Math 345, Section 201, Spring 2024

Applied Nonlinear Dynamics and Chaos

Instructor: Brian Wetton, MATX 1107, wetton@math.ubc.ca

Class: TTh 2:00-3:30 in MATH 102.

Text: Nonlinear Dynamics & Chaos (Strogatz, second edition). A pdf version of this text is available from the UBC library.

Marks: 45% final, 15% each two midterms and 25% assignments.

Assignments: There will be nine challenging assignments, assigned Thursdays and due Tuesdays (12 days later). Assignments will be submitted to the course Canvas page in pdf format. Late assignments will not be accepted. The assignment grade will be taken as an average from the eight highest marks for each student (that is, the lowest assignment grade will not be included). Assignments will have three parts, total 25 possible points:

part A: Four questions worth five marks each. These will be a mix of pencil and paper questions and computational questions using MATLAB or python. Solutions will be provided after the submission date.

part B: A challenging question worth five marks. Solutions will not be provided.

part C: Suggested problems not to be handed in. Solutions will not be provided.

At least half of the questions on the midterms and final exam will be taken from part A and C problems. Part A problems may have different coefficient numbers.

Midterm Dates: Tuesdays February 13 and March 19.

Computational Platforms: Computational exploration is an important aspect of the course. Some programming is required. Some template programs will be provided in Python and MATLAB.

Material:

1. One Dimensional Maps (Chapter 10)
2. One Dimensional Flows (Chapters 2 and 3)
3. Two Dimensional Flows (Chapters 5-8)

UBC closure policy: If UBC is closed due to weather or other events on lecture days, an asychronous video lecture will be provided. If this occurs on midterm days, the midterm will be delayed to the next class.