

APPLIED MATH 3010

Fall 2017

# Chaos in Dynamical Systems

**Instructor:** Keith. Julien – ECOT 321 – julien@colorado.edu - 303-492-5753

**Lectures:** MWF 12:00 AM – 12:50 AM, ECCR 131

**Office Hours:** M 2:00 PM – 4:00 PM, W 1:30 – 2:30 ECOT 321

Webpage: <https://www.colorado.edu/amath/course-pages/fall-2017/appm3010>

**Text:** Nonlinear Dynamics and Chaos, With Applications to Physics, Biology, Chemistry, and Engineering, 2nd ed., Steven H. Strogatz, 2014,

**Prerequisites:** Undergraduate course equivalent to APPM 2360.

**Course summary:** Mathematical modeling and analysis of engineering, physics, biology, and chemistry applications usually leads to systems with nonlinear dynamics. Even very simple nonlinear systems can display very complicated chaotic behavior. In this course we will study various aspects of nonlinear and chaotic dynamics, including bifurcations, the transition to chaos in differential equation systems and one-dimensional maps, fractals, and various applications of nonlinear dynamics. For a more detailed description of the course contents see the schedule.

**Exams:** There will be no exams.

**Homeworks:** Homeworks will be assigned roughly every two weeks. While you can **collaborate** on the homework with your classmates and consult textbooks, do not search for the answers on the web or get the answers from someone. You are required to write down and submit your own homework. You are **not** permitted to copy another student's homework, even if you worked on the problems together.

**Project:** An individual project exploring a relevant topic is due in written form the last day of classes and will be presented in class during the penultimate week of class and the final exam period. The class presentation will be about 15 minutes long. The project topic has to be chosen by Oct 9. I will give you a list of possible topics to choose from, but I encourage you to choose a topic of your own interest.

**Grading:** The grading will be based on:

Homeworks	70%
Project	30%

**Additional Policies:** For policies on Special Accommodations, Religious Observances, Classroom Behavior, Discrimination and Harassment, and Academic Honesty, visit the course webpage.

