

**MATH 602**  
**Methods and Applications of Partial Differential Equations**  
Texas A&M, Fall 2013, Section: 601, CRN: 12200 **Lecture:** T,R, 9:35 am-10:50  
am, Blocker Building 121

**Instructor:** Dr. Adam Larios **Email:** [alarios@math.tamu.edu](mailto:alarios@math.tamu.edu)  
**Office:** Blocker Building, 641 C **Math Dept. Phone:** (979) 845-3261  
**Office Hours:** T,R, 1:00 pm - 2:30 pm, or by appointment

**Course Description:** Classification of linear partial differential equations of the second order; Fourier series, orthogonal functions, applications to partial differential equations; special functions, Sturm-Liouville theory, application to boundary value problems; introduction to Green's functions; finite Fourier transforms.

Prerequisites: MATH 601 or (MATH 308 and MATH 407).

Restrictions: Must be enrolled in the Graduate level at the College Station campus, and may not be enrolled in the English Language Institute College.

Learning outcomes and course objectives: By the end of the course, students should be familiar with following topics, and be able to use the effectively: the Laplace equation, the heat equation, separation of variables, Fourier series, wave equation, method of characteristics and first-order equations (nonlinear conservation laws), eigenvalue problems, higher dimensional PDEs. Mastery of these topics can be obtained by sufficient study of student's notes from lecture notes, textbook, homework problems, past exams, and will be evaluated by quizzes and exams.

**Textbook:** Richard Haberman. *Applied Partial Differential Equations*. 5th Edition. Pearson (2013). ISBN: 978-0321797056

**Contacting me:** The best way to get in contact with me is by email, [alarios@math.tamu.edu](mailto:alarios@math.tamu.edu). Please put [MATH 602] somewhere in the title and make sure to include your whole name with your email. Polite, courteous emails are appreciated; see my website for tips on email etiquette. My office is in Blocker Building, 641 C, and my office hours are T, R 1:00 pm - 2:30 pm. Drop-ins are welcome during these times. If you want to meet me at a different time, please email me, and we will try to schedule a time to meet.

**Motivation:** This is a one-semester course on Partial Differential Equations (PDEs) which gives an introduction to various topics in PDEs and provides a firm basis for future study.

PDEs lie at the heart of an extremely large number of practical and theoretical problems in science, mathematics, and engineering. Furthermore, the unsolved problems are enormously varied, rich, and challenging. Our growing understanding of these equations has yielded a massive amount of progress for human kind. The methods involved are incredibly useful in science, and will require us to develop sophisticated and interesting mathematics to handle them.

**Homework:** Homework is designed to help students understand the material and to prepare them for the Quizzes and exams. Homework assignments will be posted on the website, but they are not to be turned in.

**Collaboration:** Collaboration is encouraged in this course. However, copying someone else's work and submitting it as your own is unacceptable. This act of academic dishonesty will be prosecuted in accordance with university policy.

**Electronic devices:** There will be no calculators (or other electronic devices) allowed on exams and Quizzes, unless otherwise stated. Laptops, cell phones, and other electronic devices, are not allowed to be used during class or exams, unless otherwise stated. Cell phones must be set on vibrate or off. If you need to take a call, send a text message, etc., please quietly leave the classroom to do so, so that you do not distract other students. You are welcome to return to class quietly when you are finished. If you wish to take notes using an electronic device, you must first demonstrate to me that you can type or write fast enough to do so properly, and that you can do it without distracting others, before the privilege to use such devices may be granted. If you are found to be abusing this privilege, you risk forfeiting it.

**Grading:** The final course grade will be computed as follows.

Homework and Quizzes:	30%
Midterm Exams:	20% + 20% = 40%
Final Exam:	30%

Your minimum grade will be A, B, C, D, or F, for averages equal to or above 90%, 75%, 60%, 45%, or 0%, respectively.

**Attendance:** Daily attendance for class lectures is expected and is extremely important. While attendance is not recorded, missing even one class will put you behind. Note that there is a strong correlation between class absences and poor grades. You are responsible for all material and announcements in class regardless of whether or not you attended. **You are also responsible for making arrangements with another classmate to find out what you missed. You should not ask me to go over material you missed (due to tardiness or absences) during office hours or over email.**

**Make-up exams:** Make-up exams will only be given with written evidence of an official University excused absence. Section 7.3 of the University Student Rules states that for an absence: “to be excused the student must notify his or her instructor in writing (acknowledged email message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g., accident or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class.”

