >> 1-27 odd, (29-35 GR), 37-41 odd, (43-48 W) 50, 53, 54, 56, 58, 62, 64, 70, 71, 73, 77-80, (93-96 TF)

2. Basic Differentiation Rules and Rates of Change (Ch. 2.2)

Assignment: Pg. 118-121 >> 1-25 odd, 31-68 odd, 70, (69-74 W), 76, 83, (85-90 TF), 93-109 odd, (114 Proof)

3. Product and Quotient Rules and Higher-Order Derivatives (Ch. 2.3)

Assignment: Pg. 129-132 >> 1-55 odd, 58, 59-79 odd, 81-86, (87 Proof), (89 MD), 90, 91, 93, 97, (110 W), 111-114, 115, 118, (131-136 TF), 137

4. TEST I (Ch. 1.1-2.3 – two parts, calculator and no calculator)

Differentiation (Ch. 2) – cont.

1. The Chain Rule (Ch. 2.4)

Assignment: Pg. 140-143 >> 9-53 odd, 58, 63-79 odd, 82, 85, (93, 94 W), 100, 102, 103, 108, 112, (121-124 TF)

2. Implicit Differentiation (Ch. 2.5)

Assignment: Pg. 149-151 >> 1-19 odd, 25-43 odd, 47, 50, 54, 63, (70 W)

3. Related Rates (Ch. 2.6)

Assignment: Pg. 157-160 >> 4, 6, 11-35 odd, 41, 43, 46, (47 MD), 48

Application of Derivatives (Ch. 3)

1. Extrema on an Interval (Ch. 3.1)

Assignment: Pg. 171-173 >> 1-43, 50, (55-56 W), 57, 61, (65-68 TF)

2. Rolle's Theorem and the Mean Value Theorem (Ch. 3.2)

Assignment: Pg. 178-180 >> 1, 3, 9-23 odd, 27, 34, 35, 46, 49, 56, 61, (64 W), (73-76 TF)

3. Increasing and Decreasing Functions and the First Derivative Test (Ch. 3.3)

Assignment: Pg. 187-190 >> 1-47 odd, 57-69 odd, 70, (78 NGAA), 79, 81, 85, (91-96 TF)

4. Concavity and the Second Derivative Test (Ch. 3.4)

Assignment: Pg. 196-198 >> 1-43 eoo, 51, 52, 56, 58, 61, 65, (75-78 TF)

5. Limits at Infinity (Ch. 3.5)

Assignment: Pg. 206-208 >> 5-10, 19-37 odd, (49 NGAA), 51, 52, (53 W), 56, 58

6. TEST II (2.4-6, 3.1-5 – two parts, calculator and no calculator)

Application of Derivatives (Ch. 3) – cont.

1. Sketching Curves (Ch. 3.6)

Assignment: Pg. 215-218 >> 1-7 odd, 9-35 odd, 29, 45, 47, 49, 51-56, (63, 64 W), 65, 78

2. TEST III (3.6 – no calculator)

Application of Derivatives (Ch. 3) – cont.

1. Optimization (applied maximum and minimum problems) (Ch. 3.7)

Assignment: Pg. 224-228 >> 3-9 odd, 17-39 odd, 43, (46 NGAA), 48, 49

2. Differentials (Ch. 3.9)

Assignment: Pg. 240-241 >> 25-39 odd, 40, 41, (47 W), (49-53 TF)

Integration (Ch. 4)

1. Antiderivatives and Indefinite Integration (Ch. 4.1)

Assignment: Pg. 255-257 >> 11-35 odd, 41, 43, 49-51, 53-59 odd, 65, 67, (73-78 TF)

2. Area (sigma notation and evaluating sums) (Ch. 4.2)  
Assignment: Pg. 267-269 >> 1-53 odd, (73, 74 TF)
3. Riemann Sums and Definite Integrals (Ch. 4.3)  
Assignment: Pg. 277-280 >> 1-43 odd, 47, 50, (63-68 TF)
4. The Fundamental Theorem of Calculus (Ch. 4.4)  
Assignment: Pg. 292-295 >> 1, (5, 7 GR), 9-51 odd, 53, 56, 60, 62, 65, 69, 71, 81-91 odd, 95-103 odd, (109, 110 TF)
5. Project IV: Demonstrating the Fundamental Theorem (Pg. 295)
6. TEST IV (3.7-9, 4.1-4 – two parts, calculator and no calculator)

#### COMPREHENSIVE FINAL EXAM

- 3 hours (4:00-7:00 PM), WHS, rm. 11, the date will be announced the first class period
- Ch. 1.1-4.4

#### **Other Course Requirements:**

A textbook and scientific 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. Due dates have been posted on WebAssign and students must keep up with these dates in an online setting.

#### **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:**

N/A