SYLLABUS FOR: Math 489 special topics
An Introduction to Chaotic Dynamical Systems

This course will be an introduction to the world of CHAOS. It will be offered as a mixed graduate/undergraduate course.

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Class: Meetings: Tues. and Thurs. Class homepage is http://www.math.tamu.edu/ Denise.Kirschner/math489.html

Textbook: *Nonlinear Dynamics and Chaos- with applications to Engineering, Physics, Biology and Chemistry*, by S. Strogatz

◇ Also, class packs will need to be purchased (not available yet) and other reference material throughout the semester. Also, The book **CHAOS** by James Gleick is also highly recommended. It is light and entertaining and gives and excellent motivation for the course.

Pre-requisites: Linear Alg. and Diff Eqns. A "C" or better.(304/423, 308/451)

Grades: The final grade will be determined by these totals:

- 2 tests (1 midterm: tentative: Oct 19, 1 final): 25% each
- class project (see description below): 25% each
- quizes, homework and class participation: 25% (see description below)
- grading scale: 90-100% A, 80-89% B, etc.

- Only pre-excused absences are allowed for test make-ups.

Objectives of Math 489:

1. Illustrate the broad range of problems which exhibit chaotic phenomenon.
2. Prove that these phenomenon are chaotic.
3. Improve skills for analyzing all dynamical systems.
4. Apply the chaotic dynamics to areas of interest in applications.

COMPUTER ACCOUNTS: Since most computation is easily carried out on the computer, and we can get immediate feed-back as well as key intuition, it will be necessary for us to use the computer for this purpose. To achieve this goal, we will use **MAPLE**. Therefore, you all have been assigned accounts on the Calclab system (at least). You will be required to check your e-mail accounts daily. I also suggest we set up an hour a week that we can meet (hopefully there is an intersection) where we can go over labs and information as necessary for the computer. This will take place in Blocker 127. Attached you will find the necessary information you need about a first day lab using the Calclab system.

Projects: Two projects will be assigned during the course of the semester. These will involve in-depth chaos projects, hopefully related to a key area of interest to you, and will constitute a major portion of your grade. For each project, you will be required to model and analyze a given situation or process and write a coherent, detailed report describing your findings.

Partners: You will need to pair up with one other individual in the class. There are times when we will work independently, in pairs and in larger groups. The option to change partners into the semester, if you are not happy, is possible.

Quizes, homework and class participation: Each week, depending on the material we are covering, there will be homework. The nature of this work will vary, but you will always be prepared for any homework given. It will always be due 1 week after assigned unless otherwise specified.

- Attendance will make a difference in your final grade....

First HOMEWORK ASSIGNMENT:

Write a summary about yourself including the following information: name, classification (i.e. when will you graduate?), major, e-mail address. I also would like to know when you had Differential equations and linear algebra and your grades. Then describe your (academic) interests, and why you are taking this class. What are your ultimate goals with your degree? Which subjects will be most interesting for you in this class? (i.e. Physics, Biology, Engineering, or other applications). I would also like to know your computer experience to date. Finally, I want (on a separate sheet), times during the week you are free for 1 hour for a computer lab (preferably between during a weekday). Anything else you would like to share/add about yourself is welcomed. Don't forget, as part of this assignment, you MUST send this as an e-mail message using PINE using the "attach" command, together with a general message.

I encourage you all to feel free to contact me over e-mail for ANY questions you may have. I am in constant e-mail contact. I enjoy an interactive classroom, I hope you all will participate, taking advantage of the small class size, and will be challenged by this exciting course.