

MATH 250, sec. 05
SPRING 2005
ORDINARY DIFFERENTIAL EQUATIONS
M W F 04:40pm – 05:30pm, 118 Thomas Bld.

YULIYA GORB

30 Scott Bld, phone: 865-2862 (office)

Office Hours: Monday 03:15-04:30pm, Thursday 02:30-03:45pm, or by appointment

e-mail: gorb@math.psu.edu, webpage: www.math.psu.edu/gorb

Ordinary Differential Equations (3 cr.) – First- and second-order equations; Laplace transform solutions; systems of two linear differential equations; stability.

PREREQUISITE: Math 141, or equivalent courses.

TEXTBOOK: *Elementary Differential Equations*, 8th ed., W.E.Boyce and R.C.Diprima, John Wiley and Sons, Inc. If you have the 6th or 7th ed. textbook from the previous years, you can also use that, but you are responsible for checking whether problems assigned for homework from 8th ed. and the corresponding problems in your textbook match.

HOMEWORK: Homework problems will be assigned every week. The homework problems and the due date will be announced in the class and it will also be posted in the course webpage (see above). You are expected to do all the assigned homework problems, however only selected problems from homework will be graded. **Late homework will not be accepted.**

If for some reason you can not be in class and turn in your HW in due day, you may drop it off **before** this due day at either my office 30 Scott (put it on the desk) or in the mailbox with my name in Scott Bld.

QUIZZES: The quizzes will be held periodically throughout the semester. The date of the quiz will be announced one class before. **No make up quizzes** will be given for any reason. So if you miss a quiz for some reason, then that would count as a zero score.

EXAMINATIONS: Two 75-minute evening (6:30-7:45pm) examinations will be given during the semester and a comprehensive final examination will be given during the final week of semester (May 02 – 06, 2005). The two exams are scheduled as follows:

EXAM I – February 24th, 2005 (Thursday)

EXAM II – March 28th, 2005 (Monday)

The date and location of the final exam will be announced in class by instructor. **The use of books, cell phones, calculators or notes of any sort is not permitted.**

CONFLICT EXAMS: For the midterms, there is a conflict exam from 5:05 to 6:20pm on the same night as the regular exam. If you have a conflict with the regular exam time, such as a class or other scheduled activity, you may sign up to take the conflict exam. You must have a valid reason for taking it, and you need to sign up one week before the exam date (in 108 Whitmore). Although the conflict exam ends at 6:20, no student will be permitted to leave the exam room before 6:25pm.

MAKEUP EXAMS: Students who have a valid verifiable reason, such as illness or class during both the conflict and regular exam times, are permitted to schedule a makeup exam at the discretion of the instructor. The makeup exam will take place one week after the regular exam. If student requires a makeup, but does not have a valid university excuse, 20% will be taken off the exam score.

FINAL EXAMINATION: The final examination will be given during the week of May 2 – 6, 2005. The date and time of the final examination will be announced by the University Registrar midway through the semester (should be available by Feb.7). The final examination may be scheduled at any time during the final exam period. **Do not plan to leave until after the last day of the final exam week, Friday, May 6, 2005.** If you have a conflict with the final exam time (such as two examinations scheduled at the same time or three or more examinations scheduled within a fifteen hour period, from the beginning of the first examination to the beginning of the third examination) you should file for the conflict exam at Registrar Office by **Feb. 20**.

GRADING POLICY: There will be two midterm exams worth 100 points each and a final exam worth 150 points. There will also be periodic quizzes and homework assignments worth a total of 100 points, making the total possible score of 450 points for the course:

EXAM I = 100 pts EXAM II = 100 pts HW+Q = 100 pts FINAL EXAM = 150 pts TOTAL = 450 pts
 All homework assignments and quizzes are mandatory and would count in the final grade, although, a couple worst grades may be dropped at the end.

ATTENDANCE AND CLASS PARTICIPATION: The material covered in the course is fairly difficult. So your presence during each class is strongly encouraged. If you miss class for some reason, please do read the relevant material from the book before you come to the class the next day. Class participation will be taken into account while deciding the final grades. Please feel free to ask any questions related to the course material during the class. There might be other in the class who have the same questions. Do not hesitate to contact me if you have problems or questions about any aspect of this course.

IMPORTANT DATES of SPRING 2005:

Classes Begin	Monday	January 10
Late Registration & Drop/Add Period	Monday - Wednesday	January 10 - January 19
Final Exam Conflict - Filing Period	Monday - Sunday	February 7 - February 20
Midterm I	Thursday	February 24
Spring Break - No Classes	Monday - Friday	March 7 - March 11
Late Drop - Deadline	Friday	April 8
Midterm II	Monday	March 28
Classes End	Friday	April 29
Final Exams week	Monday - Friday	May 2 - May 6
Final Exam	Not available yet	

TENTATIVE COURSE DESCRIPTION:

<p><i>INTRODUCTION</i> 1.1 Direction Fields 1.2 Solution of Some Differential Equations 1.3 Classification of Differential Equations <i>FIRST ORDER DIFFERENTIAL EQUATIONS</i> 2.1 Linear Equations with Variable Coefficients 2.2 Separable Equations 2.3 Modeling with First Order Equations 2.4 Differences Between Linear and Nonlinear Equations 2.5 Autonomous Equations and Population Dynamics 2.7 Numerical Approximations: Euler's Method <i>SECOND ORDER LINEAR DIFFERENTIAL EQUATIONS</i> 3.1 Homogeneous Equations with Constant Coefficients 3.2 Fundamental Solutions of Linear Homogeneous Equations 3.3 Linear Independence and the Wronskian 3.4 Complex Roots of the Characteristic Equations 3.5 Repeated Roots; Reduction of Order 3.6 Nonhomogeneous Equations; Method of Undetermined Coefficients</p>	<p>3.8 Mechanical or Electrical Vibrations 3.9 Forced Vibrations <i>THE LAPLACE TRANSFORM</i> 6.1 Definition of the Laplace transform 6.2 Solution of Initial Value Problems 6.3 Step Functions 6.4 Differential Equations with Discontinuous Forcing Functions 6.5 Impulse Functions <i>SYSTEMS OF TWO LINEAR DIFFERENTIAL EQUATIONS</i> 7.1 Introduction to Systems of Differential Equations 7.2-7.3 Introduction to 2 x 2 Matrices 7.5-7.8 2x2 Linear Systems of Differential Equations <i>NONLINEAR DIFFERENTIAL EQUATIONS AND STABILITY</i> 9.1 Phase Portraits of 2x2 Linear Systems 9.2 Autonomous Systems and Stability 9.3 Almost-linear systems (This schedule is subject to change.)</p>
--	---

ACADEMIC INTEGRITY STATEMENT: "Academic dishonesty includes, but is not limited to, cheating, plagiarizing,...facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students... A student charged with academic dishonesty will be given oral or written notice of the charge by the instructor. If students believe that they have been falsely accused, they should seek redress through informal discussions with the instructor, the department head, dean or campus executive officer. If the instructor believes that the infraction is sufficiently serious to warrant the referral of the case to Judicial Affairs, or if the instructors will award a final grade of *F*, the student and instructor will be afforded formal due process procedures". From *Policies and Rules, Student Guide to the University*, Policy 49-20.

All Penn State Academic Integrity/Dishonesty Policies apply to this course.