**Incompletes:** A grade of “incomplete” may be considered if all but a small portion of the class has been successfully completed, but the student in question is prevented from completing the course by a severe, unexpected, and documented event. Students who are simply behind in their work should consider dropping the course.

**Special Services:** The American with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protections for persons with disabilities. Among other things, this legislation provides that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, Cain Hall, Room B118, (979) 845-1637. For additional information, visit: <http://disability.tamu.edu>

**Copyright policy:** Printed materials disseminated in class or on the web are protected by copyright laws. One Xerox copy (or download from the web) is allowed for personal use. Multiple copies or sale of any of these materials is strictly prohibited.

**Honor Code:** Academic dishonesty is taken extremely seriously, and will be dealt with according to university policy. Always abide by the Aggie Code of Honor: "An Aggie does not lie, cheat or steal, or tolerate those who do." For additional information, please visit: <http://www.tamu.edu/aggiehonor>

**Useful Websites:** Course Website: [www.math.tamu.edu/~alarios/courses/TAMU/2014\\_spring\\_M602/content.html](http://www.math.tamu.edu/~alarios/courses/TAMU/2014_spring_M602/content.html)  
My Website: <http://www.math.tamu.edu/~alarios>  
Department of Mathematics: <http://www.math.tamu.edu>  
Campus emergency: <http://studentaffairs.tamu.edu/emergency>  
Student Rules: <http://student-rules.tamu.edu>  
Aggie Honor: <http://aggiehonor.tamu.edu/>  
Disability Services: <http://disability.tamu.edu>

**Disclaimer:** While this syllabus was prepared carefully and according to information available at the beginning of the semester, changes may be necessary in the interest of good teaching. Changes to any of the information above will be announced in class and posted on the class web site. This includes in particular possible updates or corrections to the syllabus, and changes of exam dates.

**Exams:** You are required to bring and possibly present your Aggie Card or a government issued ID card when taking exams, as well as standard writing materials.

- Midterm Exam 1: Tuesday Feb 25, in class [Blocker 121]
- Midterm Exam 2: Thursday April 3, in class [Blocker 121]
- Final Exam: Friday May 2, 12:30:30 p.m. [Blocker 121]

**Rough schedule:** The following tentative schedule is a rough guide to the material covered in the course, but is subject to change. **See course webpage for additional content and updates.**

- HW1, Tuesday Jan 21: Quiz 1, plus question 1 from mdt1 fall 2013, plus question 2 from final fall 2013 plus questions 1.3.1, 1.4.1(b) (g), 1.4.3, 1.4.10, 1.5.5, 1.5.8, 1.5.11, 1.5.14 from book or (see).
- HW2, Tuesday Jan 28: Quiz 2, plus look at past midterms and finals, plus questions 2.2.2, 2.3.2 (a) (c), 2.3.3 (a) (b), 2.3.5, 2.4.3, 2.4.4, 2.4.6 from book.
- HW3, Tuesday Feb 4: Quiz 3, 2.5.1(b), 2.5.3 (a), 2.5.5 (a) (d), 2.5.7 (a), 2.5.12, 2.5.14, 2.5.15 (d).
- HW4, Thursday Feb 13: Quiz 4, 3.2.1 (a,c), 3.2.4, 3.3.4, 3.3.9, 3.3.18(a,b,c).
- HW5, Thursday Feb 20: Quiz 5, 10.3.6, 10.3.7, 10.4.3, 10.4.4. (Beware of the definition on the Fourier transform). **Midterm 1, Tuesday Feb 25.**
- HW6, Thursday, March 6: Do all the problems in HW6
- HW7, Thursday, March 20: Do all the problems in HW7 plus 9.3.8, 9.3.12(c), 9.3.23, 9.3.24 (disregard hint, use FTC as usual). (Quiz 6)
- HW8, Thursday, March 27: Do all the problems in HW8 related to the material taught so far. (Quiz 7) **Midterm 2, Thursday April 3.**
- HW8, Tuesday, April 15: Do all the problems in HW8 (Quiz 8)
- HW9, Tuesday, April 22: Do all the problems in HW9 (Quiz 9)
- Last day of lecture: April 29
- Final Exam: Friday May 2 , 12:30:30 p.m. [Blocker 121]