MATH 2415.001 (24624) Syllabus
Calculus of Several Variables
Spring 2014, MW 11:30am–12:45pm, JSOM 1.117

Instructor: Dr. Minkoff
Office: FO 2.402B
Phone: (972) 883-6695
Email: sminkoff@utdallas.edu
Website: *http://www.utdallas.edu/∼sminkoff*
Note that I will maintain a web page for this course linked from my main web page. (I do not use eLearning.)

Office Hours: Monday and Wednesday 1:30–2:30 pm, or by appointment.

Course Pre-requisites: A grade of C− or better in MATH 2414 or equivalent. In general, success in Math courses strongly depends on your grade in previous relevant courses. *For Math 2415, the material in Math 2413 (Calculus I) is much more important than that in Math 2414 (Calculus II).*

Co-requisites: Students *must* be enrolled in one of the following problem sessions:

25560	Math 2415.302	M 9:00-10:50	FO 2.702
24754	Math 2415.303	M 11:00-12:50	FN 2.202
24755	Math 2415.304	W 9:00-10:50	SLC 2.304
24756	Math 2415.305	W 1:00-2:50	GR 4.204
24945	Math 2415.306	M 3:00-4:50	FO 2.404

Students *must* be enrolled the following exam section (see below for exams dates):

24627 Math 2415.701 Th 7-8:15 pm JO 3.516 or GR 3.420

Course Description (from the catalog): Continuation of the Math 2413, 2414 sequence. The course covers differential and integral calculus of functions of several variables. Topics include vector valued and scalar functions, partial derivatives, directional derivatives, chain rule, Lagrange multipliers, multiple integrals, double and triple integrals, the line integral, Green's theorem, Stokes' theorem, Divergence theorem.

Texts –Required: *Calculus (Early Transcendentals)*, 7th Edition, by James Stewart, Chapters 12-16. A less expensive Electronic Version is also available. You must have **WebAssign** access. Some Options:

1. Access code to Enhanced WebAssign (contains digital copy of the text) ISBN: 9780538738071
2. Loose leaf copy of the text bundled with Enhanced WebAssign access code ISBN: 9781285111605
3. Hardbound text bundled with Enhanced WebAssign access code ISBN: 9780495962243

Material Covered: The course will cover the following sections of the textbook: 12.1-12.6, 13.1-13.3, 14.1, 14.3-14.8, 15.1-15.4, 15.7-15.10, 16.1-16.9.

Grading Policy:

Active Participation in Problem Sessions	5%
Active Participation in Lectures	5%
Digital Homework	10%
Paper Homework	10%
Midterm 1	20%
Midterm 2	20%
Final Exam	30%
Total	100%

Participation: The Teaching Assistant will give you a grade between 0 and 5 depending on the degree to which you *actively* participate in small group learning experiences in the Problem Sessions. The Course Instuctor will give you a grade between 0 and 5 depending on the degree to which you *actively* participate in the Lectures. In particular, attendance will be taken in Lectures.

Exams: There will be two midterm exams:

- Midterm 1: Thursday Feb 20th from 7:00-8:15pm, covering Sections 12.1-12.6, 13.1-13.3 (excluding curvature), 14.1, 14.3, and 14.4.
- Midterm 2: Thursday Apr 3rd from 7:00-8:15pm, covering Sections 14.5-14.8, 15.1-15.4, and 15.7-15.9.

The final will be based on the whole course and a total time of 2 hours and 45 mins will be allocated for the final.

Homework: There will be one digit homework and one paper and pencil homework assignment both of which are due every week on Wednesdays. Paper homework is to be turned in at the START of class on Wednesday or can be slipped under my office door *prior* to class on Wednesday if you must miss class for some reason. *I will not accept homework that is handed in after the first few minutes of class!!*

The grader will check that all (paper) homework assigned has been done, but will only carefully grade selected problems. All digital problems will be graded. Your lowest two digital homework grades and your two lowest paper homework grades will be dropped. For the paper homework you must staple the cover sheet to the front of your paper homework and follow all instructions on the cover sheet. Each digital and paper problem will be worth 5 points. For the digital homework students will have three attempts, with a maximum score of 5/5 for the first and second attempts and a maximum score of 3/5 for the third attempt.

Please note that the homework constitutes a substantial portion of your overall grade. In order to learn the concepts and be able to apply them to solving problems on exams, etc., you are strongly encouraged to devote as much time as possible to working the homework problems. I encourage you to discuss the homework assignments with other students in the

class. However, I expect the homework you submit for grading to be written up by you alone.

Calculators: You are allowed to use calculators and software tools such as Mathematica, Maple, and Matlab on your homework assignments. However, since the exams are designed to test your *understanding* of the underlying concepts covered in this class, *calculators will not be permitted (or necessary) for use in the exams.*

Email: I am happy to answer questions about the class via email. However, it is much better for you if we can talk in my office at the board. Answers given over email will be brief and intended merely to answer your direct question rather than to explain concepts. I reserve the right not to respond to email if I feel it would be best for the student to discuss his/her question in person during my office hours. I will not respond to email which does not include the name of the sender.

Tests: No make-up exams will be given except *possibly* in the case of a serious emergency. In such a case I *must* be notified *in advance*. There will be no exceptions to taking the final exam at the date, time, and place specified by the University. The final exam will be comprehensive although material covered after the second midterm will be emphasized.

