

Towson University
Department of Mathematics
MATH 211.103: Calculus for Applications
Spring 2020
MW 16:30–17:45 in YR 0122

Instructor: Stanley M. Max, Lecturer in Mathematics

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Office Hours: Monday 15:30–16:00, Tuesday 15:30–17:00, Wednesday 15:30–16:00, Thursday 15:30–17:00.

Course Description: Intended primarily for students in biology, business, economics, psychology, and the social sciences. Elements of differential and integral calculus from an intuitive standpoint with emphasis on the use of calculus in the above fields. Exponential and logarithmic functions, partial derivatives included. Not open to mathematics majors or minors. Prerequisite: qualifying score on the Math Placement Test or MATH 115 (recommended) or MATH 119. Core: Mathematics or GenEd I.C.

Required Text: MyMathLab Access Code ISBN: 9780135901250, which includes e-textbook, Goldstein, Lay, Schneider, and Asmar, *Calculus and Its Applications* 14th ed. (Pearson Education, 2018).

Calculator: A graphing calculator is required. A TI-83 or TI-84 is recommended. TI-89, TI-Inspire or equivalent CAS calculators will not be allowed on tests and quizzes.

Course Objectives:

1. Demonstrate understanding of the concepts and techniques of calculus from an intuitive standpoint.
2. Compute derivatives of functions using the sum rule, constant multiple rule, general power rule, product rule, quotient rule, and chain rule.
3. Apply derivatives to solve problems related to biology, business, economics, psychology, and the social sciences.
4. Apply derivatives to solve optimization problems.
5. Demonstrate understanding of exponential and natural logarithm functions and some applications of these functions and their derivatives.
6. Use the concepts of definite and indefinite integrals to compute area, average value of a function, and future value of a continuous income stream.
7. Demonstrate the understanding of partial derivatives and their applications.

This University Core course is designed to meet the following four learning goals.

Mathematics Core Learning Outcomes
1. Construct and evaluate logical arguments.
2. Apply and adapt a variety of appropriate strategies to solve mathematical problems.
3. Recognize and apply mathematics in contexts outside of mathematics.
4. Organize and consolidate mathematical thinking through written and oral communication.

Course Content:

Textbook Topics
0.3–0.6 Chapter 0: Functions
1.1–1.3 and 1.6–1.8 Chapter 1: The Derivative
2.1–2.7 Chapter 2: Applications of the Derivative
3.1 & 3.2 Chapter 3: Techniques of Differentiation
4.1–4.6 Chapter 4: The Exponential and Natural Logarithmic Functions
5.1 & 5.2 Chapter 5: Application of Exponential and Natural Logarithmic Functions
6.1–6.5 Chapter 6: The Definite Integral
7.1–7.2 Chapter 7: Functions of Several Variables

Student Workload Expectations: Federal and State regulations require that students are expected to spend at least two hours of per credit hour for working on course-related activity outside of the classroom. The expectation is for students to spend at least six to nine hours per week outside of the three “hours” of classroom lecture for success in MATH 211.

Examples of activities outside the classroom are reading the textbook before lecture, rewriting lecture notes, redoing problems presented in class, watching videos on MyMathLab, rereading the textbook, completing assigned homework, completing additional problems to ensure mastery of concepts, making “flash cards” of important concepts, equations or problems, and preparing for quizzes and tests.

Tentative Schedule of Topics/Assignments:

Week	Dates	Material to cover
1	1/27-1/31	Introductions, Syllabus, MyMathLab instructions, basic math skills Section 0.3 The Algebra of Functions Section 0.4 Zeros of Functions
2	2/3-2/7	Section 0.5 Exponents and Power Functions Section 0.6 Functions and Graphs in Applications Section 1.1 The Slope of a Straight Line
3	2/10-2/14	Section 1.2 The Slope of a Curve at a Point Section 1.3 The Derivative and Limits Section 1.6 Some Rules for Differentiation
4	2/17-2/21	Section 1.7 More About Derivatives Section 1.8 The Derivative as a Rate of Change Review for Exam #1
5	2/24-2/28	Exam #1: Chapters 0-1 Section 2.1 Describing Graphs of Functions Section 2.2 The First- and Second-Derivative Rules
6	3/2-3/6	Section 2.3 The First- and Second-Derivative Rules and Curve Sketching Section 2.4 Curve Sketching (conclusion) Sections 2.5-2.7 Optimization Problems
7	3/9-3/13	Sections 2.5-2.7 Optimization Problems (continued) Section 3.1 The Product and Quotient Rules Section 3.2 The Chain Rule
8	3/15-3/22	Spring Break
9	3/23-3/27	Review for Exam #2 Exam #2: Chapters 2-3 Section 4.1 Exponential Functions
10	3/30-4/3	Section 4.2 The Exponential Function e^x Section 4.3 Differentiation of Exponential Functions Section 4.4 The Natural Logarithm Function
11	4/6-4/10	<i>4/6 is the last day to withdraw with a "w"</i> Section 4.6 Properties of the Natural Logarithm Function Section 4.5 The Derivative of $\ln(x)$ Section 5.1 Exponential Growth and Decay
12	4/13-4/17	Section 5.2 Compound Interest Section 6.1 Antidifferentiation Section 6.2 The Definite Integral and Net Change of a Function
13	4/20-4/24	Section 6.3 The Definite Integral and Area under a Graph Section 6.4 Areas in the xy -plane Section 6.5 Applications of the Definite Integral
14	4/27-5/1	Section 6.5 Applications of the Definite Integral (continued) Review for Exam #3 Exam #3: Chapters 4-6
15	5/4-5/8	Section 7.1 Examples of Functions of Several Variables Section 7.2 Partial Derivatives
16	5/11-5/12	Review for Final Exam: Chapters 1-7

