MATH 223 Section 1
University Calculus III
Fall 2007

Instructor: Jonathan Cox
Office: 228 Fenton Hall
Office Phone: 673-3874

Office hours*: 3-4 MW; 2-3 TuTh; 9-10 F
E-mail†: Jonathan.Cox@fredonia.edu
Course Web Page: http://www.fredonia.edu/faculty/math/JonathanCox/calculus3/
Supplemental Instructor: Derek Stoll

*While these are the official office hours, I am available at other times as well. If you want to meet at a
time outside of office hours, the best option is to set up an appointment with me. You can also just drop
by any time, but you may want to call first to see if I’m there.
†You can also instant message me on AOL at JonathanCox1975 —see the course web page. (Disclaimer:
I am not at my computer 24 hours a day!)


Calculator. A TI-eightysomething graphing calculator is strongly recommended. The particular model
(83, 84, 86, or 89) is not important. Calculators may not be allowed on certain assessments, and, when
they are, you will still be required to show work.

Other required stuff. 1) You must get access to your WebAssign account—see the course web page.
2) 4-6 cans of playdough (It should all be the same color.)

Prerequisite. MATH 123 (University Calculus II) or MATH 124 (Survey of Calculus III) or the
equivalent

Catalog Description. Parametric equations, polar, cylindrical, and spherical coordinates, vector
algebra, equations of lines, planes, quadratic surfaces, vector functions and space curves, calculus of
functions of several variables including multiple integration; applications to the physical sciences and
geometry; computational technology.

Course objectives. The purposes of this course for the student include (1) Developing an
understanding of the fundamental definitions and concepts of multivariable calculus, (2) Developing
computational skills in multivariable calculus, (3) Improving reasoning, critical thinking, and
problem-solving skills, (4) Sampling some of the many application areas of continuous mathematics, (5)
Acquiring an appreciation of the concepts that form the foundation of twenty-first century science and
technology, and (6) Learning to communicate mathematical ideas, arguments, and results.

Expected results. By the end of this course, students should (1) Understand and be able to work with
the key concepts of multivariable calculus including vectors and vector spaces, functions of several
variables and vector-valued functions, surfaces, spherical and cylindrical coordinates, continuity,
differentiability, the Chain Rule, and vector fields, (2) Be able to compute essential quantities in
multivariable calculus including dot and cross product, derivatives and partial derivatives, directional
derivatives and gradients, multiple integrals, iterated integrals, and line integrals, (3) Be able to compute
arc length and curvature of a curve in space, determine tangent planes and linear approximations, find maximum and minimum values of a function of two variables, and express multiple integrals in alternate coordinate systems, (4) Understand and be able to use some key theorems of multivariable calculus including Fubini’s Theorem, The Fundamental Theorem for Line Integrals, and Green’s Theorem, (5) Be able to use computer software (Maple) to explore concepts and solve problems in multivariable calculus, and (6) Be able to apply the techniques of multivariable calculus to solve various physical problems.

More extensive objectives (expected results of the course) can be found in the master syllabus for MATH 223 at http://www.fredonia.edu/department/math/MasterSyl/MATH/math223_master.html.

Content and Methodology. The course will cover the material in Chapters 10 and 12-16 of the text with some omissions. Our Holy Grail for the course is to get to Green’s Theorem in 16.4 so that you’ll be able to see two generalizations of the Fundamental Theorem of Calculus. A tentative schedule and outline of topics can be found on the web page. Typically, we will cover a section of the text in one to two meetings. The beginning of each class period will be reserved for discussion of the homework and other questions. Up to 1/3 of the period may be used for this purpose. Most of the remaining time will be used for presentation of new material. Sometimes the instructor will lecture. There will also be brief quizzes, group work, and some other fun activities for variety. In particular, we’ll try to occasionally use game show formats such as “Double Integration Jeopardy” and “Are You Smarter than a Three Vector?” for review. Students are encouraged to ask questions and make relevant comments at any time.

Homework and quizzes. Homework will be assigned from each section. Do the homework! How well you do in the class is directly related to how much homework you do. If you don’t do the homework, you probably won’t pass. It is also to your advantage to ask questions about homework problems that give you difficulty. You may also find it helpful to read the sections in the textbook.

Your completion and understanding of the homework will be assessed regularly. In particular, you will be asked to submit answers to selected problems on WebAssign, an online homework system. Sometimes I might also specify one or more exercises for you to turn in on paper. At other times there will be quizzes on the homework during class. Quizzes will usually be announced, but may occasionally be unannounced, and you will typically have between 5 and 15 minutes to complete each one depending on the type and length. At the instructor’s discretion, quizzes missed due to serious and unavoidable circumstances may be made up. (If you expect to have an excused absence, see me about taking the quiz early.)

Some projects and other special assignments will be collected and graded. In particular, there will be a number of Maple worksheets for you to complete. Due dates for all assignments will be specified, and no late work will receive full credit, except in the case of an excused absence on the due date. (See the Attendance Policy section below.) I define work to be late if it is handed in after the beginning of the class period following the due date. Late work can still be handed in and graded, but will receive credit for only 50% of the points earned. No late work may be handed in after the last day of class or more than one month after the original due date.

Feedback will always be provided on collected work, but some homework assignments and quizzes will be graded more on completion and the big picture than on detailed correctness. Other homework assignments and quizzes will be graded in nitpicky detail. The method of grading for each “tangible” homework assignment and quiz will be determined randomly. For homework assignments, a die will be
rolled, and the assignment will be graded in detail if the roll results in a 6. For quizzes, a coin will be flipped, and the quiz will be graded in detail if the flip results in heads. Online homework assignments will always be worth the number of points specified on WebAssign.

