University of Pennsylvania Department of Mathematics

MATH 2410 – Applied Partial Differential Equations (Course Outline)

Instructor: Dr. Michael A. Carchidi

| Textbook (Required) | 1.) | *Applied Partial Differential Equations with Fourier Series and Boundary-Value Problems* by Richard Haberman |
| | 2.) | *Class Notes* by Michael Carchidi |

Day	Topics Covered
1	Conservation of Energy and a Derivation of the One-Dimensional Heat Equation, Boundary Conditions, and Initial Conditions
2	Time-Independent (Steady-State) Temperature Distributions
3	Linear Superposition and Basis Sets, Separation of Variables (SOV)
4	University Holiday (No Class)
5	The Dot (Inner) Product Concept, Piecewise Continuous Functions
6	*Exam #1* – Lecture on Fourier Series
7	Properties of Fourier Series
8	The One-Dimensional Wave Equation
9	Time-Independent Solutions and The Method of Separation of Variables
10	The Method of Characteristics, Damped Wave Equation
11	*Exam #2* – Sturm-Liouville Eigenvalue/Eigenfunction Problems
12	Taylor's Method, Legendre's ODE and Legendre Functions
13	University Holiday (No Class)
14	Bessel's ODE and Bessel Functions and
15	Problems in Higher Dimensions, The Potential Equation
16	Non-Homogeneous Problems and Time-Dependent Boundary Conditions
17	*Exam #3*

General Information about the MATH 2410 Course

1.)	**Official Class Time:**	Using Zoom from 5:15 PM to 7:45 PM on MWF. Classes will be recorded and placed on the Canvas site.

2.)	**Prerequisites:**	MATH 2400

3.)	**Instructor:**	Dr. Michael A. Carchidi
		Email: carchidi@seas.upenn.edu
		Office Phone: None During Zoom Classes
		Office Hours:
		By Appointment via Zoom usually after class.
		Please email first with your questions.
	TA/Grader:	See the Canvas site at *https://canvas.upenn.edu/*

4.)	**Grading Policy:**	Three Exams will count for 1/3 each of the final grade.

5.)	**Textbook:**	The textbook for the course serves as a guild to the material we will cover this semester. However, it does not replace class time and you are expected to keep up with the reading of the textbook. My notes will be posted on Blackboard. Note also that the textbook is in transition from the third edition to the fourth edition. You may purchase either one as this outline is based on both editions.