Mathematics 212, Differential Equations

Spring 2015

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Office Hours: MWF 1:30-3:30 pm (Any changes or extra hours will be posted in blackboard)

Mathematics 212 introduces students to the solution techniques and applications of ordinary differential equations. The course will cover first- and second-order ordinary differential equations, their applications, series solutions, and systems of ordinary differential equations. Completion of a full year of college calculus (Math 111 and 112, or equivalent) is required.

Goals:
Students should grow in their mathematical ability by learning fundamental principles and techniques of differential equations. By the completion of this course, the student should be able to:

1. Recognize ordinary differential equations and particular classifications thereof;
2. Solve certain differential equations by applying the techniques of separation of variables, integration factors, reduction of order, undetermined coefficients, variation of parameters, and power series;
3. Find solutions to homogeneous linear equations with constant coefficients, systems of linear first-order equations, and first-order exact equations;
4. Apply these techniques to solve certain real-life problems and model systems in physics, biology, and other areas.

Text Material:
Dennis Zill, *A First Course in Differential Equations with Modeling Applications, 10th Ed.*

Class Attendance:
The student is responsible for the course material discussed in class; therefore, the student is expected to attend all classes. Generally, students who attend class on a regular basis achieve better grades than those who elect to be absent occasionally. Students accumulating an inordinate number of absences will be referred to the assistant dean of academic services.

Electronics:
During lectures, students are encouraged to use devices responsibly: large-screen devices (e.g. laptops and tablets) may be used to access electronic copies of the text and lecture notes; small-screen devices (e.g. cell phones) should be used sparingly, if at all. Research seems to indicate that taking notes with pencil and paper is more effective than recording them electronically; if you feel the need to have an electronic copy of your notes, it is suggested to initially record them the old-fashioned way in class and type/write them on your device of choice after class. We don't normally use calculators in this course; but when we do, we use scientific ones.

Grading:
The student's final course grade will be determined as follows:

Problem Sets/Quizzes	125 points
Tests (3 @ 100 points)	300 points
Final Exam	175 points
TOTAL	600 points

In general, letter grades will be determined as follows, based on points each student earns:

A: 540 or more points
B: 480-539 points
C: 420-479 points
D: 360-419 points
F: fewer than 360 points

Grades of A-, B+, B-, C+, C-, D+ may be assigned for sums of points near the above cut-off totals. For example, a B+ could be assigned for a sum of 530 points. Ultimately, the assignment of plus and minus is dependent on the overall class distribution of sums of points.

Homework:
Homework assignments are for the student's benefit and will not be collected, but are considered a mandatory component of the course! It is important that each student thoughtfully complete most of the problems assigned. Generally, each week a student should devote two to three hours of additional time studying and practicing the material for each credit hour of a course; this means you should be spending at least 8-12 hours each week grappling with the concepts and practicing meaningful problems in differential equations.

Problem Sets:
In addition to homework problems, most weeks students will be expected to turn in solutions to a posted set of problems. This set will generally be modest in size (no more than four or five problems) and so is not intended to be a replacement for the homework problems; in fact, it will generally be advantageous to work on related homework problems before working on the problem sets. You may consult your textbook, notes, instructor, and peers in your Math 212 class; no other resources should be utilized unless specifically stated. Any submitted solution should be an accurate reflection of the student's own work and understanding; to help encourage honesty in this, occasionally a pop-quiz will be given on the due date of a problem set covering one or more problems from the assignment.

Major Tests:
Tests will be given in class on **February 11, March 18**, and **April 22.** The final exam will be given on **Friday May 1 at 9am** and will be comprehensive.

Students are expected to take tests at the scheduled times. Conflicts, problems and emergencies will be handled on an individual basis. For reasons deemed legitimate by your professor, arrangements may be made for a student to take a test prior to the testing time. Arrangements must be made several days in advance.

Any student requiring special accommodations must present their letter of accommodation provided by the college; the student must make arrangements for these accommodations several days in advance of the scheduled assessment.

Responsibilities

Of the Student

As far as this course, each student needs to attend class regularly, to actively participate in the learning process both during class and outside of class, and to use the available support services in order to reach the expected competence level required in this course.