Class Attendance: I expect students to attend class and to turn up **on time**. Rarely do students do well in classes which they do not attend, and I will be less likely to give outside assistance to students who regularly miss class. Further, students arriving late for class disrupt the entire class. Students who consistently turn up more than a few minutes late for class or who regularly miss class may be docked points from their final grade. **Students should also note that I do not allow cell phones, laptops or other electronic devices to be used in class and will ask that these items be turned off at the start of class.**

Academic Conduct: I take academic dishonesty *very seriously* and will not tolerate it in this class in any form. Academic misconduct includes willfully cheating on or giving aid during an exam or copying homework assignments (from the web, from each other, or from a solutions manual). Blatant copying on an exam, homework assignment, or computer assignment will result in a grade of zero for that work. Further information on the academic conduct policy can be found at http://www.utdallas.edu/deanofstudents/dishonesty/

UT Dallas Syllabus Policies and Procedures:
The information at http://go.utdallas.edu/syllabus-policies constitutes the University's policy and procedures segment of the course syllabus.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.

Student Learning Objectives/Outcomes

Multivariable or Vector Calculus is an undergraduate course that generalizes the concepts you learned in first and second semester Calculus to higher dimensions. Specifically you will learn what it means to integrate and differentiate functions that have domains or ranges not in $\Re$ but in $\Re^n$. These concepts form the basis for a huge field of mathematics – the study of

partial differential equations (pde's). PDE's are equations that model most of the interesting physical phenomena encountered in science and engineering (just a few examples include the propagation of light and sound waves through the air or earth, the flow of fluids in a reservoir or aquifer, etc). It is essential that you master the concepts in this course in order to be able to deal with models found in the physical world (we live in three space dimensions).

Tips for Succeeding in this Class:

1. The textbook is intended to *supplement* in class lectures (and vice versa) so if you attend class but do not read the appropriate section in the book you will miss out on a wealth of good information and on an alternate view of the material. The text is an invaluable resource as it acts as a second teacher and as a reference point when topics are unclear. However, I will not test you on material in the text which I don't also cover in class.

2. Before you attempt the homework you should *read the sections* in the book which explain the concepts covered in the homework.

3. You will benefit greatly from working with others in the class so long as you use your peers as a way to hash over concepts and not a way to "get the answers". In other words, *start early* and use your fellow-classmates to discuss the best way to approach the problems. Then go off and try to work out the details yourself.

4. **Begin the new homework assignment the same day you turn in the previous assignment!** Do not wait 3–4 days to start the homework as then you will not have enough time to digest the material or understand the point of the problems.

5. Come to office hours and get help if you are stuck. It is much better to get help early than to wait. I may ask you to show me what you've come up with at the board so you should have at least attempted the homework problems before asking for help.

Important Dates:

Date	Notes
1/13/14	First day of class
1/29/14	Last day to drop without a grade of "W"
2/20/14	Midterm Exam 1
3/28/14	**Absolute Last day to drop class**
4/3/14	Midterm Exam 2
5/3/14	Last day of classes
TBD	Final Exam

Tentative Schedule:

Date	Section/Topic
M 1/13/14	First Day Handout; §12.1 – Vectors §12.2 – Vectors
W 1/15/14	§12.3 – Dot Product
M 1/20/14	MLK Holiday (no class)
W 1/22/14	§12.4 – Cross Product
M 1/27/14	§12.5 – Lines and Planes
W 1/29/14	§12.6 – Quadric Surfaces
M 2/3/14	§13.1 – Parametric Curves §13.2 – Velocity
W 2/5/14	§13.3 – Arclength §14.1 – Functions of Several Variables
M 2/10/14	§14.3 – Partial Derivatives
W 2/12/14	§14.4 – Tangent Planes and Linear Approximation
M 2/17/14	§14.5 – Chain Rule
W 2/19/14	§14.6 – Directional Derivative and Gradient
Th 2/20/14	**EXAM 1**
M 2/24/14	§14.7 – Max/Min
W 2/26/14	§14.7 – Max/Min
M 3/3/14	§14.8 – Lagrange Multipliers
W 3/5/14	§15.1, 15.2 – Double Integrals over Rectangles
M 3/10/14	**Spring Break**
W 3/12/14	**Spring Break**

Date	Section/Topic
M 3/17/14	§15.3 – Double Integrals (General Regions)
W 3/19/14	§15.4 – Double Integrals (Polar Coordinates)
M 3/24/14	§15.7 – Cylindrical Coordinates §15.8 – Spherical Coordinates
W 3/26/14	§15.7 – Triple Integrals (Rectangular) §15.8 – Triple Integrals (Cylindrical Coords) §15.9 – Triple Integrals (Spherical Coords)
M 3/31/14	§15.10 – Change of Variables (Double Integrals)
W 4/2/14	§16.1 – Vector Fields §16.2 – Line Integrals
Th 4/3/14	**EXAM 2**
M 4/7/14	§16.2 – Line Integrals
W 4/9/14	§16.3 – FTC for Line Integrals and Conservative Vector Fields
M 4/14/14	§16.4 – Green's Theorem
W 4/16/14	§16.5 – Curl and Divergence
M 4/21/14	§16.6 – Parametric Surfaces
W 4/23/14	§16.7 – Surface Integrals
M 4/28/14	§16.8 – Stokes' Theorem
W 4/30/14	§16.9 – Gauss' Theorem Review
TBD	**Final Exam**