

# MA 123: Elementary Calculus and its Applications

Welcome to Math 123! This course is an introduction to differential and integral calculus, with applications to business and the biological and physical sciences. We cover differentiation of rational, radical, and exponential functions, integration as area, and using the fundamental theorem of calculus to integrate certain elementary functions. We cover applications to increasing and decreasing functions, concavity, optimization, and related rates.

This website contains almost all the information you will need this semester, including the official text for the course, contact information for your instructors, policies for grades and absences, worksheets used during recitations, important dates and deadlines, and more.

## Texts:

The [Course Text](#) given on this website is the primary means of instruction for the course. These notes are largely based on the optional text **Calculus** by Elliot Gootman. Gootman's text is very readable and has many worked out examples, and often provides more detail than the lecture notes available here.

## Goals:

This course will cover the topics from the first ten chapters and supplement of the [Course Text](#). All of these topics are covered in the online homework sets.

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

1. Evaluate limits of functions given graphically or algebraically;
2. Compute derivatives of algebraic, logarithmic and exponential functions, and combinations of these functions; Interpret the derivative as a rate of change, and solve related application problems;

3. Use the first and second derivatives to analyze the graphs of functions, to find the maximum and minimum values of a function, and to solve related application problems;
4. Interpret the definite integral in terms of area, and solve related application problems;
5. Integrate selected functions, and apply the fundamental theorem of calculus to evaluate definite integrals.

### **Prerequisites:**

You should have a strong understanding of college algebra. Specifically, you should have a Math Index of 74 or above, or a Math ACT score of at least 26, or a Math SAT or 600 or above, or a grade of C or better in Math 109, or consent of the department. If you have a weak algebra background it is essential that you immediately brush up on this prerequisite. Most students who do not do well in calculus find that the required algebra is a major roadblock.

Helpful resources if you need to brush up on algebra, geometry, or arithmetic:

- [OpenStax College Algebra](#) A free, online open source textbook on College Algebra available through OpenStax.
- [Stitz and Zeager's College Algebra](#) A free open source College Algebra text. [Print versions](#) also available for a small fee.
- [The Khan Academy](#) Free video lectures on many mathematical topics.

### **Policies**

#### **Grading:**

Your grade will be calculated out of a total of 565 points, earned as follows:

Exam 1:	100 points
Exam 2:	100 points

Exam 3:	100 points
Exam 4:	100 points
Homework:	100 points
Recitation:	40 points
Lecture:	25 points

The homework score will be computed as follows. There are more than 265 homework problems in the course, but the homework grade will be based on your best 265 problems, with only 240 required for full credit. Thus, if you answer  $X$  homework problems correctly, your homework score will be  $X/240$  times 100. If you answer more than 240 problems correctly you will earn bonus points; the maximum allowed score is 110. (Technically, if you answer  $X$  homework problems correctly, your homework score will be  $(\min(X,265)/240)$  times 100).

Your final grade for the course will be based on the total points you have earned as follows.

A: 508-565

B: 452-507

C: 395-451

D: 339-394

E: 0-338

### **Recitation:**

The recitation/participation points will be awarded for actively engaging in discussions in recitation, performance on worksheets, and performance on quizzes. Each recitation instructor will provide a handout on the first day explaining the policies and grading specific to their sections.

### **Lecture:**

The lecture portion of your grade is based on active participation in lecture (the Mon-Wed-Fri meetings). You will participate in class using your phone, laptop, or other

device with an internet connection. You will need to create an iClicker REEF polling Student account and purchase a subscription. When setting up your account, please use your student ID number without the leading 9, and your official UK email address. A 180-day subscription costs \$14.99, and can be purchased directly through REEF or by buying an access code from one of the university bookstores. If you have any difficulties with obtaining an account or with bringing a phone or laptop to class, please see your instructor. If you are using iClicker REEF Polling in another class this term, you only need one subscription. You can access our iClicker REEF course by using the REEF Polling link on the Modules tab of our Canvas course page. **[For more information about REEF Polling click here.](#)** See below for information about absences from lecture.

### **Excused Absences:**

Excused absences are granted according to **[University Senate Rule 5.2.4.2](#)**, which defines the following as acceptable reasons for excused absences: serious illness; illness or death of family member; University-related trips; major religious holidays; other circumstances your instructor finds to be "reasonable cause for nonattendance".

The procedure for handling an absence varies based on whether you are missing an exam, a lecture class, or a recitation class.

