Mathematics 112
Spring, 2010

Textbook: Stewart, James; Single Variable Calculus, 6th ed., for reference

Instructor: Dr. Evelyn C. Bailey, Office in Pierce 122

Office Hours: Will be posted weekly on the class conference.

Email: ebailey@emory.edu or type Evelyn Bailey on Learn Link

Conference: On the learnlink class conference, Math 112 spring 2011, announcements, daily notes, scheduled SI sessions, questions related to problems, information can be posted at any time. Each student should place this conference on his/her desktop and check daily. Students are responsible for information posted on this conference.

Content: Mathematics 112 is the second semester of calculus and is designed specifically for students who have completed a semester of college calculus (Math 111, Math 110B, AP Calculus scores of 4 or 5). Course content includes methods of integration, improper integrals, polar coordinates, sequences and infinite series, power series, and introduction to differential equations. Specific topics by class day are attached.

Goals: (1) Students should have a basic understanding of derivative, of anti-derivative, and of limit. (2) Students should be able to use the rules of differentiation as they apply to algebraic and transcendental functions. (3) Students should be able to evaluate a variety of limits. (4) Students should be able to sketch graphs of transcendental functions by building on concepts from Calculus I. (5) Students should be able to demonstrate appropriately the methods of integration (substitution, parts, trigonometric substitution, partial fractions) and use these methods with typical indefinite, definite, and improper integrals. (6) Students should be able to graph and to find area using simple polar coordinate expressions. (7) Students should be able to determine convergence of appropriate infinite series by giving logical arguments. (8) Students should have a basic understanding of power series and be able to determine the domain of appropriate power series. (9) Students should be able to derive a power series expression for specified transcendental expressions using a geometric series or Taylor's Theorem. (10) Students should be able to solve simple first-order differential equations (separable, exact, linear).

Major Tests/Final Exam: Four major tests will be given in Seney 208, 209 and 215, at 2:15 - 4:00 p.m. on the following Friday afternoons: **February 4, February 18, March 25, and April 15.** The final exam will be comprehensive and will be given according to the final exam schedule. Each student is expected to take tests at the scheduled times. Any conflicts or problems will be handled on an individual basis. If your instructor considers the excuse legitimate, arrangements will be made to take a test on the afternoon prior to the testing time. No make up tests are given after the test date and time. Emergencies will be handled on an individual basis. **Any student requiring special testing arrangements must provide documentation and give sufficient time for appropriate arrangements to be made.**

Quizzes: All quizzes are announced and on the attached schedule. There are two "take home" sets of quizzes and the student must be present in class to receive these. Each quiz counts as 15 points and the best twelve quizzes (out of 16) will be used to help determine the student's grade.

Gateway Test: Passing the Gateway Test is a requirement for passing Math 112. To pass this test, a student must get six out of eight problems totally correct. Forty points are given for six correct problems, forty-five points are given for seven correct problems, and fifty points are given for a perfect paper. In addition, students who pass the first Gateway Test are rewarded 20 bonus points; students who pass the second Gateway Test are rewarded 10 bonus points. The three opportunities scheduled to take the Math 112 Gateway Test are the same days as the tests, given during class time. Students may retake the Gateway test to improve point totals without loss of previous points. It is expected that each student will take each Gateway Test until passed, three opportunities. This test includes two limits to evaluate (at least one using L'Hospital's rule after the first Gateway Test), two derivatives to differentiate (one implicit and one logarithmic, review from Calculus I), and four integrals to evaluate (one of each general type). An example Gateway Test will be available on the class conference.

Homework: Specific topics included in this course are attached. Handouts (homework and class notes) are available on the class conference. Class notes are available on the class conference. Assignments will be listed on the class conference. It is important that the student successfully complete a majority of the problems assigned. **Students will need to spend at least 3 productive hours of study for each class session, or 9 to 12 hours per week**. Students should not get behind or wait until the night before a test to study.

Attendance: The student is expected to attend all classes since the student is responsible for work covered in class and for any announcements made in class. An inordinate amount of absences will be handled in accordance with school policies.

Grading: The final course grade will be determined as follows:

Major tests (4 @ 100 points)	400 points
Quizzes (best 12 @ 15 points)	180 points
Gateway Test	50 points
Final Exam	270 points
TOTAL	900 points

In general,

A, A-: 810 points and above
B+, B, B-: 720 - 809 points
C+, C, C-: 630 - 719 points
D+, D: 540 - 629 points
F: below 540 points

Responsibilities**:** Both the student and the instructor have responsibilities, needed for success in this class.

* Each **student** has the following responsibilities:

1. Come prepared and on time to every class.
2. Complete all work on time with proper thought.
3. Consider that it is not always the fault of the instructor if the student doesn't understand the material. Use your outside help (office hours, SI sessions, posted notes)
4. Treat the instructor and peers with respect.
5. Ask questions. Asking questions is a sign of maturity, not ignorance, as long as the student thinks clearly before asking.
6. Understand that the instructor is not trying to "nit pick" when grading and remember that grading is the responsibility of the instructor. Accuracy is important in this class!

