

**University of Delaware**  
**Department of Mathematical Sciences**  
MATH-243 – Analytical Geometry and Calculus C  
Section 51 – Spring 2014

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Office hours: Tuesdays 3:00pm–5:00pm, or by appointment  
Lectures: Mondays and Wednesdays 7:00pm–9:00pm, 304 Gore Hall

## 1 Goals and Expectations

I want you to go on vacation this summer knowing how you can calculate the rate at which the temperature changes as you drive along an interstate highway, or being able to decide, with the help of a mathematical model, how much time you should spend studying for each of your classes so that your expected GPA is maximum, or understanding that taking curves at twice the maximum speed results in a fourfold increase of the force that your tires must counteract to avoid crashing, or knowing how you can calculate the buoyant force exerted by a fluid on an arbitrarily shaped object in a nonuniform gravitational field (and understanding what this means).

Come back to this document from time to time during the semester. Use the previous paragraph as a reference to know if you have learned. But only you can make it happen. I cannot meet my goals alone. I need your help from day 1. Devote at least two hours of study for each hour of class. Ask questions, come to office hours.

## 2 About the course

This course deals with the extension of the basic ideas of calculus to problems that involve two, three, and in some cases, more variables.

The textbook used in this course is “Calculus 241/242/243- Calculus Early Transcendentals”, by James Stewart, 7th edition, University of Delaware Edition, Loose-Leaf version with Enhanced Web Assign, UDel Customized Book + Enhanced WebAssign = ISBN 9781285255415.

You may use earlier editions of the textbook. However, you will also need WebAssign access (it can be purchased separately) because that will give you access to the electronic format of the latest edition of the textbook and all the homeworks will be assigned and graded through this system.

The chapters of the textbook this course is based on are: 12, 13, 14, 15 (except 15.5 and 15.10), and 16 (except 16.8). In particular, we will study:

| Topic(s)  | Book Section | Tentatively covered by | Exam        |
|---|--------------|------------------------|-------------|
| 3D coordinate systems                           | 12.1         | Week 1                 | 1st Midterm |
| Vectors   | 12.2         | Week 1                 |             |
| The dot product                                 | 12.3         | Week 1                 |             |
| The cross product                               | 12.4         | Week 2                 |             |
| Equations of lines and planes                   | 12.5         | Week 2                 |             |
| Cylinders and quadratic surfaces                | 12.6         | Week 3                 |             |
| Vector functions and space curves               | 13.1         | Week 3                 |             |
| Derivatives and integrals of vector functions   | 13.2         | Week 4                 |             |
| Arc length and curvature                        | 13.3         | Week 4                 |             |
| Motion in space                                 | 13.4         | Week 4                 |             |
| Functions of several variables                  | 14.1         | Week 4                 |             |
| Limits and continuity                           | 14.2         | Week 5                 |             |
| Partial derivatives                             | 14.3         | Week 5                 |             |
| Tangent planes and linear approximations        | 14.4         | Week 5                 |             |
| The chain rule                                  | 14.5         | Week 6                 | 2nd Midterm |
| Directional derivatives and the gradient vector | 14.6         | Week 6                 |             |
| Maximum and minimum values                      | 14.7         | Week 7                 |             |
| Lagrange multipliers                            | 14.8         | Week 7                 |             |
| Double integrals over rectangles                | 15.1         | Week 8                 |             |
| Iterated integrals                              | 15.2         | Week 8                 |             |
| Double integrals over general regions           | 15.3         | Week 8                 |             |
| Double integrals in polar coordinates           | 15.4         | Week 9                 |             |
| Surface area                                    | 15.6         | Week 9                 |             |
| Triple integrals                                | 15.7         | Week 9                 |             |
| Triple integrals in cylindrical coordinates     | 15.8         | Week 10                | Final Exam* |
| Triple integrals in spherical coordinates       | 15.9         | Week 10                |             |
| Vector fields                                   | 16.1         | Week 11                |             |
| Line integrals                                  | 16.2         | Week 11                |             |
| The fundamental theorem for line integrals      | 16.3         | Week 11                |             |
| Green's theorem                                 | 16.4         | Week 12                |             |
| Curl and divergence                             | 16.5         | Week 12                |             |
| Parametric surfaces and their areas             | 16.6         | Week 13                |             |
| Surface integrals                               | 16.7         | Week 13                |             |
| Divergence theorem                              | 16.9         | Week 14                |             |

\* This exam is comprehensive, which means that it tests material from the whole course.

In addition to the aforementioned book (and other books, of course), your other resource to help you understand the material is me. If you have any question, comment or idea about multivariable calculus, come to me. I have allocated two hours to office hours, but you may also drop by my office, or ask me to give you an appointment with me at other times. There may be times I will be forced to reschedule office hours. If this happens, I will notify you by email.

