

Partial Differential Equations
MATH-UA.0263-001
Spring 2018

- **Instructor, Locations and Hours**

- Instructor: [Dr. Pejman Sanaei](#).
- Class location: [CIWW 312, Tuesdays & Thursdays, 9:30-10:45 AM](#).
- Office: 1104 Warren Weaver Hall.
- Office hours: Thursday 10:45-12:30 PM or by appointment.

- **Textbook**

- [Walter Strauss, Partial Differential Equations: An Introduction, John Wiley & Sons, second edition, ISBN-13: 978-0470054567 \(PDE\)](#)

- **Additional Resources**

- [David F. Griffiths, John W. Dold, David J. Silvester, Essential Partial Differential Equations: Analytical and Computational Aspects, ISBN: 978-3-319-22569-2 \(EPDE\)](#)
- [J. David Logan, Applied Partial Differential Equations, Springer Verlag, 3rd edition, ISBN:978-3-319-12493-3 \(APDE\)](#)

- **Course information posted on NYU Classes**

- Homework: in “Assignments” and must be handed in class, stapled and neat.
- Other info: in “Announcements”.
- This PDF: in “Syllabus”.

- **Recitation**

- [Chhavi Yadev, MATH-UA.0263-002, CIWW 312, Fridays, 12:30-1:45PM](#).

- **Exams**

- A midterm exam (October 23, 2018).
- A cumulative final exam.

- **Grade Breakdown**

- 30% for homework.
- 30% for midterm.
- 40% for the final exam.

- **Other Informations**

- All policies set forth by the university in regards to student codes of conduct apply to this course. In particular, action will be taken if students are found to be cheating. Please refer to NYUPolicy on Academic Integrity.
- Students participating in University Sponsored events who know in advance that they will miss exams must make arrangements with the instructor ahead of time to schedule make-ups.
- Unscheduled emergencies that cause students to miss exams will be considered on a case by case basis with proper documentation.

- **Calendar & Book Sections**

- Week 1: What is a PDE and what can you do with it? Boundary and Initial Conditions
 - * PDE: §1.1, 1.4; EPDE: Chapters 1, 2; APDE: §1.1, 2.1
- Week 2: Linear PDEs, Physical Origin of PDEs: Conservation Laws
 - * PDE: §1.6; EPDE: Chapter 2, Appendix C; APDE: §2.3
- Week 3: Physical Origin of PDEs: Conservation Laws, First-Order Linear PDEs: Characteristics
 - * PDE: §1.2; EPDE: Appendix C, §4.1; APDE: §1.2
- Week 4: First-Order Nonlinear PDEs: Shocks, Classification of Second-Order PDEs
 - * PDE: §14.1, 1.6; EPDE: §9.3, 4.2, 4.3; APDE: §1.2, 1.9
- Week 5: The Wave Equation, The Diffusion Equation
 - * PDE: §2.1, 2.4; EPDE: §4.5; APDE: §2.2, 2.1
- Week 6: Properties of the Diffusion Equation, Duhamel's Principle
 - * PDE: §2.3, 2.5, 3.3, 3.4; EPDE: Chapters 7; APDE: §1.8, 2.3, 2.5
- Week 7: Distributions and the Delta Function, Midterm Review
 - * PDE: §12.1
- Week 8: Midterm, Separation of Variables
 - * PDE: §4.1, 4.2, 4.3; EPDE: §8.1; APDE: §4.1
- Week 9: Review of Linear Algebra, Fourier Series
 - * PDE: §5.1, 5.3; EPDE: Appendix B, §5.3; APDE: Chapter 3, §2.7
- Week 10: Convergence of Fourier Series, Inhomogeneous BCs and Sources
 - * PDE: §5.1, 5.2, 5.6; APDE: §3.2, 4.7
- Week 11: Sturm-Liouville Problems, Laplace and Poisson Equations
 - * PDE: §11.4, 6.2; EPDE: Chapters 5, §8.3; APDE: §4.2, 4.3, 4.4, 4.5, 4.8
- Week 12: Laplace and Poisson Equations, Solving ODEs using Maple & Matlab
 - * PDE: §6.2; EPDE: §8.3; APDE: §4.4, 4.5, 4.8
- Week 13: Solving PDEs using Maple, Discrete Sine Transform
- Week 14: Review for Final Exam