

## Math 397—Fall 2004

## Syllabus

**Instructor:** Rob Manning, [rmanning@haverford.edu](mailto:rmanning@haverford.edu)

**Office:** Hilles 207C (down a half-floor from the main math dept space), 896-1210

**Office Hours (tentative):** MT 1-3, WF 1-2, or arrange another time with me (plus I'll be on duty in the MQC on Tuesday nights).

**Text:** “Chaos: An Introduction to Dynamical Systems”, Alligood, Sauer, and Yorke, (Springer, 1998)

**Homework:** Weekly problem sets due Wednesdays (give to me in class or leave in drop box opposite printer in Hilles 207 by 5 PM).

**Homework Rewrites:** For any HW problem on which you receive a grade of 8/10 or lower, you may submit a rewritten version of the problem, due one week after you get the HW back. If you do, your final grade for the problem will be the average of the original grade and the rewrite grade. Please submit the original problem along with the rewrite.

**Late homework:** If I receive your HW before I grade that assignment, I will not assign a grade penalty (but I can not predict how often I will be checking my drop box). Thereafter, there will be a 25% grade penalty, up until the exam that covers that material. If a solution set has been posted to Blackboard, you may not look at it until after you have submitted the late assignment.

**Tests:** Instead of HW on 10/6 and 11/17, there will be a test due.

**Project:** In lieu of a final exam, we will have final projects, with a draft due the second-to-last week of class, presentations during the last week, and a final version due during final exam period. Projects can be done in groups of two, with the exception of those students writing senior papers with me, whose projects will feed into their papers next semester. Projects can range from computational to analytic to applied; we will talk about paper topics after fall break.

<b>Grades:</b>	Homework : 35%
	Project : 25%
	Tests (2): 20% each

**Collaboration:** For homework problems, discussion with other students in the class or with me is highly encouraged. The actual writing of the assignment should be done individually, without using notes from your collaborative discussions, so that you can be sure that it represents your personal understanding of the problems. To keep these guidelines clear, I would like to try a “reminder” system that other faculty have used. When you are working with someone, work on paper that you explicitly mark as “Collaboration” (and, similarly, if you are working on the blackboard, write that title on the board). Study these collaboration materials before you write up your assignment, make sure that you understand the ideas, and then get rid of them (or erase the board). If you can not write up the solution without using the collaboration material, then probably you have not yet understood the problem in full, and you should start the process again: get rid of your final solution, go back to discussions with fellow students and/or me, and try again later to write up the final solution on your own.

For the tests, no collaboration is allowed.

**Blackboard:** All assignments and solution sets (and perhaps some other stuff) will be posted on Blackboard.

### Anticipated Schedule:

8/30–9/3	1-dimensional maps
9/6–9/10	2-dimensional maps, stable & unstable manifolds
9/13–9/17	Lyapunov exponents, chaos in 1D maps
9/20–9/24	Fractals
9/27–10/1	Chaos in 2D maps
10/4–10/8	Chaos in 2D maps (con’t)
	<b>10/6: Test # 1 due (on material 8/30–9/27)</b>
10/11–10/15	<b>Fall Break</b>
10/18–10/22	Chaotic attractors, measures
10/25–10/29	Differential equations: introduction
11/1–11/5	Differential equations and limit sets
11/8–11/12	Chaos in differential equations
11/15–11/19	Stable and unstable manifolds in differential equations
	<b>11/17: Test # 2 due (on material 9/29–11/8)</b>
11/22–11/24	Bifurcations
	<b>11/25–11/26: Thanksgiving Break</b>
11/29–12/3	Bifurcations (con’t)
	<b>12/1: First drafts of projects due</b>
12/6–12/10	Project presentations
	<b>Final projects due during final exam period</b>