Math 254 Calculus IV Spring 2018 #1541

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Course Description Topics include functions of several variables, tangent planes, partial differentiation, the chain rule, Lagrange multipliers, double and triple integrals, vector fields, line and surface integrals. Culminates in the theorems of Green and Stokes, along with the Divergence Theorem. Prerequisite: Math 153 with a grade of "C" or better.

Text: Calculus Early Transcendentals 5th ed., Stewart ISBN 0-534-39321-7
Math 254 covers selected sections from chapters 14, 15, and 16.

Calculator: A graphing calculator is recommended for this class, but not required. The math department rents the TI-84 for $20 per quarter. Please see me if you are interested in renting a calculator.

A simple scientific calculator is **required** and will be the only calculator allowed on most quizzes. Don't spend more than $20.

We will also use *Mathematica* throughout the course. A home use copy of Mathematica can be downloaded off of the students app drive after logging into a campus computer using your MySVC account.

Course Objectives: After completing this course, the student will be able to:
1. Understand and use the chain rule properly.
2. Understand and use Directional Derivatives and Gradient Vectors.
3. Find Maximum and Minimum values of a multivariable function.
4. Properly use Lagrange Multipliers in applied problems.
5. Work with double integrals over regions using both Rectangular and Polar coordinates.
6. Finding applications of Double integrals, and find surface area.
7. Work with Triple Integrals using both Cylindrical and Spherical Coordinates.
8. Properly use the change of variables technique in Multiple Integrals.
9. Understand Vector Fields and Line Integrals.
10. Become comfortable with Green's Theorem and Stokes' Theorem and understand how to use them.
11. Find the Curl and Divergence.
12. Understand and use the Divergence Theorem.
13. Work with functions of several variables.
14. Find tangent planes.
15. Work with partial derivatives.

Coursework

Reading You will be expected to read the text for each section covered. We will cover the main topics of each section, but there is usually a substantial amount we wont be able to cover in class that you will need to cover on your own. Plan on spending an hour reading the text **before** working on the recommended exercises.

Worksheets/Homework is the most important part of any math course and is the course component where you actually learn the material presented in class. Homework is generally not collected, however we will spend a small amount of time going over the previous days exercises if needed before looking at new material. There will be several worksheets (seven) throughout the quarter worth 15 points each. These worksheets will be a mixture of exercises from the text and small projects requiring the use of *Mathematica.* The worksheets are worth 20% of the final grade.

Exams There are six 50-point exams, two per chapter. Exams must be taken on the scheduled day (see calendar). Make-up Exams are NOT given except for exceptional circumstances. Please contact me a week prior to a test if an alternative testing time is needed. The chapter exams account for approximately 50% of the overall grade. *Anyone found cheating on an exam will receive a 0 for that exam. Caught a second time will result in failing the course.*

Final Project/Twenty Questions A final project involving compiling twenty questions that encapsulates the entire course is worth 50 points and can be used to replace your lowest exam score.

Final Exam There is a comprehensive final exam worth 100 points covering material from the entire course. The final accounts for approximately 30% of your overall grade. You must receive at least a 60% on the final to pass the course.

Grading Scale Letter grades are determined by the following scale:

	B+ 87%	C+ 77%	D+ 63%
A 93%	B 83%	C 70%	D 60%
A- 90%	B- 80%	C- 67%	E < 60%

Daily Schedule (Very Tentative)

Monday	Tuesday	Wednesday	Thursday	Friday
4/2	4/3 14.1	4/4 14.2	4/5 14.3	4/7 14.4
4/9	4/10 **Exam 1**	4/11 14.5	4/12 14.6	4/13 14.7
4/16 14.8	4/17	4/18	4/19 **Exam 2**	4/20 15.1
4/23 15.2	4/24 15.3	4/25 15.4	4/26 15.5	4/27 15.5
4/30 15.5	5/1	5/2 **Exam 3**	5/4 15.6	5/5 15.7
5/7 15.8	5/8 15.9	5/9	5/10	5/12 **Exam 4**
5/14 16.1	5/15 16.2	5/16 16.3	5/17	5/18 **No Class**
5/21 16.4	5/22 16.5	5/23	5/24 **Exam 5**	5/25 16.7
5/28 **Memorial Day**	5/29 16.7	5/30 16.8	5/31	6/1 16.9
6/4 16.10	6/5	6/6 **Exam 6**	6/7	6/8 **20 Questions**
6/11 **Final Exam** 9:30	6/12	6/13	6/14	6/15

Recommended Exercises (Tentative)

14.1	Functions of Several Variables	3, 9 - 29 odd, 30, 49 - 58, 61, 67
14.2	Limit of a function of Several Variables	5 - 31 odd
14.3	Partial Derivatives	5, 6, 9 - 25 odd, 37, 47, 49, 53, 60, 78, 84
14.4	Tangent Planes and Linear Approximations	1 - 19 odd, 23 - 33 odd
14.5	Chain Rule and Implicit Differentiation	1 - 35 odd, 39, 45, 48
14.6	Directional Derivatives and the Gradient	1 - 33 odd, 45, 49, 53, 55
14.7	Maximum and Minimum Values	4, 5 - 18 odd, 21, 23, 25, 29, 32, 35, 39, 47
14.8	Constrained Extrema; Lagrange Multipliers	5, 7, 9, 15, 17, 19, 39, 41
15.1	Double Integrals over Rectangular Regions	1 - 13 odd
15.2	Iterated Integrals	1 - 29 odd, 35
15.3	Volumes of Solids with Non-Rectangular Bases	1 - 27 odd, 37 - 47 odd
15.4	Double Integrals in Polar Coordinates	7 - 31 odd
15.5	Applications: Center of Mass and Inertia	5, 7, 9, 11, 13, 14, 17, 19
15.6	Surface Area	1, 5, 7, 9, 13, 17, 24
15.7	Triple Integrals	1 - 21 odd, 25, 27, 29, 31, 33, 39, 41
15.8	Cylindrical and Spherical Coordinates	7 - 15 odd, 21, 25, 31, 33
15.9	Change of Variable - The Jacobian	1 - 15 odd, 19, 21
16.1	Vector Fields	1 - 7 odd, 11 - 18, 21 - 27 odd, 29 - 32
16.2	Line Integrals	1 - 15 odd, 19 - 33 odd, 37, 39
16.3	Fundamental Theorem of Line Integrals	1 - 27 odd, Conservation of Energy pg 1080
16.4	Green's Theorem	1 - 19 odd
16.5	Curl and Divergence	1 - 29 odd
16.6	Parametric Surfaces	1, 3, 5, 11 - 16, 19, 23, 31, 37, 49, 45
16.7	Surface Integrals	5, 7, 9, 11, 19, 21, 23, 25, 39, 41
16.8	Stoke's Theorem	5, 7, 9, 11, 14
16.9	The Divergence Theorem	1 - 15 odd