SU DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
SYLLABUS *(Tentative)*
MATH 311 *Differential Equations I*

Objective: To study differential equations and their applications.

Intended for: Majors in Mathematical or Physical Sciences and students in the Dual-Degree Engineering Program.

Prerequisite: Calculus through multiple integrals (MATH 310 with a grade of C or better).

Text: "A First Course in Differential Equations with Modeling Applications," by Dennis Zill; Thomson-Brooks/Cole Publishing Company, Ninth Edition, 2009.

	Weeks
Introduction to Differential Equations	1 1/2
Basic Definitions and Terminology, Directed Fields, Phase Portraits.	
First-Order Differential Equations	2
Preliminary Theory (initial value problems), Separable Equations, Exact Equations, Linear Equations, Applications (linear and nonlinear).	
Mathematical Models and Numerical Methods	1 1/2
Population Models, Improved Euler's Method, Runge-Kutta Methods	
Higher-Order Equations	3
Linear Differential Operators, Fundamental Solutions of Homogeneous Equations, Homogeneous Linear Equations with Constant Coefficients, Auxiliary Equations with Complex Roots, Superposition, Nonhomogeneous Equations, Undetermined Coefficients, Variation of Parameters.	
Applications	1
Mechanical Vibrations, Harmonic Motion, Damped and Forced Vibrations.	
Series Solutions	1
Analytic Functions, Taylor Series Method, Method of Frobenius, Finding a Second Linearly Independent Solution.	
Systems of Differential Equations	1
Elimination Method for Linear Systems, Higher-Order Differential Equations.	
Selected Topics	2
Tests	1
	14

EVALUATION

Homework/Project	25%
Tests	50%
Final Exam	25%

NOTE: Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.

M-M/ar 10/2008