Department of Mathematics & Statistics
Concordia University

MATH 473 (MAST 666/MAST 841), Sec. A

Partial Differential Equations

Winter 2023

Instructor: Dr. A. Kokotov, Office: LB 901-29 (SGW), Phone: 514-848-2424, Ext. 3471
Email: alexey.kokotov@concordia.ca

Prerequisites: **MATH 264/265** or an equivalent multivariable calculus course.
MATH 370 or an equivalent course in ordinary differential equations.

Recommended Textbooks:

Basic Level:

1. A. Komech, A. Komech, Book of practical PDE's: https://www.mat.univie.ac.at/~komech/articles/posobie.pdf
2. V. Ivrii, Partial Differential equations http://www.math.toronto.edu/ivrii/PDE-textbook/PDE-textbook.pdf

Advanced Level:
Lawrence C. Evans. Partial Differential Equations, Graduate Studies in Mathematics, Vol. 19, AMS, 2010.

Assignments: Assignments are *very important* as they indicate the level of difficulty of the problems that the students are expected to solve and understand. Therefore, every effort should be made to do and understand them *independently*. The assignments will be corrected and graded, with solution sets posted weekly. These grades together are worth a maximum of 30%.

Midterm Test: A midterm test covering the first seven weeks will be given in week 8, worth 30% of the total grade.

Final Grade: The highest of the following:

- 30% assignments, 70% final exam.
- 30% midterm, 30% assignments, and 40% final exam.

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

	Topics
1	Types of Second-Order Equations. Canonical form. Method of characteristics.
2	D'Alembert solution to the one-dimensional wave equation. Infinite and semi-infinite string
3	3D and 2D wave equations, method of descent.
4	Fourier series. Sturm-Liouville problem.

5	Fourier method: Mixed initial boundary value problems for the wave and heat equations in dimension one
6	Separation of variables in dimension two. Bessel functions
7	Laplace equation. Dirichlet and Neumann problems. Green function
8	(If time permits): Elements of the theory of distributions. Fourier transform. Fundamental solutions.

Academic Integrity and the Academic Code of Conduct
This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity." *[Undergraduate Calendar, Sec 17.10.2]*

Use of Zoom
Note: Zoom is included as an institutionally-approved technology. This means we have been assured of the privacy protections needed to use freely within the classroom)

Zoom might be used in this course to facilitate learning at a distance. It may be used to record some or all of the lectures and/or other activities in this course. If you wish to ensure that your image is not recorded, speak to your instructor as soon as possible.

Also, please note that you may not share recordings of your classes and that the instructor will only share class recordings for the purpose of course delivery and development. Any other sharing may be in violation of the law and applicable University policies, and may be subject to penalties.

Behaviour
All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

Concordia students are subject to the Code of Rights and Responsibilities which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in University activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

Intellectual Property
Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the Academic Code of Conduct and/or the Code of Rights and Responsibilities. As specified in the Policy on Intellectual Property, the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

Extraordinary circumstances
In the event of extraordinary circumstances and pursuant to the Academic Regulations the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the change.