Math 4310-51/Partial Differential Equations/ Fall 2017  
Instructor: Dr. Dhruba Adhikari  
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Office: D-243  
Classroom and Time: D-250  
MW 5:00 -- 6:15 PM  
Office Hours: MW 3:15 -- 4:15 PM, or by appointment only

Prerequisite: A grade of “C” or better in Math 2203 and Math 2306


References:

1) Introduction to Partial Differential Equations by Peter J. Olver, ISBN: 978-3-319-34744-8

The first reference is great for a rigorous treatment of PDEs. The second reference is an excellent resource for the study of PDEs from modeling to theory - a smooth transition to advanced partial differential equations.

To be covered: We will cover most of chapters 1--5 and some sections of chapters 7, 10.

Course Description: This course is an introduction to partial differential equations (PDEs), their applications in the sciences and the techniques that have proved useful in analyzing them. The techniques include separation of variables, Fourier series and Fourier transforms, orthogonal functions and eigenfunction expansions, Bessel functions, and Legendre polynomials. The student will see how the sciences motivate the formulation of partial differential equations as well as the formulation of boundary conditions and initial conditions. Parabolic, hyperbolic, and elliptic PDEs will be studied.

The following is tentative daily plan. Based on class pace, the sections may be reshuffled, but you will be notified of the change in class if any. Please read the sections and get familiar with at least terminology, definitions, laws in physics before coming to class. The symbol (R) next to a section number means that the section is assigned as a reading assignment.

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<td>1.1(R) , 1.2</td>
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<td>1.3, 1.4</td>
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<td>Aug 23</td>
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<td>Oct 2</td>
<td>Test 1</td>
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<td>Oct 4</td>
<td>5.1(R), 5.2 (withdrawal deadline)</td>
<td>Dec 4</td>
<td>Review</td>
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Comprehensive Final Exam (Wednesday, Dec 6, 2017, 6:00 PM - 8:00 PM)

*Additional material may be covered if time permits.
**Learning Outcomes:** Upon completing this course, students should be able to

1. know what a PDE is, understand the importance of initial and boundary conditions, know the classification of PDEs (parabolic, elliptic, hyperbolic);
2. be able to derive a PDE as well as the initial and boundary conditions corresponding to problems which arise in the sciences and engineering;
3. recognize Sturm-Liouville equations, be aware of the existence and uniqueness properties of boundary value problems, and demonstrate the orthogonality property of solutions of Sturm-Liouville equations;
4. solve PDEs using standard techniques including separation of variables, eigenfunction expansions, Fourier series, Fourier and other integral transforms.

**Homework:** There will be two types of homework assignments in this course. The first one is for you to exercise for an extensive understanding of content materials. This assignment will not be collected for grading; however, it is crucial that you complete the assignments to develop the skills needed for the second type which will be collected for grading. All assignments will be dynamically posted on D2L as the course progresses.

There will be four homework sets to be collected for grading. These assignments are due at the start of the class on due dates. Homework submitted after the due date but before it has been returned will be accepted with a heavy penalty. Homework handed in after the class has received the graded homework will not be accepted under any circumstances.

You will be required to trust my professional judgment made for grading homework assignments, tests and final exam by using the following rubric:

- 100% credit for correct solutions with coherent reasoning and with absolutely no errors;
- 90% credit for correct solutions, but difficult to understand because of incorrect order of arguments, incomplete analysis and unclear interpretations;
- 80% credit for mostly correct with no “damaging” errors; but certainly needing fixes;
- 70% credit for mostly correct, but needing a rewrite because of “damaging” errors;
- 60% credit for moderately correct; at least the beginning being correct, but the argument losing its track later; and
- no credit warranted for incorrect, indecipherable and incomplete solutions.

**Homework submission guidelines:**

- All homework to be graded should be stapled together (credit may be deducted if not).
- Email submissions are not accepted.
- Write your name legibly at the top of the first page.
- All problems must be clearly labeled.
- Homework is due at the beginning of the class.
- From each graded homework sets, only selected problems will be graded, but you will be notified of the problems to be graded on the due dates after the homework are submitted.

