Syllabus for Math 415, Spring 2010

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: www.math.ohio-state.edu/~kao/

Instructor: Chiu-Yen Kao

Texts: (1) Elementary Differential Equations and Boundary Value Problems, 8th Ed. Boyce DiPrima

Lecture: WMF 3:30pm @ Pomerene Hall

Topics: Ordinary, partial, linear and nonlinear differential equations; Fourier series, boundary value problems; and system of first order equations

Office Hours: MW 4:30-5:30pm @ MW 410 and by appointment

E-mails: kao@math.ohio-state.edu

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
3.1 Homogeneous equations with constant coefficients
---first midterm
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
3.8, 3.9 Vibrations with and without damping and forcing Supplement material: Systems of ODE, phase plane analysis, stability
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
--second midterm
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
7.1 Systems of first order equations: Linearization at equilibrium – the problem of stability

7.2-7.3 Matrices, eigenvalues, eigenvectors, phase plane examples in 2-D
7.4-7.5 Homogeneous linear systems with constant coefficients
7.6 Complex eigenvalues
---final exam

Grading: midterm (Mon. Apr 19, 20%, Mon. May 17, 25%), final exam(Thur. Jun 10 3:30pm-5:18pm, 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 late HW will be accepted.

Examination: final exam will be held on Thurs, Jun 10, 3:30pm. 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**.**