

**Calculus I, 10410, K254, M, W 10:00am – 11:40pm, room E227  
Spring 2016**

**Professor Larisa Alikhanova**

**3019010410**

**Prerequisite:** MAT 186, Precalculus

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

**Course Description:** Introduces functions, continuity, limits, derivatives of algebraic and early transcendental functions, antiderivatives, definite integrals, and their applications. Uses graphing calculators to enhance and broaden the range of concepts and applications discussed.

**Measurements** Quizzes, projects – 15%, 3 tests, each test – 20%, and final exam – 25%.  
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 me for extra help on an appointment basis.

**Office Hours:** M, W 9:30 – 10:00 am, 2:45 – 4:15 pm, **Room C104**

**Email** [lalikhanova@trcc.commnet.edu](mailto:lalikhanova@trcc.commnet.edu)

**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](http://www.trcc.commnet.edu/div_it/educationaltechnology/Tutorials/myCommNetAlert/MIR3.html)

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**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.

<b>TRCC Disabilities Service Providers</b> Counseling & Advising Office Room A-119	
<b>Matt Liscum</b> (860) 215-9265	<ul style="list-style-type: none"><li>• Physical Disabilities</li><li>• Sensory Disabilities</li><li>• Medical Disabilities</li><li>• Mental Health Disabilities</li></ul>
<b>Chris Scarborough</b> (860)215-9289	<ul style="list-style-type: none"><li>• Learning Disabilities</li><li>• ADD/ADHD</li><li>• Autism Spectrum</li></ul>

**Digication:** All students are required to maintain an online learning portfolio in Digication that uses the college template. Through this electronic tool students will have the opportunity to monitor their own growth in college-wide learning. The student will keep his/her learning portfolio and may continue to use the Digication account after graduation. A Three Rivers General Education Assessment Team will select and review random works to improve the college experience for all. Student work reviewed for assessment purposes will not include names and all student work will remain private and anonymous for college improvement purposes. Students will have the ability to integrate learning from the classroom, college, and life in general, which will provide additional learning opportunities. If desired, students will have the option to create multiple portfolios

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**Course Content:**

**Chapter 1: 01/25/16**

Functions and Their Representations. A Catalog of Essential Functions.  
Sec.1.1 – 1.3, 1.5, 1.6

**Chapter 2: 01/27/16 – 02/10/16**

The Limit of a Function. Calculating Limits. Limits Involving Infinity. Continuity.  
Sec. 2.2, 2.3, 2.5, 2.6

**TEST (Chapters 1, 2) 02/10/16**

**Chapter 3: 02/15/16 – 03/16/16**

Derivatives and Rate of Change. The Derivative as a Function. Basic Differentiation Formulas. The Product and Quotient Rules. The Chain Rule. Implicit Differentiation. Logarithmic Differentiation. Related Rates. Linear Approximation. Differential.  
Sec.2.7, 2.8, 3.1 – 3.7, 3.9, 3.10

**TEST (Chapter 3) 03/16/16**

**Chapter 4: 03/28/16 – 04/13/16**

Maximum and Minimum Values. The Mean Value Theorem. Derivatives and the Shapes of Graphs. Curve Sketching. Optimization Problems. Newton's Method. Antiderivatives.  
Sec.4.1, 4.2, 4.3, 4.5 - 4.8, 4.9

**TEST (Chapters 4) 04/13/16**

**Chapter 5: 04/18/16 – 05/02/16**

Areas, Distances. The Definite Integral. Evaluating Definite Integrals. The Fundamental Theorem of Calculus. The Substitution Rule.  
Sec. 4.9, 5.1 – 5.5

**Chapter 6: 05/04/16 – 05/09/16**

Areas between the Curves. Review  
Sec. 6.1

**Final Exam 05/11/16**

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**Course Objectives:**

Upon completion of the course, student should be able to:

1. Find the natural domain and range of the given function.
2. Compute the value of the function at the indicated value of  $x$ .
3. Know the classification of the functions, their basic properties and graphs,
4. Classify a function as even, odd, or neither.
5. Find the composite of two functions, and express a function as the composition of two or more functions.
6. Sketch the graphs of the functions using concepts of reflections and translations, intercepts.
7. Use vertical line test to identify whether the given graph is the graph of a function.
8. Find the limit of a function, using graph, table of values, or algebra. Find limits involving infinity.
9. Determine whether the given function is continuous or not, find and describe all points of discontinuity.
10. Know the Intermediate Value Theorem.
11. Use the definition of the derivative to differentiate a function. Understand graphical and physical meanings of the derivative.
12. Find whether the function is differentiable or not.
13. Use the techniques of differentiation, the Chain Rule to find first and higher derivatives of algebraic, trigonometric, inverse functions, exponential, and logarithmic functions.
14. Find the equation of the line tangent to the graph of a function at the specified point.
15. Solve the word problems on rate of change of the function.
16. Find the derivative of a function by implicit differentiation; apply it to related rate problems.
17. Find the derivative of a function by logarithmic differentiation.
18. Find the differential of a function. Find the linear approximation of a function.
19. 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.
20. Know the Mean value and Rolle's Theorem.
21. 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.
22. Sketch the graph of a function (show all critical points, inflections, asymptotes, etc.)
23. Find the absolute maximum and absolute minimum of a function on a given interval
24. Solve optimization problems.
25. Find antiderivatives.
26. Know the definition of a definite integral, area and distance problems that lead to the definite integral.
27. Know the Fundamental Theorem of Calculus; recognize the differentiation and integration as two inverse processes.
28. Perform the indefinite and definite integration using basic integration rules, substitution method.
29. Find the average value of a function on a given interval.
30. Solve problems on applications of integration to geometry, physics, and engineering.

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**Homework (odd numbers). This is a guide only. Assignments may vary.**

Chapter 1:

- p.19 3, 7, 9, 27, 29, 41, 43, 45, 47, 69 - 77
- p.33 1, 3
- p.42 1, 3, 5, 17, 21, 31, 33, 35, 43-47, 53
- p.53 17, 19
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- p.92 5, 7, 9, 11, 15, 17
- P.102 11 - 29, 47
- p.124 3, 5, 7, 21, 23, 41, 43, 53
- p.137 3, 5, 7, 9, 15 - 23, 41, 47
- p.148 5, 17, 31 - 35
- p.160 3, 5 - 11, 21, 23, 41, 43

Chapter 3

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- p.188 3 - 25, 27, 29, 31
- p.196 1 - 15, 21, 23
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Chapter 4:

- p.283 3, 5, 7, 9, 17, 21, 29 - 33, 47, 49
- p.291 5, 7, 11, 13
- p.300 1, 5, 7, 9 - 15, 25, 35, 37 - 45, 49
- p.321 1, 3, 9, 15, 21
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- p.355 1 - 47, 59-63

Chapter 5:

- p.375 1, 17
- p.388 5, 17 - 19, 33, 35, 47, 49, 51, 53
- p.399 3, 19 - 43
- p.408 1, 5 - 45, 61
- p.418 1 - 47, 53 - 59

Chapter 6:

- p.434 1 - 27