Math 1270 Spring 2016

Ordinary Differential Equations I

MWF 11:00am – 11:50am; 524 Thackeray Hall

Huiqiang Jiang

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Webpage:	**All homework and exam information will be posted in Courseweb**

This course covers methods of solving ordinary differential equations which are frequently encountered in applications. General methods will be taught for single n-th order equations, and systems of first order linear equations. An introduction will be given to the qualitative theory of first-order nonlinear systems which includes phase plane methods and stability analysis.

Textbook

William E. Boyce and Richard C. DiPrima: Elementary Differential Equations and Boundary Value Problems, 10th edition.

Grading Policy

There will be weekly homework assignments, two midterms and one final. Their contribution to the course grade is: homework 20%, midterms 40% and the final 40%.

Homework

Homework assignments will be posted on the courseweb every Wednesday and will be due the following Wednesday in class.

Disability Resource Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services, 140 William Pitt Union, 412-648-7890 or 412-383-7355 (TTY) as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Academic Integrity

Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity will incur a minimum sanction of a zero score for the quiz, exam or paper in question. Additional sanctions may be imposed, depending on the severity of the infraction. On homework, you may work with other students or use library resources, but each student must write up his or her solutions independently. Copying solutions from other students will be considered cheating, and handled accordingly.

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Lecture Schedule

Week	Dates	Reading	
1st Week	Jan. 6	1.1 -1.4	Introduction and classification of DEs, Direction field
	Jan. 8	2.1	Method of integrating factors
2nd Week	Jan. 11	2.2	Separable equations
	Jan. 13	2.3, 2.4	Modeling; Linear and nonlinear
	Jan. 15	2.5	Population Dynamics and autonomous system
3rd Week	**Jan. 18**	**MLK Day**	
	Jan. 20	2.6	Exact Equations
	Jan. 22	2.7	Euler's Method
4th Week	Jan. 25	2.8	Existence and Uniqueness
	Jan. 27	2.8	Existence and Uniqueness (Continues)
	Jan. 29	3.1	Homogeneous equations with constant coefficients
5th Week	Feb. 1	3.2	Linear homogeneous equations and the Wronskian
	Feb. 3	3.3	Complex roots
	Feb. 5	3.4	Repeated roots
6th Week	Feb. 8	3.5	Method of undetermined coefficients
	Feb. 10	3.6	Variation of parameters
	Feb. 12	3.6	Variation of parameters (Continues)
7th Week	Feb. 15	3.7	Vibrations
	Feb. 17	3.8	Forced vibrations
	Feb. 19	**Review**	
8th Week	**Feb. 22**	**Midterm I**	
	Feb. 24	4.1	Nth order linear equations
	Feb. 26	4.2	Homogeneous equations with constant coefficients

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Lecture Schedule

9th Week	Feb. 29	4.3	Method of undetermined coefficients
	Mar. 2	7.1-7.2	Review of matrices
	Mar. 4	7.3	Review of matrices (continues)
10th Week	**Spring Break**		
11th Week	Mar. 14	7.4	Systems of 1st order linear equations
	Mar. 16	7.5	Homogeneous linear systems with constant coefficients
	Mar. 18	7.6	Complex eigenvalues
12th week	Mar. 21	7.7	Fundamental matrices
	Mar. 23	7.8	Repeated eigenvalues
	Mar. 25	7.9	Nonhomogeneous linear systems
13th Week	Mar. 28	7.9	Nonhomogeneous linear systems (continues)
	Mar. 30	9.1	The phase plane
	Apr. 1	**Review**	
14th Week	**Apr. 4**	**Midterm 2**	
	Apr. 6	9.2	Autonomous system and stability
	Apr. 8	9.3	Locally linear systems
15th Week	Apr. 11	9.4	Competing species
	Apr. 13	9.5	Predator-Prey Equations
	Apr. 15	9.6	Liapunov's second method
16th Week	Apr. 18	9.7	Periodic solutions and limit cycles
	Apr. 20	**Review**	
	Apr. 22	**Review**	
17th Week	**Final Exam time and location to be announced**		