Dynamical Systems - 12-Week Study Plan

This schedule is based on *A First Course in Chaotic Dynamical Systems* by Robert Devaney, covering Chapters 3 through 15 (excluding 1-2 and 16-18). It follows a structure of 2 lectures and 1 recitation per week from mid-May to early August.

Week 1

Lecture A: 3.1-3.4: Orbits & Iteration

Lecture B: 3.5-3.6: Doubling Function + Exp.

Recitation: Cobweb diagrams, orbit types

Week 2

Lecture A: 4: Graphical Analysis

Lecture B: 5.1-5.3: Fixed Points

Recitation: Phase portraits, attraction/repulsion

Week 3

Lecture A: 5.4-5.6: Periodic Points

Lecture B: 6.1-6.2: Bifurcations

Recitation: Visualize bifurcations and periodic convergence

Week 4

Lecture A: 6.3-6.4: More Bifurcations

Lecture B: 7: Quadratic Family + Cantor Set

Recitation: Orbit trees, Cantor set sketch

Week 5

Lecture A: 8: Transition to Chaos

Lecture B: 9.1-9.2: Symbolic Dynamics

Recitation: Symbolic encoding, chaos definitions

Week 6

Lecture A: 9.3-9.4: Shift Map + Conjugacy

Lecture B: 10.1-10.2: Chaos Properties

Recitation: Devaney chaos criteria applications

Week 7

Lecture A: 10.3-10.4: Feigenbaum, etc.

Lecture B: 11.1-11.2: Period 3 + Sharkovsky

Recitation: Compute Feigenbaum constant

Week 8

Lecture A: 11.3-11.4: More on Periods

Lecture B: 12: Critical Points + Schwarzian

Recitation: Basins of attraction

Week 9

Lecture A: 13.1: Newton's Method Basics

Lecture B: 13.2: Convergence/Failure

Recitation: Newton fractal basins

Week 10

Lecture A: 14.1-14.4: Chaos Game, Sierpinski

Lecture B: 14.5-14.8: More Fractals, Dimensions

Recitation: Draw & analyze fractals

Week 11

Lecture A: 14.9-14.10: Real Chaos Game

Lecture B: 15.1-15.3: Complex Functions

Recitation: Explore complex arithmetic

Week 12

Lecture A: 15.4: Derivatives + Wrap-Up

Lecture B: Optional: Julia/Mandelbrot Preview

Recitation: Recap or visual experiments