Department of Mathematics & Statistics

CALCULUS AND ANALYTIC GEOMETRY III

MAT 309-01 – CRN # 81009

Course Section: 1 – Credit Hours: 4

FALL 2011 – Course Syllabus

Meeting: M T Th F 1:30 – 2:20PM; FH 308

Instructor: Dr. Donald Adongo, FH 6A-7

Contact: `donald.adongo@murraystate.edu`, 809-2490

Office Hours: M T Th F 11:30 – 12:20 PM

Web site: `http://campus.murraystate.edu/academic/faculty/dadongo`

I   Title

Calculus and Analytic Geometry III

II   Catalog Description

Course develops main ideas of differentiation and integration of functions of several variables and introduces vector calculus. Topics include vectors, analytic geometry of 3-dimensional space, functions of several variables, partial derivatives, directional derivatives, integrals of functions of two and three variables, vector fields, line integrals, Greens theorem, and the divergence theorem. Prerequisite: MAT 308.

III   Purpose

The purpose of this course is to complete a standard Freshman-Sophomore level sequence in elementary calculus. It is designed to introduce a student to the theory and applications of multivariate calculus. This course is a prerequisite for many upper division courses in mathematics and is required for any mathematics major or minor.

IV   Course Objectives

A student should learn standard theory and applications of the calculus for functions of two or more variables. A student who successfully completes the course should be able to:

1) Graph spheres and cylindrical surfaces in 3-space.

2) Perform vector algebra, including dot product, projections, cross product, and triple scalar product.

3) Find vector, symmetric and parametric equations of a line in space.

4) Find vector equation, point-normal form, and general form of equation of plane.

5) Graph cylinders and quadric surfaces. Convert between rectangular, cylindrical and spherical coordinates.

6) Find limit of, differentiate, and integrate vector-valued functions.

7) Find arc length for vector-valued functions and determine motion-velocity, speed, and acceleration along a curve.

8) Find unit tangent and normal vectors to surfaces.

9) Calculate curvature.

10) Determine limit and continuity of functions of several variables.

11) Calculate partial derivatives of functions of several variables.

12) Demonstrate differentiability and chain rules for functions of two or more variables; calculate directional derivatives and gradients.

13) Generalize chain rule for functions of several variables.

14) Use second partial test to find maxima and/or minima and/or saddle points for functions of two variables.

15) Use Lagrange Multipliers to maximize/minimize subject to constraints, a function of two or more variables.

16) Use double integrals to find area over non-rectangular regions or in polar coordinates and surface area.

17) Use triple integrals to find volume of solids, centroids, and centers of gravity and in spherical and cylindrical coordinates.

18) Calculate Jacobian for two and there-spaces.

19) Evaluate multiple integrals by change of variables.

20) Evaluate a line integral and relation to independence of path.

21) Evaluate surface integrals including vector-valued functions.

22) Evaluate a line integral using Green's Theorem; Apply the Divergence Theorem, and Stokes' Theorem.

The course will also help a student who successfully completes it to achieve a higher level of "mathematical maturity" needed to study more advanced mathematics courses.

V   Content Outline

This course will address the calculus content of chapters 12–17.

VI Instructional Activities

Students are expected to read the material before coming to class.

A portion of most class periods will be spent discussing new material and working examples from this material as a class, another portion of most class periods will be spent addressing questions about the previous day's material. There is no need to be formal or to raise your hand to ask questions. Feel free to just ask, whether I am explaining a problem or introducing new material. There is no need to feel shy about asking questions; that is the purpose of the class. Those in the class who do not ask questions do not necessarily know more than you do, they might be shy about asking questions, or they might not be aware of what they do not know because they have not read the sections or worked any problems.

One of the primary objectives of this course is to help you learn to think about problems mathematically and to solve the problems on your own. Working with colleagues in this class and talking about problems with your class mates are strategies to help you better understand a problem situation from several points of view. It has been observed that students who collaborate with their colleagues not only do better in the course but also learn more.

VII Field, Clinical, And/Or Laboratory Experiences

NONE

VIII Resources

No outside texts or materials are required. However, occasionally handouts will be given to aid in the understanding and organization of the material. If you miss a class period, it is your responsibility to get a copy of any item handed out that day.

IX Electronic Communication Policy:

It is the default policy of the **Department of Mathematics and Statistics** that, without the prior consent of the course instructor, no device may be used for electronic communication in class. This shall include cell phones, smart-phones, computers, laptops, and tablets. In addition, this includes verbal calling, incoming calls, email, text messaging, the use of cell phone calculators on tests and quizzes, and the use of the wireless capabilities of calculators or other electronic devices. Unless given special permission in advance from the course instructor for potential cases of emergency or critical family situations, cell phones must be kept on silent and out of sight (i.e. secured to a person's belt or kept in a bag or purse away from desks). Should a student's cell phone be visible, ring, or should the student be engaged in some other form of unauthorized usage that the course instructor finds to be disruptive to the class, the student may be asked to leave class and not return for that class period, and be counted absent for that day. Similar restrictions and penalties apply to use of other electronic devices, unless permitted by the instructor for that class period.

X   Grading Procedures

Your Course grade will be based on EXAM grades, HOMEWORK grades, QUIZ grades, and the FINAL EXAM. Sixty percent of the course grade will come from 5 major exams (each exam counts 12 percent of the grade) and 20 percent of the course grade will come from the final exam. The homework grade will contribute 10 percent while the quiz grade is worth 10 percent of the course grade. The grading scale will be:

% Points (x)	90 - 100	$80 \leq x < 90$	$70 \leq x < 80$	$60 \leq x < 70$	$0 \leq x < 60$
Grade	A	B	C	D	E

I do reserve the right to curve the grade should I deem it necessary.

