Syllabus Math 163
UNM Valencia Fall 2016

MATH 264-501 43645 Class Fridays 9:00 am-12:30 pm VAAS 129

TEXTBOOK: Thomas' Calculus 13th Edition.
Instructor: Alfonso Heras aheras@unm.edu
Office Hours: TBA
No calculators on exams.
Catalog Description: Vector operations, vector representation of planes and curves, functions of several variables, partial derivatives, gradient, tangent planes, optimization, multiple integrals in Cartesian cylindrical and spherical coordinates, vector fields, line integrals and Green's theorem.
Content: Most of chapters 12, 13, 14, 15, 16: Here is a listing and brief description of the material:

COURSE WEBSITE: learn.unm.edu
GRADING: Your total course grade is obtained from your percentage grade out of the following:
Three in-class exams: 100 pts each
Daily Quizzes: 200 pts (At the stem Center) we keep the best 12.
Final Exam: 200 pts
Total: 700 pts
HOMEWORK: Your homework is your most important effort in this class; homework is how you learn the material that will be on the quizzes and exams.
Expect to do 2-3 hours of homework for every hour of class meeting time (on average 10-15 hours per week). Each day, you need to do a written homework posted on your learn.unm.edu account, that you must write out by hand. This homework is due at the beginning of the class. The "Daily Written" problems must be clearly and neatly written up in a folder or notebook that you need to bring with you when you go to see the instructor or get tutoring.
The \Daily Written" problems are representative of most of the material you will be tested on in exams and quizzes. You therefore need to do all the listed problems daily to succeed. Unfortunately, we cannot collect the problems for grading. It is your responsibility to do these problems and ask your instructor about anything you do not understand.
QUIZZES: There will be a daily quiz given in class, consisting of recent homework problems.
To do well on the quizzes, make sure to fully understand the solution to these homework problems. As a bonus, you will then understand the material well and will also do well on the exams.
There will be no makeup quizzes unless you contact your instructor ahead of time with a documented \university authorized absence" (documented illness, family emergency, active participation in scholarly or athletic events).
The first quiz will be given on the second day of classes.
EXAMS: The in-class exams and the final exam will cover problems like all the assigned homework problems, a selection of which is given in review sheets for each exam. The exam dates are given in the syllabus. No makeup exams will be given unless you contact your instructor ahead of time with a documented \university authorized absence" (illness, family emergency, active participation in scholarly or athletic events).
GRADING GUIDELINES: To get full credit on exams, homework, quizzes, worksheets, you need to show your work, neatly, in clear and correct mathematical notation, annotated by English sentences where appropriate. You will be graded based on the work shown, not on the answer.
CALCULATORS: Graphing calculators and other technology (eg, MATLAB) can be used effectively to illustrate many basic concepts and promote understanding. However, the student must master many basic algebraic and graphing skills without a calculator. To promote these skills, we **will not** use any (graphing or non-graphing) calculators on the exams or quizzes.
ATTENDANCE: Attendance is mandatory. If you have three or more unexcused absences your instructor may drop you from the class. However, you are ultimately responsible for dropping your class if you cannot attend.

STUDENT BEHAVIOUR: Be courteous and respectful towards the class: be on time for lectures, turn off cellphones and refrain from talking in class, leaving the classroom in the middle of a lecture or doing any other activity that could be disruptive to the class. Cheating will not be tolerated.
DISABILITY STATEMENT: Students with documented disabilities must inform their instructor of their needs during the first two weeks of the semester.

SLO's: The successful Calculus III student (A or B) should be able to reach the following learning outcomes:

1. Perform and apply vector operations, including the dot and cross product of vectors, in the plane and space. Graph and find equations of lines, planes, cylinders and quadratic surfaces.

2. Differentiate and integrate vector-valued functions. For a position vector function of time, interpret these as velocity and acceleration**.**

3 Evaluate limits and determine the continuity and differentiability of functions of several variables.

4. Describe graphs, level curves and level surfaces of functions of several variables.

5. Find arc length and curvature of space curves, including the use of unit tangents and unit normals; identify and interpret tangential and normal components of acceleration.

6. Find partial derivatives, directional derivatives, and gradients and use them to solve applied problems.

7. Find differentials of functions of several variables and use them to solve applied problems.

8. Find equations of tangent planes and normal lines to surfaces that are given implicitly or parametrically.

9. Use the chain rule for functions of several variables (including implicit differentiation).

10. For functions of several variables, find critical points using first partials and interpret them as relative extrema/saddle points using the second partials test. Find absolute extrema on a closed region. Apply these techniques to optimization problems.

11 Use Lagrange multipliers to solve constrained optimization problems.

12. Evaluate multiple integrals in appropriate coordinate systems such as rectangular, polar, cylindrical and spherical coordinates and apply them to solve problems involving volume, surface area, density, moments and centroids.

13. Use Jacobians to change variables in multiple integrals.

14. Evaluate line and surface integrals. Identify when a line integral is independent of path and use the Fundamental Theorem of Line Integrals to solve applied problems.

15. Identify conservative and inverse square fields.

16. Find the curl and divergence of a vector field, the work done on an object moving in a vector field, and the flux of a field through a surface. Use these ideas to solve applied problems.

17. Introduce and use Green's Theorem, the Divergence (Gauss's) Theorem and Stokes's Theorem.

Tentative Schedule for the class

12. **Vectors and the Geometry of Space**	**Suggested Problems**	**Homework**	
Section	**Odd problems only**	**From Chapter Review Page 733**	
12.1	1-15, 17-25, 41-57	Vector calculation in 2D and in 3D	Quiz 1
12.2	1--47	Lines, planes and distances	Quiz 2
12.3	1-7, 9-13, 33-35	Quadratic Surfaces	Quiz 3
12.4	1--39		
12.5	1-59		
12.6	1-43		
13.Vector valued functions and motion in space		**From Chapter Review Page 776**	
13.1	1-23	Motion in the plane	Quiz 4
13.2	1-25	Projectile Motion	Quiz 5
13.3	1-17	Motion in space	Quiz 6
13.4	1-17		
13.5	1-19		
13.6	1-5		
Test 1			
14. Partial Derivatives		**From Chapter Review Page 863**	
14.1	1-51	Domain, range, level curves and limits	Quiz 7
14.2	1-47	Partial derivatives 1st and 2nd order), Chain rule	Quiz 8
14.3	1-55	Implicit differentiation, gradients, tangent planes	Quiz 9
14.4	1-35	Local and absolute extrema and Lagrange Multipliers	Quiz 10
14.5	1-39		
14.6	1-17		
14.7	1-59		
14.8	1-29		
Test 2			
15. Multiple Integrals		**From Chapter Review Page 932**	
15.1	1-33	Double Iterated integrals, Areas, Volumes, and average	Quiz 11
15.2	1-65	Average values and volumes using triple integrals	Quiz 12
15.3	1-23	Cylindrical and spherical coordinates.	Quiz 13
15.4	1-25		
15.5	1-27, 37-43		
15.6	1-9		
15.7	1-17, 21-25, 43-55		
15.8	1-15		
Test 3			
16. Integrals and Vector fields		**From Chapter Review Page 1028**	
16.1	1-31	Evaluating line integrals	Quiz 14
16.2	1-49	Conservative fields	Quiz 15
16.3	1-21	Work and circulation	Quiz 16
16.4	1-31		
Final Exam			

Breaks and Holidays

Martin Luther King Jr. Day	January 16
Spring Break	March 12-19
Final Exams	May 8-13
Commencement	May 12-13

All dates subject to change