Syllabus for MTH 329-201 Spring 2011

Course Information:

Catalog Entry: MTH 329 - Elementary Linear Algebra

Semester: Spring 2011

Section Number: 201

CRN: 3198

Lecture: MWF 1:00 pm - 1:50 pm in Smith Hall 513

Instructor: Dr. Duane Farnsworth

Office: 103 Morrow Library

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Office Phone: (304) 696-3609

Office Hours: MTWR 2:30 pm - 4:00 pm. And by appointment.

Required Materials:

Required Text: *Linear Algebra: A Modern Introduction, Second Edition* by D. Poole.

Prerequisites:

To take this course a student must meet at least one of the following prerequisites.

- A score of 27 or higher on the math section of the ACT.
- A score of 610 or higher on the math section of the SAT.
- Successful completion of MTH 122, MTH 127, MTH 130, MTH 132, MTH 229, or IST 131.

Students should be aware that *satisfying this prerequisite on paper does not guarantee that one is ready for this class.* One needs to enter this class with a certain level of mathematical maturity.

Course Description:

This three credit hour course in linear algebra will cover chapters 1-5 of the text with some omissions. Linear algebra is the study of vectors and functions of vectors that have a certain nice property called linearity. Linear algebra has many applications; the most direct one being a complete framework for solving systems of linear equations in any number of variables. Unlike MTH 331, this course will only consider vectors that are ordered n-tuples of real numbers. In other words, abstract vector spaces will not be studied.

This course will begin in chapter one of the textbook with the study of vectors in $\mathbb{R}^n$ and a bit about geometry in $\mathbb{R}^2$ and $\mathbb{R}^3$. In chapter two, the general theory for systems of linear equations is developed, and methods for finding solutions using matrices are introduced. Moving on to chapter three, an algebra of matrices is introduced which has some interesting properties and which establishes a correspondence between matrices and an important class of functions. Important information about a matrix can be determined from a single number called its determinant. Determinants will be studied in chapter four along with the related problems of finding eigenvalues and eigenvectors. The course will conclude with a look at the notion of orthogonality in an arbitrary number of dimensions. This is a useful generalization of the observation that moving an object horizontally does not affect its vertical displacement.

Technology Requirements/Usage:

A calculator is not required for this course. Moreover, the use of a graphing calculator will not be permitted on any exams; the use of a simple scientific calculator will be permitted.

Course Objectives:

Students who complete MTH 329 will:

- be able to find the equation of a line or a plane in $\mathbb{R}^3$.
- be able to completely determine the solution set of any system of linear equations.
- be able to determine if a set of vectors spans $\mathbb{R}^n$ and/or is linearly independent.
- be able to perform matrix algebra.
- be able to find the standard matrix for a given linear transformation.
- be able to find the determinant of a square matrix.
- be able to diagnolize a diagnolizable square matrix.
- be able to find the orthogonal projection of a vector onto a given subspace of $\mathbb{R}^n$.
- be able to carry out the Gram-Schmidt orthonormalization process for a given linearly independent set.
- be able to supply definitions/explanations in their own words for key mathematical constructs and concepts.
- be capable of applying what is learned in this course to problems encountered in other science and mathematics courses.

Homework:

Suggested homework exercises will be provided frequently. Although most exercises will not be graded, it is *essential* that students do them. The only way to really learn mathematics is to do mathematics. Problems on the exams will often come directly from the homework.

Attendance:

Attendance is strongly encouraged, but will not usually influence the final grade. It may be used as the deciding factor in border-line grade situations.

Course Requirements:

Students in this course are expected to do the following:

- Study the material covered in lecture, course handouts, and any sections of the text that are assigned as reading.
- Do suggested exercises in a timely fashion.
- Come to lecture prepared to discuss current topics and assignments.
- Be aware of scheduled exams and of assignment due dates.
- Take exams when they are scheduled. Students must attend lecture on these days and must arrive on time.
- Turn in assignments on time.
- Take responsibility for their own learning.

Assessment:

In this course there will be three exams, at least ten graded sets of exercises, and a comprehensive final exam. When determining the final grade, class participation and attendance will be considered in borderline situations.

Approximate exam dates can be discerned in the tentative course calendar below. Exam dates will be fixed at least one week in advance; these announcements will be made in lecture and on-line. According to the current university schedule, the final exam for this course will be Friday, May 06 at 12:45 pm in Smith Hall 513.

