Course title and number	Business Calculus (MATH 142)
Term	Summer 2018
Class times and location	***MTWRF 12:00pm - 1:35pm*** in ***HALB 105***

Instructor Information

Name	***Justin Owen***
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Office Hours	***Tuesday and Friday 3:00pm - 5:00pm***
Help Sessions	http://www.math.tamu.edu/courses/helpsessions.html
Departmental Web Page	http://www.math.tamu.edu/courses/math142

Catalog Description

Business Calculus (Credit 3) Derivatives, curve sketching and optimization, techniques of derivatives, logarithms and exponential functions with applications, integrals, techniques and applications of integrals, multivariate calculus. No credit will be given for more than one of MATH 131, MATH 142, MATH 147, MATH 151 and MATH 171. Prerequisites: MATH 140 or equivalent or acceptable score on Texas A&M University math placement exam.

Learning Outcomes

This course is focused on quantitative literacy in mathematics found in both business and everyday life. Upon successful completion of this course, students will be able to:

- Logically formulate mathematical variables and equations to quantitatively create mathematical models representing problems in everyday life, as well as business, so that calculus can be applied to achieve an optimal solution.
- Identify patterns in numeric data to calculate limits and derivatives of functions numerically.
- Justify whether a function is continuous or not using the mathematical definition of continuity.
- Understand the derivative as a rate of change in order to quantitatively apply it to everyday life as well as business applications such as marginal analysis and elasticity of demand.
- Investigate the relationship between a function and its first and second derivatives, and use the information obtained from its derivatives to identify pertinent information about the function.
- Demonstrate the ability to implicitly differentiate functions in order to solve applications involving related rates
- Apply the definite integral to quantitatively determine solutions to problems in everyday life and business such as area between curves, average value of a function, and producers' and consumers' surplus.
- Recognize and appreciate the relationship between the derivative (rate of change) and the definite integral (accumulation of change), and utilize the Fundamental Theorem of Calculus as the bridge between the two.

CORE OBJECTIVES
Critical Thinking

- Students will analyze a function and justify whether or not it is continuous using the definition of continuity.
- Students will use inquiry to determine the best method for taking derivatives of complicated functions.
- Students will identify and categorize information about a function in order to construct a graph of its derivative.
- Students will apply calculus to find innovative ways to graph complicated functions without the aid of technology.
- Students will analyze and synthesize data and think creatively to develop mathematical models for optimization purposes.
- Students will examine how the Fundamental Theorem of Calculus connects differential and integral calculus.

Communication

- Students will symbolically relay mathematical information and concepts by creating variables and writing equations.
- Students will recognize, construct, and interpret graphs of basic functions.
- Students will write mathematical information symbolically to describe the behavior of functions.
- Students will justify results that use mathematical definitions such as the definition of continuity by writing proofs.
- Students will explain verbally in class the connection between derivatives, rates of change, and slopes of tangent lines.
- Students will develop sketches of the graphs of complicated functions by analyzing their first and second derivatives.
- Students will explain (both in writing and verbally) mathematical solutions to problems.
- Students will be required to answer questions during lecture concerning topics discussed in class.

Empirical and Quantitative Skills

- Students will evaluate limits numerically and use the information to draw conclusions about the behavior of a function.
- Students will calculate a derivative numerically and explain the result in the context of the problem.
- Students will use marginal analysis to make informed and quantitative business decisions.

- Students will manipulate empirical data to develop a mathematical model to use in an optimization problem, such as maximizing revenue or minimizing cost, and then apply calculus to find and interpret the optimal solution.
- Students will apply the Fundamental Theorem of Calculus to quantitatively compute the accumulated change of a quantity

Textbook and/or Resource Material
Calculus: Applications and Technology, 3rd edition, by Tomastik

Note: You will be required to purchase access to the online homework system, WebAssign. The required access code will give you access to both the online homework and an electronic copy of the textbook. Thus, you are not required to purchase a hard copy of the textbook, although you have the option to purchase a custom loose-leaf copy of the textbook (which should be bundled with an access code to WebAssign) through the local bookstores. For more information, click on "Student Information Page" on the following webpage: http://www.math.tamu.edu/courses/eHomework. *NOTE: You may purchase access to both the online homework and electronic copy of the textbook online after logging into WebAssign (starting the first day of classes), or you may purchase the access code (without a book) at the bookstore.*

Calculator Policy
A TI-83, TI-83PLUS, TI-84, TI-84PLUS, or TI-Nspire Non-CAS (with an 84 faceplate) is REQUIRED. These are the only types of calculators that you are allowed to use on quizzes and exams. You must bring your calculator to every class period. NOTE: It is considered a violation of the Aggie Honor Code to have any programs, notes, etc. in your calculator that have not been approved by your instructor.

Highly Suggested Homework
Your daily highly suggested homework will prepare you for your computer homework, in-class assignments, and exams, but will not be turned in for a grade. It is crucial that you work these problems. A list of highly suggested homework problems can be found on the course homepage www.math.tamu.edu/courses/math142/

Computer Homework
There will be a graded computer homework assignment for each section we cover in-class. These assignments will be taken on the WebAssign computer system. For more information and to login please go to http://www.math.tamu.edu/courses/eHomework/

Quizzes
Quizzes will be given regularly throughout the semester. Some of the in-class quizzes will be announced in advance while others will not be announced. Some quizzes may be given as take-home assignments. The in-class quizzes will either be "written quizzes" in which problems are posted on the board and you record each problem and your solution on your own paper, or they will be "typed quizzes" in which I provide you with a quiz that has each problem typed.

