MATH 305: Introduction to Differential Equations
Spring 2014   Section 001   3 Credit Hours

Instructor:	**Dr. Kristen Abernathy**	**Instructor Teaching Schedule:**	MWF 9:30-10:45 MWF 11:00-12:15 TR 9:30-10:45
Office:	Bancroft 148		
Office Phone:	803-323-4681	**Office Hours:**	W 1:30-3:30 F 12:30-1:30 and by appointment
Math Department:	803-323-2175		
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Instructor Website:	http://faculty.winthrop.edu/abernathyk/		

The instructor reserves the right to make modifications to this syllabus. Students will be notified in class & by email.
A complete syllabus and schedule is available at: www.winthrop.edu/cas/math/syllabus.

Winthrop University is dedicated to providing access to education. If you have a disability and require specific accommodations to complete this course, contact the Office of Disability Services (ODS) at 323-3290. Once you have your official notice of accommodations from the Office of Disability Services, please inform me as early as possible in the semester.

Course Content
Throughout the semester, we will study first and second order linear ordinary differential equations, ordinary linear systems, and nonlinear systems. Differentiation and integration techniques from single variable calculus will be used frequently, and we will encounter some basic linear algebra methods in our study of systems.

Grades
We will have three tests, various homeworks, a course project, and a cumulative final exam. The three tests will be worth 50% of the final grade, the homework assignments will be worth 20%, the course project will be worth 10%, and the final exam will be worth 20%. Grades will be assigned as follows:

92-100 A	90-91.99 A-	87-89.99 B+	82-86.99 B	80-81.99 B-	77-79.99 C+
72-76.99 C	70-71.99 C-	67-69.99 D+	62-66.99 D	60-61.99 D-	

Assignments/Assessments
Homework will be assigned regularly, and selected homework problems will be graded in detail. The homework should be handed in at the beginning of class on the due date. Graded homework should be written as a solution and a clear, logical argument should accompany all mathematical work. Late assignments will be accepted for one week after the due date without penalty; after one week, ten points will be deducted for each week past due. Make-up tests are not given. **An unexcused absence will result in the grade of zero for any missed test.** Excused absences from tests will be dealt with at the end of the term and may depend on individual circumstances. Anticipated absences should be reported and verified in advance, and emergency absences must be verified within one week after returning to class. The test dates and final exam date are listed below:
Tests: 2/4, 3/4, 4/3   Final Exam: 5/2 at 11:30am

Text, Materials, and Resources
- Required Text: *Differential Equations with Boundary Value Problems*, 2nd Ed. John Polking, Albert Boggess, & David Arnold, 2006, ISBN: 0-13-186326-7.
- Students are encouraged to use office hours and peer study groups as ways to receive extra help.
- Winthrop's Academic Success Center (ASC) is a free resource for all undergraduate students seeking to perform their best academically. Information is available at www.winthrop.edu/success.

Policies
1. Review the student code of conduct for university polices on academic misconduct. Academic misconduct will not be tolerated and will result in a failing grade on the assignment and/or in the course. The full handbook is available online at: http://www2.winthrop.edu/studentaffairs/handbook/StudentHandbook.pdf.
2. All electronic devices (including cell phones) other than a calculator should be on silent and kept in your book bag or purse throughout class time unless otherwise instructed. (Note if you have some educational, health, or physical reason for an electronic device you must work with your professor to inform them of the accommodation.)

3. Any questions concerning grading of assignments must be resolved within one week after the assignment is returned.

Attendance Policy:
The University attendance policy is stated in the current catalog (http://www.winthrop.edu/recandreg/default.aspx?id=7380).

Departmental Goals
1. Apply fundamental mathematical concepts and techniques to solve problems and evaluate results.
2. Demonstrate the ability to apply appropriate technologies to the study of mathematics and effectively use such technologies to investigate and develop an understanding of mathematical ideas.

Course Goals
1. Analytically solve first order differential equations, initial value problems, and applied problems using integration, separability, and linear techniques.
2. Analytically solve second order differential equations, initial value problems, and applied problems with linear techniques.
3. Analytically solve systems of first order differential equations, initial value problems, and applied problems with linear techniques.
4. Learn methods such as linearization and phase plane analysis for studying nonlinear systems of first order differential equations.

This course meets the Logic, Language, and Semiotics requirement through activities and requirements that require students to use logic and mathematical information to draw reasonable conclusions and to use the symbols and language of mathematics to communicate about problems and to present solutions.

Tentative Course Schedule

	Date	Section	Subject
T	1/14	1.1, 2.1	Mathematical modeling
R	1/16	1.3, 2.2	Integral and separable solutions
T	1/21	Lab	Direction fields
R	1/23	2.4	Integrating factors and variation of parameters
T	1/28	2.3, 2.5	Applications
R	1/30	2.6-2.8	Other first order considerations
T	2/4		Test 1
R	2/6	4.3	The characteristic equation
T	2/11	4.1	Linear independence
R	2/13	4.4	Harmonic analysis
T	2/18	4.5	2nd order undetermined coefficients
R	2/20	4.6	2nd order variation of parameters
T	2/25	4.7	More harmonic analysis
R	2/27	Lab	Harmonic analysis
T	3/4		Test 2
R	3/6	Chapter 7	Basic linear algebra
T	3/11	8.1, 8.4	Systems of differential equations
R	3/13	9.1	Spectral analysis
T	3/25	9.2	Orthogonal bases
R	3/27	9.2	Systems applications
T	4/1	Lab	Systems
R	4/3		Test 3
T	4/8	9.5	Higher-dimensional systems
R	4/10	9.9	Variation of parameters
T	4/15	10.1	Nonlinear systems - linearization
R	4/17	10.2	Nonlinear systems - stability
T	4/22	10.3	Invariant sets and nullclines
R	4/24		Extra Day for review

SU Deadline: T 1/28   **Course Withdraw Date:** W 3/12
Spring Break: M 3/17 to F 3/21   **Final Exam:** F 5/2 at 11:30am