



Department of  
Mathematics  
*Franklin College of Arts and Sciences*  
**UNIVERSITY OF GEORGIA**

**Math 2250 – Calculus I for Science and Engineering  
Section 42799  
Spring 2020**

**Course Instructor Information**

Instructor: Dr. Jennifer Royal

Pronouns: she/her/hers

Email: [jroyal@uga.edu](mailto:jroyal@uga.edu)

Office: Boyd 637A

Office Hours: M 2:30 p.m.-3:30 p.m., W 12:15 p.m.-1:15 p.m., F 10:15 a.m.-11:15 a.m.,  
and by appointment (email [jroyal@uga.edu](mailto:jroyal@uga.edu) to schedule), in Boyd 637A

Website: <https://faculty.franklin.uga.edu/jroyal/math-2250-spring-2020>

**Course Meeting Information**

Meetings: MWF 9:05-9:55, T 9:30-10:45

Location: Boyd 204

UGA MATH 2250 Website: <http://www.math.uga.edu/2250>

**Communication Preferences**

I strongly prefer that you contact me via my UGA email address. Include your full name and course record number (CRN 42799) in your email, and be sure to email me from your UGA email address.

**Office Hours**

Office hours are times that I set aside especially for students to come and discuss math. When you come to office hours, you can arrive at any time that is convenient for your schedule (not just at the beginning). Be sure to allow yourself enough remaining time to ask questions. Here are some things we can do during office hours:

- go over problems you are stuck on
- talk about questions from class work
- discuss strategies for studying, taking exams, etc.
- talk about how you are doing in the class

If you want to speak privately during office hours (e.g. about your grades), let me know.

If you want to meet with me individually outside of office hours, please make an appointment by email at least 24 hours in advance. If you receive a grade of D or F on any assignment, I expect you to schedule a meeting with me as soon as possible.

**General Class Information**

**Course Description**

In this course we will work to develop your critical thinking skills. This course focuses on using the derivative to better understand the behavior of functions. We will discuss the limit, the derivative, and the antiderivative, both conceptually and computationally.

Throughout the semester, we will use calculus concepts to model and solve various

problems in science and engineering, with particular emphasis on graphs, optimization problems, and basic integration problems. In these science and engineering problems, we will focus on how to transfer course knowledge to specific applied scenarios.

### **Diversity and Inclusion Statement**

In this classroom, ***you will be treated with respect***, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class. (Source: modified from a statement provided by the American Society of Engineering Education)

### **Classroom Expectations**

We will discuss mathematics together on a daily basis. These discussions are important because they provide for a richer classroom discussion, and they ensure that we all encounter different ways – correct and/or incorrect – of thinking about the material. It will be important for you to listen attentively to your peers' thinking, even if you think you already have a full solution to the problem being discussed. I expect you to respond respectfully and carefully to your peers' comments. When you are working in groups, I expect you to help your group members to all work at the same pace; it will be important for you to keep your peers informed about the choices you are making, and for you to check in with them to make sure they follow your thinking and are ready to move on.

### **Program-Level Learning Outcomes**

At the end of the degree program, a successful student will be able to apply the methods of calculus to set up and solve real world problems in science and engineering.

### **Student Learning Outcomes**

At the end of the semester, a successful student will be able to:

1. Calculate and interpret basic trends, rate, and accumulation using the limit, the derivative, and the integral, respectively.
2. Use a function's graph to:
  - a. Identify increasing/decreasing behavior and critical numbers of the first or second derivative of the function
  - b. Identify extrema
  - c. Determine limits
  - d. Identify points of continuity/discontinuity
  - e. Identify asymptotes
  - f. Identify points where function is/is not differentiable
3. Use information (a formula or table and/or first or second derivative, etc.) about a function to predict:
  - a. Behavior of the function and/or its first or second derivative
  - b. Extrema

- c. Limits
  - d. Points of continuity/discontinuity
  - e. Asymptotes
  - f. Identify points where function is/is not differentiable
4. Apply calculus to solve an application problem by selecting an appropriate model, identifying an appropriate calculus technique, using the calculus technique on the model to solve the problem, and interpreting the solution in context.
  5. Effectively communicate mathematics, in writing and orally, with their peers and with the course instructor.

