

## Mth 481/581 Systems of Differential Equations

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**Textbook:** *Advanced Engineering Mathematics, 5th ed.* by Peter V. O'Neil.

**Computer Lab:** We will have some Friday sessions in a computer lab. On those days, we will meet in Milne 201. In order to use the lab, you need to have an active ONID account (and to know your password). I may also use your ONID email address to send out announcements, so if you read your mail elsewhere, you should make sure that your ONID mail is forwarded.

**Outline:** The majority of this course is devoted to the study of systems of (first order) differential equations. Initially we will make a careful study of linear systems, especially constant coefficient systems, and then look at some non-linear systems. This is covered in Chapters 9 and 10 of the text. Time permitting, we may look at some special second order linear equations which admit power series solutions. There are a number of differential equations of this type which arise in the separation of variables technique for partial differential equations, and these will appear in the sequel, Mth 482/582. Discovery of interesting dynamic phenomena often arises from numerical experimentation, and so you will have the opportunity to do some investigation using tools introduced in the computer lab.

It is expected that you are familiar with elementary differential equations and linear algebra. You can find a review in the earlier chapters of the text. Look especially at sections 2.4 and 2.6 for linear differential equations. From linear algebra, we will need matrix arithmetic, solution of systems of linear equations, determinants, and eigenvectors and eigenvalues through diagonalizability. You can find this in Chapters 6 and 7, and the first two sections of Chapter 8.

**Grading:** There will be one midterm exam, counting 20%, homework and labs combined will count 45% and the final exam will count 35%. Straight percentage grading will give minimum guarantees, but there may be curving downward.

### Important Dates:

Wednesday, Nov. 3, midterm exam  
Tuesday, Dec 7, at 14:00, Scheduled Final Exam.

**Accommodation:** Students with documented disabilities who may need accommodations, who may have emergency medical information the instructor should know, or who may need special arrangements in the event of evacuation, should make an appointment with the instructor as early as possible, no later than the end of the first week. In order to arrange alternative testing the student should make the request at least one week in advance of the test. Students seeking accommodations should be registered with the Office of Services for Students with Disabilities.