

Calculus III
Fall 2015

MATH 311.01 (4 credits), MTu_ThF, 12:00N-12:50P, 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: 09:00A-09:50A (MTuWThF), or by appointment

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Textbook: *Calculus: Early Transcendental Functions*, 4th edition, Robert T. Smith and Roland B. Minton, McGraw-Hill Company, New York, (2012), ISBN 978-0073532325.

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 and \mathbb{R}^3 , 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.

Homework: Students are expected to do their homework and participate in class. 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.

In addition to practice exercises from the textbook, graded homework problems will be administered periodically on-line through the [Desire2Learn](#) course shell. Since computer hardware and software problems, website availability, and network problems are often unpredictable you should start all assignments as early as possible.

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 three in-class, 50-minute tests given on the schedule in the table below.

| | Date |
|--------|-----------------------------|
| Test 1 | Tuesday, September 15, 2015 |
| Test 2 | Friday, October 16, 2015 |
| Test 3 | Friday, November 20, 2015 |

The final exam is scheduled for Thursday, December 10, 2015, 12:30P–02:30P.

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.

| | |
|------------------|-----|
| Test Average | 50% |
| Exam | 25% |
| Homework Average | 25% |

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 three test grades were 87, 78, 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 the average of all the student's homework assignments is 85. This hypothetical student's numerical course grade would be calculated according to the formula

$$\frac{87 + 78 + 70}{3} \cdot 0.50 + 71 \cdot 0.25 + 85 \cdot 0.25 = 78$$

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 this course and receive a W grade (signed withdrawal card must be in the Registrar's Office by 04:30P) is Friday, October 30, 2015.

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.

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

Cell Phones: Silence (or better yet, turn off) all cellular telephones upon entering the classroom. Leaving class to initiate or receive a telephone call will not be tolerated and students doing so will not be re-admitted to the classroom until the following class meeting. Texting or tweeting during class interferes with the learning process. Students distracted by their cell phones are not engaged in class and will find, over the course of the semester, that learning and course grade will suffer.

Title IX Reporting Responsibilities: Millersville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972, 20 U.S.C. §1681, *et seq.*, and act in accordance with guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University protection of minors policy.

Information regarding the reporting of sexual violence, and the resources that are available to victims of sexual violence, is available at <http://www.millersville.edu/social eq/title-ix-sexual-misconduct/index.php>.

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.