MATH 4512 - APPLIED PARTIAL DIFFERENTIAL EQUATIONS

Autumn 2013; MWF 9:10 - 10:05 a.m. (247 Townshend Hall)

Instructor: Feride Tiglay

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Office: 750 Mathematics Tower (MW)

Office hours: Monday, Wednesday 10:30–11:30 a.m. and Friday 4–5 p.m.

Textbook: *Math 4512: Partial Differential Equations & Boundary Value Problems, 9th Custom edition for OSU, ISBN 978-1-119-93514-8.*

Quizzes/Exams: There is a quiz in class every Friday from the assignments of the previous week. There is no quiz on August 23rd and on November 1st.

There are two in-class midterm exams:

- Midterm 1 on Wednesday, October 2,
- Midterm 2 on Friday, November 1.

The final exam will be held on **Wednesday, December 11, 8:00–9:45 a.m.** You are required to take the final exam at the appropriate time, unless you have a conflict as determined by the registrar. Please note these dates when making any travel arrangements; make-up exams will not be offered except in extraordinary circumstances, such as illness certified by a physician or an approved University function. In such cases, please contact the instructor as soon as possible.

Grading: The course grade will be determined as follows:

Quizzes 20% Midterm I 20% Midterm II 20% Final exam 40%.

Your participation in lecture may also be considered in borderline cases.

Calculator Policy: A scientific calculator is recommended for quizzes and exams. Calculators with graphical capabilities and calculators with programming or computer algebra capabilities, such as the TI-89 or the TI-92, will not be allowed during exams and quizzes. Laptops, PDA's, cell phones, and any other communication devices or computers of any kind will not be allowed either.

Disability Statement: Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone (614) 292-3307 and VRS (614) 429-1334; webpage http://www.ods.ohio-state.edu.

Academic Misconduct Statement: 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

Topics to be covered:

	Part I: ODE's via The Laplace Transform and Euler's and Bessel's Equation
3.1	Homogeneous Equations with Constant Coefficients
3.4	Complex Roots of the Characteristic Equation
6.1	Definition of the Laplace Transform
6.2	Solution of Initial Value Problems
6.3	Step Functions
6.4	Diff'l Equations with Discontinuous Forcing Functions
6.5	Impulse Functions
6.6	Convolution Integral
5.4	Euler's Equation; Regular Singular Points
5.5	Series Solution Near a Singular Point: Part I
5.6	Series Solution Near a Singular Point: Part II
5.7	Bessel's Equation
	Midterm I
	Part II: Partial Differential Equations and Fourier Series
10.1	The Two-Point Boundary Value Problem
10.2	Fourier Series
10.3	Fourier Convergence Theorem
10.4	Even and Odd Functions
10.8A	Heat Conduction Equation: Motivation via Derivation
10.5	Separation of Variables; Heat Conduction in a Rod
10.6	Other Heat Conduction Problems: Nonhomogeneous, Neuman, Mixed Boundary Conditions
10.8B	Wave Equation: Motivation via Derivation
10.7	Vibrations of an Elastic String
10.8	Laplace's Equation: Separation in Cartesian Coordinates Dirichlet vs. Neuman Boundary Conditions
10.8	Separation and Solution in Polar and Cylindrical Coordinates
	Midterm II
	Part III: Boundary Value Problems
11.1	Two-point Boundary Value Problems
11.2	Sturm-Liouville Boundary Value Problems I
11.2	Sturm-Liouville Boundary Value Problems II
11.3	Nonhomogeneous Boundary Value Problems
11.4	Singular Sturm-Liouville Problems
11.5	Bessel Series Expansion: Vibrating Drum
11.6	(If time permits: Series of Orthogonal Functions: Mean Convergence)