The final grade for this class will be computed as follows.

Average of the highest nine assignments	30%
Average of the three in class exams	45%
Final exam	25%

Make up exams will only be given for excused absences and assignments will only be accepted late in the case of an excused absence. The university's policies regarding excused absences can be found at `http://www.marshall.edu/student-affairs/absence.htm`. Students with an excuse for missing an exam must notify the instructor in person or by email as soon as possible (prior to the absence if at all possible). Missed exams count as zeros in calculating the course grade.

The base grading scale for this course is given in the following table.

90-100	A	80-89	B	69-79	C	58-68	D	0-57	F

A course grade will never be any *lower* than what is indicated by this table.

If a student believes that a paper has been improperly graded, then he or she must bring this to the instructor's attention within one week of the paper having been returned to the class. One week after the return of any paper, the grades will be considered final and will not be changed for any reason.

University Calendar:

The following is a collection of some important dates.

Mon, Jan 10	First day of class.
Fri, Jan 14	Last day to drop/add courses.
Mon, Jan 17	Martin Luther King Jr. Holiday – University closed.
Thu, Mar 03	Last day to register for a 2nd 8 weeks course.
Fri, Mar 18	Last day to withdraw from full semester courses.
Sun, Mar 20 to Sun, Mar 27	Spring Break – Classes dismissed.
Wed, Apr 06	Assessment Day. Regular classes will not meet, but students are expected to participate in University-Wide Assessment Activities. Students may obtain a list of activities from their respective department chairs. Undecided students should go to their college offices for a list of Assessment Day activities. Regularly scheduled classes will resume at 4:00 P.M.
Fri, Apr 29	Last day of class. Last day to completely withdraw for semester
Fri, May 06	Final exam scheduled for 12:45 pm in Smith Hall 513.

Tentative Course Calendar:

The following calendar provides a *rough* outline of the course. *It is subject to change!* Modifications to the course calendar need not be distributed by the instructor.

Week	Course Coverage
01: 01-10	1.1, 1.2
02: 01-17	1.3, 2.1
03: 01-24	2.2, 2.3
04: 01-31	2.3, 2.4
05: 02-07	exam, 3.1
06: 02-14	3.1, 3.2
07: 02-21	3.3, 3.5
08: 02-28	3.6, 3.7
09: 03-07	exam, 4.1
10: 03-14	4.1, 4.2
11: 03-21	Spring Break
12: 03-28	4.3, 4.4
13: 04-04	4.6, 5.1
14: 04-11	5.2, 5.3
15: 04-18	5.4, exam
16: 04-25	7.1, 7.2, 7.3

Web Resources and Email:

Useful on-line resources for this course can be found on my homepage `http://mupfc.marshall.edu/~farnsworthd/`. There you will find a list of suggested exercises, announcements, dates of exams, and any course handouts (like this syllabus). However, please note that use of this resource is not a substitute for attending lecture. The instructor makes no guarantees that the site will always be completely up to date, nor that the site will be free from errors.

Email the instructor only at the address listed on the front page of this syllabus. Other accounts may not be monitored. Any email sent to the instructor must contain both the course number and the section number in the heading.

Students with Disabilities:

Marshall University is committed to equal opportunity in education for all students, including those with physical, learning and psychological disabilities. For more information, please visit `http://www.marshall.edu/disabled` or contact the Disabled Student Services Office at Prichard Hall 11, phone 304-696-2271.

In this course, any student with a disability must notify the instructor during the first two weeks of the semester about any need for accommodations. To receive accommodations, a student must be registered with an appropriate campus service (DSS or HELP) and that service must contact the instructor on the student's behalf (it is the responsibility of the student to ensure that this happens).

Academic Dishonesty Policy:

All students should be familiar with the university's policy concerning academic dishonesty. This policy can be found on pages 66 – 68 of the undergraduate catalog `http://www.marshall.edu/catalog/undergraduate/ug_10-11_published.pdf`.

Final Remarks:

- This syllabus is subject to change. Any changes (other than changes to the tentative course calendar) will be distributed to the class in writing.
- To succeed in this class, students should exert a steady, consistent effort. Cramming for mathematics exams seldom has the desired result. On the other hand, only a modest amount of preparation is necessary the night before an exam if homework is completed when it is assigned.
- Often, there is no substitute for individual instruction in a mathematics course. For this reason, the instructor strongly encourages all students to attend office hours whenever they have questions or are frustrated by the material.