# MAT 361 - Differential Equations

**Syllabus** **Dr. R.L. Herman** **Spring 2004**


**Instructor: Dr. R. Herman**
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## Course Content:

**Required Text:** *There will be no required text.*

In this course we will investigate analytical, graphical and approximate solutions of differential equations. We will study the theory, methods of solution and applications of ordinary differential equations. This will include common methods of finding solutions, such as using Laplace transform and power series methods.

You should also be prepared to review your calculus, especially if you have been away from it for a while. In particular, you should know how to differentiate and integrate all elementary functions, including hyperbolic functions. You should review your methods of integration as the need arises, including methods of substitution and integration by parts. For the most part, you will just need material from Calculus I and II. Check out some of the links at the web site and Chapter 7 of your calculus text. Other topics from Calculus II that we will review are infinite series and introductory differential equations and applications.

## Course Philosophy

You have just come out of calculus knowing about derivatives and integrals. Hopefully, you have even seen some applications of calculus in your study. You are now about to embark on what you may think is an entirely different subject - differential equations - however, it is not different. In some cases, this is why calculus was developed.This might be why your department requires you to take so much mathematics.In fact, you have already seen some of the basic methods of solutions of differential equations in your second course in calculus.

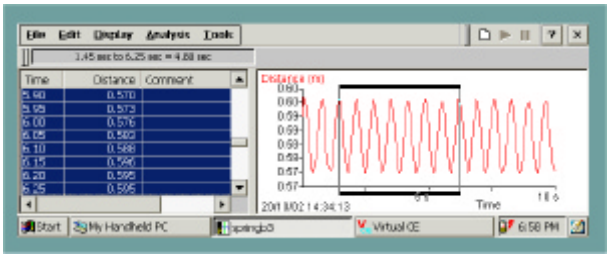
As you will observe from the web materials we will not just study formal solutions of differential equations. In this course we will also be interested in understanding the origins of the equations, their qualitative and quantitative solutions, and the interpretation of these solutions.

You will be guided through various analytical, graphical, numerical and descriptive methods of studying differential equations. We will see that differential equations are a natural tool for numerous investigations in science, mathematics and engineering. We will use technology to explore and visualize solutions behaviors and solution methods. In this way we hope that we can learn to think, experiment and comprehend the role that this subject plays in your chosen majors. Further applications will be found on the course webpage.


## Group Work:

In this course you will be doing several projects. You will be working with other students to complete a task. For many of you group work will be a new experience. In order to make this experience both productive and enjoyable, we offer the following suggestions:

- Start the assignment as soon as it is assigned. Do not put it off until the last minute. Some of the assignments will take time and working in a group may require more time due to scheduling difficulties.
- Read over the entire lab, or homework assignment, carefully before discussing or completing any part of it.
- Initially, you may have no idea as to how to get started. Don't panic! Discuss the lab with the group and generate some ideas.
- Lab work is not always as straightforward as standard homework assignments. You may need to make some assumptions and later justify these assumptions, indicating how they affect your results.
- The final report should be thoughtful, well-written and neatly organized. It should summarize your approach to the problem, present your results and conclusions, and be furnished with full explanations.
- If you have investigated the lab work as far as possible and still have questions, or there is a need for clarification of some point, then discuss them with your instructor before writing the report.



# Web Pages/Email:

This syllabus as well as a variety of other relevant information for this class is posted on the internet. The website is located at

**http://people.uncw.edu/hermanr/mat361**

You are encouraged to log onto this page often to check the homework assignments, read text material, listen to videos and read about related topics and further examples. You can email me for hints to homework questions, after working on them, or any other concerns with the topics we are covering.

You will need to continually watch for additions, changes, and announcements for the class. So, make it a daily habit to go to the web site and read something different.

# Course Requirements:

**Homework:** Homework assignments will be collected on a regular basis and you will be told when the work is due. There will be a penalty of 10% for each class that it is late. As doing homework is very important for learning the material in this course, it will count as 35% of your grade.

**Labs/Projects:** At times the computations can become tedious. It is not our aim to force you into carrying out long algebraic manipulations. Therefore, to relieve you of some of this, you will be exposed to using a symbolic manipulator. You will also have the opportunity to carry out physical experiments hightlighting some of the standard applications in the class.

You will be expected to carry out in depth group projects or be assigned group computer labs. Due to the nature of some problems and the applicability of this course to your major, you will work on a project, which will extend over several weeks of the course. These will count for 15 % of your total grade.

**Attendance**: YOU ARE EXPECTED TO ATTEND ALL OF THE CLASSES! After two excused absences there will be a penalty of 2% for each absence from your total grade.

**Exams and Grades:** There will be three exams and a final for this course. These exams will cover the basic material from the lectures and the homework. There will be no makeup exams without prior permission. The tentative dates of the exams covered are

| Exam | Date |
|---|---|
| 1 | Feb 6 |
| 2 | Mar 5 |
| 3 | Apr 7 |
| Final | Apr 30, 8:00 AM |

Your final grade will be based on the following:

| | |
|---|---|
| Hour Exams | 30% |
| Homework | 35% |
| Labs/Projects | 15% |
| Final | 20% |

| | |
|---|---|
| 90-100 | A |
| 80-89.5 | B |
| 70-79.5 | C |
| 60-69.5 | D |

**Borderline grades may be modified by a plus, or a minus, if the instructor determines that such grades are earned.**

**This syllabus is subject to change!**

**Academic Honor Code:** "The University of North Carolina at Wilmington is committed to the proposition that the pursuit of truth requires the presence of honesty among all involved. It is therefore the institution's stated policy that no form of dishonesty among its faculty or students will be tolerated. Although all members of the university community are encouraged to report occurrences of dishonesty, each individual is principally responsible for his or her own honesty." Student Handbook. *(This includes plagiarism, bribery and cheating.)*

**Student Disabilities:** UNCW Disability Services supplies information about disability law, documentation procedures and accommodations that can be found at http://www.uncwil.edu/stuaff/disablty . To obtain accommodations the student should first contact Disability Services and present their documentation to the coordinator for review and verification. (If you feel that you should qualify for disability testing or accommodations during this course, contact the Office if Disability Services in Westside Hall or call ext. 3746.)

# Advice for Success:

In order to learn the material in this course and earn a good grade, you need to put in some effort. Do not put off assignments or reading. If you do not understand something, ask the instructor. Come to office hours, use email, ask knowledgeble students, or go to the library/internet and find supplementary material. The instructor can only cover the basics in class. You are not expected to know the material by only listening to the lectures. You need to work problems and think about what you are doing. **As this is a three credit course, You should expect to spend at least 6 hours per week outside of class.**