

Methods of Applied Mathematics

Winter Quarter Outline

Week	Lab/Seminar	Nonlinear Dynamics	Partial Differential Equations	Variational/Vector Calculus
1	Intro to LaTeX	Strogatz: Ch 2 and 3.0-3.3 Flows and Bifurcations	Handout: Intro. to PDE's Workshop	Variational Calc: Lemons 1.1-1.2, 2.1-2.2 Introduction
		Strogatz 3.6-3.7 Catastrophes	Haberman 1.1-1.4 Heat Equation	Nonlinear Dynamics: Strogatz 3.4-3.5 Pitchfork Bifurcations
2	Graphics with LaTeX	Holiday -- No Class	Haberman 2.1-2.3 Separation of Variables	Variational: Holiday -- No Class
		Strogatz Ch 4 Flows on a circle	Haberman 2.4 Worked Example Workshop	Vector Calc:
3	Seminar: Maor Ch 1-9	Strogatz Ch 5 and 6.0-6.2 Phase Plane	Haberman 2.5 Laplace's Equation	Variational Calc: Lemons 2.3,3.1,3.2 First Integrals
		Strogatz Ch 6.3-6.4 and B&D Ch 5.1-5.2 Fixed Points and Linearization	Haberman 3.1-3.3 Fourier Series Mathematica Demo	Vector Calc:
4	Fourier Series	Strogatz Ch 6.5-6.6 and B&D Ch 5.3 Conservative Systems	Quiz on Chapter 1 and 2 Haberman 3.4-3.6 Complex Fourier Series	Variational Calc: Lemons 2.4,3.3,3.4 Multiple Coordinates
		Strogatz Ch 6.7-6.8 and B&D Ch 5.4 Dissipative Systems	Haberman 4.1-4.4 Wave Equation	Vector Calc:
5	Seminar Maor Ch 10-15	Strogatz Ch 7.0-7.3 Limit Cycles	Haberman 5.1-5.4 Sturm Liouville Eigenvalue Problems	Variational Calc Lemons Ch 4 Constraints Take Home Test on Ch 1-3
		Strogatz 7.4-7.5 Oscillators	Haberman 5.5-5.7 Sturm Liouville Theory Workshop	Vector Calc:
6	Perturbation Theory	Strogatz 7.6 Perturbation Theory	Haberman 5.8 Sturm Liouville Examples Workshop	Variational Calc: Lemons Ch 5 Least Action
		Test on Ch 2-6	Haberman 7.1-7.3 PDE's in Higher Dimensions	Vector Calc: Test
7	NonLinear Dynamics Lecture 8.0-8.2 Hopf Bifurcations	Holiday No Class	Haberman 7.4-7.6 PDE's Helmholtz Equation Workshop	Variational: Holiday No Class
		Strogatz 8.3-8.4 Homoclinic Bifurcations	Quiz on Chapter 3,4 and 5 Haberman 7.7-7.8 Vibrating Circular Membrane	Vector Calc:
8	Vibrations of a Drum	Strogatz 8.5,8.7 and B&D 5.6 Chaos in Forced Nonlinear Systems	Haberman 7.9-7.10 PDE's in Cylindrical and Spherical Coordinates	Variational Calc: Lemons Ch 6&7 Hamilton's Principle
		B&D 3.8 Linear Systems in 3D	Haberman 10.-10.4 Fourier Transforms	Vector Calc:
9	Lorenz Equations	Strogatz 9.0-9.2 and B&D Ch 5.5 Lorenz Equations	Haberman 10.5 Sine and Cosine Transforms	Variational: Cumulative Test
		Strogatz 9.3-9.5 Chaos	Haberman 10.6 Worked Examples Workshop	Vector Calc:
10	Presentations	Cumulative Final Test	Cumulative Final Test	Presentations Preparation
		Presentations	Presentations	Presentations