Math 261 Calculus 4

Credit Hours: 4
Scheduled hours per week
Lecture: 4
Lab: 0
Other: 0

Catalog Course Description: Ordinary differential equations, Laplace transforms, partial differential equations with emphasis on engineering and scientific applications.

Pre-requisites: C or better in Math 251

Co-requisites: None

Course Learning Outcomes:

1. Students will demonstrate ability to solve ordinary differential equations of the first order.
2. Students will demonstrate ability to solve linear differential equations
3. Students will demonstrate ability to solve systems of differential equations.
4. Students will demonstrate ability to generate power series solution to differential equations.
5. Students will demonstrate ability to use Laplace transform to find solutions to differential equations.

Topics to be studied:
Basic Concepts and Ideas Geometrical Considerations, Isoclines Separable Equations Equations Reducible to Separable Form Exact Differential Equations Integrating Factors
Linear First-Order Differential Equations Variations of Parameters Electric Circuits Families of Curves Orthogonal Trajectories Picard's Iteration Method
Existence and Uniqueness of Solutions Homogeneous Linear Equations of Second- Order
Homogeneous Second-Order Equations with Constant Coefficients Nonhomogeneous Linear Equations Solving Nonhomogeneous Linear Equations Modeling: Forced oscillations, Resonance Modeling Electric Circuits
Systems of Differential Equations Phase Plane Critical Points, Stability Power Series Method
Theoretical Basis for Power Series Method Legendre's Equation Legendre Polynomials
Extended Power Series Method; Indicial Equation Bessel=s Equation Bessel Functions of the First Kind Orthogonal Sets of Functions Sturm-Liouville Problem
Orthogonality of Legendre Polynomials and Bessel Functions Laplace Transform Inverse Transform, Linearity
Laplace Transforms of Derivatives and Integrals
Shifting on the s-axis Shifting on the t-axis, Unit Step Function Differentiation and Integration of Transforms Convolution

Partial Fractions Periodic Functions
Minor Discussion of Partial Differential Equations

Relationship of Course to Program or Discipline Learning Outcomes:

(What program outcomes are being met by this course?
For general education courses, a listing of the general education competencies that are met.)

Relationship of Course to General Education Learning Outcomes:	
Composition and Rhetoric Students illustrate a fundamental understanding of the best practices of communicating in English and meet the writing standards of their college or program-based communication requirements.	
Science & Technology Students successfully apply systematic methods of analysis to the natural and physical world, understand scientific knowledge as empirical, and refer to data as a basis for conclusions.	
Mathematics & Quantitative Skills Students effectively use quantitative techniques and the practical application of numerical, symbolic, or spatial concepts.	x
Society, Diversity, & Connections Students demonstrate understanding of and a logical ability to successfully analyze human behavior, societal and political organization, or communication.	
Human Inquiry & the Past Students interpret historical events or philosophical perspectives by identifying patterns, applying analytical reasoning, employing methods of critical inquiry, or expanding problem-solving skills.	
The Arts & Creativity Students successfully articulate and apply methods and principles of critical and creative inquiry to the production or analysis of works of art.	
5/3/2016	

Relationship of Course to Mathematics (MATH) Student Learning Outcomes:	
Demonstrate understanding of the language of mathematics, by their use of symbols, definitions, word phrases, and representations.	x
Display proficiency in mathematical computations.	x
Implement mathematical techniques to solve applied problems.	x
Employ appropriate technology to demonstrate knowledge of mathematical concepts.	x
Exhibit mastery of core course competencies.	x
10/20/2017	

Special requirements of the course: None

Additional information: None

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Date: 10/20/2017