**Course Prerequisite**

MATH 1113 or permission of department

**Assignments and Grading**

**Course Grade** Your numeric grade will be calculated using the following percentages:

Gateways	20% (5 gateways worth 4% each)
In-class Exams (4)	40% (4 exams worth 10% each)
Final Exam (Mass Exam, Cumulative)	25%
Hand-in Problems	5%
Workbook Checks	5%
Participation	5%
WeBWork	0% (totally optional)
Total	100%

**Gateways**

Gateways will assess your understanding of the routine, computational skills required for success in this course. These skills primarily fall under Student Learning Outcome 1. Typically, these skills will be skills covered in the outside-of-class videos, and they will primarily be assessed via the gateways (and not on the midterms). These topics are “gateway” topics in the sense that you must be proficient in these skills in order to be successful in the higher-order learning outcomes of the course (Student Learning Outcomes 2, 3, and 4).

Gateways will be given in class, on paper; each gateway will also have an optional “retake” during another specified class meeting. When you retake a gateway, your grade on the retake *will be capped at 90%*. (See the course schedule for tentative

dates.) Your recorded grade for a gateway will be the maximum of your first attempt grade and your second attempt grade. In general, these assignments will take 15-30 minutes of our class time.

No makeup gateways will be given. If you are absent from a scheduled gateway, and your absence is excused (generally, this requires a medical or legal explanation, with supporting documentation), you will be allowed to earn up to 100% on the retake attempt. If you know in advance that you cannot be in attendance for a particular gateway, discuss this with the instructor as early as possible.

Gateway 1: Precalculus Review: Algebra, Trig, and Models (Prereq knowledge)

Gateway 2: Limits

Gateway 3: Differentiation Rules and Implicit Differentiation

Gateway 4: Extreme Values and the First Derivative Test

Gateway 5: Antiderivatives and Approximate Area

### **In-class Exams**

Our in-class exams will be traditional exams given during class time. Most questions will be free response, although we may occasionally have some multiple choice and/or true/false questions. Midterms will focus on higher-level tasks, which will also be the focus of our class time.

No makeup exams will be given, and these exams may not be repeated. If you are absent from a scheduled in-class exam, and your absence is excused (generally, this requires a medical or legal explanation, with supporting documentation), the grade for the missing exam will be replaced with your final exam grade. If you know in advance that you cannot be in attendance for a particular midterm, discuss this with the instructor as early as possible.

Tentative exam dates are listed below; any changes to the testing schedule will be announced by the instructor in class and/or by email.

Exam 1: Tuesday, February 4

Exam 2: Tuesday, February 25

Exam 3: Tuesday, March 31

Exam 4: Tuesday, April 21

Final Exam: Thursday, April 30, from 7 p.m. to 10 p.m.

### **Final Exam**

In this course we have a mass final exam. The final exam is comprehensive, meaning that it covers everything from the whole semester. Students from all sections of MATH 2250 take the same exam at the same time, in a location determined by the registrar (location TBD in March/April). This semester, the mass final exam for MATH 2250 is on Thursday, April 30, from 7 p.m. to 10 p.m.

If you have three or more exams scheduled during a 24-hour period, you are eligible to request a rescheduled exam; mass exams are to be rescheduled first if possible. See

the official university exam conflict policy for details:

<https://curriculumsystems.uga.edu/curriculum/finalExamConflicts/>

### **Hand-in Problems**

The purpose of working problems on your own is for you to continue developing your understanding of the material. Struggle is a part of the learning process; I hope that you will wrestle with problems you do not understand, and that you will grow and learn through this process. Please get help during office hours if you have questions.

Hand-in problems will deepen your understanding of course topics, and they will provide an opportunity for me to give you feedback on your written work. Some hand-in problems will be individual assignments, and others will be group work. These may be turned in at the end of class, or they may be taken up at the beginning of the next class. Hand-in problems will be collected on your own paper; you are responsible for showing complete work on each problem. If you have an excused absence with valid documentation on a day when I collect hand-in problems, I will drop the hand-in problems grade from that day.