***** The **instructor** has the following responsibilities:

1. Come prepared to every class.
2. Design each class so students can accomplish the cognitive objectives listed in the syllabus.
3. Provide appropriate tips for studying and study materials as seem appropriate.
4. Create a mutually respectful classroom environment.
5. Return tests and quizzes in a timely manner so that students will know their grade.
6. Grading, as far as possible, to be consistent and impersonal even though students might not agree with the decisions concerning partial credit.

Outside Help**:** Students are encouraged to use the following:

* **Office hours** will be posted weekly on the class conference. Students should use this time to come by and ask specific questions related to this course. In addition, students may use email, either privately or on the class conference, to pose questions.

* **Class notes** are available on the class conference. **Handouts** are available on the conference. Each student should have these prior to the respective class.

* There are **SI leaders** who will schedule review sessions each week, the topic for which will be posted on the class conference. Each student is encouraged to pick at least one of the times per week and attend regularly. Even though these sessions are optional, students who attend SI sessions generally do better in Math 112.

* **Student tutors** will be available to help with homework problems in the Math Center in Pierce Hall. A schedule giving specific times will be posted as soon as the schedule is complete.

* **Study groups**, organized by students, are highly recommended. The meetings should be scheduled weekly and should be part of a regular weekly routine. The Math Center has a quiet area in the back area.

Organizational Guidelines for students**:**

(1) As soon as you get your syllabi from all your courses, put all test dates on a single calendar, clearly labeled. Make sure there are no conflicts in testing times.

(2) Stay current in your subjects by setting aside 8 to 9 hours per week to study each subject. You may need more time in some subjects. Spread your per-subject time out over the week. Marathon studying, especially in mathematics, does not work well! So, make a schedule and keep to it! Be flexible enough to make changes in your schedule but don't schedule marathon studying. Begin early on papers and projects.

(3) Plan ahead so that you get enough sleep before a test or you will not be able to think clearly and logically.

(4) Take advantage of the available outside help for each of your courses. Schedule at least one SI session per week for each course that has SI leadership.

(5) Plan ahead for all your papers and projects so that studying for tests is not compromised. Create and schedule mini-goals to attain the major goal of completion on time.

(6) Have needed supplies for each course. Make sure you get copies of the handouts and class notes PRIOR to the topic for which they are needed.

(7) Follow each syllabus carefully. For Math 112, your homework assignments are listed for each class meeting. Reading the section before coming to class will help your understanding.

Written Style**:** Neatness is one way of showing courtesy toward your instructor and pride in your work. Thoughts in mathematics are expressed in sentences, such as “1+1=2”. There is a subject “1+1”, a verb “=”, and a predicate “2”. Remember that “=” should not be treated as a comma”,”. The student should strive to be neat and to use mathematical symbols appropriately.

For the second half of this course, arguments must be expressed clearly to gain credit for the problem. The "answer" is only one part of an appropriate response to the problem.

Notes to the serious student:

1. **How much to study:** Calculus, to some, is a hard subject. It may be your most challenging course this semester. You should spend around 10 hours a week studying calculus, even if you have "seen it before." Don't assume you know the material! Extra time is needed to complete quizzes. If you cannot make this level of time commitment this semester you will likely be better off taking calculus at another time.

2. **How to study:** Students often find calculus texts hard to read. They are not to be read like a novel, or a history or even a biology text. Your text is a reference book and should be read in a series of passes. The first pass through a section, done **before** the class for which the topics will be studied, you should skim through it lightly, reading definition and theorems, and trying to **work** through some of the examples. After class, re-read the text, your notes and/or e-Reserves. Don't expect to understand fully much of what you’ve read until you start working on the exercises. In fact, you should spend most of your study time working problems, thinking about those problems, and discussing problems. As you get stuck, go back, rereading the text or your notes or the e-Reserves, studying the examples and derivations, on a “need-to-know” basis.

3. **Homework:** Work lots and lots of problems. When you finish the current section, go back and work review problems. Furthermore, you have not completed the homework just because you have the right answers, you must understand **why** your methods worked. If all you are doing is blindly applying formulas and mimicking examples, get extra help. The problems should make logical sense to you. You must get to the point where you are able to work problems correctly, from start to finish, without having "to flip" back to the answer or to previous work. Time to reflect on your work helps build confidence and speed and enables you to retain the material.

