MATH 225 SPRING 2015

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Office hours: 1:15 – 3:00 MWF. (Also often on TTh mornings and afternoons.)

Class Meetings: 10:00 – 10:50 MWF in ZHS 352 and 2, 3, or 4 PM TTh in GFS 202. The final exam will be in ZHS 352 unless otherwise announced.

Text: Differential Equations and Linear Algebra (3rd Ed.) by S. W. Goode and S. A. Annin. The material consists of parts of Chapters 2, 3, 4, 5, 1, 6, and 7, roughly in that order.

Grading: There will be regular homework assignments counting for 10% of the course grade. Midterms (tentatively) on Friday Feb. 20 and Friday April 3 count 30% each toward the course grade. The final exam is Monday, May 11 from 8:00 – 10:00 and counts for 30% of the course grade. Half of the letter grade on the final exam may replace half the letter grade of a midterm. The deadline for dropping a course this semester is Friday, April 10 and the result of the second midterm will be available in class by April 8. Late homework assignments need a good excuse and my approval.

Prerequisite: The prerequisite for the course is Math 126 (Calculus II). The first part of the course requires a bit of Calculus only for examples. About the last third of the course deals with differential equations, so you need to review techniques of integration—especially integration by parts, partial fractions, and the integration of exponential and trigonometric functions.

Course Content: The first part of the course deals with matrices and computations with them. One application is a procedure for solving general systems of linear equations that is very useful in many areas of mathematics, science, and engineering. Then comes an introduction to abstract vector spaces and linear transformations. These ideas, important themselves in many areas and applications, are used in finding the solutions of differential equations. In the last third of the course the focus of interest is to obtain solutions of \( n \)-th order linear differential equations with constant coefficients, and solutions of simple systems of first order linear differential equations.

General Comments/Expectations: Math 225 covers important and interesting topics that are useful in many disciplines. A major difference between this course and Calculus is that Calculus concentrates on techniques of computation and the problems to which these apply, but here the focus is on the mathematical ideas themselves. Applications of the ideas and computational procedures are also important in the course, but it is vital to understand what you are doing, rather than just "how to do it".

The course will introduce a number of easy concepts. Throughout the course it is essential that you memorize the definitions: learn them precisely and well. If you do not know what the words used mean, then it is difficult to understand new material using these words. To encourage you to learn the definitions I will ask for definitions on midterms. The results and theorems from class are an essential part of the course and must be memorized; you may be asked to state these on exams. Knowing the definitions and results will make learning the subsequent material easier. Therefore a significant part of the course material is the collection of definitions and theorems that we will cover, and you are responsible for knowing them precisely.

Homework: It is important to work on the problems assigned (most not to be turned in). The purposes of working on problems are to have the concepts, theorems, and techniques illustrated—making these easier to remember, and to become proficient with the computational methods introduced: the problems serve to help you learn the course material. Consequently, when working on problems refer to the class notes and to the text to see how the problem at hand is related to the course material and how the material might be used to solve the problem. Getting the "answer" is not as important as understanding the underlying ideas and seeing why a certain approach or computation should give the answer. Experience shows that typically one cannot learn how to do problems simply by seeing them done or seeing the solution: one must sit down and work on the problems, and do so regularly and frequently.
Exam Content: You are responsible for what is presented in class and assigned as homework. The material presented in class will be much like what is in the text but there will be some differences. Homework and exam problems are based on the lecture material and the way it is developed, so typically those who do not attend class regularly do poorly on exams. Also, since doing the homework problems is not the objective of the course but only a way to help learn the material, you should not expect exam problems to be the same as the text problems. Text problems mostly aim to help you become familiar with certain techniques or computations. The purpose of the exam problems is to find out if you have learned the material and understand it as it has been presented in class, not merely to see if you have memorized a particular technique.

Exam and Homework Credit: Since the purpose of the homework and exam problems is to see if you have learned the material as presented in class, to receive credit for solutions of problems you must use the notation, results, approaches, and techniques presented in class. For example, to solve a system of three or more linear equations you must use the matrix techniques developed in class, not ad hoc combinations of the equations themselves.

Studying: The comments above do not mean that this will be a difficult course, but alert you to the need to change the way you likely study mathematics; more than rote learning of procedures is needed. If you spend a fair amount of time learning the definitions and the results, then you should not find the course or the exams particularly difficult, you will better understand the new material as it is presented, and you will find it more interesting as well.

Help: Although you are responsible for learning the material, I will do my best to help you and give you hints as needed for homework problems. I encourage you to ask questions in class and to come to see me with any questions or concerns you may have. Feel free to discuss with me anything about the course: the material presented, the problems assigned, the organization of the course, the details of my grading procedures, etc. I will try to accommodate your schedule. Note that I typically deal with e-mail only when I am in my office. Remember that the Math Center in KAP 263 is open daily and the various TAs and faculty there can provide help with this course. It is possible to find answers to homework problems on-line, from friends, or at the Math Center, but doing so will not prepare you for exams—you need to work on problems yourself.

Academic Integrity Statement: Your work on exams is to be your work alone. Calculators, books, or notes may not be used in midterms or the final exam, and no communication with anyone other than the proctor is allowed. For the homework problems handed in, you may not copy solutions from anyone else or any other source (this includes simply changing notation or rearranging the order of some other person's solution). You may discuss the general approach to these problems with others in the class, or with me or the TA. I will be happy to give you hints. You may not discuss with TAs or faculty in the Math Center those homework problems to be handed in. Violation of these policies is a VERY serious offense.

Good luck, work hard, enjoy the course, and do well!