Mathematics 112
Spring, 2013

<u>Textbook</u>: You may use any calculus text as your personal reference

<u>Instructor</u>: Dr. Evelyn C. Bailey, Office in Pierce 122

<u>Office Hours</u>: Will be posted weekly on the class conference.

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

<u>Conference</u>: On the Learnlink class conference, **Math 112 spring 2013**, 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.

<u>Content</u>: Mathematics 112 is the second semester of calculus and is designed specifically for students who have completed a semester of college calculus (Math 111, 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.

<u>Goals</u>:
Building upon Calculus I, students should know and/or demonstrate:
     (1) A basic understanding of derivative, of anti-derivative, and of limit.
     (2) Use the rules of differentiation as they apply to algebraic and transcendental functions.
     (3) Evaluate a variety of limits and appropriately interpret findings.
     (4) Sketch graphs of transcendental functions by building on concepts from Calculus I.
     (5) All variations for the u-substitution method of integration, definite and indefinite integrals.

Additional goals for Calculus II, students should know and demonstrate:
     (6) New methods of integration (parts, trigonometric substitution, partial fractions) for typical indefinite, definite, and improper integrals.
     (7) Be able to graph and to find area using simple polar coordinate expressions.
     (8) Determine convergence of appropriate infinite series by giving logical arguments.
     (9) A basic understanding of power series and be able to determine the domain of appropriate power series.
     (10) Be able to derive a power series expression for specified transcendental expressions using a geometric series or Taylor's Theorem.
     (11) Be able to solve simple first-order differential equations (separable, exact, linear).

Major Tests/Final Exam: Four major tests will be given in class, in two parts each. The majority of each test will come directly from the assigned homework. 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. 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 to take the test before or during the scheduled time.**

Quizzes: Seven quizzes will be given, 20 points each, two quizzes (lowest) will be dropped. The quiz problems will come directly from the homework problems. Students who stay current should be successful at these quizzes. You may only use the reference sheet provided for this course.

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. There are three opportunities scheduled to take the Math 112 Gateway Test

   It is expected that each student will take each Gateway Test until passed, three opportunities.

   Each Gateway Test includes two limits to evaluate (at least one using L'Hospital's rule after Gateway Test 1), 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 prior to the first scheduled test.

Projects: There will be three group projects, assigned well in advance of the due date. Students are to work together in groups of two or three. One project paper is to be turned in for each group. The projects will be given out and described during class time. Topics are integration (Project 1), graphing (Project 2), differential equation (Project 3).

Homework: Specific topics included in this course are attached. Handouts (homework and 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. Remember that problems from the homework will be used for the quizzes and for a majority of each test.

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. An absence when a quiz is given will result in that quiz being one of the two dropped. There is no provision for making up quizzes.

<u>Bonus Points:</u> Opportunities for bonus points are at the discretion of the instructor. In general, 10 additional points are available on each major test, 20 points on the first Gateway test. Some quizzes may include bonus points.

<u>Grading</u>: The final course grade will be determined as follows:

Major tests (4 @ 100 points)	400 points
Quizzes (5 @ 20 points)	100 points
Gateway Test	50 points
Projects (3 @ 50 points)	150 points
Final Exam	300 points
TOTAL	1000 points

In general,

        A, A-: 900 points and above
        B+, B, B-: 800-899 points
        C+, C, C-: 700-799 points
        D+, D: 600-699 points
        F: below 600 points

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

* Each **<u>student</u>** 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 **<u>instructor</u>** 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 reviewed 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.

* **Tutoring** 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. In general, the Math Center is opened Monday through Thursday from 3:00 until 6:00.

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

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.

<u>Written Style</u>**:**

        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.

<u>Notes to the serious student:</u>

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 6	Gateway Test 1
February 8,11	Test 1
February 15	Project 1
February 25, 27	Test 2
March 8	Project 2
March 11-15	Spring Break
March 27	Gateway Test 2
March 29, April 1	Test 3
April 19	Project 3
April 24, 26	Test 4
April 29	Last Class Day
April 30	Reading Day/ Gateway Test 3 at 10:00
May 6	01A final, 9 - 12
May 7	12A final, 2 - 5

HONOR CODE:

        THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT IN THIS COURSE.

        ALL WORK WILL BE PLEDGED TO BE YOURS AND YOURS ALONE ON ALL QUIZZES AND TESTS.

        ALL WORK WILL BE PLEDGED TO BE YOURS AND YOUR PARTNER(S) ON ALL PROJECTS.

Part 1: Methods of Integration, Review of Graphing

Wednesday, January 16   Review integration

Methods of Integration handout

Friday, January 16   Integration by Parts

Wednesday, January 23   Trigonometric Substitution

Friday, January 25   Partial Fractions
Monday, January 28

Quiz 1 on January 28

Wednesday, January 30   Graphing logarithmic and exponential graphs

Handout on graphing

Friday, February 1   Review

Quiz 2
Review for Test 1 handout

Monday, February 4   Review

Wednesday, February 6   Review and Gateway Test 1

Friday, February 8   **Test 1 Part 1**
Monday, February 11   **Test 2 Part 2**

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

Wednesday, February 13   L'Hospital's Rule

Handout on L'Hospital's Rule and Improper Integrals

Friday, February 15   Improper Integrals

Project 1 due

Monday, February 18   Polar Coordinates
Wednesday, February 20

Handout on Polar Coordinates
Quiz 3 on February 18

Friday, February 22   Review for test 2

Review for Test 2 handout

Monday, February 25   **Test 2 Part 1**
Wednesday, February 27   **Test 2 Part 2**

Part III: Infinite Series

Friday, March 1   Infinite Sequences

Handout on Infinite Sequences

Monday, March 4   Infinite Series

Handout on Infinite Series

Wednesday, March 6   nth term Test, Integral Test and p-series
Friday, March 8
        Quiz 4 on March 8
        Project 2 due on March 8

March 11 – 15   Spring Break

Monday, March 18   Comparisons of Series

Wednesday, March 20   Alternating Series

Friday, March 22   Ratio and Root Test

Handout on Review Infinite Series

Monday, March 25   Review Infinite Series

        Quiz 5

Wednesday, March 27   Review/ Gateway Test 2

Review for Test 3 handout

Friday, March 29   **Test 3 Part 1**
Monday, April 1   **Test 3 Part 2**

Part IV: Power Series, Differential Equations

Wednesday, April 3   Introduction to Differential Equations
Friday, April 5   (first order separable, linear, exact)

Handout on Differential Equations

Monday, April 8
Wednesday, April 10   Power Series
Friday, April 12

Quiz 6 on April 10
Handout on Power Series

Monday, April 15   Taylor and Maclaurin Series
Wednesday, April 17
Friday, April 19

Quiz 7 on April 17
Project 3 due on April 19

Monday, April 22   Review for test 4

Wednesday, April 24   Test 4 Part 1
Friday, April 26   Test 4 Part 2

Review for Test 4 handout on electronic reserve

Monday, April 29   Last Class Day

Review for Final handout

Tuesday, April 30   Reading Day

Final Exams:
       12A section, 2 – 5, Tuesday, May 7
       01A section, 9 – 12 , Monday, May 6