### **Workbook Checks**

Each day that you present a complete\* pre-class workbook assignment *at the beginning of class*, you will receive full credit for that day's workbook check. Each day you will receive one of three grades: complete (2 points), partially complete (1 point), or not attempted (0 points). At the end of the semester, your workbook check grade will be calculated using the formula  $(\text{points earned})/(\text{possible points}) \times 5\%$ . You must present your physical workbook, with the notes written in the workbook itself, to receive credit for your workbook check. Photographs and/or digital copies will not be accepted. I will upload your Workbook Check grades approximately once per week on eLC.

\*By "complete" I mean that you filled in everything in the relevant Guided Exercises and made a reasonable attempt at each of the Practice On Your Own Problems.

### **WeBWork**

This course has a free online homework system called WeBWork. WeBWork is a good resource for practice problems for the gateways. In-class activities will give you a better idea of what you can expect in terms of midterm and final exam questions and skills, so I have decided to make the WeBWork problems optional.

You can access the WeBWork system at **URL TBD**. Your username for WebWork is your UGA myID, and your password is your nine digit 810 or 811 student number. For example, if your UGAMail address is xyz30602@uga.edu and your student number is 8114567890, then your username is xyz30602 and your password is 811456789. To access WeBWork off campus, you will need a VPN; here is a link to information about using a VPN with WeBWork: <http://www.math.uga.edu/webwork/VPN> If you have trouble setting up the VPN, please contact EITS so that they can help you get things working:

<https://confluence.eits.uga.edu/display/HDSH/Help+Desk+Support+%28HDS%29+Home>

## Letter Grades

Letter grades will be assigned using the following scale:

≥92	89-91	87-88	82-86	79-81	77-78	72-76	69-71	60-68	<60
A	A-	B+	B	B-	C+	C	C-	D	F

## Tentative Course Outline

The schedule and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better student learning.

Wk	Mth	Date	Day	Pre-class	Topic	OpenStax Section(s)	Gateways	
1	Jan	6	M					
	Jan	7	T	NA	Intro to Calculus: Graphs/Functions	2.1		
	Jan	8	W	A1	Algebra Review	Ch 1		
	Jan	10	F	A2	Trig Review	Ch 1	Gateway 1: Precalculus	
2	Jan	13	M	A3	Review of Models *drop/add ends	Ch 1		
	Jan	14	T	B1	Graphical Limits	2.2		
	Jan	15	W	B2	Limit Laws	2.3		
	Jan	17	F	B3	Continuity	2.4	Gateway 1 Retake	
3	Jan	20	M	Holiday: MLK Jr. Day				
	Jan	21	T	B3	Continuity	2.4		
	Jan	22	W	B3	Continuity	2.4		
	Jan	24	F	B4	Vertical Asymptotes	2.3	Gateway 2: Limits	
4	Jan	27	M	B5	The Derivative	3.1		
	Jan	28	T	B6	More on Derivatives	3.2		
	Jan	29	W	C1	Differentiation Rules	3.3		
	Jan	31	F	C2	Rates/Applications	3.4	Gateway 2 Retake	
5	Feb	3	M	Review				
	Feb	4	T	Exam 1	Exam 1: Units A,B			
	Feb	5	W	C3	Trig Derivatives	3.5		
	Feb	7	F	C4	The Chain Rule	3.6		
6	Feb	10	M	C5	Implicit Differentiation	3.8		
	Feb	11	T	NA	Exam 1 Deconstruction	NA		
	Feb	12	W	C6	Inverse Functions and Trigonometry	3.8, 3.7		
	Feb	14	F	C7	Derivatives of Exponential and Logarithmic Functions	3.9	Gateway 3: Differentiation Rules and	

