Mathematics 118, Calculus I, Fall 2011

Instructor
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Class Meetings
MWF, 11:30am-12:35pm
Class starts promptly at 11:30 a.m. Please arrive on time, ready to start class at 11:30 a.m.

Required Materials
*Calculus, Single Variable* (4th Edition), by
Hughes-Hallett, Gleason, McCallum, et al.
A graphing calculator. I recommend the TI-83 or TI-84

Network Resources
Moodle   http://courses.agnesscott.edu
Egrade   http://aca-egrade.agnesscott.edu/classes/118BF11/

Goals
• Learn to examine mathematical concepts graphically, numerically, and algebraically.
• Be able to define, describe, and apply the concepts of calculus to include derivatives and definite integrals.
• Learn to work with the basic computations of calculus.
• Develop skills in problem analysis and problem solving.
• Learn to use and trust your intuition to better understand how to interpret and solve problems.
• Learn to interpret real-world problems in the language of mathematics.
• Be able to use graphing calculators as computational tools for understanding and solving problems in calculus and its applications
• Learn to communicate mathematics effectively, both verbally and in writing.

Topics
• A Library of Functions: Chapter 1, sections 1–7
• Key Concept–The Derivative: Chapter 2, sections 1–6
• Shortcuts to Differentiation: Chapter 3, sections 1–7
• Using the Derivative: Chapter 4, sections 1, 3, 5, 6, 8
• Key Concept–The Definite Integral: Chapter 5, sections 1–4

Office Hours and Sources of Help
I have open door office hours. If my door is open, you are encouraged to stop by my office at any time when you have questions or problems and if I am not busy I will be happy to work with you. You may also stop by to make an appointment for a time that is mutually
convenient. Another good way to contact me is through email, particularly during the evenings or weekends. I promise to respond to your email as quickly as I can.

You are also encouraged to work with the learning assistants assigned to this course, in the afternoons and evenings in the Math Learning Center in Buttrick G-12. Their hours will be listed on the Math Learning Center schedule posted on Moodle and the math department website. These are times when you are encouraged to drop in and work alone or with others and chat about your progress, but you are, of course, also welcome to visit the Learning Center at any of the times it is open. Students who attend these sessions on a regular basis often find them beneficial.

**Reading the Text!**

*In this course, it is absolutely essential that you do the reading assignments.* Your experience with previous math courses may make this seem unlikely, since it may have been possible to avoid reading the text, yet do adequately well by copying down the examples the instructor did in class and then doing the homework exercises by just changing the numbers in those “pattern examples” and the pattern examples given in the text. Unfortunately, this approach resulted in students being able to do the mechanical computations quite well, but having no real understanding of the material and no real ability to apply it in situations that are even a little bit different from that covered by the pattern examples. This is one factor that led to the national movement toward reformed courses, like Math 118, stressing understanding. This modern approach to learning requires new methods in the classroom emphasizing learning rather than lecturing, as well as new texts such as the one for this course.

Doing the problems requires an understanding of the material in the text, not just the ability to change numbers in pattern examples. Also, I will be counting on you to read the text since I will not be lecturing very much and will be relying on you to have seen the material before we work with it in class.

Since the reading is so important, some hints on how to do it might be helpful. You may find that slight variations on the following scheme will work for you.

- a. Plan on doing the reading more than once, and do not make it an essential goal to understand everything in the reading the first time through it. The first reading should be devoted only to getting a general overview of the material of the section.
- b. After the first reading, stop for a few minutes and attempt to summarize to yourself, in your own words, what the section is all about. Then immediately reread the section.
- c. During the second reading, make a serious effort to understand all of the material in the section. This does not mean to memorize it, but rather to understand all of the points before going on.
- d. If you do not understand something during the second reading, put the book aside awhile and return to it later when your mind is fresher. If you still do not understand it after returning to it, ask me or some other members of the class about it. Do make sure you eventually understand all of the material. You will probably get tripped up in later reading, in doing the homework, or on tests if you treat material you don’t quite understand as “probably not all that important.”

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1 Adapted from materials by Bob Megginson, University of Michigan Mathematics Department.
e. Do not get discouraged if some points require some time to understand. It is not uncommon to have to think about a point in a math text for a half hour (or more, for more complicated concepts) before it becomes clear what is really going on.

Do not just accept mathematical statements or graphs of functions depicted in the text, but try to verify these statements and graphs yourself. Working with your graphing calculator while you read the text is a good way to do this. Often the book will ask you to try something. When it does, try answering the book’s question before reading further. If you have questions, ask in class, stop by my office, or send me email.

**Assessment**

You will be given homework problems to do from each section we cover. You will need to take the responsibility to keep up with these problems and work on the appropriate problems as we cover those sections in class. You should plan to work on these problems on a daily basis. You are encouraged to work with others on homework problems and check each other’s work. You may ask questions about them in class or come talk to me about the problems. You are expected to check your answers to the odd-numbered problems in the back of the book. Answers to selected even-numbered problems will be checked using the Egrade web site. You may rework any of the Egrade problems until you correctly solve them. I will keep track of how many of the Egrade problems you successfully complete and this will factor into your course grade. The purpose of the homework is to help you learn the concepts and techniques for working with calculus, and to prepare for the exams. Therefore you should work on the homework on a daily basis as we cover each section. Read that last sentence again. And again! It is a violation of the Agnes Scott College Honor Code to simply copy another student’s answers into Egrade. By doing so you will not learn anything and you will not have benefitted from the active process of thinking about the problems and how they should be approached. So work with others, but make sure you understand and can replicate solutions to all problems you solve.

