MAT 284: Business Calculus
M001 — Summer I 2021

Instructor Information

Name: Jianqing Jia
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Office Hours: TuTh 4:30PM – 5:30PM via Zoom

Class Information

Dates: June 7 – July 16
Time: MoTuWeTh 2:00PM – 4:25PM
Instruction Mode: Online Synchronous

Course Description

MAT 284 Business Calculus (4 credits). One-variable differential and integral calculus. Applications to business and economics. MAT 284 may not be taken for credit after successful completion of MAT 285 or MAT 295.

Course Supervisor

Please inform your instructor of any problems you have with this course. Problems not satisfactorily resolved with your instructor should be brought to the attention of the course supervisor:

Prof. Leonid Kovalev, lvkovale@syr.edu

Mathematics Prerequisite

Although there are no formal prerequisites, knowledge of precalculus material at the level of MAT 194 is essential for success in this course. In particular, facility with solving linear and quadratic equations, factoring and multiplying polynomials, and manipulating polynomial, rational, exponential and logarithmic functions is important.

Course Objectives

After this course, you should be able to...

- To use and understand basic mathematical notation.
- To select and apply an appropriate mathematical model for a given business/economics problem.
- To do hand calculations accurately and appropriately.
- To do calculations with the aid of appropriate hardware and/or software.

Textbook and Calculator

Textbook: *Introductory Mathematical Analysis*, by Haeussler, Paul, and Wood, second custom edition for SU, Pearson. ISBN: 978-1-323-26203-0. (Can substitute Intro Math. Analysis, Haeussler et. al, 13th ed. ISBN: 978-0-321-64372-8) Only the textbook is required. Used copies are fine. The course will cover most of chapters 1-4 and 10-14.

Calculator: A TI-83 or TI-84 calculator is required. No other calculators, e.g. TI-Nspire with/or without TI-84 keypad, are to be used on tests. Further, calculators are not to be shared during exams. The TI-84 or TI-83 is the only calculator that may be used on a test or the final exam.

Course Format

This course is a 6 week online course. There will be regular meetings, and your participation is expected. Homework will be online via WeBWork, and exams/assignments in written format will be through Blackboard.

Attendance and Participation

It is essential to your success in this course that you attend each lecture, take necessary notes and participate in the discussions. Therefore, you are expected to attend each lecture and to show up on time. Should you need to miss a class for any reason, you are to contact the instructor in a timely manner.

There are participation assignments after each lecture to ensure that you are keeping up with the material. The assignment consist of two parts. One is your lecture notes. The other is one or two problems assigned at the end of each lecture. The daily participation assignments are due next day 1:50PM EDT, which means you need to submit your lecture notes with the solved problems before next lecture. Participation in the course will be worth 15% of your final grade. Disorganized lecture notes are acceptable. Some extra credit ($\leq 5\%$) may be rewarded to the students whose lecture notes are well-organized.

Homework

The key to success in this course is to master the homework. Homework will be assigned everyday in class. Homework will be done online using WeBWorK, an open-source homework system. The number of attempts is unlimited. Problems can be done in any order. You do not have to do them all at once. If you need or desire an extension on any homework for any reason, contact the instructor in a timely fashion before the due time, as permitted by the need.

WEBWORK ACCESS INFORMATION:

1. Go to http://webwork.syr.edu/
2. Click on the class name “MAT_284_Summer_2021_Jia".
3. Your username is your NetID in lower case letters (for example, “jqpublic"). Your password is initially set to be your 9-digit SUID. You should change it after logging in for the first time.

Also, note that even if you used WebWorK before for another course, the password is reset to the 9-digit student id number.

Homework will be worth 20% of your final grade.

Exams

Take-Home Exams: At the end of each week there will be a take-home exam covering only the material from that week (except the final exam will be cumulative). You will have more than two days to complete and submit the exam through Blackboard. The exams must be completed on your own and you may not use any resources besides your book and your notes. Each exam will be worth 10% of your final grade.

Final Exam: The cumulative final exam will also be take-home. Unlike the other exams, you will have only 24 hours to complete the final exam. It will be available on Blackboard on Thursday July 15th, 2021 from 12:00AM to 11:59PM EDT. The final exam must be completed on your own and you may not use any resources besides your book and your notes. The final exam will be worth 15% of your final grade.

