

## Math 220/CME 303 – Partial Differential Equations of Applied Mathematics

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- September 21. Introduction, classification of PDEs (Vasy 1.1-2, Strauss 1.1, Evans 1.1-1.3)
- September 23. Where do PDE come from? (Vasy 2.1-2) and  
First order PDEs: characteristics (Vasy 3, Strauss 1.2, Evans 2.1)
- September 28. Quasilinear first order PDEs (Vasy 4, Evans 3.2, John 1.4-1.5)
- September 30. Distributions (Vasy 5, Strauss 12.1, John 3.6)
- October 5. Distributions, weak solutions, shocks (Vasy 5, Strauss 12.1,  
Strauss 14.1, John 3.6, Evans 3.4)
- October 7. Distributions (Vasy 5); Classification of second order equations (Vasy 6.1,  
Strauss 1.5, Evans 2.4, John 2.4, Strauss 2.1)
- October 12. The wave equation on  $\mathbb{R}$ , domain of dependence, propagation of singularities  
(Vasy 6.2, 7.1, Strauss 1.5, 2.2-2.3, John 4.2)
- October 14. Energy conservation for the wave equation; the maximum principle for  
Laplace’s equation and the heat equation (Vasy 7.2-3, Strauss 2.2-2.3, John 4.2)
- October 19. Energy decay for the heat equation; energy estimates for Laplace’s equation;  
the Fourier transform (Vasy 7.3-4, Strauss 2.3, 12.3, Evans 4.3.1)
- October 21. The Fourier transform and solutions of PDE’s (Vasy 8.1-2, Strauss 12.3-12.4)
- October 26. Convolutions, solutions of PDE’s by Fourier transform  
(Vasy 8.3, Strauss 12.3-12.4)
- October 28. Midterm
- November 2. Democracy Day, no classes
- November 4. Tempered distributions, convolutions, solution of Laplace’s equation  
and the wave equation in terms of convolutions (Vasy 9)
- November 9. Heat and wave equations in half space and on intervals  
(Vasy 10, Strauss 3.1-3.2, John 5.1)
- November 11. Inhomogeneous PDE: Duhamel’s principle (Vasy 11, Strauss 3.3-3.4,  
Evans 2.4.2, John 5.1)
- November 16. Separation of variables, eigenvalue problems (Vasy 12, Strauss 4.1-4.3)
- November 18. Inner product spaces and symmetric boundary conditions; Fourier series  
(Vasy 13, Strauss 5.1-5.3)
- November 30. Fourier series (Vasy 13.3, 14.1-3, Strauss 5.1-5.5)
- December 2. Convergence of Fourier series (Vasy 14, Strauss 5.4-5.5),  
Laplace’s equation on the disk (Vasy 14.4, Strauss 6.3, John 4.3)

**Note: The schedule is still subject to change.**