

Lecture by dates

(Sections listed are material that will be covered and are taken from Haberman's textbook, unless otherwise noted)

WEEK 1

Tuesday, June 23:

Review of second-order ODEs, linear superposition principle, mass-spring system
5.3: Sturm Liouville Equations.
1.1-1.5: Introduction to heat equation

Wednesday, June 24:

2.1-2.4: General solution of heat equation by separation of variables
All of chapter 3: Fourier series, orthogonality

Thursday, June 25:

4.1-4.4: Introduction to wave equation and its general solution

WEEK 2

Monday, June 29:

6.1 – 6.5 Basics of Numerical Methods
6.7 Finite Element Methods

Tuesday, June 30

7.2 – 7.3 Higher Dimensional PDE; Separation of Variables and Rectangular Membrane

WEEK 3

Wednesday, July 8: Student Team Lecture

Team 1 2.4 Heat Conduction in Rod with Insulated Ends and in a Thin Circular Rings
2.5.1-2.5.2: Solution to Laplace's equation on the rectangle and on the circle
2.5.3: Fluid Flow past a Circular Cylinder (Lift)
2.5.4: Qualitative Properties of Laplace's Equation (Mean value theorem and maximum principle)

Team 2 5.2 and 5.4 Examples: Heat Flow in a Nonuniform Rod
5.7 Vibration of Nonuniform String

Thursday, July 9:

8.1 – 8.5 Nonhomogeneous Problems

WEEK 4

Monday, July 13:

9.2 – 9.5 Green's Functions

Tuesday, July 14: Student Team Lecture

Team 3 7.7: Vibrating Circular Membrane and Bessel Functions

Wednesday, July 15: Student Team Lecture

Team 4 8.5- 8.6 Forced Vibrating Membrane and Poisson's Equation

Team 5 10.1-10.4: Fourier transforms, heat equation for an infinite-domain

Team 6 10.6.1: One-dimensional wave equation on an infinite interval
10.7: Scattering/inverse scattering method for nonlinear PDEs

Thursday, July 16 Student Team Lecture

Team 7 11.2 – 11.3, Green's Function for Wave and Heat Equations

Team 8 14.1-14.2, Nonlinear PDEs, dispersion

Team 9 14.3-14.4, Nonlinear PDEs, dispersion

Team 10 14.7, Solitons and inverse scattering for KdV and NLS

WEEK 5

Tuesday July 21:

12.1-12.5: Method of characteristics, D'Alembert's solution to wave equation
12.6: Introduction to quasi-linear PDEs, traffic flow

Wednesday July 22 and Thursday July 23: Student Team Presentation