							Implicit Differentiation
7	Feb	17	M	C7	Derivatives of Exponential and Logarithmic Functions	3.9	
	Feb	18	T	C8	Related Rates	4.1	
	Feb	19	W	C8	Related Rates	4.1	
	Feb	21	F	D1	Linearization/Differentials	4.2	Gateway 3 Retake
8	Feb	24	M	Review	Review		
	Feb	25	T	Exam 2	Exam 2: Unit C		
	Feb	26	W	D2	Extreme Values	4.3	
	Feb	28	F	D2	Extreme Values	4.3	
9	Mar	2	M	D3	Mean Value Theorem	4.4	
	Mar	3	T	D4	First Derivative Test	4.5	
	Mar	4	W	D4	First Derivative Test	4.5	
	Mar	6	F	D5	Concavity/Curve Sketching	4.5	Gateway 4: Extreme Values and the First Derivative Test
10	Mar	9	M	Spring Break Mar 9-13			
	Mar	10	T				
	Mar	11	W				
	Mar	13	F				
11	Mar	16	M	D5	Concavity/Curve Sketching	4.5	
	Mar	17	T	D6	Asymptotes and Curve Sketching	4.6	
	Mar	18	W	D7	Intro Optimization	4.7	
	Mar	20	F	D8	Optimization *withdraw deadline	4.7	Gateway 4 Retake
12	Mar	23	M	D8	Optimization	4.7	
	Mar	24	T	D8	Optimization	4.7	
	Mar	25	W	D9	L'Hopital's Rule	4.8	
	Mar	27	F	D9	L'Hopital's Rule	4.8	
13	Mar	30	M	Review	Review		
	Mar	31	T	Exam 3	Exam 3: Unit D		
	Apr	1	W	E1	Antiderivatives	4.ten	
	Apr	3	F	E1	Antiderivatives	4.ten	
14	Apr	6	M	E2	Approximate Area	5.1/5.2	
	Apr	7	T	E3	Exact Area; how to study for the mass final exam	5.1/5.2	
	Apr	8	W	E3	Exact Area	5.1/5.2	

	Apr	10	F	E4	The Definite Integral	5.2	Gateway 5: Antiderivatives and Approximate Area
15	Apr	13	M	E5	FTC	5.3/5.4	
	Apr	14	T	E5	FTC	5.3/5.4	
	Apr	15	W	E6	Substitution - Indefinite Integrals	5.5-5.7	
	Apr	17	F	E7	Substitution - Definite Integrals	5.5-5.7	Gateway 5 Retake
16	Apr	20	M	Review	Review		
	Apr	21	T	Exam 4	Exam 4: E1-E7		
	Apr	22	W	E8	Areas Revisited; check in on studying for the final exam	6.1	
	Apr	24	F	E8	Areas Revisited	6.1	
17	Apr	27	M	Review	Review		
	Apr	28	T	Review	Last class day: Monday class schedule		
	Apr	29	W	NA	Reading Day; No classes		
	Apr	30	TH		MATH 2250 Mass Final Exam, 7 p.m. - 10 p.m.		
	May	11	M		Grades due in Athena		
	May	12	T		Grades visible to students on Athena		

## Classroom Policies

### Course Materials

Our textbook is OpenStax Calculus I, Custom UGA Edition. You can print and bind the PDF if you would like to have a physical textbook. [Download the PDF from this link](#). (The web version does not include problem numbers, so be sure to download and use the PDF.) If you have problems accessing and/or viewing the UGA custom version, you can use the non-UGA version. (Google OpenStax Calculus Volume 1.)

For class, you will need to purchase\* a course notebook, available [through UGA Press at this link](#)). We are part of a special pilot this semester; UGA is working on ways to get course materials to students **at cost**, and the notebooks will be available for purchase at cost for \$15.75 plus tax. You will bring the course notebook to class every day. For the first few days of class, I will bring copies of the notebook pages you need, so you will have until the end of drop-add to purchase the notebook. Please let me know if you are having financial issues and are unable to purchase the notebook. (Email [jroyal@uga.edu](mailto:jroyal@uga.edu).)

\*You will receive the password for textbook purchase once the notebook has been printed. As of 1/1/2020 the password is not available yet.

You do not have to purchase or use a calculator. If you purchase a calculator, be sure



to get a [TI-30XS Multiview](#). The TI-30 XS Multiview is the only calculator allowed for this course, and sharing of calculators is not permitted. If you would like a calculator and are unable to purchase one, please send me an email and let me know.

Examples of calculators that are not allowed: TI-34, basic four-function, Casio (any model), TI-30X IIS, TI-36X Pro. If you are not sure if your calculator is allowed, I will look at it for you.

