

Youngstown State University

Department of Mathematics and Statistics

Course Outline for MATH 5857

Course Title: Partial Differential Equations

Course Credit: 3 s.h.

Text: *Partial Differential Equations: An Introduction.* (second edition) by Walter A. Strauss. Wiley.

Course Prereq: MATH 3705 and MATH 3720.

Course Description: Introduction to partial differential equations (PDE) and their applications. Classification of the basic types of linear partial differential equations and understanding of how boundary and initial conditions affect solutions. Exploration and application of solution techniques for PDE's.

Course Objectives: The goals for the course include:

- Developing an understanding of partial differential equations; their origins, applications, solution techniques and mathematical analysis.
- Learn the importance of boundary conditions and initial conditions on solutions.
- Classification of PDE's; wave equation (hyperbolic), heat equation (parabolic) and Laplace equation (elliptic).
- Understand and exploit properties of solutions for each type of PDE.
- Expansions in orthogonal functions (e.g., Fourier Series).

Material Covered:

<u>Sections</u>	<u>Topics</u>
1.1-1.5	Introduction to PDE' and applications
2.1-2.5	Waves and Diffusion
4.1-4.3	Boundary Problems
5.1-5.5	Fourier Series
6.1-6.3	Harmonic Functions

Selected topics may include:

3.1-3.5	Reflections and Sources
7.1-7.4	Green's Identities and Green's Functions
8.1-8.5	Computation of Solutions

Additional sections could include: 1.6, 5.6, 6.4

Grading: A grading and attendance policy will be distributed by the instructor.

Students with Disabilities: In accordance with University procedure, if you have a documented disability and require accommodations to obtain equal access in this course, please contact the Office of Equal Opportunity and Disability Services at the beginning of the semester or when given an assignment for which an accommodation is required. Students with disabilities must verify their eligibility through the Office of Disability Service ((330) 941-1372) intake procedure.

Cancelled Class Policy: Notice that this class is being cancelled for any one day because of instructor illness, or other reasons will be sent to the student address <...@student.yzu.edu> as soon as possible.

Semester: Fall 2011

Last Day to Withdraw with a "W": Thursday, November 3, 2011.