

**Mathematics 211**  
**Fall, 2001**

**Instructor:** Dr. Michael Rogers.

Office: 115 Seney Hall

Phone: x4-8419

E-mail: mroge02@emory.edu (or LearnLink)

Hours: **MWThF 2–3 p.m.** and by appt.

**Course Content:** Mathematics 211 is the third semester of calculus. It revisits and adapts the concepts from first-year calculus in the setting of three-dimensional space. The main topics are geometry in space; vectors; functions of more than one variable including vector fields; the limits, differentiation, and integration of such functions; and applications.

**Textbook:**

- Howard Anton, *Multivariable Calculus*, 5<sup>th</sup> edition.

**Course Goals:** After this course, you should be able to do the following: to sketch three-dimensional graphs, to understand how the calculus of single-variable functions generalizes to multivariable functions, to evaluate limits of multivariable functions, to differentiate multivariable functions and vector fields, to integrate multivariable functions and vector fields, to discuss the roles of these processes of multivariable calculus in solving problems, to understand better the material of first-year calculus.

**Classes:** 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 each class is greatly diminished by a failure to be prepared.

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

Tests (3 @ 100 pts)	300 points
Problem Sets (100, 150, 250 pts)	500 points
Commentaries (10 @ 10 pts)	100 points
Quizzes (7 @ 15 pts)	105 points
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Total	1005 points

The plus/minus system will be used. A rough guide to grades: A:  $\geq 900$  pts. B: 800–900 pts. C: 700–800 pts. D: 600–700 pts. F:  $< 600$  pts.

**Tests:** There are three in-class, closed-book tests, each worth 100 points. If a student has an excuse deemed legitimate by the instructor, arrangements will be made to take the test **prior to** the scheduled time.

**Problem Sets:** There are two midterm problems sets and a final problem set. The problem sets are take-home and open-book, but they are to be worked one's own. A midterm problem set will be handed out before each of the first two tests and due after it; at least a week will be allowed. During that time, the student is expected to keep up with the regular class work. The final problem set takes the place of a final examination. The problem sets are cumulative, increase in value, and are worth 100, 150, and 250 points respectively.

**Commentaries:** Commentaries are assigned roughly weekly, excepting in weeks in which there is a test. Each is to be two pages, typed and double-spaced. Each is to comment on the ideas in the course covered in the previous week or so. Each may provide alternate explanations of things, probe issues which cause the student confusion, amplify or clarify the successes or failures of the text, or anything which shows serious thought about some part of the course. A comment is more than an off-hand reaction like “It was interesting.” A comment is to be critical or questioning, wondering or insightful, coherent and focused. Outside sources are permissible; keep in mind that each commentary will be evaluated on the quality of the student’s own reflections. If outside sources are used, be sure to cite them appropriately and to avoid plagiarism as defined in the Honor Code.

**Quizzes:** All quizzes are announced and take-home. The student must be present in class to receive her or his quiz. Each quiz must be worked at *one sitting* and use only *authorized materials*. In general neither books nor notes will be allowed. Quizzes are due by the next class meeting. Each quiz is worth 15 points. In total there will be 10 quizzes of which 7 will be counted. In each of the three testing units, one quiz will be dropped.

**Homework:** Assignments from the text for each unit are attached to this syllabus; these assignments will not be collected. **The purpose of calculation is insight** (Gauss). In general a good student will need to spend at least six good hours per week on homework.

It is the instructor’s opinion that this course is about as hard as first year calculus with this important qualification: If you enrolled in a college-level calculus course with no previous calculus experience, then this course will require about as much work. If you “coasted” through calculus, this course will be different. Almost no one will have any familiarity with the new concepts in this course, except in as much as they resemble those from single variable calculus.

A routine exercise in multivariable calculus tends to take more time than one in single-variable calculus. Therefore it will not be possible to practice with the same level of repetition as in Math 111/112. Instead, the student must probe each exercise deeply. Take time to reflect on each problem as you complete it.

**Calculators:** Calculators which do not differentiate, integrate, nor perform algebraic manipulations may be used to assist the student with any assignment or examination, provided that the solutions are carried out in exact, rather than approximate, form (e.g.,  $\pi$  rather than 3.14,  $10/\sqrt{3}$  but not 5.77). In general calculators are not recommended for the in-class tests.

**Use Good Style:** Thoughts are expressed by sentences: just so in mathematics. **Written work must be in complete sentences.** The same applies to daily homework. See Priestley, “Clean Writing in Mathematics,” pp. 413–420 in *Calculus: An Historical Approach*, which is on reserve.

**Honor Code:** The Honor Code of Oxford College applies to all work submitted for credit in this course. To receive credit for work submitted you must place your name on it. By placing your name on such work, you pledge that the work has been done in accordance with the given instructions and that you have witnessed no Honor Code violations in the conduct of the assignment.