**Exams.** The purpose of the exams is to determine your level of mastery of the concepts of the course. They will test not only your ability to memorize, but also your ability to think. There will be three 50 minute in-class exams and a 120 minute comprehensive final examination. The tentative dates of the in-class examinations are October 3, October 31, and December 3. The final exam will be given on Thursday, December 20, at 8:30am.

Make-up exams may be given in serious and unavoidable circumstances, or in the event of an excused absence, and only if your request to make up an exam is approved by the instructor in advance or as soon as reasonably possible. Make-up exams should be taken within two class periods following the day of the exam if at all possible.

**Grading and Evaluation.** Performance in this course will be evaluated on a percentage system. The regular exams will constitute 45% of the final grade, so that each exam will end up being 15% of the grade. The online homework via WebAssign will account for 15% of the grade, and all other homework, quizzes, and projects will be lumped into one category making up another 15% of the grade. The remaining 25% of the grade will be determined by the final exam. At the end of the course, your cumulative average (AVE) will be computed as follows.

\[
\text{AVE} = .45E + .25F + .15W + .15Q
\]

To obtain your cumulative average at any time after the first exam and prior to the final, compute AVE = .6E + .2W + .2Q. I will also update your averages regularly and make them available on ANGEL.

Letter grades will be assigned as follows based on a student’s final percentage:

- 93 and above=A; 90-92=A–; 87-89=B+; 83-86=B; 80-82=B–;
- 77-79=C+; 73-76=C; 70-72=C–; 67-69=D+; 63-66=D; 60-62=D–; below 60=F

The instructor reserves the right to lower the grade ranges. The grade ranges will not be raised.

**Supplemental Instruction (SI).** The Learning Center is providing our course with a supplemental instructor this semester. Typically, the supplemental instructor will conduct one session per week to reinforce the material covered in class and work through more examples. Data from past semesters has shown a strong positive correlation between SI attendance and course grades. I strongly encourage you to participate in the SI sessions if at all possible. Do not let this good fortune go to waste!

**Attendance Policy.** We will follow the SUNY Fredonia attendance policy. (See p. 219 and p. 239 of the 2007–09 undergraduate catalog.) Attendance is not officially a part of the grade in this course. However, you probably won’t be able to pass the course if you do not attend regularly. Learning calculus is a cumulative experience. If you miss class even once, you may have difficulty catching up. If you must be absent, please notify the instructor ahead of time. For informational purposes, an attendance sheet will be passed around each time the class meets. It is your responsibility to sign this sheet each period in order for your attendance to be official.
Work missed during an absence can be made up if the absence is determined by the instructor to be an *excused absence*. Your absence will be excused if you are participating in a university-sponsored program, exercising religious beliefs, hospitalized, or attending the funeral of a relative. Other absences due to unavoidable circumstances may also be excused at the discretion of the instructor. Appropriate documentation for an excused absence should be provided to the instructor within three days of returning to classes.

**Special Accommodations.** “It is the responsibility of students with disabilities to identify themselves by notifying the Coordinator of Disability Support Services for Students.... For specific information about services and facilities for students with disabilities, students should contact: Adam Hino, coordinator of Disability Support Services for Students, Reed Library (fourth floor), by telephone at (716) 673-3270, by TTY at (716) 673-4763, or by email at disability.services@fredonia.edu” (p. 217, 2007–09 SUNY Fredonia Catalog). See also www.fredonia.edu/tlc/DSS/dss.htm.

**Withdrawal Policy.** The drop and withdrawal policy for this course will be that of the University. (See p. 218 and p. 223 of the 2007–09 SUNY Fredonia Catalog.) **IT IS YOUR RESPONSIBILITY TO KNOW AND COMPLY WITH ALL DEADLINES.** The last day to DROP this course is **Friday, August 31**. The last day to WITHDRAW from this course is **Friday, November 2**. The last day to completely withdraw from the university is **Monday, November 26**.

**Academic Integrity Policy and Honor Pledge.** Each student is expected to “support and abide by all provisions of the ... Academic Integrity Policy” (pp. 236-239 in the 2007–09 SUNY Fredonia Catalog or pp. 212–215 in the 2005–2007 Catalog). While we will follow this policy, more details are given below regarding what behavior is or is not allowed in this class. Please ask me whenever it is unclear whether something is or is not allowed.

You are encouraged to work together on homework and in learning the material. While working with another person or in study groups is permitted, **all written work submitted for individual assignments must be your own**. The principle here is simple: *Under no circumstances and in no way should you ever copy any part of anyone else’s work and present it as your own.* Here are some examples:

1. If you discuss hand-in homework with a group before doing it, afterward go off and write up the solutions yourself.
2. If you compare solutions with a friend and have different answers, neither should correct his solution using the other’s. You can try to figure out who went wrong where, and then go off and rework the problem on your own.
3. If a tutor gives you some hints on how to do a hand-in problem, do not just copy what the tutor wrote as part of your solution. Instead, think about the hints and then attempt the problem on your own. This list is meant to be illustrative, not exhaustive. Further elaboration will be provided in class as needed. In cases where work appears to be copied, I will invite the students involved to my office to explain the relevant material to me. A student who cannot explain his or her work adequately or who fails to present an explanation will lose points or receive a grade of zero on the assignment in question. The point is, *in order to be successful in learning the material and preparing for the examinations, you need to try to work out homework problems yourself as much as possible*. Otherwise you are cheating yourself.

**Daily schedule.** A *tentative* daily schedule for this course is available online at http://www.fredonia.edu/faculty/math/JonathanCox/calculus3/sch.pdf.

Any changes to this syllabus will be communicated in class by the instructor.