COURSE DESCRIPTION
PARTIAL DIFFERENTIAL EQUATIONS I
MA 555 – 2D (51963)
FALL 2024

DEPARTMENT OF MATHEMATICS
UNIVERSITY OF ALABAMA AT BIRMINGHAM

Course Instructor: Professor M. Nkashama
Office: UH 4033
Phone#: (205) 934-2154 (Math Dept)
E-mail: nkashama@uab.edu
Office Hours: Monday 11:00 AM – 1:00 PM (or by appointment)

Class Meeting times: TR 12:30 PM – 1:45 PM
Class Meeting location: UH 2009
Credits: 3 semester hours
Textbook: *Applied Partial Differential Equations*, Third Edition, by J. David Logan, Springer, New York, 2015.
   Topics to be covered can be found in Chapters 1 — 6.
Additional Optional Resource: *Partial Differential Equations,* Second Edition, by Walter A. Strauss, John Wiley & Sons, Inc., New Jersey, 2008.

Important dates:

First day of class: August 26, 2024
Labor Day Holiday: September 02, 2024
Last day to drop/add without paying full tuition: September 03, 2024
Last day to withdraw from the course with a grade of "W": October 18, 2024
Fall/Thanksgiving Break: November 25 – December 01, 2024
Last day of class: December 06, 2024
Major exam (test):   Test I: near Tuesday, October 08;
   (This date is approximate and may be slightly shifted due to unforeseen circumstances.)
Final exam: Thursday, December 12, 2024, 10:45 AM – 1:15 PM. **The final exam is comprehensive!**

Course policies:

- Please make sure that you are able to receive e-mail through your Blazer-ID account. Official course announcements may be sent to that address.
- If you wish to request a disability accommodation please contact DSS at 934-4205 or at *dss@uab.edu.*
- The University of Alabama at Birmingham expects all members of its academic community to function according to the highest ethical and professional standards. It will be important that you review and become familiar with the University's Academic Integrity Code.
  Student Resource: https://www.uab.edu/one-stop/policies/academic-integrity-code
- The two lowest homework grades will be dropped to account for any missed assignments due to illness or any other circumstance. If a test is missed due to a serious verifiable circumstance or official university business, the test grade will be replaced with the properly rescaled final exam score. You must advise the instructor of such circumstances **before** the exam takes place. A missed final exam gets a score of zero.
- Homework problems will be assigned regularly.

Methods of teaching and learning:

- Class meetings of 75 minutes consisting of lectures and discussions of examples and/or homework problems. Time for one in-class test is also included.
- Students are expected to undertake at least 6 hours of private study and homework per week.

Course content/Learning outcomes:

- PDE Models (Conservation Laws, Diffusion, Vibrations and Acoustics, *Quantum Mechanics*, Classification of PDEs)
- PDEs on Unbounded Domains (Heat Equation, Wave Equation, Semi-infinite Domains, Laplace Transforms, Fourier Transforms)
- PDEs on Bounded Domains (Separation of Variables, Orthogonal Expansions, Fourier Series, Sturm-Liouville Problems, Laplace's Equation)
- Applications in Life Sciences (Traveling Waves Fronts, Equilibria and Stability)
- Some Numerical computation of solution (Heat and/or Laplace equations)

Assessment procedures:

- Student achievement will be assessed by the following measures:
  - **Homework.** Homework will be assigned regularly. Since the homework grade constitutes 40% of your course grade, it is strongly recommended that you attend classes on a regular basis and complete all homework assignments when due (no late homework/assignment will be accepted, for any reason).
  - **One in-class test** including short questions for which either full credit or no credit is awarded (Part I) as well as problems requiring in depth understanding (including word-problems) for which partial credit is awarded where appropriate. The test contributes 20% to the course average.
  - **A 150-minute comprehensive final examination** including Part I and Part II type problems. The final contributes 40% to the course average.

- Your course performance is your course average (including the final exam score). This is a number between 0 and 100.
- Your course grade is determined according to the following table:

Course performance:	90-100	80-89	65-79	50-64	below 50
Course Grade:	A	B	C	D	F

- In addition your course grade may be raised by a strong performance on the final exam (normally at most one letter grade).

Divisive Concepts: All University faculty, instructors and teaching staff have the academic freedom to explore, discuss, and provide instruction on a wide range of topics in an academic setting. This class may present difficult, objectionable, or controversial topics for consideration, but will do so through an objective, scholarly lens designed to encourage critical thinking. Though students may be asked to share their personal views in the academic setting, no student will ever be required to assent or agree with any concept considered "divisive" under Alabama law, nor penalized for refusing to support or endorse such a concept. All students are strongly encouraged to think independently and analytically about all material presented in class and may express their views in a time, place, and manner, consistent with class organization and structure, and in accordance with the University's commitment to free and open thought, inquiry, and expressions.

Shared Values Statement: Collaboration, integrity, respect, and excellence are core values of our institution and affirm what it means to be a UAB community member. A key foundation of UAB is diversity. At UAB, everybody counts every day. UAB is committed to fostering a respectful, accessible and open campus environment. We value every member of our campus and the richly different perspectives, characteristics and life experiences that contribute to UAB's unique environment. UAB values and cultivates access, engagement and opportunity in our research, learning, clinical, and work environments. Our [School] aims to create an open and welcoming environment and to support the success of all UAB community members.