Chaos is a relatively new area of applied mathematics that has influenced everything from spacecraft trajectories, the design of lasers, ultrafast spectroscopy, the design of micro-mixers, and stock market analysis to even psychology, drama, and literature.¹ Our study will begin with simplest of systems—one dimensional dynamics and progress to systems with more degrees of freedom (We will move nonlinearly through the text!). Our study includes differential equations and maps, bifurcations and catastrophes, and the qualitative analysis of dynamical systems. The emphasis will be on dynamics that model real world phenomena.

Homework

Homework will be assigned on a roughly bi-weekly schedule. As there are no exams, the homework will count for a substantial portion of your grade, and each homework assignment must be your own work. However, you are encouraged to discuss “techniques for doing” problems with your classmates.

Final Project

The final project will be presented in class, as a 20-minute presentation during the last week of class or during the final exam period. The project will be due in written form on the last day of class. A list of possible topics will be given to you during the second week; you may choose from these or your own ideas—subject to approval. To get you started, I will require a 2-4 page project proposal in mid-semester. In-class presentations will start Dec 5, and end Dec 13. You must attend all of these sessions. The format of your project is open. It may be an historical study, some analysis, a computer project, a video...the limit is your own imagination.

Sept. 16: Choose Topic for Project
Nov. 4: 3 Page Project proposal with Lit Review
Dec. 5,7,9,13 Class Presentations (Final exam is scheduled for Dec 13, 1:30PM)
Dec. 9: Written Project Due (Due Last Day of Class!)

This course operates under the Academic Honor code: Your work on this project must in your own words. It need not be original research and can be an explanation of the work of others (properly cited); however, your writing should go beyond the papers you cite in explaining details that are often left out of published work and that you needed in order to understand the concepts. See <http://www.colorado.edu/policies/student-honor-code-policy>.

**Grading**

What you get out of this course depends mostly on your input and out of class work. A portion of this class will be devoted to discussions, and a portion of your grade will reflect your willingness and ability to participate in these. Homework will be assigned roughly weekly.

1. In-Class participation  
2. Homework  
3. Final Project (Presentation + Written)

If you qualify for accommodations because of a disability, please submit a letter from Disability Services (DS) early in the semester so that your needs may be addressed. DS determines accommodations based on documented disabilities (303-492-8671, C4C N200). If you have religious holidays or obligations that would make it impossible for you to hand in an assignment on time, please let me know so that arrangements can be made for a delayed due date.

**Outside Reading Reference List**

**Popularizations**


**Introductory References**


**Advanced Texts**


