**Department of Mathematics & Statistics**

**MATRIX THEORY AND LINEAR ALGEBRA**

**MAT 335 – CRN 81680**

**Course Section: 1 – Credit Hours: 3**

**FALL 2009 – Course Syllabus**

**Meeting:** M W F 9:30–10:20 PM; FH 108

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

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

**Office Hours:** M W F 10:30-11:30 AM

**Website:** http://campus.murraystate.edu/academic/faculty/donald.adongo

# I Title

MATRIX ANALYSIS AND LINEAR ALGEBRA

# II Catalog Description

The algebra of matrices and its application to problems in Euclidean spaces and elementary linear transformations. Prerequisites: MAT 308.

# III Purpose

This course is primarily for mathematics majors/minors and students of client disciplines such as computer science, engineering, physics, chemistry, biology. economics and business.

# IV Course Goals

The primary goals of this course are that a student who successfully completes it will have be able to synthesize solutions to problems and to prove simple theorems in the subject.

# V Course Objectives

Students will

- demonstrate a theoretical, operational, and graphic understanding of vector spaces and linear transformations.
- analyze systems of linear equations and determine if any solutions exist.

- examine some elementary properties of matrices and determine the dimension and structure of some matrices.

## VI Content Outline

In this course we will cover the following materials from the textbook. The number of class meetings per chapter may vary from section to section.

- Chapter 1: Vectors [Sections 1.1 – 1.3]
- Chapter 2: Systems of Linear Equations [Sections 2.1, 2.2]
- Chapter 3: Matrices and Matrix Algebra [Sections 3.1 – 3.4, 3.6]
- Chapter 4: Determinants [Sections 4.1 – 4.4]
- Chapter 6: Linear Transformations [Sections 6.1, 6.3]
- Chapter 7: Dimension and Structure [Sections 7.1 – 7.5, 7.7, 7.9, 7.11 ]
- Chapter 9: General Vector Spaces [Sections 9.1 – 9.2]

## VII Instructional Activities

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.

## VIII Calculators

Not required.

## IX 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.

## X Grading Procedures

Your grade will be based on EXAM grades, HOMEWORK grades, PROJECT grades, and the FINAL EXAM. Fifty percent of the course grade will come from 4 major exams (each exam counts 12.5 percent of the grade) and twenty five percent of the course grade will come from the final exam. The homework grade will contribute 12.5 percent while the project grade is worth 12.5 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 |

**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 four semester exams will be **September 4, September 28, October 21** and **November 20**.

**Final:** The Final will be a comprehensive exam covering any material addressed that semester. The Final exam will be on **Tuesday, December 8th at 8:00 a.m.** in **FH 108**.

**Homework:** Homework will be assigned at the beginning of each section and will also be listed on the course website. Homework will be collected weekly. **(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**. Your name and class meeting time should be written on the top right part of the first page.

**Project:** The project part will comprise of simulating some applications using ©Matlab. You do not need to have prior knowledge of matlab. There will be a total of 4 projects. Projects are due one week from the assigned date.

**Important Grade-dates:** The last day to drop a course without receiving a grade (or a W) is Tuesday, August 25th. The last day to change from Audit to Credit is Tuesday, August 25th. The last day to drop individual courses and receive a grade of "W" is Monday, November 2nd. Students who withdraw from all classes between Monday, November 3rd and November 24th will receive a 'WP' or a 'WE'. The last day to change from Credit to Audit is Monday, November 3rd, 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 25%, and you will be expected to attend with no more than 5 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 5 absences for the entire semester. Thus, if you have already missed 6 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. While you are not graded on class attendance, you are expected to attend every class period and your grade will suffer (indirectly) if you do not attend. If you miss three or fewer days this semester, I will drop your two lowest homework grades. 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.

Your project grade can be no more than 1.1 *your percentage of class attendance.

**Holidays:** We will not have class on Monday September 1 (Labor Day), Friday October 3 (Fall Break) and from Wednesday November 26 through 28 (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

Contemporary Linear Algebra, by Howard Anton and Robert C. Busby. John Wiley & Sons, Inc. ISBN 0-471-16362-7

## XIV Prerequisites

MAT 308.

## XV Statement of Affirmative Action and Equal Opportunity

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).