Exams: The Exams will test your comprehension of concepts and skills not covered on a previous exam. Exams may contain both problem-solving questions and essay questions. Exams occur for everyone (to be fair to everyone) on the scheduled date. Sometimes, however, extenuating circumstances do exist. If you absolutely must miss an exam, you are to stop by or call me (or leave a message with the office if I am not in when you call) before the exam to tell me why you cannot be at the exam. In addition, you must complete the "missed exam form" (see the course website) within one week. If you do not, you will get a zero on that exam with no opportunity to make it up. An excused missed exam will be made up in my office within two weeks (an extension may be granted in rare cases), with the grade to be determined as explained at that time. Our five semester exams will be **September 2, September 19, October 14, October 31, and November 18**.

Final: The Final will be a comprehensive exam covering any material addressed that semester. The Final exam will be on **Thursday, December 8, 2011 at 1:30 p.m.** in **FH 308**.

Homework: Homework will be assigned at the beginning of each section and will also be listed on the course web site. Homework will be collected twice a week **(No Late Homework)**. Homework must be completed in pencil, separate from your notes, and on loose-leaf paper or paper without rough edges. **Staple** your papers together if you have used more than one sheet other wise your homework **will not be accepted**.

Quizzes: Each day's discussion of new material depends on vigorous participation on your part. During the semester numerous inclass quizzes will be given. These will generally not take more than five (5) minutes to complete.

The value of presentations depend upon basic familiarity with the topic, and naturally, your participation in the quizzes might be limited by your attendance. See attendance policy below.

Important Grade-dates: The last day to drop a course without receiving a grade (or a W) is Monday, August 22nd. The last day to change from Audit to Credit is Monday, August 22nd. The last day to drop individual courses and receive a grade of "W" is Tuesday, November 15th. The last day to change from Credit to Audit is Tuesday, November 15th, if you qualify for an Audit. (See the Audit policy below.)

Auditing: To Audit the course you need my permission. You will be expected to participate in all tests and assignments with a course average of at least 40%, and you will be expected to attend with no more than 4 absences for the whole semester. If you switch to 'Audit' in mid-semester, you must meet all of the requirements of an ordinary auditor (mentioned above). In addition, you may not miss more than 7% of the remaining class periods and you may not have more than 4 absences for the entire semester. Thus, if you have already missed 5 or more class periods, you may not change to 'Audit.' Failure to meet any of these after being granted an Audit will result in the grade 'Au' being changed to an 'E.'

XI   Attendance Policy

If you miss class you are responsible for obtaining the day's notes and assignments. You are expected to attend every class period or your grade will suffer (directly) if you do not attend.

- If you miss two or fewer days this semester, I will drop your four lowest homework grades and four lowest quiz grades.

- If you miss three or four days this semester, no homework grades will be dropped and No penalty.

- If you miss five or more days this semester, there will be a penalty on your Grade. You will loose 2% of your grade for every absence starting with the fifth.

To level the playing field between those who must miss classes because of MSU and those who do not, the only kind of absence which will not be counted in this regard is a university-required absence. Thus, anything else (for instance, being sick, going on a job interview, taking care of a sick relative, etc.) will count as one of these absences. See the MSU policy on attendance in the current Catalog: (online at http://www.murraystate.edu/provost/catalogs/010507.html#Policies) Note the following provisions on arriving late to class or leaving early:

(a) Every two tardies (arriving late) will count as an absence.

(b) Leaving class early will count as an absence unless you provide me with a reason in advance.

Holidays: We will not have class on Monday September 5 (Labor Day), Thursday September 29–30 (Fall Break) and from Wednesday November 23 through 25 (Thanksgiving Break).

XII   Academic Honesty

Cheating and plagiarism (submitting another person's material a is one's own, or doing work for another person which will receive academic credit) are all impermissible. This includes

1) the use of unauthorized notes on an exam,

2) looking at the exam of another or allowing another to look at your exam,

3) taking an exam for another or having another take an exam for you,

4) telling others the contents of an exam they have not yet taken or soliciting from others the contents of an exam which you have not taken, and

5) copying the contents of another's take-home assignment or allowing another to copy the contents of your take-home assignment (this does not include working together, with mutual understanding, on a take-home assignment).

The result of non-premeditated cheating (i.e. (2) or (5)) will be a zero for that assignment. The result of premeditated cheating (i.e. plagiarism or (1), (3), or (4)) will result in a grade of 'E' for the course. See the MSU policy on Academic Honesty in the current Catalog: (online at http://www.murraystate.edu/provost/catalogs/010507.html#Policies)

XIII   Texts and references

Calculus, Early Transcendentals, 1st ed. by Jon Rogawski, 2008; W.H. Freeman and Company.

XIV   Prerequisites

MAT 308.

XV   Non-Discrimination Policy Statement

Murray State University endorses the intent of all federal and state laws created to prohibit discrimintation. Murray State University does not discriminate on the basis of race, color, national origin, gender, sexual orientation, religion, age, veteran status, or disability in employment, admissions, or the provision of services and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities equal access to participate in all programs and activities. For more information, contact Sabrina Y. Dial, Director Equal Opportunity, Murray State University, 103 Wells Hall, Murray KY 42071-3318. Telephone 270-809-3155 (voice), 270-809-3361 (TDD).

Please fill out this portion, detach it and return to the instructor by **Friday August 19, 2011**.

By my signature below, I certify that I have received a copy of the course syllabus for MAT 309 taught by Dr. Donald Adongo during the Fall Semester of 2011. Furthermore, I certify that I have read and understand the contents of the course syllabus.

Printed Name ....

Signature ....

Date ....