

MATH 6410. ORDINARY DIFFERENTIAL EQUATIONS
Fall Semester, 2003

INSTRUCTOR: David C. Dobson
OFFICE: LCB 210
OFFICE HOURS: Regular hours to be announced.
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PREREQUISITES: Math 5210 or consent of instructor.
CLASS MEETINGS: To be determined.
TEXT: *Differential Equations and Dynamical Systems, Third Edition*
by Lawrence Perko. Supplementary notes may also be provided.
HOME PAGE: <http://www.math.utah.edu/~dobson/6410.html>

COURSE DESCRIPTION:

Existence, uniqueness theory; stability theory; invariant sets and manifolds; periodic and quasiperiodic motions; boundary value problems; ODEs in Banach spaces; applications.

1. *Review of linear ODEs:* Matrix exponentials, linear stability theory, fundamental matrix solutions and nonhomogeneous systems, Floquet theory, linear ODEs in Banach spaces.
2. *Local theory:* Picard Lindelöf Theorem, the Stable Manifold Theorem, the Hartman-Grobman Theorem, stability and Liapunov functions, gradient and Hamiltonian systems.
3. *Global theory:* Limit sets and attractors, periodic orbits, Poincaré-Bendixson theory, global phase portraits.
4. *Bifurcation theory:* structural stability, Hopf bifurcations.
5. *Boundary-value problems:* Second-order linear equations, Sturm-Liouville theory.

GRADES:

Homework	50%
Midterm exam	25%
Final exam	25%