MATH 211: MULTIVARIABLE CALCULUS I

FALL 2015

Place:	Physics 122
Time:	MTWF, 9:00–9:50A.M.
Instructor:	Kyle Ormsby (ormsbyk@reed.edu)
Office Hours:	Library 313, times to be determined
Textbook:	*Vector calculus* by Susan Colley (4th ed.)
Tutoring:	SuMTWTh 7–9P.M. in Library 387
	Individual tutoring through Student Services
Website:	people.reed.edu/~ormsbyk/211/

Summary. In calculus, you studied functions of a single variable. These accepted one real number as input and produced another real number as output. Multivariable calculus (the subject of this course) studies functions with multiple inputs and outputs. Multiple variables entail multiple dimensions, and our task is to develop intuition and tools (mathematical, cognitive, and physical) which will enable us to understand, visualize, and approximate such objects.

Specific topics include multivariable functions, basic linear algebra, multivariable derivatives (including the chain rule and Jacobian matrix), and optimization (including first and second derivative tests and the method of Lagrange multipliers).

Texts. The course will use Susan Colley's *Vector Calculus* (4th ed.) as its primary text. Copies are available in the campus bookstore, and will additionally be on reserve in the library. Professors David Perkinson and Jerry Shurman also have notes for previous versions of Math 211 available to freely download from their Reed websites. These may prove to be useful supplementary texts, though they will not completely replace Colley's book.

Participation. All of our meetings will place an emphasis on active engagement with multivariable calculus. Students are expected to do assigned readings in advance of class, and to participate in discussions and demonstrations.

Homework. Homework will be assigned on a weekly basis. Serious engagement with problems is the best way to learn mathematics, and this course will not be an exception. Exercises will range from rote to challenging, requiring anything from basic familiarity with definitions and concepts to genuine insight and mathematical creativity. Especially difficult or deep problems will be singled out as bonus problems; all students are encouraged to interact with these exercises despite their optional nature.

Excellent solutions take many forms, but they all have the following characteristics:

- they are written as explanations for other students in the course; in particular, they fully explain all of their reasoning and do not assume that the reader will fill in details;
- they include a paraphrasing of the problem;
- when graphical reasoning is called for, they include large, carefully drawn and labelled diagrams;

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- they are neatly written or typeset;[1] and
- they use complete sentences, even when formulas or symbols are involved.

Each homework problem will be graded according to the following five-point scale:

5 – Perfect, well-communicated solution.
4 – Right idea with minor errors in mathematics or exposition.
3 – Right idea with major problems in execution.
2 – Incorrect solution with significant idea.
1 – Incorrect solution with relevant idea.
0 – None of the above.

Late assignments *will not be accepted*.

Technology. The use of electronic devices (cell phones, computers, tablets, calculators, *&c*) is strictly prohibited in the classroom without prior authorization from the instructor. That said, legitimate uses of technology (*e.g.*, note-taking) will be accommodated — just talk to me first.

Tests and grades. We will have two take-home midterms and a take-home final exam. All exams are open book, open internet, open instructor. You may *not* collaborate with your classmates or other individuals on the exam problems. The final presentation of your solutions must be your own and must be properly cited.

Your exams, homework, and class participation will be taken into account in the determination of your final grade.

[1] Interested students are encouraged to prepare solutions in the LaTeX document preparation system. A guide to LaTeX resources is available on the course website.