

Calculus III
Fall 2009

MATH 311.01 (4 credits), MTu_ThF, 10:00A-10:50A, Wickersham 219

Prerequisites: A grade of C- or better in MATH 211 (*Calculus II*) is the prerequisite for this course.

Instructor: Dr. Buchanan

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Office Hours: 2:00P-3:00P (MTWTF), or by appointment

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Course URL: <http://banach.millersville.edu/~bob/math311/>

Textbook: *Calculus*, 3rd edition, Robert T. Smith and Roland B. Minton, McGraw-Hill Company, New York, (2007), ISBN 0-07-286953-4.

Objectives: Upon successful completion of this course the student will:

- Understand the algebra and geometry of vectors in 2 and 3 dimensions.
- Understand the calculus of curves in \mathbb{R}^2 , the unit tangent and unit normals vectors, curvature, and motion along a trajectory.
- Learn the three-dimensional vector algebra required by linear algebra courses: dot and cross products, projections, and equations of line and planes in \mathbb{R}^3 .
- Understand spherical coordinates and cylindrical coordinates.
- Understand partial differentiation, and will apply partial derivatives to the computation of gradients, directional derivatives, tangent planes, and differentials.
- Understand differentiable functions of several variables.
- Locate and classify critical points of functions of several variables, and will solve applied optimization problems.
- Understand definite integrals in higher dimensions. The student will set up and evaluate multiple integrals, and will be able to interchange the order of integration.
- Understand line and surface integrals, potential functions, and path independence. The student will apply Green's theorem in the plane, and Gauss's and Stokes' theorems in \mathbb{R}^3 .

Course Contents: Textbook chapters and topics covered during this class will include:

- Vectors and the Geometry of Space (Chap. 10)
- Vector-valued Functions (Chap. 11)
- Functions of Several Variables and Partial Differentiation (Chap. 12)
- Multiple Integrals (Chap. 13)
- Vector Calculus (Chap. 14)

Attendance: Students are expected to attend all class meetings; however, merely attending class will not earn you a passing grade. If you cannot regularly attend class due to a time conflict with another class or activity, you should wait until a later semester to take this course. If you must be absent from class you are expected to complete class requirements (*e.g.* homework assignments) prior to the absence. Students who miss a test should provide a valid excuse, otherwise you will not be allowed to make up the test. Tests should be made up within one week of their scheduled date. There will be no final exam exemptions.

Homework: Students are expected to do their homework and participate in class. Occasionally homework assignments will be collected and graded. The homework is your opportunity to determine if you understand the material covered in class. The homework assignments will also reinforce and extend the classroom material covered. The textbook exercises are arranged in an increasing level of difficulty. Working only the low-numbered exercises will not prepare a student sufficiently for the test and final examination exercises. All assigned homework exercises must be worked until successful completion. Students are encouraged to work homework exercises together and to study together. Students who work together on graded homework assignments should attach all of their names to one copy of the submitted assignment for grading.

Students should expect to spend a *minimum* of twelve hours per week reviewing notes taken during class and working assigned homework exercises. Preparation for the tests and final exam will require additional hours of study. Students will find it beneficial to review all lecture notes and other relevant material collected from the beginning of the semester until the present time at least once per week.

Tests: There will be four 50-minute in class tests which are tentatively scheduled for

- Friday, 09/18/2009
- Friday, 10/09/2009
- Thursday, 11/05/2009
- Friday, 12/04/2009

and a comprehensive final exam (Saturday, 12/19/2009, 8:00AM-10:00AM). If you are unable for any reason (illness, family emergency, military commitment, *etc.*) to take the test or exam at these times you must notify me before the test is given. A make-up test or exam will be scheduled at a mutually convenient time.

I will not “curve” test grades. If you feel that an error was made in the grading of a test, you should explain the error on a separate sheet of paper and return both it and the test to me within three class periods after the test is returned to you. In no case will adjustments amounting to less than 3 points be made. After three class periods, changes to graded material will be made at the instructor’s discretion.

Grades: Course grade will be calculated as follows.

Tests	60%
Exam	25%
Homework	15%

Tests and the final examination will be graded individually on a 100-point scale. Graded homework assignments may consist of a variable number of problems worth ten points each. I keep a record of students' test, homework, and exam scores. Students should also keep a record of graded assignments, tests, and other materials. As an example of the calculation of the numerical course grade, suppose a student's four test grades were 87, 78, 65, and 70 (out of a maximum of 100 points on each test), the student's final examination grade was 71 (again, out of a maximum of 100). Suppose seven homework assignment were collected and the student's grades were 32/40, 38/50, 50/60, 20/40, 27/50, 40/40, and 23/40. This hypothetical student's numerical course grade would be calculated according to the formula

$$\begin{aligned} & \frac{87 + 78 + 65 + 70}{4} \cdot 0.60 + 71 \cdot 0.25 \\ & + \frac{32/40 + 38/50 + 50/60 + 20/40 + 27/50 + 40/40 + 23/40}{7} \cdot 15 \\ & = 45 + 17.75 + 10.7321 \\ & = 73.4821 \end{aligned}$$

I will not "curve" course grades. There will be no extra credit assignments during the semester. Therefore students should take all assignments seriously from the beginning of the semester.

Course grades will be assigned according to the following scale.

90-92	A-	93-100	A		
80-82	B-	83-86	B	87-89	B+
70-72	C-	73-76	C	77-79	C+
60-62	D-	63-66	D	67-69	D+
		0-59	F		

Course Repeat Policy: An undergraduate student may not take an undergraduate course of record more than three times. A course of record is defined as a course in which a student receives a grade of A, B, C, D, (including + and -) F, U, Z or W. The academic department offering a course may drop a student from a course if the student attempts to take a course more than three times.¹

The last day to withdraw from a course (and receive the W grade) is November 6, 2009.

Inclement Weather Policy: If we should miss a class day due to a school closing because of weather, any activities planned for that missed day will take place the next time the class meets. For example, if a test is scheduled for a day that class is canceled on account of snow, the test will be given the next time the class meets.

Final Word: Mathematics is not a spectator sport. What you learn from this course and your final grade depend mainly on the amount of work you put forth. Daily contact with the material through homework assignments and review of notes taken during lectures is extremely important.

¹Memorandum to mathematics faculty from Dr. Charles G. Denlinger, Assistant Chair, Department of Mathematics, August 30, 2004.