Classroom: 2308 SFLC.

Class Time: 12:00–12:50 MWF.

Instructor: Chris Grant, 283 TMCB, 378-4105, grant@math.byu.edu. A webpage for this class is located at:

http://www.math.byu.edu/~grant/courses/m634/f99/index.html

Office Hours: Tentatively, 1:00–1:50 Daily. Other times by appointment.

Text: None, although a collection of 7 texts that you may find useful is on 48-hour reserve in the library.

Prerequisites: Math 315, 334.

Grading: Periodically, I will assign homework problems for you to work on and turn in. Approximately 70% of your grade will be based on your performance on these problems, and 30% will be based on the final exam (scheduled for Wednesday, December 15, 11:00-2:00). The four previous times I taught this course, the class GPAs were: 3.93, 4.00, 3.75, and 3.55.

Homework: Homework will be assigned periodically. Homework that is assigned on a Monday is due 18 days later at 12 p.m. Homework that is assigned on a Wednesday is due 16 days later at 12 p.m. Homework that is assigned on a Friday is due 14 days later at 12 p.m. Homework can be turned in to me at the start of class, left in my mail slot, or slid under my office door.

Homework that is turned in late, but less than one week late, will be eligible for 50% credit. Homework that is turned in one to two weeks late will be eligible for 25% credit. Homework that is turned in two to three weeks late will be eligible for 12.5% credit, etc. In case of an emergency (such as serious illness) or absence because of official university business, these deadlines may be extended by mutual agreement with the instructor. The length of the extension should be negotiated with the instructor as early as possible. In particular, extensions for foreseeable absences must be negotiated before the absences occur. Indeterminate extensions will not be given. Under no circumstances will homework be accepted (for any credit) after midnight, December 9.

You are allowed (and encouraged) to get together with classmates to discuss homework problems, but you should not copy someone else’s answers nor should you let someone else copy your answers. If you have any questions at all about the difference between permissible collaboration and impermissible copying, consult BYU’s Academic Honesty Policy or ask your instructor.

Your homework will be graded carefully and should, therefore, be written carefully. You will be expected to communicate your answers clearly and give a logically coherent justification for them.
Computers: There is a variety of mathematical software that may be of assistance to you when working with differential equations and dynamical systems. If you don’t already have an account on the Math Department network, one will be assigned to you.

Time: If you find that you are spending much more than 9 hours per week exclusively on this class, please let me know as soon as possible, and we will see what adjustments can be made.

Feedback: Please let me know what I can do to help you learn the material better.

Topics: Tentatively:

1. Introduction to differential equations and dynamical systems
2. Well-posedness
   (a) Existence
   (b) Uniqueness
   (c) Dependence on parameters/initial conditions
3. Linear systems
   (a) Constant coefficients
      i. Matrix exponential
      ii. Eigensystems
      iii. Jordan and real canonical forms
      iv. Classification of planar systems
      v. Qualitative behavior of solutions
   (b) Nonautonomous systems
      i. General
      ii. Asymptotically autonomous systems
      iii. Periodic systems
4. Autonomous equations
   (a) Limit sets
   (b) Regular points
   (c) Singular points
      i. Stability theory
         ii. The Hartman-Grobman Theorem
         iii. Invariant manifold theory
   (d) The Poincaré-Bendixson Theorem