Evaluation: Your overall grade for this course will be computed based on the following scheme:

GRADED COMPONENTS	
Exam 1	15%
Exam 2	15%
Exam 3	15%
Cumulative Final Exam	30%
Online quizzes <i>(Quizzes may be taken a second time)</i>	10%
Online homework	10%
Class attendance	5%

FINAL GRADE CUT-OFFS (where x is your overall score)	
A	$93\% \leq x \leq 100\%$
A-	$90\% \leq x < 93\%$
B+	$87\% \leq x < 90\%$
B	$83\% \leq x < 87\%$
B-	$80\% \leq x < 83\%$
C+	$77\% \leq x < 80\%$
C	$70\% \leq x < 76\%$
D+	$67\% \leq x < 70\%$
D	$60\% \leq x < 66\%$
F	$0\% \leq x < 60\%$

Attendance and Make-up Policy: Class attendance is expected. TU policy is to excuse student absences for the following reasons: illness or injury when the student is unable to attend class; religious observance where the nature of the observance prevents the student from attending class; participation in university activities at the request of university authorities; and compelling, **verifiable** circumstances beyond the control of the student. Absences that do not fall into any of these four categories are unexcused. Make-ups are allowed only for **documented** excused absences. Read the University policy regarding class attendance in the online Towson University Undergraduate Catalog, at <https://catalog.towson.edu/undergraduate/academic-policies/class-attendance-absence-policy/>

Academic Integrity Policy: This class is conducted in accordance with the Towson University's Code of Conduct as described in the TU Catalog or accessed at:

<https://www.towson.edu/about/administration/policies/documents/polices/03-01-00-student-academic-integrity-policy.pdf>

This code prohibits "all forms of dishonesty including cheating (and) plagiarism." Cheating includes using unauthorized materials, technology, or websites during an assessment or for an assignment. If a violation of the academic integrity policy appears to occur, I will meet with the student to present the evidence and request an explanation. If I determine that a violation has occurred, you will be informed, in writing, of the academic penalty and of your right of appeal. This letter also goes to the Office of Student Conduct. The range of potential penalties includes deduction of points or rejection of assignment, failure of course, or a more severe disciplinary action by University authorities. The more severe the violation (in terms of extensiveness and intentionality), the more severe the penalty.

Diversity Statement: Towson University values diversity and fosters a climate grounded in respect and inclusion. Everyone participating in this course is expected to treat all others in accordance with this vision and policy and is expected to be respectful of each other without regard to sex, sexual orientation, race and ethnicity, color, nationality, gender identity or expression, mental or physical ability, religious affiliation, age, and veteran status. If you feel these expectations have not been met, please contact the Mathematics Department's Diversity representative, Dr. Goode, at egoode@towson.edu.

Disability Statement: This course complies with Towson University policies for students with disabilities. If you are a student with a disability and believe you may need accommodations for this course, please notify me with a memo from Accessibility & Disability Services (ADS). Since accommodations are not retroactive, it is strongly recommended that you provide me with notification as early as possible in the term. To register with ADS, or if you have questions about disability accommodations, contact ADS at (410) 704-2638 or <https://www.towson.edu/ads/> or visit the ADS office in the Administration Building, Room 232.

Math Tutoring: Is available in the Spence Tutoring Lab, YR 109. See additional information about this service at <https://www.towson.edu/tutoring-learning/course-support/tutoring/mathematics.html>

Last day to withdraw with a grade of "W": Monday (06 April 2020)

Final Exam: Wednesday (13 May 2020) 17:15–19:15