

MATH 5321 Applied Partial Differential Equations

Section Number 001, Spring 2013

Course Number: 23163

Lecture: MW 4:00-5:20pm, 103 Pickard Hall(PKH)

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Office Hours: MW 2:00pm -3:30pm or by appointment.

Prerequisite: Analysis, a limited amount of ordinary differential equations.

Text: *Partial Differential Equations*, Second Edition by Lawrence C. Evans

Course Description: We will provide in this course a wide-ranging survey of many important topics in the mathematical theory and application of partial differential equations (PDE), with particular emphasis on various modern approaches. In particular, we will study the theory for more general linear and non-linear elliptic, hyperbolic, and parabolic equations and properties of their solutions, with examples drawn from physics, differential geometry, and applied science. Basic analysis tools include the Fourier transform, the theory of distributions, Sobolev spaces, energy methods, and techniques of harmonic and functional analysis.

Topics: 1. Representation formulas for solutions: the linear transport equation, Laplace's equation, the heat equation, the wave equation, and nonlinear first-order PDE. 2. Theory for linear PDE: Sobolev spaces, second-order elliptic equations, and linear evolution equations. 3. Theory for nonlinear PDE: the calculus of variations, nonvariational techniques, and system of conservation laws.

Requirements: Several Homework assignments.

Exam and Quiz Calculator Policy: On the midterms and final you will be allowed to use only the TI-30XA and TI-30XIIS, the latter is on the current list of calculators allowed for the professional engineering exams. No calculators will be allowed on quizzes. **ONLY TEXAS INSTRUMENTS CALCULATORS IN THE 30 SERIES WILL BE PERMITTED DURING THE EXAMS.** Calculators other than TI-30XA and TI-30XIIS will be confiscated at the beginning of exams, no exceptions. Any device that has electronic communication abilities of any kind is not allowed for any reason, including child care issues, during any exam or quiz. Any student caught with such a communication device will be considered as cheating, with resulting consequences.

Exam Picture ID Policy: You will be asked to present a UTA picture ID at all exams. Bring your UTA picture ID to all exams.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising. Drops can continue through a point two-thirds of the way through the term or session. The last day this semester to drop a course is **Wednesday, October 31 at 5pm.** Any student who drops the course on or before this date will receive a W. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not automatically be dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://web.uta.edu/ses/fao>).

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor **in a timely manner** with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. **This must be done by the Census Date, September 10.** Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817)272-3364.

Academic Integrity: All students enrolled in this course are expected to adhere to the UT Arlington Honor Code: *I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

Student Support Services: UT Arlington provides a variety of resources and programs

designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Math Clinic Tutoring Available: The Math Department operates the Math Clinic, a tutoring service staffed by upper level undergraduate students. You will need to show your Mav ID to use the Math Clinic. There are tables where you may study on your own or quietly with other students. Each table has a flag that you can raise to indicate that you need help from a tutor. The Math Clinic is on the 3rd floor of Pickard Hall. Go to the Math Clinic webpage <http://www.uta.edu/math/clinic/> to get more information or to access assignment sheets for the courses for which tutoring is offered.

Private Tutoring: The Math Dept. maintains a list of people who have expressed an interest in tutoring. These persons are **not** necessarily recommended by the Math Dept. and they set their own fees. You may obtain a copy of the tutor list in the Math Office.

Student Disruption The University reserves the right to impose disciplinary action for an infraction of University policies. For example, engagement in conduct, alone or with others, intended to obstruct, disrupt, or interfere with, or which in fact obstructs, disrupts, or interferes with, any function or activity sponsored, authorized by or participated in by the University.

Cell Phone/Laptop Use: Cell phones are not allowed during class time; the only exception is those who are the primary contact for a child in daycare/school. If this is the case, notify me by email by the census date. If you need to check your messages, you must do so on your own time, not class time. Using a laptop during class is a privilege, not a right. This privilege will be revoked for any students using the laptop for purposes other than Calculus 3.

Grade Exclusion and Grade Replacement Policies: These policies are described in detail in the University catalog and can also be found online. Further questions should be directed to your academic advisor and not the instructor of this course.

Drop for Non-Payment of Tuition: If you are dropped from this class for non-payment of tuition, you may secure an Enrollment Loan through the Bursar's Office.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>

Final Review Week: A period of five class days prior to the first day of final examinations

in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems, or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are NOT required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.