

MA 221 Differential Equations Spring 2010 Syllabus

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Class meetings: Monday, Wednesday, and Friday, 11:45 a.m. to 12:55 p.m., PPHAC 232

Office hours: Monday, Wednesday, and Friday, 10:30 to 11:30 a.m.; Monday, 2:00 to 3:00 p.m., and by appointment.

Textbook: *Fundamentals of Differential Equations*, 7th edition, 2008; Nagle, Saff, and Snider; Pearson Addison Wesley.

Course Content and Organization

The course focuses on a study of various methods for solving ordinary differential equations, including first-order techniques and higher-order techniques for linear equations. Additional topics include applications, existence and uniqueness of solutions, and the Laplace transform.

We will explore many sections in Chapters 1 through 8 of the class text. However, not all sections in each of these chapters will be included.

The class will be a mixture of short lectures, questions and discussion, and classroom activities that we will investigate. Active participation during each class meeting is expected from all students. Some activities will involve students working together in pairs or small groups and some activities will involve individual work.

Course Goals

The main purpose of this course is to provide you with the necessary skills and background to understand and successfully solve ordinary differential equations, as well as to formulate, understand, and interpret applications of ordinary differential equations. Upon successful completion of the course, students will be able to

- identify and classify various types of differential equations;
- explore and solve various types of differential equations using graphical, analytical, and numerical methods;

- find general and particular solutions of various types of differential equations;
- create and solve differential equations that model physical problems using appropriate methods, and interpret the solutions in context;
- understand and use Laplace transforms to solve differential equations;
- use technology as appropriate to help understand and solve differential equations.

Assessment

Attendance

Attendance is listed first under assessment because your understanding of the material in this course will be assessed during every class meeting. If you are not in class, you cannot show mastery of the day's work during that class. In addition, this course is about participating in the discovery of mathematics, not just learning facts and algorithms. Thus, *attendance is required*. Please contact me in advance if you must miss class for some reason beyond your control. Students are responsible for all work covered in class and all assignments, even if you must be absent from class. Also, common courtesy demands that you be on time for class and do not leave the room during class (unless you are ill). This will help you, your classmates, and your professor focus on what we all came to do.

Readings and daily homework

Daily reading and problem assignments from the text will be given; you are expected to come to class prepared to explain problem solutions and to ask questions on anything that is unclear. As an added incentive to arrive to class on time and to work seriously on the daily problem assignments, at the beginning of most classes, we will randomly choose one homework problem for you to re-write and hand-in to be evaluated. You will be asked to re-write the solution to the problem using only your notes, without referring to your text. These problems will be graded 0/2, 1/2, or 2/2. A 2/2 can be earned by successfully solving the problem, or by showing work so far, and asking questions that show you worked seriously on the problem. Your two lowest daily problem grades will be dropped.

It is suggested that you keep your work on these daily assignments in an organized notebook so you can easily refer to it. You are encouraged to work with your classmates on the daily homework problems, but please do not copy the solution from someone else, or another book or the internet. Finding a solution in another source will not help you learn to think for yourself. Giving and receiving explanations can be very helpful when working on problems and when preparing for exams, in a way that copying from another source cannot.

Longer hand-in homework and project assignments

There will be regular additional longer hand-in homework/project assignments. You will be told in advance when these longer assignments will be collected and graded. All longer homework assignments must be completed by you alone unless it is explicitly stated in writing that the assignment is a group assignment. For these homework assignments, you may consult Dr. Somers, but you may not consult any other people and you may not look for the solution in another book or on the internet. The Academic Honesty Policy guidelines for Mathematics courses, which are attached, are to be followed on all assignments.

Exams

There will be three in-class exams and a cumulative final exam. You will have the whole class period to work on the in-class exams, which will be given on **Friday, February 12, Monday, March 22, and Wednesday, April 21**. The final exam is scheduled by the College and will be given on **Thursday, May 6, at 1:30 p.m.** Please mark these dates on your calendar. Make-up tests will be given only under extreme circumstances and with appropriate documentation. (This is a fairness issue; it is really impossible to construct fair make-up exams for a class like this one.)

Grading

Your grade will be based on daily graded problems (15%); three in-class exams (15% each, for a total of 45%); a cumulative final exam (20%); and longer graded homework assignments (20%).

Extra help

You are encouraged to see Dr. Somers for extra help during office hours or to arrange an appointment for extra help, if needed.

General recommendations for success

- Be on time for class and stay focused on the work of the class during the entire period. (Temporarily forget about text messages, e-mail, other coursework, and so on.)
- Keep a reliable record of all assignments, if they are to be collected or not, and when they are due.
- Prepare for each class by completing the reading and daily homework assignments. When you read, read with pencil or pen and paper in front of you, and take notes, write out definitions in your own words, create your own examples, work out the examples in the text, and write down your questions.
- Keep an organized three-ring binder that contains all completed classroom activities, exams, and other course material, including your notes taken during class and your notes on the readings.
- Begin to work on the homework assignments as soon as they are assigned.
- Find one, two, or more students from this class with whom to discuss the course material outside of class.

- Come see me for help whenever you have unanswered questions.

Accommodations

Any student who wishes to request accommodations under the Americans with Disabilities Act (ADA) for this course should contact Mr. Joe Kempfer, Assistant Director of Learning Services for Disability Support, 1307 Main Street (extension 1510.) Accommodations cannot be provided until authorization is received from the Office of Learning Services.

Possibility of changes

This syllabus is a guideline for the course. It may be necessary to make changes during the semester. I will announce any changes in class.

ACADEMIC HONESTY POLICY GUIDELINES

MATHEMATICS COURSES

The Department of Mathematics and Computer Science supports and is governed by the *Academic Honesty Policy of Moravian College* as stated in the Moravian College Student Handbook. The following statements will help clarify the policies of members of the Mathematics faculty.

In all homework assignments which are to be graded, you may use your class notes and any books or library sources. When you use the ideas or thoughts of others, however, you must acknowledge the source. For graded homework assignments, you may not use a solution manual or the help, orally or in written form, of an individual other than your instructor. If you receive help from anyone other than your instructor or if you fail to reference your sources, you will be violating the *Academic Honesty Policy of Moravian College*. For homework which is not to be graded, if you choose, you may work with your fellow students. You are responsible for understanding and being able to explain the solution of all assigned problems, both graded and ungraded.

All in-class or take-home tests and quizzes are to be completed by you alone without the aid of books, study sheets, or formula sheets unless specifically allowed by you instructor for a particular test.