Hunter College of The City University of New York

MATH 354 Dynamical Systems and Chaos 3 hrs, 3 cr.

Textbook: *Nonlinear Dynamics and Chaos* by Steven H. Strogatz, Westview Press

One-Dimensional Flows

- The phase line
- Fixed points and stability
- Population growth
- Flows on the circle

Two-Dimensional Flows

- Linear systems
- Classification of equilibria
- Linear oscillators
- Non-linear systems
- Linearization of equilibria
- Conservative systems

Limit Cycles

- Poincare'Bendixson Theorem
- Ruling out closed orbits

Chaos

- Introduction to chaotic systems
- Lorenz equations
- One dimensional maps
- The logistic map and its bifurcations
- Periodic points
- Period 3 implies chaos
- Sharkovsky's Theorem