

Mathematics 119 Section A Spring 2003

"A theory is the more impressive the greater the simplicity of its premises is, the more different kinds of things it relates, and the more extended is its area of applicability."

- ALBERT EINSTEIN

"It seems to me that the poet has only to perceive that which others do not perceive, to look deeper than others look. And the mathematician must do the same thing."

- SONYA KOVALEVSKY

Instructor:

Dr. M. Lewin, Buttrick 325, telephone #6201, mlewin@agnesscott.edu
MF 9:00 - 9:50 and TTh 9:30 - 10:20 in Buttrick 201.

Required Materials:

- *Calculus, Single Variable*, Third Edition, Hughes-Hallett, Gleason, McCallum et al.
- A graphing calculator. We recommend either the TI-83 or the TI-86.

Network Resources:

- Blackboard <http://blackboard.agnesscott.edu>
- Egrade <http://aca-egrade.agnesscott.edu/classes/math119A/>

Course description and objectives:

Calculus is one of the great collaborative ventures in mathematics. The germs are evident in the mathematics of the ancient Greeks and other cultures, the ideas develop and mature at different times and on different continents, and what we now learn is the culmination of the genius of many great minds. The first two semesters of calculus (largely single variable calculus) begin a journey that continues into multivariable calculus, and then into more exotic settings. You are invited to continue your personal journey in Calculus II, Mathematics 119.

The course will continue the development in mathematics 118 (calculus I). After a brief review of chapters 5, we will study most of chapters 6 through 11 of the text. We will continue to focus on problem solving skills and coherent writing. The course will have a slightly more theoretical flavor than did MAT118, and the problems may be more sophisticated (but you are better prepared for this). You are expected to be graphing calculator literate.

Chapter 6 deals with constructing antiderivatives and the second Fundamental Theorem of Calculus; chapter 7 develops techniques of integration; chapter 8 deals with applications of the integral in geometry, physics and economics, and introduces the ideas of probability; chapters 9 and 10 develop infinite series and series representations of functions; and chapter 11 is an introduction to differential equations.

As we begin the course, you should:

- Read through parts of Chapter 5 and the first two sections of chapter 6 as a review of the definite integral (the Riemann integral), and of the antiderivative (indefinite integral), and make sure you understand the Fundamental Theorem of Calculus.

By the end of the course, you should:

- Have a thorough understanding of the concepts of calculus including derivatives and definite and indefinite integrals, and an ability to interpret these concepts graphically, numerically and algebraically;
- Understand the role of infinite series in describing functions, and have a working knowledge of the more common series;

- Understand the role of differential equations and their solutions in describing real world phenomena;
- Be capable of using and trusting your intuition (including your geometric intuition) to better understand how to interpret and solve problems;
- Be able to interpret real world problems in the language of mathematics, and be skilled at mathematical modeling;
- Have much improved mathematical problem solving and algebraic manipulative skills, and a developing ability to work with abstraction;
- Be able to communicate mathematically (through writing and speaking), and understand its importance.

Office Hours and Sources of Help:

- Almost all course materials are available on the class page in Blackboard. You are expected to consult this regularly. These resources include announcements, assignments, and handouts.
- I don't schedule official office hours. But instead, I have a two week schedule on the white board in my office, the door is seldom shut, and you are encouraged to just stop by, call or email me, or pop by to schedule a time with me at your convenience. I also spend at least one hour a week (time TBA) in the Mathematics Learning Support Center (Buttrick 101A).
- You are encouraged to work among yourselves, on your own, with the learning assistants assigned to this course, or with Ms. Schwarzlose, the Learning Support Coordinator, in the afternoons and evenings, in the Mathematics Learning Support Center (Buttrick 101A). The weekly schedule is posted for your convenience both on Blackboard and on bulletin boards in Buttrick. Please be aware that not all learning assistants are specifically prepared to help with this course, and that learning assistants are themselves students, so don't expect miracles from them. But you are encouraged to plan some time in room 101A each week as a regular part of your math study, knowing that if you get stuck, need a nudge, or want to just chat, that someone is there to share that chatting or to do that nudging. Students who do this on a regular basis tend to enjoy the camaraderie, and to do well in my math courses.

