COURSE INFORMATION FOR 21-630

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There will be weekly homework, a midterm, and a final. There is a course website which is listed on blackboard. There is no textbook for the course, I will post a copy of my notes on the course website.

Also I have put the following books on reserve for the course:

1. Ordinary Differential Equations by Hartman

2. Ordinary Differential Equations by Miller and Michel

3. Ordinary Differential Equations by Hale

This course will present the main theorems of ordinary differential equations in a rigorous manor. Thus a strong background in real analysis is an important prerequisite. Uniform convergence of sequences of functions is a particularly important topic that will reoccur numerous times. The following is an outline for most of the course.

I Preliminaries
- A two examples
- B reduction to first order
- C Lipschitz and Holder conditions

II Existence
- A iteration
- B contraction mapping
- C compactness
- D continuation

III Uniqueness
- A Gronwall's inequality

B uniqueness
C continuous dependence
IV Linear Equations
A principal matrix solutions
B inhomogeneous equations
C constant coefficient case
V Stability
A definitions
B comparison with linear equation
C Liapunov functions
D invariance theory
VI Two Dimensional Theory
A Poincare-Bendixson Theorem
B orbital stability