In addition you will be given some problem sets that I will ask you to write up and submit for me to grade. You are encouraged to work together on all these problems, but each student is always expected to write up (and understand) her own solutions. The problem sets do not fully cover the entire scope of the course and you should not use them as a substitute for the daily homework assignments.

The homework assignments and problem sets can be found at the course site on Moodle.

Information about homework problems and assignments will be posted on Moodle so I expect you to check Moodle on a regular basis.

**Differentiation Proficiency Skills.** All Calculus I students will be expected to pass a test on basic “differentiation proficiency skills”. This test will have 8 differentiation problems (chapter 3 stuff) and you must get each problem correct in order to pass. You may re-take the test as often as needed until you pass it. The test will be taken using the Egrade software which will provide immediate feedback on your score. This test is about 5% of your final grade, and no partial credit will be given.
Class involvement is important. This includes your attendance and punctuality, your attitude, your willingness to contribute ideas and questions, to listen to your peers, and to be a contributing partner in collaborative efforts.

There will be three take-home exams and a final. These will be closed book. The following tentative schedule is subject to change. Watch Moodle for more precise information.

- Test 1: Wednesday, September 14, due Friday, September 16
- Test 2: Monday, October 10, due Wednesday, October 12
- Test 3: Monday, November 14, due Wednesday, November 16

The final will cover material from the entire semester.

For the take-home exams, you may use your calculator, a pencil, and the exam. You are forbidden from using your textbook or your notes or any other sources (including people, of course). All exams must be pledged to indicate you took the exam under the Agnes Scott College Honor Code.

Honor Code and Plagiarism

All students are expected to follow the Agnes Scott College Honor Code in this class. You are encouraged to work together on the homework and problem sets for this course, but each student is always expected to write up (and understand) her own solutions. Working with someone else to understand an idea or a concept or even the requirements of an assignment is group learning and is encouraged. But once you understand what you were struggling with, you should complete the assignment individually, giving the work your own identity. You should never copy another student’s work to submit as your own. Take-home exams should be done according to the conditions specified for each exam, and you should never receive assistance from anyone else with problems on an exam. When you pledge your work, you are pledging that you have followed all these guidelines.

Computing Resources

We will make frequent and important use of a graphing calculator to help us learn about functions and to work with functions to solve real problems. You will use a graphing calculator for much of the work in the course. The philosophy we will take can be summarized by the following adaptation of a quote from *Elementary Differential Equations, 5th Edition*, by William Boyce and Richard DiPrima:

“For you, the student, these various computing resources have an effect on how you should study functions. It is still essential to understand the behavior of standard functions, and this understanding is achieved, in part, by working out a sufficient number of examples in detail. However, eventually you should plan to delegate as many as possible of the routine (often repetitive) details to a calculator while you focus more attention on the proper formulation of the numeric, graphic, and analytic methods so as to attain maximum understanding of the behavior of functions and of the underlying processes that the functions model. Our viewpoint is that you should always try to use the best tools available for each task. Sometimes this is a pencil and paper; sometimes a calculator (or computer). Often a judicious combination is best.”
Attendance
Regular attendance for this class will be very important since much of our class time will be spent on discussing problems or working in small groups on problems or computing experiments. It is therefore expected that you will attend and be prepared for every class, and that you will arrive to class on time. You are responsible for all material discussed in class whether you are there or not, and for submitting all work before the due date. Approval for extensions must be obtained in advance. An excessive number of unexcused absences or being late to class may result in a reduction of your course grade.

Disabilities
If you have a disability that may have some impact on your work in this class and for which you may require accommodations, please see Machamma Quinichett in the Office of Academic Advising to register for services. Students that receive accommodation checklists, please meet with me to discuss the provisions of those accommodations as soon as possible.

Course Evaluation
The completion of course evaluations is an expectation of students in this class. Your feedback on the course is extremely valuable to me. In particular, I take your comments very seriously and use them to improve the course the next time I teach it. You are responsible for completing an on-line evaluation of the course at the end of the semester. You will receive more details later via email.

Grading (I reserve the right to change the point allocation if necessary)
Your grade will be determined by applying the most favorable of the following two weighting schemes. I use a 10 point scale, using plus and minus as appropriate. So 90% guarantees you at least an A–, 80% guarantees at least a B–, 70% guarantees at least a C–, and 60% at least a D–.

Your two best exams (100 points each)............................................ 200 points
The remaining exam ................................................................. 75 points
Final exam ................................................................................. 125 points
Egrade Homework and Problem sets........................................ 100 points
Differentiation Proficiency Skills .............................................. 25 points
Total .......................................................................................... 525 points

Or

Three exams (100 points each)......................................................... 300 points
Final exam .................................................................................. 100 points
Egrade Homework and Problem sets........................................... 100 points
Differentiation Proficiency Skills ............................................... 25 points
Total .......................................................................................... 525 points