Grading:

Your final grade will be computed as follows¹:

Reading responses	25 points	5%
Participation and class attendance	25 points	5%
Egrade problems (even numbered problems)	25 points	5%
Graded homework problems and projects	100 points	20%
Integral Proficiency Test (all or nothing)	25 points	5%
Class work subtotal: 40% of final grade		
Three midterm tests (70 points each)	210 points	42%
Final Exam:	90 points	18%
Test subtotal: 60% of final grade		
Total:	500 points	100%

I use a ten point scale, using + and - as appropriate. So 90% guarantees you an A-, 80% a B-, 70% a C-, and 60% a D-.

¹ I reserve the right to make minor changes to this as necessary.

Assignments and Class Participation:

- ⇒ Before each class, you will be expected to **read the section in the text** for that class. After the class, you should study the material we did in class critically, and read the text again. If you do this **every single class day**, and do regular homework problems, everything else will be easy. Sporadically, you will be asked to complete a 3X5 card with a question on the reading for that day. These will be graded S/U, with + and -. Five S+'s will earn you 25 points, five S's 20 points, and five S-'s 15 points. **(25 points or 5% of the final grade).**
- ⇒ **Participation** includes your attitude, attendance and punctuality, your willingness to contribute ideas and questions in class, to listen respectfully to others, to show by your responses in class that you are current in your work, and to be a contributing partner in collaborative efforts. You are expected to be in class for every class meeting. You are responsible for all the material discussed in class whether you are there or not, and for submitting work by the due date. Extensions will only be granted for good reason. **(25 points or 5% of the final grade).**
- ⇒ You will be given **homework problems** from the text with each section we cover, with the expectation that you do at least some of these problems every day, even though nobody may ever check them. (Details will be given on chapter handouts, and these can be accessed on Blackboard.)
- You are expected to check your answers to most even-numbered problems using the Egrade system. An electronic record will be kept of how many of these problems you solve correctly, but you may rework them and check your answers as many times as needed while the problem answers are available on Egrade. **(25 points or 5% of the final grade)**
- Fairly regular weekly homework **problem sets** will be given, and are due on **Friday by 5 p.m.** Some weeks, the problems will be drawn from the daily homeworks, at other times you will be given a separate handout. The problems to turn in will be announced by the preceding **Tuesday**, either in class or on Blackboard. Sometimes, you will be explicitly told **not** to work on some of these problems with others, so that your independent problem solving skills are developed. But otherwise, collaboration is OK, as long as it is acknowledged.
- Once or twice, the problem set may be longer, in the form of a mini **project**, which you are encouraged to solve in collaboration with one or two other students in the class, and will have a week to complete. In all this work, even though you may have collaborated with others, your written solutions must be your own, and should represent your personal understanding and writing style.
- When you pledge your work, you are pledging that you have followed all these guidelines.
- The problem sets and projects will be checked, and given a grade of A/B/C/U, and returned to you hopefully by the following Tuesday. They will **not** be accepted late. You are encouraged to write corrections and responses to my comments, due the next Friday. If you respond well to the comments on your original homework, you may improve your grade by up to one letter (from a B- to an A-, or from a U to a C, for example). Corrections for a grade will be accepted **only** if they are accompanied by the first attempt, and will not be accepted late.
- Your best 6 problem set/project grades will count (expect about 8 to be given). 6 A's will give you 95 (you need five A+'s for 100), 6 B's will give you 80, 6 C's 65, and a U will not count. This scale should tell you that a bunch of C's is barely passing, really poor work. **(100 points or 20% of the final grade)**
- ⇒ The **Integral Proficiency Test** is taken on-line, using Egrade. Each test has seven integration problems (chapter 6 and 7 stuff), and you must get all 7 problems correct to pass. You may repeat the test as often as you wish, and may use the software to practice for the test. **(5%, all or nothing).**

Summary: If you keep your homework organized, and do all of it regularly, turning in Egrade answers regularly, you will probably thrive. If you try to do only the minimum problem sets to turn in on Fridays, you will be cheating yourself, and you will not cope.

Tests, Quizzes, Final Exam:

- There will be three timed, closed book, **take home midterm tests** (70 points each, total 42%), and a **final exam** (90 points or 18%).

This schedule for the tests is tentative. It can be adjusted, but only slightly.

