

Prerequisite: MAT 186, Precalculus

Text: Calculus, Early Transcendentals, by James Stewart, 8th edition
Publisher: Thomson/Brooks/Cole

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Course Description: This is the first course in the Calculus sequence intended for students who plan on majoring in Mathematics, Physics or Engineering. Topics we cover include: slopes and rates of change, limits, continuity, differentiation of algebraic, trigonometric, exponential and logarithmic functions. We also spend a great deal of time discussing differentials and their applications, define and solve indefinite integrals with an emphasis on integral application.

Course Content:

Chapter 1, 1.1 - 1.5

- 1.1 Four Ways to Represent a Function
- 1.2 A Catalog of Essential Functions
- 1.3 New Functions from Old Functions
- 1.4 Exponential Functions
- 1.5 Inverse Functions and Logarithms

Chapter 2, 2.1 - 2.8

- 2.1 The Tangent and Velocity Problems
- 2.2 The Limit of a Function
- 2.3 Calculating Limits Using the Limit Laws
- 2.4 The Precise Definition of a Limit
- 2.5 Continuity
- 2.6 Limits at Infinity; Horizontal Asymptotes
- 2.7 Derivatives and Rates of Change
- 2.8 The Derivative as a Function

Chapter 3, 3.1 - 3.11

- 3.1 Derivatives of Polynomials and Exponentials
- 3.2 The Product and Quotient Rules
- 3.3 Derivatives of Trigonometric Functions
- 3.4 The Chain Rule
- 3.5 Implicit Differentiation
- 3.7 Rates of Change

3.8 Exponential Growth and Decay

3.9 Related Rates

3.10 Linear Approximations and Differentials

3.11 Hyperbolic Functions

Chapter 4, 4.1– 4.5, 4.7 – 4.9

4.1 Maximum and Minimum Values

4.2 The Mean Value Theorem

4.3 How Derivatives Affect the Shape of a Graph

4.4 Indeterminate Forms and L'Hospital's Rule

4.5 Summary of Curve Sketching

4.7 Optimization Problems

4.8 Newton's Method

4.9 Antiderivatives

Chapter 5, 5.1 - 5.5

5.1 Areas and Distances

5.2 The Definite Integral

5.3 The Fundamental Theorem of Calculus

5.4 Indefinite Integrals

5.5 The Substitution Rule 412

Chapter 6, 6.1

6.1 Areas Between Curves

Course Objectives:

After the successful completion of the course the student must be able to:

1. Find the natural domain and range of the given function. Compute the value of the function at the indicated value of x .
2. Know the classification of the functions, their basic properties and graphs,
3. Classify a function as even, odd, or neither.
4. Find the composite of two functions, and express a function as the composition of two or more functions.
5. Sketch the graphs of the functions using concepts of reflections and translations, intercepts.
6. Use vertical line test to identify whether the given graph is the graph of a function.

7. Find the limit of a function, using graph, table of values, or algebra. Find limits involving infinity.
8. Determine whether the given function is continuous or not, find and describe all points of discontinuity.
9. Know the Intermediate Value Theorem.
10. Use the definition of the derivative to differentiate a function. Understand graphical and physical meanings of the derivative.
11. Find whether the function is differentiable or not.
12. Use the techniques of differentiation, the Chain Rule to find first and higher derivatives of algebraic, trigonometric, inverse functions, exponential, and logarithmic functions.
13. Find the equation of the line tangent to the graph of a function at the specified point.
14. Solve the word problems on rate of change of the function.
15. Find the derivative of a function by implicit differentiation; apply it to related rate problems.
16. Find the derivative of a function by logarithmic differentiation.
17. Find the differential of a function. Find the linear approximation of a function.
18. Identify which of the given curves represents a function and which represents its first and second derivative. Sketch the graph of the derivative of a function defined by the graph.
19. Know the Mean value and Rolle's Theorem.
20. Use the first and second derivatives to find the shape of graph, show where the function is increasing / decreasing, concave up/ concave down; find the inflection points. Use the First and Second Derivative Tests to find relative extrema.
21. Sketch the graph of a function (show all critical points, inflections, asymptotes, etc.)
22. Find the absolute maximum and absolute minimum of a function on a given interval
23. Solve optimization problems.
24. Find antiderivatives.
25. Know the definition of a definite integral, area and distance problems that lead to the definite integral.
26. Know the Fundamental Theorem of Calculus; recognize the differentiation and integration as two inverse processes.
27. Perform the indefinite and definite integration using basic integration rules, substitution method.
28. Find the average value of a function on a given interval.
29. Solve problems on applications of integration to geometry, physics, and engineering.

When is the School closed?

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|----------------------|--------------------------------------|
| Sep 2 nd | Labor Day |
| Nov 27 th | College open - no classes in session |
| Nov28th - Dec 1st | Thanksgiving recess |

Measurements

Quizzes – 40%, 2 tests, each test – 15%, and final exam – 30%.

Grade equivalents: A 93 – 100, A- 90 – 93, B+ 87 -89, B 83 – 86, B- 80 – 82, C+ 77 – 79, C 73 – 76, C- 70 – 72, D+ 67 – 69, D 63 – 66, D- 60 – 62, F below 60.

Support Services:

Tutorial services. Peers. Meeting with YR for extra help on an appointment basis.

Office Hours: TBD

Class Cancellation: In case of increment weather, check the college website for class cancellations or call 860-215-9000 for recorded message.

Plagiarism and Academic Honesty

At TRCC, we expect the highest standards of academic honesty. The Board of Trustees' Proscribed Conduct Policy prohibits cheating on examinations, unauthorized collaboration on assignments, unauthorized access to examinations or course materials, plagiarism.

MyCommNet Alert: MyCommNet is a system that sends text messages and emails to anyone signed up in the event of a campus emergency. Additionally, TRCC sends messages when the college is delayed or closed due to weather. All students are encouraged to sign up for myCommNet Alert. A tutorial is available on the Educational Technology and Distance Learning Students page of the web site. http://www.trcc.commnet.edu/div_it/educationaltechnology/Tutorials/myCommNetAlert/MIR3.html

Disabilities: If you have a disability that may affect your progress in this course, please meet with a Disability Service Provider (DSP) as soon as possible. Please note that accommodations cannot be provided until you provide written authorization from a DSP.

| TRCC Disabilities Service Providers Counseling & Advising Office | |
|--|--|
| Elizabeth Willcox , Advisor (860)215-9289 Room A113 | <ul style="list-style-type: none">• Sensory Disabilities• Medical Disabilities• Mental Health Disabilities |
| Matt Liscum , Counselor (860) 215-9265 Room A113 | <ul style="list-style-type: none">• Learning Disabilities• ADD/ADHD• Autism Spectrum |

Digication: *As a student, you will maintain an online learning portfolio using a TRCC designed template. Through this electronic tool, you can see your own growth in college-wide learning. It may even help you to find the major that is a match to you. You can keep this Digication account after graduation, too. A Three Rivers General Education Assessment Team will select random works and review them so that we can improve the college experience for all. Your name will not be attached to any of the assessment work; it is private. This tool will also be a “place” where you can connect your learning from the classroom, school, and life. Sometimes when you look at all of the work you have done and think about it, you learn something else. In Digication, you will be able to make other portfolios, too. It’s like a file cabinet with the ability to have multiple but separate files. What is exciting about the electronic tool is when you look inside you will see you are developing in new ways! Look at your class outline to see what assignments to post into the TRCC Template; you may post your own choices, too.*

Have fun in learning!