

# MA775 - Ordinary Differential Equations - Fall 2010

## Lecturer

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## Class Details

Day	Time	Room
TTh	11-12:30	PRB 146

## Grading

Graded Item	Weighting	Date
Homework	70%	Assigned every 1-2 weeks
Take-home final	30%	Due date TBA

## Textbook and topics covered

The main book we will use is “Ordinary Differential Equations with Applications,” by Carmen Chicone. Unfortunately this book is not available in the BU library. We will also use parts of various other books, which I will mention in class when I use them. You need not buy any of these books.

The basic plan for the course is: (1) Introduction: existence and uniqueness, flows, first examples; (2) Linear Theory: semigroups, spectral theory, Floquet theory, exponential dichotomies; (3) Local Nonlinear Theory: invariant manifolds, Hartman-Grobman, Poincaré maps; (4) Global Nonlinear Theory: Poincaré-Bendixson, Lyapunov functionals and gradient flows, Hamiltonian dynamics; (5) Bifurcations: saddle node, pitchfork, transcritical, Hopf, normal forms; (6) Additional topics (if time): forced oscillations, averaging, Melnikov theory, Poincaré maps, extensions in infinite dimensions.

## Homework

Homework assignments will be given approximately every 1-2 weeks. You are encouraged to work together on these, but please make sure that you write up the solutions on your own.

## Take-home final

There will be a take-home final exam at the end of the semester. It will probably be due on Monday, December 13. You must work independently on this final, but you may consult your notes and any books or other references you find helpful.