First test: Out on Friday February 14, due on Wednesday February 19 at 5 p.m., on Chapter 6 and Chapter 7.

Second test: Out on Friday March 21 (after Spring break), due on Wednesday March 26 at 5 p.m., on Chapter 8 and Chapter 9.

Third test: Out on Thursday April 17 (before Easter break), due on Tuesday April 22 at 5 p.m., on part of Chapter 9 and Chapter 10.

Final Exam: This will be a self-scheduled, closed book, timed test during the exam period. It will have a focus on the later chapters (chapters 8 through 11), particularly chapter 11.

Some suggestions for effective learning:

- You should keep your homework problems in an organized fashion, separate from your class notes. Usually a notebook is best for class notes. But loose paper that is carefully labeled and filed in a three ring binder is best for homework. This arrangement will enable you to redo or add to problems, and to turn in problems easily. This will also help you to be able to study from your class notes as an alternate textbook without it being mixed up with your homework.
- As you study, have a supply of scratch paper and use it freely (Agnes Scott recycles!). Rewrite problems that were worked in class. Make journal notes of points where you are confused, and resolve your confusion using the resources we offer. Do some mathematics after every single class, and not just the routine problems.
- From time to time, look at your notes from class and ask yourself: Am I recording too much detail instead of listening and participating? Am I recording enough? Is it coherent? Will it still be coherent tomorrow? in six months' time? (How accessible and useful are your materials from Calculus I?) Is my homework organized? Can I find problems from three sections ago? Do I know what problems I haven't finished or got stuck on?
- You are encouraged to study collaboratively whenever you believe such study will be fruitful, and not always with the same person. Collaborative learning is effective in part because it allows us to have others serve as sounding boards for ideas through listening and talking. But you are ultimately responsible for your own learning, so collaboration used effectively must help you to be independent and creative. It should also help you to listen to yourself more critically, read what you write more carefully, and expose you to the ideas and inspiration of others.
- **A final suggestion:** Become familiar with your textbook, and let it become part of your permanent intellectual library. Long after this course is over, you will find it a useful resource, and if you have sold it, you will be sorry.

A very rough layout for the material in chapters 6 through 11 in the text

We will decide which of sections 8.4 through 8.7 to study, depending on the interests of students in the class.

Our goal is to get through most of Chapter 11. We may not manage to reach section 11.10 as this schedule indicates, but we should finish sections 11.1 through 11.6. I would rather we do part of it well than rush to do more.

Week	Dates	Monday	Tuesday	Thursday	Friday
1	1/23 - 1/24			Introduction and Review	More review in chapters 5 and 6
2	1/27 - 1/31	Section 6.3, 6.5	Section 6.4	Section 7.1	Section 7.2
3	2/3 - 2/7	continue..	Section 7.3	Section 7.5, 7.6	Section 7.7
4	2/10 - 2/14	Section 7.8	Review of Chapter 7	Section 8.1	Section 8.1 First test out
5	2/17 - 2/21	Section 8.2	Section 8.2 First test due Wed. 5 p.m.	Section 8.3	Section 8.3
6	2/24 - 2/28	Section 8.4 – 8.7	Section 8.4 – 8.7	Review of Chapter 8	Section 9.1
7	3/3 - 3/7	Section 9.2	Section 9.2	Section 9.3	Section 9.3
	3/10 - 3/14	Spring	Break!	Spring	Break!
8	3/17 - 3/21	Section 9.4	Section 9.4	Review of Chapter 9	Section 10.1 Second test out
9	3/24 - 3/28	Section 10.1	Section 10.2 Second test due Wed. 5 p.m.	Section 10.2	Section 10.3
10	3/31 - 4/4	Section 10.3	Section 10.4	Section 10.5	Section 10.5
11	4/7 - 4/11	continue..	Review of Chapter 10	Section 11.1	Section 11.2
12	4/14 - 4/18	Section 11.2	Section 11.3	Section 11.4 Third test out	Easter Break
13	4/21 - 4/25	Section 11.4	Section 11.5 Third test due Tu. 5 p.m.	Section 11.5	Section 11.6
14	4/28 – 5/2	Section 11.6	Section 11.7	Section 11.10	Section 11.10
15	5/5 - 5/9	Review	Review (last day of classes)	Reading Day	Reading Day