If you have difficulty with a problem, come to office hours well prepared. I suggest you to bring your notes so that you can show me exactly where you are stuck or confused.

### 3 Assessment

You will be graded based on three elements: Homeworks, quizzes, and exams.

#### 3.1 Homework

Thirteen individual homeworks will be assigned throughout the term. Each homework will be graded on a scale from 0 to 100 points. These homeworks will be assigned and graded through WebAssign. The score

corresponding to homeworks that will be considered in the calculation of the final grade is going to be the average of all your homeworks throughout the term. The worst three homework scores will be dropped.

The tentative homework schedule is the following:

| HW # | Assignment Date |
|------|-----------------|
| 1    | February 12     |
| 2    | February 19     |
| 3    | February 26     |
| 4    | March 5         |
| 5    | March 12        |
| 6    | March 19        |
| 7    | March 26        |
| 8    | April 9         |
| 9    | April 16        |
| 10   | April 23        |
| 11   | April 30        |
| 12   | May 7           |
| 13   | May 14          |

### 3.2 Quizzes

There will be six quizzes during the course. Absences due to recognized University related activities, religious holidays, verifiable illness, and family/medical emergencies will be dealt with on an individual basis.

The quizzes are scheduled as follows:

| Quiz # | Date        |
|--------|-------------|
| 1      | February 19 |
| 2      | March 5     |
| 3      | March 19    |
| 4      | April 9     |
| 5      | April 23    |
| 6      | May 7       |

**By University policy, digital calculators or any other similar devices, are not allowed during quizzes or exams.**

The score corresponding to quizzes that will be considered in the calculation of the final grade is going to be the average of the best five scores throughout the term.

### 3.3 Exams

There will be two midterm exams and a comprehensive final exam. As with quizzes, exam absences due to recognized University related activities, religious holidays, verifiable illness, and family/medical emergencies will be dealt with on an individual basis.

The exams are scheduled as follows:

| Exam   | Date      | Book Sections                                    |
|--------|-----------|--|
| 1      | March 21  | 12.1 through 14.4                                |
| 2      | May 2     | 14.5 through 15.9                                |
| Final* | May 21–29 | 12.1 through 16.9 (Except 15.5, 15.10, and 16.8) |

\*Check <http://www.udel.edu/exams> toward the end of the term to know the exact date and location.

## 4 Grading Policy

The final grade composition is as follows:

| Component | Weight |
|-----------|--------|
| Homeworks | 15%    |
| Quizzes   | 15%    |
| Exam 1    | 20 %   |
| Exam 2    | 20 %   |
| Final     | 30 %   |

The scale used in this course to map your point score to a letter grade is the following:

A  $\geq$  92, A-  $\geq$  88, B+  $\geq$  84, B  $\geq$  80, B-  $\geq$  77, C+  $\geq$  74, C  $\geq$  71, C-  $\geq$  68, D+  $\geq$  65, D  $\geq$  62, D-  $\geq$  59, F < 59.

## 5 Expected Behavior

### 5.1 Attendance

You are advised to attend all the scheduled meetings. Do not expect me to give you a private lesson during office hours on topics covered in a class you missed. Please see the University's attendance policies for more information (Go to <http://academiccatalog.udel.edu>  $\rightarrow$  2013-2014 Undergraduate Programs  $\rightarrow$  Academic Regulations for Undergraduates  $\rightarrow$  UNIVERSITY ATTENDANCE POLICIES  $\rightarrow$  Class Attendance).

### 5.2 Tardiness

Please arrive on time to avoid distracting your classmates (especially during exams or quizzes). If you need to arrive late or leave early please inform me in advance.

### 5.3 Academic Honesty

All University of Delaware Policies regarding ethics and honorable behavior apply to this course. The student guide to university policies (read more at: <http://www.udel.edu/stuguide/13-14/code.html#honesty>) is very clear: "All students must be honest and forthright in their academic studies. To falsify the results of one's research, to steal the words or ideas of another, to cheat on an assignment, or to allow or assist another to commit these acts corrupts the educational process. Students are expected to do their own work and neither give nor receive unauthorized assistance."

## 6 Accessibility for Students with Disabilities

If you are a student with a disability and wish to request accommodations, please contact the Office of Disabilities Support Services, 325 Academy St. Suite 161, or call (302) 831-4643. Information regarding your disability will be treated in a confidential manner. Because many accommodations require early planning, requests for accommodations should be made as early as possible.

## 7 Disclaimer

The above schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances and/or to ensure better student learning.