MATH 365 ʹ ORDINARY DIFFERENTIAL EQUATIONS ʹ SYLLABUS
Department of Mathematics
Millersville University
Description
First-order differential equations; linear first- and second-order initial-value problems; power
series solutions; applications. Also includes at least one of the following topics: special
functions of mathematical physics, Laplace transforms, systems of first-order equations. (3
credits)

Prerequisites
C- or higher in MATH 311.

Course Objectives
Students will learn theory and techniques of ordinary differential equations of first and second
order and applications. By the conclusion of this course the successful student will be able to:
x Solve first order differential equations using the techniques of separation of variables
and integrating factors
x Analyze autonomous equations as applied to population dynamics applications
x Solve exact equations
x Understand and apply existence and uniqueness theory to differential equations
x Solve homogeneous second order differential equations with constant coefficients
x Apply the techniques of method of undetermined coefficients and variation of
parameters to solve nonhomogeneous second order differential equations
x Use the techniques for solving second order differential equations to solve application
problems
x Solve second order differential equations using series solutions

Assessment
Assessment of student achievement of the course objectives may vary from one instructor to
another. Typical assessment will be made through work in class, homework, and examinations.
Additional assessment may be made through the completion of projects and/or presentations.

d. Differential equations with discontinuous forcing
e. Impulse functions
f. The convolution integral
5. Systems of first order linear equations
a. Review of matrices
b. Systems of linear algebraic equation; linear independence, eigenvalues,
eigenvectors
c. Basic theory of systems of first order linear equations
d. Homogeneous linear systems with constant coefficients
e. Complex eigenvalues
f. Fundamental matrices
g. Repeated eigenvalues