

**J. Sargeant Reynolds Community College
Course Content Summary**

Course Prefix and Number: MTH 279

Credits: 4

Course Title: Ordinary Differential Equations

Course Description (including lecture hours, lab hours, total contacts)

Introduces ordinary differential equations. Includes first order differential equations, second and higher order ordinary differential equations with application. Designed for mathematical, physical, and engineering science programs. Lecture 4 hours per week.

General Course Purpose

Introduces differential equations for application in applied mathematics, engineering, and the sciences.

Course Prerequisites/Corequisites (*Entry-level competencies **required** for enrollment*)

MTH 174 or equivalent.

Course Objectives (Each item should complete the following sentence.)

Upon completing the course, the student will be able to:

- a. Solve a first-order differential equation by recognizing if it is separable or linear or can be simplified by a substitution or the introduction of an integrating factor or if it is a Bernoulli's equation or if Picard's method applies.
- b. Solve problems involving orthogonal trajectories, growth and decay, cooling, circuits and chemical mixtures.
- c. Apply the Wronskian, find a fundamental set on an interval and derive the general solution for a linear second-order differential equations involving vibrational models.
- d. Solve applications of second-order differential equations involving vibrational models.
- e. Solve differential equations with variable coefficients: recognize second-order Cauchy-Euler equations, Bessel's equation, Legendre's equation and apply the method of Frobenius.
- f. Solve differential equations by applying the Laplace Transform.
- g. Solve systems of linear differential equations.

Major Topics to be Included

- a. First-Order Differential Equations
- b. Applications of First-Order Differential Equations
- c. Linear Differential Equations with Variable Coefficients
- d. Differential Equations with Variable Coefficients
- e. Laplace Transforms
- f. Systems of Differential Equations

Effective Date of Course Content Summary (Month, Date Year): Fall 2007