

**Math 285 Course Syllabus  
Sandhills Community College  
Department of Mathematics**

Course:	MAT 285 Differential Equations
Credit Hours:	3
Lecture Hours:	3 per week
Lab Hours:	0 per week
Prerequisite:	Math 272 with a grade of C or better
Corequisite:	None
Course Description:	This course provides an introduction to ordinary differential equations with an emphasis on applications. Topics include first-order, linear higher-order, and systems of differential equations; numerical methods; series solutions; eigenvalues and eigenvectors; Laplace transforms, and Fourier series. Upon completion, students should be able to use differential equations in order to model physical phenomena, solve the equations, and use the solutions to analyze the phenomena. <b>This course has been approved to satisfy the Comprehensive Articulation Agreement pre-major and/or elective course requirement.</b>
Text: (Subject to change)	<u><b>A Modern Introduction to Differential Equations</b></u> , Ricardo, 2003, Houghton Mifflin Co., ISBN 0-618-042393.
Goals and Objectives:	<p>Students will master the material outlined in “<b>Outline of Course Content.</b>” Specific competencies expected are the correct formulation and solution of differential equations problems using the techniques and method on that page.</p> <p><b>OUTLINE OF COURSE CONTENT</b></p> <ul style="list-style-type: none"> <li>I. Introduction to Differential Equations <ul style="list-style-type: none"> <li>A. Introduction</li> <li>B. Basic Terminology</li> <li>C. Solutions of Differential Equations</li> </ul> </li> <li>II. First-Order Differential Equations <ul style="list-style-type: none"> <li>A. Introduction</li> <li>B. Separable Equations</li> <li>C. Linear Equations</li> </ul> </li> <li>III. Numerical Approximation of Solutions <ul style="list-style-type: none"> <li>A. Introduction</li> <li>B. Euler’s Method</li> <li>C. Improved Euler’s Method</li> <li>D. Runge-Kutta Method</li> </ul> </li> <li>IV. Second- and Higher-Order Equations <ul style="list-style-type: none"> <li>A. Introduction</li> <li>B. Homogeneous Second-Order Linear Equations with Constant</li> </ul> </li> </ul>

- Coefficients
- C. Nonhomogeneous Second-Order Linear Equations with Constant Coefficients
- D. Higher-Order Linear Equations with Constant Coefficients
- V. Systems of Linear Differential Equations
  - A. Introduction
  - B. Systems and Matrices
- VI. Laplace Transformation
  - A. Introduction
  - B. Some Basic Functions
  - C. Inverse Transform and Convolution
  - D. Discontinuous Functions
  - E. Impulse Functions and Dirac-Delta Function
  - F. Systems in Transformation
  - G. Qualitative Analysis of the Transform
- VII. Nonlinear Systems
  - A. Introduction
  - B. Equilibria
  - C. Linear Approximation of Equilibrium Points
  - D. Lotka-Volterra Equations
  - E. Undamped Pendulum
  - F. Van der Pol's Equation and Limit Cycles

General Education:	Students who are successful in this course will improve in the following general education areas: reading, oral communication, mathematical skills, problem solving, critical thinking, and cooperating with others.
Course Requirements:	TEXT, paper, pencils, notebook and paper, erasers, and scientific calculator.
Grading Scale:	Grading scale: 90 - 100 = A 80 - 89 = B 70 - 79 = C 60 - 69 = D Below 60 = F