Exam schedule summarized as follows:

	Available	**Due**
Take-Home Exam 1	Thursday, June 10 - 6:00PM EDT	Saturday, June 12 - 11:59PM EDT
Take-Home Exam 2	Thursday, June 17 - 6:00PM EDT	Saturday, June 19 - 11:59PM EDT
Take-Home Exam 3	Thursday, June 24 - 6:00PM EDT	Saturday, June 26 - 11:59PM EDT
Take-Home Exam 4	Thursday, July 01 - 6:00PM EDT	Saturday, July 03 - 11:59PM EDT
Take-Home Exam 5	Thursday, July 08 - 6:00PM EDT	Saturday, July 10 - 11:59PM EDT
Final Exam	Thursday, July 15 - 12:00AM EDT	Thursday, July 15 - 11:59PM EDT

Make-Up Policy

There will be no make up exams. You have more than two days to complete each take-home exam and 24 hours to complete the final exam. If you miss a take-home exam for a valid reason (which must be verified by a note from a physician or your dean's office), the missing score will be replaced by the final exam.

Grading

The course grade is determined by the following components:

Five Take-Home Exams	50%
Final Exam	15%
Homework	20%
Participation	15%

Grades and important announcements will be posted on Blackboard. Please check Blackboard regularly to ensure the grades have been recorded correctly. You must bring clerical errors to the

instuctor's attention within 3 days of the date an assignment was returned. No changes will be made after this time. You are also responsible for any announcements about changes to the course schedule, the exam schedule, or the course requirements.

Grade Scale

Final grades will be given according to the following scale:

Raw Grade x	Letter Grade	Raw grade	Letter Grade
$93 \leq x \leq 100$	A	$77 \leq x < 80$	C+
$90 \leq x < 93$	A-	$73 \leq x < 77$	C
$87 \leq x < 90$	B+	$70 \leq x < 73$	C-
$83 \leq x < 87$	B	$60 \leq x < 70$	D
$80 \leq x < 83$	B-	$0 \leq x < 60$	C

Email Policy

Syracuse University has established email as a primary vehicle for official communication with students, faculty, and staff. All email communication in this course should be done using your @syr.edu email account. Due to federal laws, such as FERPA, emails coming from a non-SU email may not receive a response. Please, title emails with MAT 284: [Email Issue], where "email issue" is a summary title of the content of the email. This is to help ensure that your email is noticed and responded to.

Important Dates

The following IMPORTANT deadlines are available on MySlice:

- Financial Aid/Academic Drop Deadline
- Academic Withdrawal Deadline

These deadlines are posted in MySlice under Enrollment/View My Class Schedule and Finances/View Financial Deadlines.

Tips for Success

- It is absolutely essential that you understand how to solve the assigned homework problems and, more importantly, how and why the skills and techniques presented in the course are used in solving the assign problems. Exam questions will be similar to these problems.
- Ask questions about anything that is not completely clear. Don't hesitate to bring questions to your instructors during office hours.
- Every day, read and study the sections in the textbook covered in the lecture. Learning mathematics takes time! Read carefully and work through all the examples in complete detail. It can be helpful to try to work through an example on your own before reading the solution.

- Stay caught up. Mathematical concepts build on each other cumulatively and you need to stay on top of the material at every stage. If you are having difficulty, don't expect that the problem will take care of itself and disappear later. Contact your course instructor immediately and discuss the problem!
- Form a study group. Many students benefit from a study group to work through challenging problems and to review for exams. You should attempt the problems ahead of time by yourself and then work through any difficulties with your study partners. Explaining your reasoning to another student can help to clarify your own understanding.
- You should expect to work hard. Don't get discouraged if you find some of the material very difficult. Be persistent and patient! If you follow the above suggestions, your experience in this course will be a rewarding one.

Academic Integrity

Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The university policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same written work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the university's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice.

For this course, the academic integrity aspects especially relate to exams, as well as independent work to be done for any assignments. No student is allowed to use *any* electronic device, except for a calculator, during any exam until the exam is turned in. Accessing material beyond what is provided during any exam is a violation of the academic integrity policy.

The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level. For more information and the complete policy, see http://class.syr.edu/academic-integrity/policy/.