### **Missing an exam:**

Absences from exams should be **[reported \(in advance\) on this form.](#)** Students who have university excused absences or who have university-scheduled class conflicts with uniform examinations need to make arrangements to take exam at an alternate time. According to **[university policy](#)**, it is the student's responsibility to resolve scheduling conflicts with common hour exams, and this must be done at least TWO WEEKS before the exam. If you fail to inform your instructor of exam conflicts in timely manner, a penalty may be assessed on your exam score and you will be required to take the exam at one of the already scheduled alternate exam times. To

avoid any problems [request alternate exams](#) here as soon as you know you may have a conflict.

### **Missing a lecture class:**

For lecture attendance, your clicker grade will automatically allow you to have up to five excused absences without providing any documentation. If you are absent, please collect your documentation in a safe place and keep careful count. **If you accumulate six or more EXCUSED absences from lecture, you should provide official documentation for ALL of the absences to your lecturer within one week of the sixth excused absence (and for any absence thereafter).** (In other words, in order to drop more than five days of lecture, you need to bring MORE than five days' worth of verifiable excuses.)

### **Missing a recitation class:**

Recitation attendance is required. Because recitation meets only once a week, you should make every effort to attend. For policies about handling excused absences, see your recitation instructor for details. Contact information is on the [Sections and Instructors](#) page. Generally, you will be required to make up the work you miss in a timely fashion.

### **Calculator Policy:**

During exams, we allow the same calculators as the [ACT allows](#); no Computer Algebra System (CAS), no network (data or wifi), no camera. Absolutely no cell phone use during an exam is allowed. A good scientific calculator will be sufficient, as long as it has exponential and ln functions; occasionally a graphing calculator (such as a TI-84) may be helpful but is not required. It is recommended that you practice with whatever calculator you plan to use during the exams.

### **Disability Accommodations:**

If you have documented disability that requires academic accommodations, please see your lecturer as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide a Letter of Accommodation from the [Disability Resource Center](#) (Suite 407, Multidisciplinary Science Building, 859-257-2754, email address [drc@uky.edu](mailto:drc@uky.edu)) for coordination of campus disability services available to students with disabilities.

### **Academic Integrity, Honesty, and Cheating:**

You should feel free to study with friends, but any work you submit for a grade should be your own work. This applies to all exams, quizzes, and writing assignments, with the exception of assignments that are specifically designated as group assignments. Academic dishonesty, in any form, will not be tolerated. This includes, but is not limited to, having someone else bring your clicker to class, using multiple people's clickers during class, copying a classmate's work, allowing a classmate to copy your work, having someone else turn in a quiz for you, turning in a quiz for someone who was not there, modifying an exam after it has been handed back in an attempt to deceive the instructor into believing the assignment was graded incorrectly, using cell phone during an exam. A student found guilty of academic dishonesty will receive an automatic E on the assignment, and in some cases the offense may lead to an E for the course, academic probation, or even expulsion. See [sections 6.3.1 and 6.3.2 of the University Senate Rules](#) for more information regarding academic integrity.

### **Classroom decorum and civility:**

Students are expected to be actively participating during class. Students are also expected not to distract others. If you arrive late, leave early, are distracted by your phone, or are otherwise not actively engaged with the class you may not receive credit for participating that day. If you are disrupting class, you may be asked to leave.

College-level mathematics can be very difficult, and many of your classmates will be having a hard time adjusting both to the university and to the demands of the class. You are expected to treat your classmates with respect. It is reasonable to disagree, but you should express your disagreement respectfully. Personal attacks or statements denigrating another on the basis of race, sex, religion, sexual orientation, gender or gender expression, age, national/regional origin or other such irrelevant factors are considered a severe disruption. Harassment will not be tolerated.

**Non-Discrimination Statement and Title IX Information:**

The University of Kentucky faculty are committed to supporting students and upholding the University's non-discrimination policy. Discrimination is prohibited at UK. If you experience an incident of discrimination we encourage you to report it to Institutional Equity & Equal Opportunity (IEEO) Office, 13 Main Building, (859) 257-8927.

Acts of Sex- and Gender-Based Discrimination or Interpersonal Violence: If you experience an incident of sex- or gender-based discrimination or interpersonal violence, we encourage you to report it. While you may talk to a faculty member or TA/RA/GA, understand that as a "Responsible Employee" of the University these individuals MUST report any acts of violence (including verbal bullying and sexual harassment) to the University's Title IX Coordinator in the IEEO Office. If you would like to speak with someone who may be able to afford you confidentiality, the [Violence Intervention and Prevention \(VIP\) program](#) and [Bias Incident Support Services](#) (Frazee Hall – Lower Level), the [Counseling Center](#) (106 Frazee Hall), and [University Health Services](#) are confidential resources on campus.

Corrections to ewhitaker@uky.edu.