Exams
There will be three in-class exams. You must bring your student id and approved calculator to each exam. Calculators will be checked before or during each exam. If there are any programs, notes, or formulas on your calculator which I did not give you, the occurrence will be considered scholastic dishonesty. The tentative exam schedule is as follows:

Exam 1: ***6/7/2018***

Exam 2: ***6/18/2018***

Exam 3: ***6/27/2018***

Final Exam
The final exam will be comprehensive and given on Monday, July 2, 2018 from ***1:00pm - 3:00pm*** in the classroom. If it will benefit you, the final exam grade will replace your lowest individual exam grade. Please note that this benefit will only occur if you took all exams.

Grading Policies

- (Exam dates tentative)

Activity	Date	Percentage
Homework	Biweekly	15%
Quizzes	Regularly	10%
Exam I	***6/7/2018***	18%
Exam II	***6/18/2018***	18%
Exam III	***6/27/2018***	18%
Final Exam	***7/2/2018***	21%
TOTAL		100%

- **Grading Scale**

Range	Grade
$90\% \leq$ average $\leq 100\%$	A
$80\% \leq$ average $< 90\%$	B
$70\% \leq$ average $< 80\%$	C
$60\% \leq$ average $< 70\%$	D
$0\% \leq$ average $< 60\%$	F

Grading Policy for Online Homework
Due to the pace of the summer session, your online homework will be graded using a sliding scale(i.e. you do not have to get all of the problems correct to receive a 100%).

In WebAssign, when you work a problem correctly, you will see that you have earned a certain number of points for that problem (partial points are possible for questions with multiple parts), here we name it W.A Points. The number of final homework points (H.W. Points) you earn per problem is based on the number of questions in the assignment.

The following chart shows the number of W.A. points necessary to receive the corresponding H.W. Points. Remember, for each homework, you can receive up to 10 homework points (100%).

Homework has 16 or more questions

W.A. Points	H.W. Points
0	0
more than 0 but less than 2	2
2 or more but less than 4	4
4 or more but less than 6	6
6 or more but less than 8	8
8 or more	10

Homework has 10 to 15 questions (inclusive)

W.A. Points	H.W. Points
0	0
more than 0 but less than 2	2
2 or more but less than 4	5
4 or more but less than 6	8
6 or more	10

Homework has 4 to 9 questions (inclusive)

W.A. Points	H.W. Points
0	0
more than 0 but less than 1	3
1 or more but less than 2	5
2 or more but less than 3	8
3 or more	10

Example: The homework for section 1.5 contains 16 questions. After 3 attempts, W.A. shows you have earned 6.5 points (out of 20). Then your homework grade is 8/10 (or 80%).

Example: The homework for section 5.6 contains 10 questions. After 3 attempts, W.A. shows you have earned 2 points (out of 20). Then your homework grade is 5/10 (or 50%).

Example: The homework for section 6.4 contains 5 questions. After 3 attempts, W.A. shows you have earned 0.5 points (out of 20). Then your homework grade is 3/10 (or 30%).

Attendance and Makeup Policies
Attendance is mandatory and may affect your grade. No make-up assignments, computer homework, or exams will be given without an official, written, University Excuse (falsification of documentation is a violation of the Aggie Honor Code). You must notify me in advance to ensure the right to a make-up. If advance notice is not possible (i.e. sudden illness), you MUST contact me within TWO working days of the missed assignment/homework/exam; otherwise, you forfeit the right to a make-up. An absence for a non-acute medical service or regular check-up does not constitute an excused absence. For more information please go to http://student-rules.tamu.edu/rule07. Please note that I will NOT accept the Explanatory Statement for Absence from Class form as sufficient written documentation of an excused absence.

If you have a University approved absence for missing an exam, you will be expected to make up your exam according to arrangements made with your instructor. You must discuss (email is fine) the need for a make-up exam with me according to the rules stated above.

Class Policies
To succeed in this class, attendance is a necessity. Be on time to class!! Once in the classroom, you will be expected to be respectful to everyone. This includes turning off and putting away cell phones, electronic devices (besides your calculator), and newspapers. You will be asked to leave the classroom if I see any of these out in the classroom. Also, it is very disrespectful to talk during lecture. If I feel you are being disrespectful, I will tell you to leave the classroom.

Available Help
If you are having problems please come to my office hours as soon as possible. Other sources of help include help sessions and archived week-in-reviews. The days and times for the help sessions will be announced as soon as they are scheduled. The archived Week-in-Review from Spring 2018 may be found at http://www.math.tamu.edu/~kilmer/14218awir.html

Americans with Disabilities Act (ADA)
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 845-1637. For additional information visit **http://disability.tamu.edu**.

Academic Integrity *"An Aggie does not lie, cheat, or steal, or tolerate those who do."*
Upon accepting admission to Texas A&M University, a student immediately assumes a commitment

to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information on the Honor Council Rules and Procedures, consult **http://aggiehonor.tamu.edu**.

Tentative weekly schedule.

Week	**Topics**	**Sections Covered**
1	Brief Pre-Calculus Review, Limits, and Continuity	Review, 3.1
	Rates of Change, The Derivative	3.2, 3.3
	Simple Derivative Rules	4.1
2	Derivative Rules	4.2, 4.3, 4.4
	Review, **Exam I**	
	Analyzing Graphs with First & Second Derivative	5.1, 5.2
3	Limits at Infinity, Curve Sketching Techniques	5.3, 5.4
	Absolute Extrema, Optimization	5.5, 5.6
	Review, **Exam II**	
4	Implicit Differentiation and Related Rates	5.8
	Antiderivatives, Substitution, Estimating Distance	6.1, 6.2, 6.3
	Definite Integral, Fund Thm of Calculus, Avg Value	6.4, 6.5
5	Review, **Exam III**	
	Area Between Curves, Producers/Consumers' Surplus	6.6, 6.7
	Review for Final Exam	