Brief Summary of Important Course Information and Policies

Course: MA 655–2D, Partial Differential Equations, Spring 2026
Instructor: Professor M. Nkashama
Office/Hours:

UH 4033. My posted hours this term will be on Monday 1:30 pm –3:30 pm, but appointments may be scheduled at other times if these hours are inconvenient for you.

Phone: 934-2154 (Mathematics Department)
E-mail: nkashama@uab.edu

Class Meeting times/location: TR 12:30pm – 1:45pm, Room UH 4002

Textbook:

A Course on Partial Differential Equations, by Walter Craig, Graduate Studies in Mathematics, Volume 197, American Mathematical Society, Providence, RI, 2018.

Additional Resource:

[1] *A Basic Course in Partial Differential Equations,* by Qing Han, Graduate Studies in Mathematics, Volume 120, American Mathematical Society, Providence, RI, 2011.

Grading: The course grade will comprise the following:

1 midterm (20%)

Regular homework - including (possible) presentations in class (40%)

Final examination (40%)

Make-up(s): *None.*

If you miss the final, you will receive a score of zero on the exam. If you miss the midterm for serious and verifiable circumstances, your score on the final will be used (proportionally) in its place.

Homework:

Homework will be assigned regularly. Since the homework/presentations grade constitutes 40% of the course grade, it is strongly recommended that you attend classes on a regular basis and complete all homework assignments when due. No late homework will be accepted; for any reason!

Final Examination:

Thursday, April 30, 2026, 10:45am – 1:15pm. (Note that the final exam will be a *comprehensive examination.*)

Course content/Learning outcomes:

- Wave Equations (Fourier Transform, Method of Characteristics, Conservation Laws, Method of Images, Separation of Variables)
- Heat Equation (Heat Kernel, Convolution Operators, Maximum Principle, Conservation Laws and Evolution of Moments, Gradient Flow)
- Laplace Equation (Dirichlet, Neumann and Robin/Regular Oblique Boundary Conditions, Green's Identities, Fundamental Solution, Maximum Principle, Green's Functions and Dirichlet-Neumann Operators)
- Wave Equations on $\mathbb{R}^n$ (Lagrangians and Hamiltonian PDEs)
- Dispersion (Schrödinger Equation)
- Conservation Laws and Shocks (First-Order Quasilinear Equations)

Artificial Intelligence Use

Academic Integrity Academic misconduct is present in an academic work wherever AI assistance has been used when unauthorized, or when authorized, has not been disclosed as required. Such behavior is considered deceit and a violation of UAB's shared commitment to truth and academic integrity. Deceit constitutes academic misconduct and is subject to review according to UAB's Academic Integrity Code.

Expect Changes The developments around generative AI are in flux and the rules that are expressed in this syllabus may need to change on short notice. This may affect the contents of assignments, as well as their evaluation.

Important Notice: If you wish to request a disability accommodation, please contact DSS at 934-4205 or *dss@uab.edu*.

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.