Students are encouraged to collaborate on homework assignments. However, you are expected to write up your solutions independently. *If solutions are found identical to ones of your fellow classmates, you may receive no credit, and may be considered having Academic Misconduct as defined under Code of Academic Integrity as briefed on page 4.*
Grading Scheme:

Participation: 5%
Homework: 20%
Test 1: 25%
Test 2: 25%
Final Exam: 25% (The final exam is comprehensive.)

All tests and final exam are closed book and closed notes. Make-up exams will only be allowed for a university approved excuse in writing. Wherever possible, you should inform me prior to missing an exam. Everyone must take the final. The final exam percentage will be used to replace your one lowest test score if it helps your average. There will be no extra credit in this course, and therefore please do not ask for one.

Participation: Your class attendance will be recorded on every class day. Class roll will be passed around the class. Make sure you sign in. There will be five participation points for each class day. The points will be based on
- your class attendance for the entire duration of class time;
- participating in course content related discussions erupted in class;
- refraining from unwarranted use of electronic devices (e.g. texting, surfing websites).

The participation grade for an unexcused absence will be a zero. Repeated use of electronic devices for purposes unrelated to the learning of the course will result in your participation grade of zero, and you will be asked to leave classroom. Excused absences will not count against your participation grade. The two lowest participation grades will be dropped, and the remaining will be averaged for 5% participation grade.

Grading Scale: A for [90%, 100%], B for [80%, 90%), C for [70%, 80%), D for [60%, 70%), F for [0, 60%)

Student Disability Services: Any student with a documented disability needing academic adjustments is requested to notify the instructor as early in the semester as possible. Verification from KSU Student Disability Services is required. All discussions will remain confidential.

Class Attendance: Regular attendance is expected and will be recorded. There will be a class roll going around in class every day, and it is your responsibility to sign in. Missing a class can leave you a lot behind in the course and, in this case, you will be responsible for all announcements, class assignments and material presented in class. I will need to report the last day of attendance when submitting grades.

Classroom Behavior: All phones must be put in silence or turned off in the classroom. Music players should not be used for the duration of class. You are expected to arrive in class on time, be prepared for interactive learning, and not be disruptive during the class. You may be asked to leave the classroom for any misconduct or inappropriate behavior, and your participation point for the day will result in a zero.

The instructor of the course reserves the right to make changes on pages 1-3 of this syllabus if it is absolutely necessary to account for ineluctable circumstances. In such events, students will be notified of any changes ahead of time by the instructor.
WITHDRAWAL FROM THE UNIVERSITY OR FROM INDIVIDUAL COURSES AND ACADEMIC INTEGRITY
Fall 2017

Withdrawal

Students who find that they cannot continue in college for the entire semester after being enrolled, because of illness or any other reason, need to complete an online form. To completely or partially withdraw from classes at KSU, a student must withdraw online at http://www.kennesaw.edu, under Owl Express, Student Services.

The date the withdrawal is submitted online will be considered the official KSU withdrawal date which will be used in the calculation of any tuition refund or refund to Federal student aid and/or HOPE scholarship programs. It is advisable to print the final page of the withdrawal for your records. Withdrawals submitted online prior to midnight on the last day to withdraw without academic penalty will receive a “W” grade. Withdrawals after midnight will receive a “WF”. Failure to complete the online withdrawal process will produce no withdrawal from classes. Call the Registrar’s Office at 470-578-6200 during business hours if assistance is needed.

Students may, by means of the same online withdrawal and with the approval of the university Dean, withdraw from individual courses while retaining other courses on their schedules. This option may be exercised up until October 4, 2017.

This is the date to withdraw without academic penalty for Fall Term, 2017 classes. Failure to withdraw by the date above will mean that the student has elected to receive the final grade(s) earned in the course(s). The only exception to those withdrawal regulations will be for those instances that involve unusual and fully documented circumstances.

Academic Integrity

Every KSU student is responsible for upholding the provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. Section II of the Student Code of Conduct addresses the university’s policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to university materials, misrepresentation/falsification of university records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Department of Student Conduct and Academic Integrity (SCAI), which includes either an “informal” resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct’s minimum one semester suspension requirement. See also http://www.kennesaw.edu/scai/content/ksu-student-code-conduct