

**COURSE DESCRIPTION**  
**PARTIAL DIFFERENTIAL EQUATIONS I**  
**MA 455/555 – 2D**  
**FALL 2021**

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)

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**Class Meeting times:** TR 12:30 PM – 1:45 PM  
**Class Meeting location:** UH 2007 (mask/face-covering during class required)  
**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 Resource:** *Partial Differential Equations*, Second Edition, by Walter A. Strauss, John Wiley & Sons, Inc., New Jersey, 2008.

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**Important dates:**

**First day of class:** August 23, 2021  
**Last day to drop/add without paying full tuition:** August 30, 2021  
**Labor Day Holiday:** September 06, 2021  
**Last day to withdraw from the course with a grade of “W”:** October 15, 2021  
**Fall/Thanksgiving Break:** November 22 – 28, 2021  
**Last day of class:** December 03, 2021  
**Major exams (tests):** Test I: near Tuesday, October 05;  
Test II: near Thursday, November 18;  
(These dates are approximate and may be slightly shifted due to unforeseen circumstances.)  
**Final exam:** Thursday, December 09, 2021, 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 are contacted by the Early Alert Program, you should consider taking advantage of the services it offers. Various services to assist you are also listed in the *Student Resources* sections of *CANVAS* and *BlazerNET* web sites.
  - If you wish to request a disability accommodation please contact DSS at 934-4205 or at *dss@uab.edu*.
  - 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.
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**Methods of teaching and learning:**

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

- 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)
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**Assessment procedures:**

- Student achievement will be assessed by the following measures:
  - **Homework.** Homework will be assigned regularly. Since the homework grade constitutes 20% 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).
  - **Two in-class tests** 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. (Student(s) in **MA 555** will generally have additional questions.) Each 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.

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- 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).
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