Math 4211: Partial Differential Equations

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Office Hours: MW 11-12
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Course Content and Goals

In this course, you will be introduced to the theory of partial differential equations. Partial differential equations are ubiquitous in mathematical modeling, and have wide-ranging and deep applications to mathematical physics, economics, finance, computer science...

During the semester we will cover the following topics:

- The method of characteristics and first-order transport equations,
- waves and diffusions in space,
- the theory of Fourier series and their applications to boundary-value problems,
- applications of PDE to mathematical physics,
- systems of orthogonal functions.

We will also cover a variety of special topics, time permitting.

If you are undecided about whether to take the course, please talk to me!

Textbooks

The official textbook is Partial Differential Equations: An Introduction, by Walter Strauss. There are copies of the book available in the Brooklyn College Library. *Please note: you do not need to purchase this textbook to be successful in this course*. In particular, you will not need the textbook to complete homework assignments. The material in class will be *self-contained* and you will not need to complete any readings from the textbook.

Technology

Blackboard. Course organization (calendar, assignments, pdfs of handouts) will be on Blackboard. Emails with course announcements will often be sent through Blackboard so please be sure they are not filtered from your inbox.
Gradescope. A website where you upload your classwork to be graded. You will be able to log in and see your grades and my comments on your assessments. Make an account for our course at www.gradescope.com using the entry code posted on Blackboard. You do not need to enter your student ID number.

Homework

I will provide you with practice problems, selected to strengthen your understanding of the material. You should aim to finish the problems so that you can practice and learn the topics we are covering.

Homework is an opportunity to learn math the best way possible – by doing it. In order to encourage you to keep up with the material, I will ask you to submit your work to 2 - 4 problems that I will choose from each week's notes. You will submit your homework on Gradescope.

You may collaborate on the homework, but the work that you submit for individual assignments should reflect your own understanding of the problems. Please see the policy on collaboration below.

Grades

Grades are a reflection of your mastery of the material and your ability to communicate through the graded assignments. Grades are not a reflection of your self-worth. Your grade for the course is determined by:

Homework 30 % **Midterm Exam** 20% each **Final Exam** 30%

Course Engagement. There are many ways to be engaged in this course, including: asking and answering questions in class, working with others both inside and outside of the classroom, attending office hours, and emailing questions. You are expected to come to every class prepared to do mathematics. You should bring paper, pens or pencils, and other equipment you may need. You must be up to date and prepared for class to participate effectively. Attendance and Participation are *not* a part of your grade, but they are required if you will be successful in the course.

Exams. There will be three exams in this class: two midterms and a cumulative final exam. The midterm exams will be during class on the dates listed in the course schedule TBD. The final exam will be during Finals Week on TBD. The final exam will be cumulative (it will be based on all topics covered this semester).

Academic Integrity

The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. **If you have any questions about what constitutes plagiarism in this course, please ask your instructor.** The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for policy implementation can be found at brooklyn.cuny.edu/bc/policies. If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member must report the violation. Students should be aware that faculty may use plagiarism detection software.

On-campus Resources

Office Hours. Please stop by office hours to ask questions! I have set aside this time specifically to help you learn and be successful in the course. If you are unable to make any of my office hours, please email me to set up an appointment.

Please check this website for updates on services at Brooklyn College, including Personal Counseling, Advising, Financial Aid, Immigrant Student Services, and Internet Access:
https://brooklyn.cuny.edu/web/about/initiatives/initiatives/return/students/student-resources.php

The Learning Center. The Learning Center is a place where you can go to discuss homework with your classmates and ask questions of tutors. The Learning Center Math tutoring schedule can be found here: LC.brooklyn.cuny.edu

Support and Accommodations. Brooklyn College is committed to supporting the learning process for all students. Please contact me as soon as possible if you are having difficulties in the course. There are also many resources on campus available to you as a student, including

Center for Academic Advisement and Student Success
brooklyn.cuny.edu/web/about/offices/caass.php

Personal Counseling
brooklyn.cuny.edu/web/about/offices/studentaffairs/health-wellness/counseling.php

Student Bereavement Policy: https://www.brooklyn.edu/policies/bereavement/

Center for Student Disability Services
brooklyn.cuny.edu/web/about/offices/studentaffairs/student-support-services/disability.php

The Center for Student Disability Services (CSDS) will be offering services both in-person and virtually for the fall semester. In order to receive disability-related academic accommodations students must first be registered with CSDS. Students who have a documented disability or suspect they may have a disability are invited to schedule an interview by calling (718) 951-5538

or emailing testingcsds@brooklyn.cuny.edu. If you have already registered with CSDS, email Josephine.Patterson@brooklyn.cuny.edu or
testingcsds@brooklyn.cuny.edu to ensure the accommodation email is sent to your professor.

Immigrant Student Success Office. The mission of the Immigrant Student Success Office is to recruit, enroll, and retain students, with an emphasis on new immigrants, such as students granted Deferred Action for Childhood Arrivals (DACA) who identify with the Development, Relief and Education for Alien Minors Act (DREAMERS), and first-generation students by providing the necessary academic and non-academic support to ensure graduation from Brooklyn College in a timely manner.
brooklyn.cuny.edu/web/about/offices/studentaffairs/student-support-services/isso.php

Off-campus Resources

NYC Well
English: 1-888-NYC-Well (1-888-693-9355), Press 2
Espanol: 1-888-692-9355, Press 3
Text WELL to 65173
Free confidential mental health support for NYC residents:
https://nycwell.cityofnewyork.us/en/

Crisis Text Line
Text HOME to 741741
https://www.crisistextline.org/

Schedule

The schedule is tentative and subject to change. Each exam will test on the material that was taught up until 1 week prior to the exam. **Due dates for Homework and Classwork are Sundays at 11:59 PM**. I will update the schedule on Blackboard throughout the semester, so be sure to check there for the most up-to-date information.

Week 1, 01/29 - 02/02: *Review of the basic theory of ODE:* solutions of first- and second-order equations, equations, the Picard local existence theorem.

Week 2, 02/05 - 02/09: *Basic facts about PDE:* Classification of linear PDE, first-order PDE and the method of characteristics.

The rest of the schedule TBD.