MATH 550: Special Topics in Mathematics
Fall 2017 Section 001 3 Credit Hours

Instructor:	**Dr. Kristen Abernathy**	**Instructor Teaching Schedule:**	MW: 9:30-10:45am MW: 11:00 am – 12:15 pm MW: 12:30 – 1:45 pm W: 3:30 – 4:45 pm
Office:	Bancroft 148		
Office Phone:	803-323-4681	**Office Hours:**	M: 3:30-4:30 T: 8:30-9:30 R: 10:00-11:00
Math Department:	803-323-2175		
Campus Email:	abernathyk@winthrop.edu		
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 committed to providing access to education. If you have a condition which may adversely impact your ability to access academics and/or campus life, and you require specific accommodations to complete this course, contact the Office of Accessibility (OA) at 803-323-3290, or, accessibility@winthrop.edu. Please inform me as early as possible, once you have your official notice of accommodations from the Office of Accessibility.

Course Content
The focus of this course is the qualitative analysis of linear differential equations. We will begin by reviewing relevant preliminaries concerning first order equations. Next, we will develop theory to study planar systems and their behavior. The latter portion of the course will be devoted to studying the behavior of nth-order linear differential equations.

Grades
We will have various homework assignments, a course project, a midterm, and a final exam. The homework will be worth 45% of the final grade, the project will be worth 15%, midterm will be worth 20%, 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. Late homework will be accepted for one week after the due date at a five point penalty for each day it is late. 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 midterm and final exam dates are listed below:

Midterm: 10/4 Final Exam: 11:30am, Monday, 12/11

Text, Materials, and Resources
- Required Text: *The Theory of Differential Equations*,2nd Ed. Walter Kelley and Allan Peterson, 2010, ISBN: 978-1-4419-5782-5.
- Students are encouraged to use office hours as a way to receive extra help.

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. Communicate mathematical ideas, demonstrate mathematical reasoning skills, and create and evaluate mathematical conjectures at various levels of formality.
2. Apply fundamental mathematical concepts and techniques to solve problems and evaluate results.
3. 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. Communicate formal mathematical reasoning through writing assignments.
2. Further develop the ability to think deductively, analyze mathematical situations, and extend ideas to graduate level mathematics.
3. Demonstrate knowledge and understanding of, and construct and analyze proofs of theorems involving the following topics:

Tentative Course Schedule

Date		Section	Subject
W	8/23	1.1	Basics of Differential Equations
M	8/28	1.2	First-Order Linear Equations
W	8/30	1.3	Autonomous Equations
W	9/6	1.4	Generalized Logistic Equation
M	9/11	1.5	Bifurcation
W	9/13	2.1	Introduction to Linear Systems
M	9/18	2.2	The Vector Equation
W	9/20	2.3	The Matrix Exponential Function
M	9/25	2.4	Induced Matrix Norm
W	9/27	2.5	Floquet Theory
M	10/2		Review for Midterm
W	10/4		**Midterm**
M	10/9	3.1	Introduction to Autonomous Systems
W	10/11	3.2	Phase Plane Diagrams
W	10/18	3.3	Phase Plane Diagrams for Linear Systems
M	10/23	3.4	Stability of Nonlinear Systems
W	10/25	3.5	Linearization of Nonlinear Systems
M	10/30	3.6	Existence and Nonexistence of Periodic Solutions
W	11/1	3.7	Three-Dimensional Systems
M	11/6	3.8	Differential Equations and *Mathematica*
W	11/8	6.1	Basic Results of Linear Differential Equations
M	11/13	6.2	Variation of Constants Formula
W	11/15	6.3	Green's Functions
M	11/20	6.4	Factorizations and Principal Solutions
M	11/27	6.5	Adjoint Equation
W	11/29		Project Presentations
M	12/4		Review for Final Exam

Drop/Add: Through F 8/25 **S/U and Course Withdraw Date:** F 10/20
Fall Break: M 10/16 and T 10/17 **Final Exam:** M 12/11 11:30am