

## Math 204 (Differential Equations) – Fall 2006

## Syllabus

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

**Office:** KINSC H207C (down a half-floor from the main math dept space), 896-1210

**Office Hours (tentative):** MTW 1-3 PM, or arrange another time with me

**Class meetings:** MWF 3-4 PM, KINSC H108. **On some days, we will meet in KINSC H012 for computer lab – you will receive a schedule indicating these days.**

**Math Question Center:** Sun-Thu 7-9 PM. optional time to gather in KINSC H011 to discuss upcoming homework problems with other students and get assistance from a faculty member or upperclass math major on duty.

**Text:** “Differential Equations (3rd ed)”, Blanchard, Devaney, and Hall, (Brooks/Cole, 2006)

**Homework:** Problem sets most weeks, due on Wednesdays in class; roughly half of the HW will involve some computer use. Solutions will be posted on the Web after HW is returned in class.

**Late homework:** You can leave late HW in the Math 204 box in the “waiting area” outside my office. If I retrieve it from the box before I grade that batch of HW, there will be no grade penalty (but I can not promise I will check the box between class time on the due date and the time when I begin grading). Thereafter, there will be a 20% grade penalty, up until the point when I return that HW in class. After then, that HW can not be turned in for a grade, although I will be happy to mark it for correctness.

**Tests:** There will be a test on Oct. 9-11 (in-class, closed-book part during class on Oct. 11, and a self-scheduled part distributed in class on Oct. 9 and due in class on Oct. 11). Similarly, there will be a second test on Nov. 6-8 (in-class, closed-book part during class on Nov. 8, and a self-scheduled part distributed in class on Nov. 6 and due in class on Nov. 8). The third test will be self-scheduled during final exam period (distributed in class on last day of classes).

**Grades:**

Homework :	25%
Tests (3):	25% each

**Honor Code:** For homework problems, discussion with other students in the class or with me is highly encouraged, e.g., in Math Question Center, my office, or elsewhere. Please indicate on your homework who your collaborators were. *Please see <http://www.haverford.edu/math/collaboration.html> for discussion of appropriate modes of collaboration on homework.* The short version is that the actual writing of the assignment should be done individually, without using detailed notes from your collaborative discussions, so that it represents your personal understanding of the problems. (For computer homework, you will submit a joint assignment as a group of two). For the midterms and final, no collaboration is allowed. You may ask me for clarification of the questions on tests, but I will not give suggestions about the actual solutions.

**Blackboard:** The class Blackboard page will contain all handouts, HW assignments, and HW solutions.

## Anticipated Schedule

Week	Material (with corresponding text sections)
9/4–9/8	Modeling via Differential Equations, Separable 1st-order ODEs, Slope Fields (1.1–1.3)
9/11–9/15	Euler’s Method and other numerical methods, Existence and Uniqueness (1.4, 1.5, 7.1–7.3)
9/18–9/22	The Phase line, Bifurcations (1.6–1.7)
9/25–9/29	Linear 1st-order ODEs, Changing variables (1.8, 1.9, Appendix A)
10/2–10/6	Introduction to systems of ODEs (2.1–2.4)
10/9–10/13	Linear systems, basics of linear algebra, Eigenvalues/eigenvectors (3.1, 3.2)
	<b>10/11: Test # 1 on material 9/4–9/29 (take-home part due in class, in-class part taken in class)</b>
10/16–10/20	<b>Fall Break</b>
10/23–10/27	Solving linear systems (3.3–3.5)
10/30–11/3	Harmonic oscillators, bifurcations in linear systems (3.6–3.7)
11/6–11/10	Forced Harmonic Oscillators (4.1–4.5)
	<b>11/8: Test # 2 on material 10/2–10/27 (take-home part due in class, in-class part taken in class)</b>
11/13–11/17	Nonlinear systems: linearization, nullclines (5.1–5.2)
11/20–11/22	Nonlinear systems: Hamiltonian systems, dissipation (5.3–5.4)
	<b>11/23–11/24: Thanksgiving Break</b>
11/27–12/1	Partial differential equations: Wave equation (Supplement)
12/4–12/8	Partial differential equations: Heat equation (Supplement)
12/11–12/15	Chaos in differential equations (5.6)
	<b>Test # 3 during finals period (on material 10/30–12/15)</b>