Physics PHYD38
Nonlinear systems and Chaos

Winter 2018

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- Applications to Physics and Beyond

PREREQUISITES:

A working knowledge of calculus and calculus-based general physics.

Prerequisite: PHYC54H3
Corequisite: --
Exclusion: PHY460H
Breadth Requirement: Natural Sciences

TEXTBOOK:

Nonlinear Dynamics and Chaos (by Steven H. Strogatz)

PROBLEM SETS:

Handed out in class and posted on this website, approximately every other week (total of 4-5). Due one week later.

Policy on collaboration: You are welcome to discuss the problems with fellow students, but you must write your own solutions, individually.

Policy on late problem set returns: In order to be fair to those who turn assignments in on time, points will be deducted on assignments turned in late.

GRADING:

Problem sets: 50%
Midterm exam: 20%
Final exam: 30%

APPROXIMATE SCHEDULE:

1. Introduction, organisation and overview

2. Flows on the Line
3. Bifurcations of 1D systems
4. Flows on the Circle
5. 2D Linear Systems
6. Phase Plane
7. Limit Cycles
8. 2D Bifurcations
9. 3D systems: Lorenz model
10. One-dimensional maps
11. Fractals
12. Strange Attractors