

MATH 473 (MAST 666/MAST 841), Sec. A
Partial Differential Equations
Winter 2021

- Course Instructor:** Dr. A. Kokotov
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- Prerequisites:** MATH 264/265 or an equivalent multivariable calculus course.
MAST 330 or an equivalent course in ordinary differential equations.
- Recommended Textbooks:** Basic level: A. Komech, A. Komech, *Book of practical PDE's*: see <https://www.mat.univie.ac.at/~komech/articles/posobie.pdf>
David L. Powers. *Boundary value problems and Partial Differential Equations*, Elsevier, Academic Press, 2006.
Advanced level: Lawrence C. Evans. *Partial Differential Equations*, Graduate Studies in Mathematics, Vol. 19, AMS, 2010.
- Delivery Methods:** The course will be delivered in the remote format. Pre-recorded lectures will be posted in the Moodle weekly. Additional video-files will be prepared and put in the system in order to answer the questions of students that cannot be answered via E-mail.
- Format of the midterm and final: "take home" (can be changed depending on general situation).
- 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 a representative sample graded, with solution sets posted. These grades together are worth a maximum of 30%.
- 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 |
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| 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*]

Behaviour

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

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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.