### **Announcements Policy**

I will make most announcements in class; I will send others to your UGA email. You are responsible for the content of all announcements, even if you miss class or fail to check your UGA email.

### **Email Policy**

I welcome emails from students; please give me at least 48 hours to respond. (For weekend emails, that means 48 business-day hours, which means Wednesday morning.) Be sure to work on assignments in advance so that you have enough time to get your questions answered.

### **Electronics Policy**

Laptops\*, cell phones, tablets\*, smart watches, etc., may not be used in class. You may not have a smart watch or other personal electronic device on your person during a quiz or exam; these devices must be stored in a backpack or purse. Your personal electronic devices must be in "silent" mode during class; a ringing or vibrating device disrupts the classroom experience. I understand that there may be times when you need to be connected (childcare issues, family emergencies, etc.). If such a situation arises, please step outside and address these as needed. If you repeatedly violate this policy, you will be asked to leave the room immediately. No exceptions.

\* I will make one possible exception to this policy. If you are legitimately using one of these devices for note taking purposes, you must request permission from me in person. If granted, you may be required to email your notes to me at the end of every class. I reserve the right to revoke permission if I feel this policy is being abused or becomes disruptive to others.

### **Attendance Policy**

A student who is not fully engaged in class activities is considered absent for the day. Students are allowed no more than 3 unexcused absences. On the fourth unexcused absence, a student may be withdrawn from the course with a grade of W before midpoint, F after midpoint. Do not regard these 3 allowed absences as "personal free days". These are only to be used in cases of personal or family emergencies. In some cases, verification may be required. I will work with any student who has a documented emergency, so please let me know as soon as possible if something is going on. Social functions, work, weddings, etc. do not count as excused absences, but documented medical emergencies and active duty military service are excused absences. Let me know if you will miss class for an excused absence; if so, I may allow you to complete

in-class assignments early. In the event that the university cancels our class, any assignments scheduled to be due that class day will be due the next time the class meets.

### **Deadline Policy**

Any work that is not submitted on time will receive a grade of zero. You are responsible for submitting assignments on time, even following an absence (excused or unexcused).

### **Academic Honesty Policy**

As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty," and the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty" found at: <https://honesty.uga.edu/Academic-Honesty-Policy/>. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

### **Specific Academic Honesty Guidelines for This Course**

You may not discuss a graded assignment with other students until that assignment has been graded and returned to you, unless you have been given explicit permission to do so. You are encouraged to discuss homework with others. The following are examples of academic dishonesty and are prohibited in this course:

- getting an answer by finding a solution to a similar problem and changing the numbers to your own numbers without thinking through (and working through) the steps on your own
- getting someone (or an app) to work a problem for you and submitting the work as your own
- using unauthorized materials during a testing situation (e.g. exams) including cheat sheets, the internet, another person's test paper, an unauthorized calculator, etc.
- having a cell phone or smart watch accessible during a testing situation, even if you are not using it to find problem solutions

This is not an exhaustive list; it is meant to give you an idea of prohibited activities.

## **General Operating Policies and Procedures**

### **FERPA Notice**

The Federal Family Educational Rights and Privacy Act (FERPA) grants students certain information privacy rights. See the registrar's explanation at <https://apps.reg.uga.edu/FERPA/>

### **Course Evaluations**

I encourage you to complete the online evaluation near the end of the semester. Student evaluations of teaching are used by university administrators to evaluate instructional faculty. I also take your feedback seriously; note that it is delivered anonymously and is not visible to me until after I have submitted all final course grades.

**Office of Student Care and Outreach**

If you have a personal crisis during the semester, you will want to contact the Office of Student Care and Outreach so that they can support you:

<https://sco.uga.edu/sco/services-students>

**Accessibility Statement**

If you anticipate issues related to the format or requirements of this course, please meet with me. I would like us to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with the Disability Resource Center located in Clark Howell Hall (Voice: 706-542-8719 or TTY: 706-542-8778 or Web: <https://drc.uga.edu>) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations. If you have a documented disability, I strongly encourage you to register now with the DRC so you have access to any accommodations that you may need throughout the semester.

**Disclaimer** The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary. It is the responsibility of the student to seek clarification of the grading policy and/or course requirements and procedures from the instructor.