MATH 242 SECTION H01
SPRING 2014

Time:	Tuesday and Thursday 1:15 p.m. to 2:30 p.m.
Place:	LeConte 115

Instructor:	George F. McNulty
Office:	LeConte 302
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Office Hours:	11:30 noon to 1:00 p.m. Monday through Thursday
	2:30pm to 3:30pm Monday through Thursday

Textbook

Text:	Worldwide Differential Equations with Linear Algebra
Author:	Robert McOwen
url:	http://www.centerofmath.org
	PDF Version: $ 9.95
	Print Version: $29.95
Midterm Exams:	Thursday 6 February
	Thursday 6 March
	Thursday 10 April
Final Exam:	Thursday 1 May at 12:30 9.m.

Differential equations arise natural in many domains of science, engineering, economics, and increasingly across a broad range of human endeavors. In particular, many natural processes admit mathematical descriptions by means of differential equations, that is equations involving derivatives (of perhaps many orders) of various functions. This applies the behavior of electrical circuits, to heating and cooling, the growth of populations, the flow of fluids, the spread of diseases and many other phenomena. The main mathematical task at the center of our course is to understand how come to a detailed understanding of the behavior of the functions described by a particular differential equations subject to some further constraints. For example, Newton's laws of motion and gravity can describe, via differential equations, the orbit of the Earth. We can produce from such equations, a prediction of where the Earth will be at any time. In other words, we can give another effective description of the motion of the Earth.

While I plan to give lectures, some of our time in class will be spent in discussion and working in small groups. For this reason, active personal participation is a key to the course. Your attendance and efforts will be needed during every meeting of the class.

Homework is at the heart of our course. Generally, an assignment will be due at the beginning of class every Tuesday. Homework will be collaborative. The class will be divided into small teams for the purposes of homework. Unlike the homework problems in lower division mathematics courses, our problems will require more reflection. It will usually not be possible to successfully complete a problem set the night before it is due.

Your efforts in this course should yield for you a facility with the formulation and use of abstract mathematical concepts, an increased ability to express your mathematical reasoning verbally and in writing, a strengthened capacity for reading mathematics carefully and critically. Your level of mathematical craftsmanship should increase to the level where you can rely on it to obtain solutions to differential equations that come up in your science and engineering courses.

Every one of you is welcome to come to my office at anytime. I will generally be in every day from 10 am until 5 pm. While I have other responsibilities, your success is my first priority. Most of the time I will be able to set aside whatever I am doing, so don't hesitate to visit my office.

I hope you will find our course enjoyable, informative, and useful.

How Course Grades Will be Determined

The objectives of this course can be broken down into categories according to various methods for solving differential equations. In turn each of these categories comprises a number of objectives, some of which are essential to applications in science and engineering and for the further study of mathematics while the remaining objectives touch on more peripheral topics.

The mid-term examinations and the final will provide problems that address each objective. Your grade for the course will be determined by how well you display mastery of these problems. For each sort of problem I identify three levels of performance: master level, journeyman level, and apprentice level. The examinations will all be cumulative. The First Midterm will probably have 4 problems, the Second 8 problems (with 4 being variants of the ones occurring on the First Midterm), the Third Midterm as well as the final will probably have 12 problems. I record how well you do on each problem (an M for master level, a J for journeyman level, an A for apprentice level) on each exam. After the Final, I make a record of the highest level of performance you have made on each sort of problem and use this record to determine your course grade. If you have at some point during the semester displayed a mastery of each of the 12 sorts of problems, then your grade will be an A. If you have at some point during the semester displayed a mastery of each of the essential problems, then you will get at least a C. The grade B can be earned by displaying mastery of all the essential problems and mastery of about half of the rest of the problems. The grade D will be assigned to anyone who can master several problems but has not yet displayed a mastery of all the essential problems. In borderline cases, the higher grade will be assigned to those students who turn in their homework regularly.

This particular way of arriving at the course grade is unusual. It has some advantages. Each of you will get several chances to display mastery of almost all the problems. Once you have displayed mastery of a problem there is no need to do problems like it on later exams. So it can certainly happen that if you do well on the midterms you might only have to do one or two problems on the Final. (It is not unusual that a few students do not even have to take the final.) On the other hand, because earlier weak performances are not averaged in, students who come into the Final on shaky ground can still manage to get a respectable grade for the course.

This method of grading also stresses working out the problems in a completely correct way, since accumulating a lot of journeyman level performances only results in a journeyman level performance. So it pays to do one problem carefully and correctly as opposed to trying get four problems partially correctly. Finally, this method of grading allows you to see easily which parts of the course you are doing well with, and which parts deserve more attention.

The primary disadvantage of this grading scheme is that it is complicated. At any time, if you are uncertain about how you are doing in the class I would be more than glad to clarify the matter.