Students with Disabilities

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. There may be aspects of the instruction or design of this course that result in barriers to your inclusion and full participation in this course. I invite any student to meet with me to discuss strategies and/or accommodations (academic adjustments) that may be essential to your

success and to collaborate with the Center for Disability Resources (CDR) in this process. If you would like to discuss disability-accommodations or register with CDR, please visit their website at https://disabilityservices.syr.edu. Please call (315) 443-4498 or email disabilityservices@syr.edu for more detailed information. The CDR is responsible for coordinating disability-related academic accommodations and will work with the student to develop an access plan. Since academic accommodations may require early planning and generally are not provided retroactively, please contact CDR as soon as possible to begin this process.

Religious Observances Policy

Syracuse University's religious observances policy, found at http://supolicies.syr.edu/emp_ben/religious_observance.htm, recognizes the diversity of faiths represented in the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their tradition. Under the policy, students should have an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors no later than the end of the second week of classes for regular session classes and by the submission deadline for flexibility formatted classes. You should discuss with your instructor how any missed work is to be made up in a timely fashion; in particular, discuss the issue with them *before* the absence. An online notification process is available in MySlice (under Student Services/Enrollment/My Religious Observances/Add a Notification) from the first day of class until the end of the second week of class .

Tentative Schedule

The following is a *tentative* schedule for the course.

Week of	Sec	Topic
06/07	1.1	Applications of Equations
	1.3	Applications of Inequalities
	2.1	Functions
	2.2	Special Functions
	2.3	Combinations of Functions
	2.5	Rectangular Coordinates
06/14	3.1	Lines
	3.2	Linear Functions
	3.6	Systems of Equations
	4.1	Exponential Functions
	4.2	Logarithmic Functions
	4.3	Properties of Logarithms
06/21	10.1	Limits
	10.2	More on Limits
	10.3	Continuity

Week of	Sec	Topic
06/21	11.1	Derivative
	11.2	Rules for Differentiation
06/28	11.3	Rate of Change
	11.4	Product and Quotient Rules
	11.5	Chain Rule
	12.1	Derivatives of Logarithmic Functions
	12.2	Derivatives of Exponential Functions
07/05	12.3	Elasticity of Demand
	12.7	Higher-Order Derivatives
	13.1	Relative Extrema
	13.3	Concavity
	13.4	Second-Derivative Test
07/12	13.6	Applied Maxima and Minima
	14.2	Indefinite Integral
	14.3	Integration with Initial Conditions

Additional Suggested Homework Problems

These are suggested exercises you try from the textbook.

Chapter 1	Section 1.1	11, 17, 29, 33, 40
	Section 1.3	1, 3, 5, 7, 9
Chapter 2	Section 2.1	5, 13, 23, 31, 39
	Section 2.2	1, 3, 11, 32, 33
	Section 2.3	3, 7, 11, 15, 17
	Section 2.5	3, 9, 16, 18, 39
Chapter 3	Section 3.1	23, 27, 39, 55, 61
	Section 3.2	5, 15, 17, 21, 23
	Section 3.6	1, 9, 17, 19, 21
Chapter 4	Section 4.1	3, 7, 9, 11
	Section 4.2	3, 9, 19, 31, 59
	Section 4.3	5, 21, 35, 45, 47
Chapter 10	Section 10.1	3, 11, 15, 25, 33
	Section 10.2	13, 21, 23, 33, 41
	Section 10.3	1, 5, 9, 12, 25
Chapter 11	Section 11.1	3, 5, 7, 12, 15
	Section 11.2	17, 25, 33, 45, 47
	Section 11.3	13, 19, 21, 23, 30
	Section 11.4	3, 15, 21, 27, 33
	Section 11.5	1, 7, 11, 19, 25
Chapter 12	Section 12.1	3, 5, 11, 25, 43
	Section 12.2	3, 5, 11, 13, 25
	Section 12.3	3, 5, 15, 17, 19
	Section 12.7	1, 3, 5, 9, 11
Chapter 13	Section 13.1	1, 3, 35, 57, 71
	Section 13.3	7, 9, 29, 35, 63
	Section 13.4	3, 5, 8
	Section 13.6	17, 19, 27, 32, 33
Chapter 14	Section 14.2	3, 5, 9, 15, 21
	Section 14.3	1, 11, 13, 15, 21