MA 123: Elementary Calculus and its Applications

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.

Texts:

The lecture notes listed in #2 are the primary means of instruction for the course. These notes are based on the text listed in #1. The text is very readable and has many worked out examples. The text often provides more detail than the lecture notes.

1. **Calculus** by Elliot Gootman. The book is published by Barron's, and it will be the primary text for the course. The book can be purchased from the bookstores or online. We shall cover the material in the first ten (10) chapters of this book, as well as appendix B.
2. **Online Course Notes.** The **course text** will be used as the primary means of instruction.

Goals:

This course will cover the topics from the first ten chapters and appendix B of the text, Calculus, by Gootman. 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 and an ACT score of at least 26 or a score of 70% on the placement exam. 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:

- **MA 109: College Algebra** Website for UK's On-line College Algebra from Summer 2014. This page includes video lectures on many topics from MA 109.
- **Fine's College Algebra** Free on-line version of a classic College Algebra text.
- **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 polices 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 and browser. You will need to create a REEF Student account and purchase a subscription. 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 are using REEF Polling in another class this term, you only need one subscription. You can access our REEF course by using the REEF Polling link on the Modules tab of our Canvas course page. See **https://reef-education.com/get-started/for-students/** for more information about REEF polling. If you have any difficulties with access to your account or with bringing a phone or laptop to class, please see your instructor. See below for information about absences from lecture.

Excused Absences:

Excused absences are granting 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".

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.

For lecture attendance, your clicker grade will automatically allow you to have up to five excused absences without providing any documentation. **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).**

For recitation attendance, see your recitation instructor for details.

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 jkarnes@email.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.

Corrections to ewhitaker@uky.edu.