

**University of Delaware**  
**Department of Mathematical Sciences**

MATH-243 – Analytical Geometry and Calculus C  
Section 51 – Spring 2013

Instructor: Dr. Marco A. MONTES DE OCA  
Office: 315 Ewing Hall  
Phone: 302-831-7431  
Email: [mmontes@math.udel.edu](mailto:mmontes@math.udel.edu)  
URL: <http://math.udel.edu/~mmontes/teaching/UD/S13-MATH243-51.html>  
<https://sakai.udel.edu/portal/>  
Office hours: Mondays and Wednesdays 5:00pm–6:30pm or by appointment  
Meetings: Mondays and Wednesdays 7:00pm–9:00pm, 304 Gore Hall

## 1 About me

I am a postdoctoral researcher at the Department of Mathematical Sciences at the University of Delaware. Before moving to the U.S. in 2011, I was a Ph.D. student at the artificial intelligence laboratory (IRIDIA) at the *Université libre de Bruxelles* (the French-speaking Free University of Brussels), Brussels, Belgium.

One of my research areas is called swarm intelligence. It is an artificial intelligence subfield in which we take inspiration from the collective-level problem-solving behavior of large groups of animals, such as bee and ant colonies. Swarm intelligence has applications in the field of optimization, which is a topic we will discuss toward the middle of the course.

I like eating good food. Let me know if you know of a good (and reasonably priced) restaurant in the Washington, D.C.–Boston megalopolis. I will appreciate the information.

## 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. Note: The UD Bookstore provides the bundle: UDel Customized Book + EWA. ISBN:113349756X. The chapters this course is based on are: 12, 13, 14, 15 (except 15.5), and 16. In particular, we will study:

Topic(s)	Book Section	Tentatively covered by
3D coordinate systems	12.1	Week 1
Vectors	12.2	Week 1
The dot product	12.3	Week 1
The cross product	12.4	Week 1
Equations of lines and planes	12.5	Week 1
Cylinders and quadratic surfaces	12.6	Week 2
Vector functions and space curves	13.1	Week 2
Derivatives and integrals of vector functions	13.2	Week 2
Arc length and curvature	13.3	Week 3
Motion in space	13.4	Week 3
Functions of several variables	14.1	Week 4
Limits and continuity	14.2	Week 4
Partial derivatives	14.3	Week 4
Tangent planes and linear approximations	14.4	Week 5
The chain rule	14.5	Week 5
Directional derivatives and the gradient vector	14.6	Week 6
Maximum and minimum values	14.7	Week 6
Lagrange multipliers	14.8	Week 6
Double integrals over rectangles	15.1	Week 7
Iterated integrals	15.2	Week 7
Double integrals over general regions	15.3	Week 7
Double integrals in polar coordinates	15.4	Week 9
Surface area	15.6	Week 9
Triple integrals	15.7	Week 10
Triple integrals in cylindrical coordinates	15.8	Week 10
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 12
Green's theorem	16.4	Week 12
Curl and divergence	16.5	Week 13
Parametric surfaces and their areas	16.6	Week 13
Surface integrals	16.7	Week 14
Stoke's and divergence theorem	16.8 & 16.9	Week 14

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 four hours to office hours, but you may also set an appointment with me at other times. 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

To have a rough idea of your mastery of the subject matter, you will be graded based on three elements: Homeworks, quizzes, and exams.

#### 3.1 Homework

Twelve individual homeworks will be assigned and collected throughout the term. Each homework will be graded on a scale from 0 to 100 points. These homeworks and their solutions will be posted on the course website, so make sure that you check it regularly. 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 two homework scores will be dropped.

The tentative homework schedule is the following:

HW #	Due Date
1	February 11
2	February 18
3	February 25
4	March 4
5	March 11
6	March 18
7	April 1
8	April 8
9	April 15
10	April 22
11	April 29
12	May 6

The homeworks should be prepared using sheets of white paper (using both sides). If more than one sheet of paper is used, staple the set on the upper-left corner. Homeworks that are not neatly prepared according to the aforementioned requirements will be returned to their authors without grading.

### 3.2 Quizzes

There will be six quizzes during the course. The grading scale for each quiz will be 0 to 100 points. The worst quiz score will be dropped.

The quizzes are scheduled as follows:

Quiz #	Date
1	February 13
2	March 6
3	March 20
4	April 10
5	April 24
6	May 8

It is a University policy not to allow the use of digital calculators, or any other device during quizzes or exams.

### 3.3 Exams

There will be three midterm exams and a comprehensive final exam. Each exam is graded on a scale from 0 to 100 points. 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
1	February 27
2	April 3
3	May 1
Final*	May 16–23

\*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	10%
Exam 1	15 %
Exam 2	15 %
Exam 3	15 %
Final	30 %

Suppose your final score is  $X$ . The scale used in this course to map your point score to a letter grade is the following:  $0 < X < 60$  for F,  $60 \leq X < 63$  for D-,  $63 \leq X < 67$  for D,  $67 \leq X < 70$  for D+,  $70 \leq X < 73$  for C-,  $73 \leq X < 77$  for C,  $77 \leq X < 80$  for C+,  $80 \leq X < 83$  for B-,  $83 \leq X < 87$  for B,  $87 \leq X < 90$  for B+,  $90 \leq X < 93$  for A-,  $93 \leq X \leq 100$  for A.

## 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> → 2012-2013 Undergraduate Programs → Academic Regulations for Undergraduates → UNIVERSITY ATTENDANCE POLICIES → 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/12-13/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.