4. **Studying for tests:** If you were an athlete preparing for track meet, and you slacked off during the weeks before the meet, doing just what you needed so coach wouldn't get on your case, and then stayed up running the whole night before your meet, you'd loose. Many students prepare for tests by cramming; they procrastinate and then believe that they can "stuff in" what they need for success by staying up all night attempting to study. Your brain will not to be in top shape by marathon studying. The right way to study is to do your work at a steady pace throughout the semester. There are a few facts and formulas you'll need to remember for a test. Make note cards for those facts and formulas and "touch base" with them often. In order to think well, you need to rest sufficiently and exercise adequately. Remember that aerobic exercise circulates blood to the body and that includes the brain.

5. **Come to class and use your outside help:** Many college students treat class attendance as optional. This may be fine for some classes; however, for calculus you can get way behind very fast. You should come to class every period unless you are seriously ill. Schedule at least one SI session per week. Stop by and see your instructor during office hours to ask pertinent questions. Take charge of your learning!

Summary of Important Dates:

February 4	Test I
February 4	Gateway Test 1
February 18	Gateway Test 2
February 18	Test 2
March 8-12	Spring Break
March 25	Gateway Test 3
March 25	Test 3
April 15	Test 4
April 25	Last Class Day
April 27	Reading Day

HONOR CODE: THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT IN THIS COURSE, AND ALL SUCH WORK WILL BE PLEDGED TO BE YOURS AND YOURS ALONE. THIS INCLUDES THE TESTS and QUIZZES.

Specific Topics

Homework is listed on the class conference and included in the handouts.

Part I: Methods of Integration, Review of Graphing

Wednesday, January 12	Review integration

Methods of Integration handout

Friday, January 14	Integration by Parts, substitution
Wednesday, January 19	

QUIZ 1 Wednesday

Monday, January 17, is a holiday

Friday, January 21	Trigonometric Substitution
Monday, January 24	Review Limits

QUIZ 2 Monday

Wednesday, January 26	Partial Fractions
Friday, January 28	

QUIZ 3 Friday

Monday, January 21	Graphing logarithmic and exponential graphs Review of graphing concepts

Handout on graphing

Wednesday, February 2	Review for test 1 and Gateway 1

Review for Test 1 handout and example Gateway

Friday, February 4	Gateway Test 1 (during class)

Test 1 on Friday, February 4 at 2:15, Seney 209 and 215

Part II: Improper Integrals, Polar coordinates (graphing and area)

Monday, February 7 L'Hospital's Rule

Handout on L'Hospital's Rule and Improper Integrals

Wednesday, February 9 Improper Integrals

Friday, February 11 Polar Coordinates
Monday, February 14

Handout on Polar Coordinates
QUIZ 4 Friday

Wednesday, February 16 Review for test 2

Review for Test 2 handout
QUIZ 5

Friday, February 18 Review (first half); Gateway Test 2 (second half)

Test 2 on Friday, February 18 at 2:15 p.m., Seney 209 and 215

Part III: Infinite Series

Monday, February 21 — Infinite Sequences

Handout on Infinite Sequences

Wednesday, February 23 — Infinite Series

Handout on Infinite Series

Friday, February 25 — nth term Test, Integral Test and p-series
Monday, February 28

QUIZ 6 Friday

Wednesday, March 2 — Comparisons of Series
Friday, March 4

QUIZ 7 Wednesday
Take Home QUIZZES 8 & 9 given out on Friday, due on Monday, March 14

March 8-12 is Spring Break

Monday, March 14 — Alternating Series

Wednesday, March 16 — Ratio and Root Test

Handout on Review Infinite Series

Friday, March 18
Monday, March 21 — Review Infinite Series
Wednesday, March 23

QUIZ 10 Friday
QUIZ 11 Monday
Review for Test 3 handout

Friday, March 25 — Review (first half); Gateway Test 3 (second half)

Test 3 on Friday, March 26 at 2:15 p.m., Seney 209 and 215

Part IV: Power Series

Monday, March 28 Power Series
Wednesday, March 30

Handout on electronic reserve

Friday, April 1
Monday, April 4 More Power Series

QUIZ 12 Friday

Wednesday, April 6 Taylor and Maclaurin Series
Friday, April 8

QUIZ 13 Friday

Monday, April 11 Review Power Series
Wednesday, April 13
Friday, April 15

QUIZ 14 Monday
Review for Test 4 handout on electronic reserve

Test 4 on Friday, April 16 at 2:15 p.m., Seney 209 and 215

Introduction to Differential Equations, Review of Integration

Monday, April 18 Introduction to Differential Equations
Wednesday, April 20 (separable, exact, linear, all first order)

Take home **QUIZZES 15 & 16 given out on Wednesday and due on Friday**
Handout on Differential Equations

Friday, April 22 Review for the final exam
Monday, April 25

Review for Final handout

Wednesday, April 27 Reading Day

The Final Exam will be given in accordance to the final exam schedule and college policies:

9:35 class on Wednesday, 5/4, 2:00 – 5:00, EV classroom
10:40 class on Monday, 5/2, 9:00 – 12:00, EV classroom