Each **student** has the following responsibilities:

1. Come prepared and on time to every class.
2. Complete all work on time with proper thought.
3. Consider that adequate understanding of a concept may not always occur by the end of the lecture. Use your outside help (office hours, student tutors, online course material).
4. Treat the instructor and peers with respect.
5. Ask questions. Asking questions is a sign of maturity, not ignorance, as long as the student thinks clearly before asking.
6. Understand that grading is the responsibility of the instructor and accuracy is important in this class!

Of the Instructor

As far as this course, the instructor is a facilitator of student learning and as such, should provide materials and the environment to enable students to learn what is expected.

The **instructor** has the following responsibilities:

1. Come prepared to every class.
2. Design each class so students can accomplish the cognitive objectives listed in the syllabus.
3. Provide advice for studying and study materials as appropriate.
4. Establish and foster a mutually respectful classroom environment.
5. Return tests and quizzes in a timely manner so that students will know their grade.
6. Grading, as far as possible, is to be consistent and impersonal even though students might not agree with the decisions concerning partial credit.

Support Services:

Students are expected to use the following:

Office hours will be posted on Blackboard. Students should use this time to come by and ask specific questions related to this course. There is a study area outside Pierce 122 for you to use.

There is a **Blackboard online course**, Spring 2015 Math 212. Students should consult Blackboard frequently for announcements about office hours, tutoring, handouts, class notes, and homework assignments. These handouts provide problems and explanations for the material being studied. Students may pose individual questions on the discussion boards.

Student tutors are available (schedule to be posted as soon as it is finalized). Tutors may be found in the Mathematics Center in Pierce Hall.

Study groups organized by students are highly recommended. For these to be profitable, the meetings should be part of a regular weekly routine.

Written Style/Neatness:

Neatness is one way of showing pride in individual work and courtesy toward the instructor!

Remember that thoughts in mathematics are expressed in sentences, such as "1 + 1 = 2." There is a subject "1 + 1", a verb "=", and a predicate "2". Note that "=" should not be treated as a comma ",". When using an equality symbol, make sure that both sides of the equation are equivalent.

For all work, each student should strive to make a neat and logical presentation while using mathematical symbols appropriately. Taking time to be neat while working mathematical problems has been shown to eliminate many careless mistakes and to allow the student to focus on conceptual misunderstandings.

Organizational Guidelines for students:

(1) As soon as you get your syllabi from your courses, put important dates on a single calendar, clearly labeled.
(2) Stay current in each of your courses by setting aside 8 to 10 hours per week per course to study and really grapple with the material. You may need more time in some subjects. Spread your per-subject time out over the week. Marathon studying, especially in mathematics, does not work well! So, make a schedule and keep to it! Be flexible enough to make changes in your schedule but don't schedule marathon studying.
(3) Plan ahead so that you get enough sleep before a test so you will be able to think clearly and logically.
(4) Take advantage of the available outside help for each of your courses. Plan to visit the instructor during office hours at least once per week.
(5) Plan ahead for all your papers and projects so that studying for tests is not compromised. Create and schedule mini-goals to attain the major goal of completion on time.
(6) Follow each syllabus carefully. For Math 212, your homework from the text will be listed on Blackboard. Reading the appropriate material before coming to class will help your understanding.

Summary of Important Dates:

January 19	Martin Luther King Jr. Holiday
February 11	Test 1
March 6	Last Day to Drop the Course
March 9-13	Spring Break
March 18	Test 2
April 3	Last Day for Freshman Withdrawal
April 22	Test 3
April 27	Last Class Day
May 1	Final Exam (9am)

Tentative Schedule:

Week 1: Chapter 1 & Section 2.1
Week 2: Sections 2.2-2.3
Week 3: Sections 2.4-2.5
Week 4: Chapter 3
Week 5: Test 1; Section 4.1
Week 6: Sections 4.2-4.4
Week 7: Sections 4.6-4.7 & 4.9
Week 8: Section 4.10 & Chapter 5
Week 9: Spring Break
Week 10: Test 2 & Section 6.1
Week 11: Section 6.2-6.3
Week 12: Section 6.3 & Appendix II
Week 13: Section 8.1-8.3
Week 14: Finish Chapter 8
Week 15: Test 3 & Chapter 9
Week 16: Review & Final

THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT IN THIS COURSE. BY YOUR SIGNATURE ON SUCH WORK, YOU PLEDGE THAT WORK WAS DONE IN ACCORDANCE WITH THE RULES STIPULATED ON THE WORK OR IN THIS SYLLABUS.