MATH 483/683: Partial Differential Equations: 3 credits

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Lecture hours	MWF 10:00am–10:50am, Minard Hall Rm 306
Office hours	MWF 9:00am–9:50am (or by appointment)
Textbook	P. Olver, Introduction to Partial Differential Equations, Springer, 2014
Prerequisites	MATH 266 and MATH 329
Course Description	First and second order partial differential equations, classification, examples, solution methods for the wave, diffusion, and Laplace equations, causality and energy, boundary value problems, separation of variables, Green's identities, Green's functions.
Course Objectives	Partial differential equations (PDE) are among the main tools of applied mathematics that are used to model various processes in physics, engineering, economics, natural and social sciences. The purpose of the course is to learn the basics of the theory of linear PDE and master the elementary tools (Fourier series, integral transforms, Green's functions) to solve three most important linear partial differential equations: heat, wave, and Laplace equations. The students will be exposed to both theoretical and applied points of view.
Class Attendance	According to NDSU Policy 333 (www.ndsu.edu/fileadmin/policy/333.pdf), attendance in classes is expected. The students are solely responsible for missed handouts or announcements made during the lectures.
Homework	Starting week two of the course there will be a regular weekly homework. No late homework will be accepted. Group work on homework problems is encouraged, however, the final writing of solutions should be entirely your own (LaTeX is preferred but not required).
Exams	There will be three midterm tests and a comprehensive take home final exam at the end of the semester. Make-ups for the midterm tests are possible in case of a legitimate (documented) excuse. Please contact me well in advance to arrange for a make-up.
Grading	The students taking 683 section of the course will be assigned additional problems. The grading of the course will be based on the homework (30%), midterm tests (15% each), and the final exam (25%). The final grade will be A/B/C/D/F with the thresholds 90/80/70/60.

Academic Responsibility and Conduct

The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at `www.ndsu.edu/academichonesty`.

Any student found guilty of academic dishonesty will receive a grade of 0 for the homework assignment, or quiz, or exam in question. In addition, every such student will be reported to the Chair of Mathematics, the Dean of their major college, the Dean of the College of Science and Mathematics, the Provost, and the Registrar. The Registrar will add any such student to NDSU's Student Academic Misconduct Database. (Multiple entries in this database may result in additional sanctions from NDSU.)

Special Needs

Any students with disabilities or other special needs, who need special accommodations in this course are invited to share these concerns or requests with the instructor and contact the Disability Services Office as soon as possible.

Schedule

Note: This is a tentative schedule and subject to a change. Week 1 starts January 13th.

Week 1. Introduction. What are PDE?

Week 2. Linear waves. Transport equation.

Week 3. The wave equation. d'Alembert's formula.

Week 4. The wave equation (cont.). First midterm test.

Week 5. The heat equation. Fourier series.

Week 6. Convergence of Fourier series.

Week 7. Separation of variables.

Week 8. Separation of variables (cont.).

Week 9. Separation of variables (cont.). Second midterm test.

Week 10. Spring break, no classes.

Week 11. Delta-function and Green's function.

Week 12. Green's function (cont.). Fourier transform.

Week 13. Fourier transform (cont.).

Week 14. Fundamental solution to the heat equation. Third midterm test.

Week 15. Planar heat and wave equations.

Week 16. Planar heat and wave equations (cont.).

Week 17. Planar heat and wave equations (cont.). Review classes. Dead week.

Week 18. Final exam (May 13th, Wednesday, 8:00am).