Mathematics 111
Spring, 1997

Textbook: Varberg and Purcell, *Calculus with Analytic Geometry,* 6th edition.

Instructor: Dr. Michael Rogers.

Office: 116 Seney Hall
Phone: x4-8419
E-mail: mroge02@emory.edu (or LearnLink)
WWW: http://userwww.service.emory.edu/~mroge02/Math111/Index.html

Office Hours: M–F: 2–3 p.m. Also by appointment.

Course Content: Mathematics 111 is the first semester of first-year calculus. The main topics are limits, the differentiation of functions, and the integration of functions and their applications. Specific topics are outlined in a later section of this course guide.

Course Goals The manifest goal is to prepare the student for Mathematics 112. After this course, you should be able to do the following: to find the limit of a function, to find the derivative of a function, to find the antiderivative of a function, to find the integral of a function, to discuss the relationships between these major processes and to discuss the roles of these processes in solving problems.

Classes: There are 42 class meetings over 15 weeks. There is optional, supplemental instruction available. In addition there are four tests scheduled.

You are expected to attend all classes since you are responsible for work covered in class. Furthermore you are expected to have done the reading for each class. Your ability to get the most out of your professor and each class is greatly diminished by a failure to be prepared.

Evaluation: Evaluation will be based on the following written work:

Tests (4 @ 100 pts)	400 points
Projects (4 @ 25 pts)	100 points
Quizzes (8 @ 25 pts)	200 points
Computer Graphing Project	100 points
Final	200 points
Total	1000 points

A rough guide to letter grades:

A	900 points and up
B	800–899 points
C	700–799 points
D	600–699 points
F	below 600

Plus "+" and minus "−" may be applied to letter grades (A^-, B^+, etc.) for point totals near the cutoffs.

Tests: The material is broken into four units culminating in a test. The four tests will be given on the following days:

8:00 a.m., Thursday, February 6
8:00 a.m., Tuesday, March 4
8:00 a.m., Tuesday, April 1
8:00 a.m., Thursday, April 24

In general, calculators will not be allowed on tests.

You are expected to take tests at the scheduled times. Any conflicts or problems will be handled on an individual basis. If you have an excuse deemed legitimate by your instructor, arrangements will be made for you to take a test **prior to** the testing time.

Projects: A part of each of the four test units is a written essay which gives you the opportunity to examine and investigate some aspect of the unit and its connections to other concepts in greater depth. These assignments will be handed out near the end of each test unit. Generally they will be due on the Monday following the test. You will be able to use your calculator, notes and book. However you must work alone.

Quizzes: All quizzes are announced and "take-home." You must be present in class to receive your quiz. You must work each quiz at *one sitting* and use only *authorized materials.* In general no books, notes or calculators will be allowed. Quizzes are due in class on the class day following your receipt of them. Each quiz is worth 25 points. Three quizzes will be given during each test unit and the best two of them will be used in determining your grade. In total there will be 12 quizzes of which 8 will be counted.

Computer Project: The computer laboratory facilities in Pierce Hall has the package *Derive* on the IBM computers. An information pamphlet pertaining to graphing using the computer software *Derive* is available in the laboratory. There are also computer aides to assist you.

You are to prepare a portfolio of computer print-outs showing the graphs of 10 different functions. Specific instructions will be given out near the end of February. You may get help from the computer aides on the use of the computer; but *you* must create your own functions and you must not share functions. Due on **Wednesday, April 16.**

Homework: Assignments from your text will be given at the beginning of each unit. These assignments will not be collected but are for your benefit. **The purpose of calculation is insight** (Gauss). It is important that you complete assignments as they are assigned and that you not wait until a few days prior to a test to do homework. Collaboration is encouraged as discussion of the concepts often leads to their clarification. **However be sure that you can solve problems unaided.** Use good exposition on your homework. Daily practice will cure you of lazy mental habits. In general you need to spend at least six good hours per week on study not counting the time spent taking quizzes and reviewing for tests.

Use Good Exposition: Thoughts are expressed by sentences: just so in mathematics. Pay attention to your textbook: it is written in sentences. **Your written work must be in complete sentences.** Mathematical symbols are a shorthand for words. Note "$1 + 1 = 2$" is a complete sentence (it has a subject "$1 + 1$", verb "$=$" and predicate "2"). Use mathematical symbols wherever appropriate; do not use a lot of words unless explanation is needed. Your daily work needs to be neat and orderly to be intelligible. It is common practice to rewrite solutions once they are found.

Tutoring/Help/SI Sessions: Student tutors will be available and a schedule will be announced.

Help sessions will be scheduled as there is demand for them. Attendance to these is optional.

The SI program is a program in supplemental instruction. These are not tutoring sessions and are not for going over homework. They are organized study sessions. They will review difficult material and difficult algebraic techniques appropriate to the current class material. The supplemental instructor this term is Sandra Enriques.

Honor Code: The Honor Code of Oxford College applies to all work submitted for credit in this course. All such work will be pledged to be yours and yours alone. This is the case when you place your name on work submitted. The Honor Code applies to all tests, projects, quizzes, the computer project and any work you may submit.

Topics by Date:

Day	Topics
15 Jan.	Functions (2.1, 2.2, 2.3)
17 Jan.	Limits (2.4, 2.6, 4.6)
20 Jan.	*Martin Luther King, Jr., Holiday*
22 Jan.	Limits cont'd
24 Jan.	Continuity, Intermediate Value Theorem (2.7)
27 Jan.	
29 Jan.	Approximation, Continuity and Differentials
31 Jan.	The Derivative, Tangent Lines, Velocity (3.1, 3.2); Leibniz Notation (3.6)
3 Feb.	
5 Feb.	Review
6 Feb.	**Test 1 at 8:00 a.m.**

7 Feb. Rules of Differentiation (3.3, 3.4, 3.5)
10 Feb.
12 Feb.
14 Feb. Review Differentiation; Continuity and Differentiability
17 Feb. Optimization (parts of 4.1, 4.2)
19 Feb.
21 Feb. Higher Order Derivatives; Implicit Differentiation (3.6, 3.7, 3.8)
24 Feb.
26 Feb. Related Rates (3.9)
28 Feb. Review
3 Mar.

4 Mar. Test 2 at 8:00 a.m.

---

5 Mar. Graphing Concepts; Polynomial Functions (parts of Ch.4.)
7 Mar. Graphing: Rational Functions (4.7)
17 Mar. Graphing: Vertical Tangents, Cusps (4.7)
19 Mar. Mean Value Theorem for Derivatives (4.8)
21 Mar. Antiderivatives (5.1); Substitution (5.8)
24 Mar. Introduction to Differential Equations (5.2)
26 Mar. Linear Motion
28 Mar. Review
31 Mar.

1 Apr. Test 3 at 8:00 a.m.

---

2 Apr. Sums; Sigma Notation; Proof by Mathematical Induction (5.3)
4 Apr. Definite Integral; Area; (5.4, 5.5)
7 Apr. Fundamental Theorem of Calculus (5.6)
9 Apr. Substitution (5.8)
11 Apr.
14 Apr. Area between Curves (6.1)
16 Apr. Volumes of Revolution (6.2)
Computer Project Due
18 Apr. Volumes of Revolution (6.3)
21 Apr. Review
23 Apr.

24 Apr. Test 4 at 8:00 a.m.

---

25 Apr. Review
28 Apr. Review
30 Apr. Review