

Syllabus for Math 415, Fall 2007

Ordinary and Partial Differential Equations

Please read this syllabus carefully. You will be responsible for all the information given here, and for any modifications to it that may be announced in class. Updated information and handouts can be accessed at my website: <http://www.math.ohio-state.edu/~kao/>

Instructor: Chiu-Yen Kao

Texts: Elementary Differential Equations and Boundary Value Problems, 7th Ed. Boyce DiPrima

Lecture: WMF 11:30am @ BL311

Topics: Solutions to first order, second order and higher order ordinary differential equations and partial differential equations; Phase plane analysis; Fourier series; Boundary value problems.

Office Hours: MWF 10:30-11:30am @ MW 410 and by appointment

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Tentative Schedule:

- 1.1-1.3 Introduction to differential equations
- 2.1 Linear Equations with Variable Coefficients
- 2.2 Separable equations
- 2.3 Applications of linear equations
- 2.4 Bernoulli's equation: Differences between linear and nonlinear equations
- 2.5 Autonomous Equations and Population Dynamics
- 2.6 Exact equations
- 2.7 Euler's Method
- 2.8 The Existence and Uniqueness Theorem
- first midterm
- 3.1 Homogeneous equations with constant coefficients
- 3.2, 3.3 Fundamental solutions, linear independence, Wronskian
- 3.4 Complex numbers and complex roots of the characteristic polynomial
- 3.5 Repeated real roots of the characteristic equation and the method of reduction order
- 3.6 Nonhomogeneous equations: method of undetermined coefficients
- 3.7 Nonhomogeneous equations: method of variation of parameters
- 3.8, 3.9 Vibrations with and without damping and forcing
- Supplement material: Systems of ODE, phase plane analysis, stability
- second midterm
- 10.1 Two-point boundary value problems
- 10.2, 10.3 Fourier series, Fourier convergence theorem
- 10.4 Fourier series for even and odd functions
- 10.5 Heat equation with zero boundary conditions
- 10.6 Heat equation with other boundary conditions
- 10.7 Wave equation and D'Alembert's solution
- 10.8 Laplace's equation
- final exam

Grading: first midterm (Fri. Oct 5, 20%), second midterm (Fri. Nov. 2, 25%), final exam (Mon. Dec 3 11:30am, 30%), class participation (5%), and homework (20%). The letter grade will be with an approximately 90(A)-80(B)-70(C)-60(D) scale.

Class Participation: You are expected to attend all lectures, and are responsible for all information given out during them. Excessive absences without any medical reasons will result in points lost from your class participation grade. Activities such as sleeping, reading, listening to headsets, browsing the web, conversing with other students, and so on do not constitute class participation. Students engaging in such behavior during the lecture will be counted as absent.

Homework: I encourage students to discuss HW with each other. However, you should still write your own answers. No credit for verbatim copying. No late HW will be accepted. The lowest grade HW will be dropped. HW is due every Monday in class. It includes all assignments given in the previous week.

Examination: final exam will be held on Mon, Dec 3, 11:30am-1:18pm. University regulations require that you take it at that time. It will cover all sections listed in the class schedule. All tests must be taken at the scheduled times, except in extraordinary circumstances. If you cannot take a test at the scheduled time, you should contact me in advance. Check the grading of your exams carefully when they are returned; all grading errors should be brought to my attention as soon as possible. **No calculators will be allowed during any exams.**

*Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact the Office for Disability Services at 614-292-3307 in room 150 Pomerene Hall to coordinate reasonable accommodations for students with documented disabilities. <http://www.ods.ohio-state.edu>

*It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee. For additional information, see the Code of Student Conduct http://studentaffairs.osu.edu/resource_csc.asp.