

# Math 311 Chaotic Dynamical Systems Syllabus

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Spring 2018

**Instructor:** Jim Wiseman

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**Office hours:** Mon 2:30-4:00, Tues 2-3:30, and by appointment.

**Course information:** Available on [Moodle](#) and the course website, <http://ecademy.agnesscott.edu/~jwiseman/mat311>.

**Required material:** The textbook is Devaney, *A First Course in Chaotic Dynamical Systems: Theory and Experiment*, available in the bookstore (NOTE: The same author has another book with a similar title; don't be deceived). A good reference is Alligood, Sauer, and Yorke, *Chaos: An Introduction to Dynamical Systems*; the library has an [online copy](#).

**Plan:** We'll cover most of the first fourteen chapters on one-dimensional dynamics from Devaney and some new topics at the end of the semester. Topics include orbits, attractors, fixed points, periodic points, chaos, sensitive dependence on initial conditions, fractals, and symbolic dynamics. There's a more detailed schedule at <http://ecademy.agnesscott.edu/~jwiseman/mat311/schedule.html>, but it's subject to change.

**Homework:** By now you've probably figured out that working problems is mostly how you learn math. There will be homework assigned nearly every week, and many assignments will have two due dates: one for the seminar day (see below), and one to turn in the finished assignment. I strongly encourage you to work in groups, but you must write up the results yourself. Assignments will be posted at <http://ecademy.agnesscott.edu/~jwiseman/mat311/assignments.html> – you are responsible for checking the assignments, as I won't give them in class.

**Seminar days:** Roughly every other week we'll have a seminar

day (see the schedule for details). **Attendance is mandatory on seminar days.** On these days we (by which I mean "you") will discuss the week's assignment. You don't need to have finished all the problems by the seminar day, but you do need to have at least tried all of them. By 9:00 on the morning of the seminar date, email me a listing of:

- which problems you know how to do
- which problems you've made progress on, but haven't finished
- which problems you haven't made progress on.

(Part of your homework grade will be based on these lists, so the third category should be pretty small.) On the seminar day, I may ask you to present problems that you know how to do or have made progress on; I won't ask you for problems that you haven't made progress on. Your finished assignments should be polished, but seminar days are about the messy creative process of mathematics - first drafts, half-formed ideas, getting stuck, getting unstuck, and giving and receiving criticism and ideas for improvement.

**Honor code and group work:** All students are expected to follow the honor code throughout the semester; all exams and assignments should be pledged.

I strongly encourage you to work on the homework in groups. I suggest that you work on the problems by yourself first, making a note of anything giving you trouble; then meet with your group and work through the remaining problems together; and finally write up the solutions by yourself. Every group member must write up her own solutions independently; just copying the group's answers is plagiarism and is unacceptable.

**Getting help:** As Talking Barbie says, "Math class is tough." (Unless she's the hacked version - then she says, "Eat lead, Cobra.") Chances are that sooner or later you'll get stuck on something, so don't get frustrated. Think hard, and if you're still stuck, do something else for a while. (It's amazing how often that works.)

My office hours are above - these are times when I'm guaranteed to be in my office and willing to talk. If you want to see me at other times, the best thing to do is to set up an appointment with me by email or after class. Of course, you're welcome to just drop by my office, as long as you don't mind if I'm not there or don't have time to talk.

Finally, I can't emphasize enough that your classmates are your best source of help.

**Course goals:** Learn to

- Understand, define, describe, and apply the ideas of discrete dynamical systems
- Communicate mathematics effectively, both orally and in writing

**Exams:**

- First midterm: Handed out Fri 2/23, due in class Wed 2/28.
- Second midterm: Handed out Fri 4/20, due in class Wed 4/25.
- Final exam: self-scheduled.

**Assessment:** Each midterm 20%, homework 30%, final exam 30%.

**Late work:** Late work won't be accepted, and you won't be allowed to make up missed exams, except under very exceptional circumstances (e.g., the skunk ape attacks - and even then you should get a note from the skunk ape). In the case of a conflict that you absolutely can't resolve (for example, a religious holiday), you may arrange to take a midterm exam early.

**Attendance:** I expect you to be at every class, on time.

**Attendance is mandatory on seminar days.** Tardiness or absence on other days will have no (direct) effect on your grade.

**Cell phones:** Cell phone use (including texting) is of course not permitted in class. Turn off cell phones, smart phones, etc., before class.

**Course evaluation:** Your feedback on the course is extremely valuable to me, the math department, and the administration. In particular, I take your comments very seriously and use them to improve the course the next time I teach it. You are responsible for completing an evaluation of the course at the end of the semester.

**Title IX:** For the safety of the entire community, any incidence of or information about sexual misconduct must be reported immediately to Title IX Coordinator Marti Fessenden (mfessenden@agnesscott.edu, 404-471-6547) or Deputy Title IX Coordinator Karen Gilbert (kgilbert@agnesscott.edu, 404-471-6435).

**Inclusion:** This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and affirm people's decisions about gender expression and identity. Please let me know your preferred name or gender pronoun if different from the class roster.

**ADA:** Agnes Scott College seeks to provide equal access to its programs, services and activities for people with various abilities. If you will need accommodations in this class, please contact the Office of Academic Advising and Accessible Education (404-471-6150) to complete the registration process. Once registered, please contact me so we can discuss the specific accommodations needed for this course.

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