Chapter 1: Introduction Chapter 2.1-2.2: Periodic functions, L^p-spaces and inner product Chapter 2.3: Fourier series Week 2 (20.9.2021) Chapter 2.4: Best square approximation Chapter 2.5: Other intervals Chapter 2.6: Real form Fourier series Chapter 2.7: Differentiation of Fourier series Chapter 2.8-2.9: Dirichlet kernel and convolution Chapter 2.10: Pointwise convergence

Chapters 2.12(-2.13) Heat equation in one dimension Chapter 2.14: Approximations of identity Week 5 (11.10.2021) Chapter 3.1-3.2: L^p-space and Fourier transform Chapter 3.3 Fourier transform and differentiation (part 1) Chapter 3.3 Fourier transform and differentiation (part 2) Chapter 3.4-3.5 Fourier transform of the Gaussian and Fourier inverse

Week 3 (27.9.2021)

Week 4 (4.10.2021)

Chapter 2.11: Laplace equation on the unit disc

theorem Chapter 3.6-3.8: Convolution, Plancherel's formula and approximations of identity Week 6 (18.10.2021) Chapter 3.9: The Laplace equation in the upper half-space Chapter 3.10 Heat equation in the upper half-space Chapter 3.11 Wave equation in the upper half-space Week 7 (1.11.2021) 4 Laplace equation (introduction) 4.1 Gauss-Green theorem **4.2 PDEs and physics** 

4.3 Boundary value problems

**4.4 Fundamental solution** 

4.13 Weak solutions

4.14 Laplace equation in other coordinates

4.5 Poisson equation Week 8 (8.11.2021) 4.6 Green's function 4.7-4.8 Green's function in upper half space and unit ball using reflection principle 4.9 Mean value property for the Laplace equation 4.10 Maximum principle Week 9 (15.11.2021) 4.11 Harnack's inequality 4.12 Energy methods

5.1 Heat equation 5.2 Fundamental solution (for the heat equation) 5.3 Nonhomogeneous problems Week 10 (22.11.2021) 5.4 Separation of variables for heat equation 5.5 Maximum principle (for the heat equation) 5.5 Uniqueness for the heat equation (using maximum principle) 5.6 Energy methods for the heat equation Week 11 (29.11.2021) **6.1 Wave equation - introduction** 

6.2 Wave equation in dimension 1 (part 1/2) 6.2 Wave equation in dimension 1 (part 2/2) **6.3 Euler-Poisson-Darboux-equation** 6.4 Wave equation in dimension 3 Week 12 (7.12.2021) 6.5 Wave equation in dimension 2 6.6 Nonhomogeneous wave equation

**◄** Previous section Pre-lecture assignments



**Students** MyCourses instructions for students

 Support form for students **Teachers** 

6.7 Energy methods for the wave equation

 MyCourses help MyTeaching Support **About service** Privacy notice

 MyCourses protection of privacy Service description Accessibility summary