

MAT 285, Differential Equations, 31228, MW 5:00 pm – 6:15 pm, room D 224

Fall 2015

Prof. Larisa Alikhanova

Pre-requisite: MAT K256

Text: Elementary Differential Equations, 6th Edition, C. Henry Edwards and David E. Penney.

Course Description: A continuation of Calculus with introduction of standard techniques of solving differential equations. The following topics will be introduced: first - order differential equations, linear equations of higher order, power series methods, Laplace transform methods, linear systems of differential equations, numerical methods, and modeling by differential equations in a variety of applications in physics, chemistry, engineering, biology, social sciences, and finances.

Measurements Quizzes, projects – 15%, 3 tests, each test – 20%, and final exam – 25%.
Grade equivalents: A 93 – 100, A- 90 – 93, B+ 87 -89, B 83 – 86, B- 80 – 82, C+ 77 – 79, C 73 – 76, C- 70 – 72, D+ 67 – 69. D 63 – 66. D- 60 – 62, F below 60.

Attendance: Your attendance in the classroom, participation in classroom work/projects and preparation for each class is required and is essential to success in the course.

Support Services: Tutorial services. Peers. Meeting with me for extra help on an appointment basis.

Office Hours: MW 3:00 pm – 5:00 pm, **Room C104**, **Email** lalikhanova@trcc.comnet.edu

Class Cancellation: In case of increment weather, check the college website for class cancellations or call 860-886-0177 for recorded message on the college phone

Plagiarism and : Academic Honesty At Three Rivers we expect the highest standards of academic honesty. The Board of Trustees' Proscribed Conduct Policy prohibits cheating on examinations, unauthorized collaboration on assignments, unauthorized access to examinations or course materials, plagiarism.

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Disabilities If you have a disability that may affect your progress in this course, please meet with a Disability Service Provider (DSP) as soon as possible. Please note that accommodations cannot be provided until you provide written authorization from a DSP.

TRCC Disabilities Service Providers Counseling & Advising Office Room A-119	
Matt Liscum (860) 383-5240	<ul style="list-style-type: none">• Physical Disabilities• Sensory Disabilities• Medical Disabilities• Mental Health Disabilities
Chris Scarborough (860) 892-5751	<ul style="list-style-type: none">• Learning Disabilities• ADD/ADHD• Autism Spectrum

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Course outline and Content

Chapter 1 Sec. 1.1-1.8 8/31/2015 – 9/23/2015

Differential Equations and Mathematical Models

Integrals as General and Particular Solutions

Slope Fields and Solution Curves (Existence and Uniqueness of Solutions)

Separable Equations and Applications

Linear First Order Equations and Integrating Factors

Substitution Methods and Exact Equations

Population

Acceleration-Velocity models

TEST 9/23/2013

Chapter 2, Sec. 2.1-2.8 9/28/2015 – 10/21/2015

Second Order Linear Equations

General Solutions of Linear Equations

Homogeneous Equations with Constant Coefficients

Mechanical Vibrations

Nonhomogeneous Equations and Undetermined Coefficients

Forced Oscillations and Resonance

Endpoint Problems and Eigenvalues

TEST 10/21/2015

Chapter 3, Sec. 3.1-3.3 10/26/2015 – 11/18/2015

Introduction and Review of Power Series

Series Solutions Near Ordinary Points

Regular Singular Points

Chapter 4, Sec. 4.1-4.6 11/23/2015 - 12/02/2015

Laplace Transforms and Inverse Transforms

Transformation of Initial Value Problems

Translations and Partial Fractions

Derivatives, Integrals, and Products of Transforms

Periodic and Piecewise Continuous Input Functions

Impulses and Delta functions

TEST 12/02/2015

Chapter 5 Sec. 5.1-5.2 12/07/2015-12/09/2015

First Order Systems and Applications

The Method of Elimination

Chapter 6 Sec. 6.1-6.3 12/11/2015

Numerical Approximation, Euler's Method

The Runge-Kutta Method

FINAL EXAM 12/16/2015

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Outcomes

Upon successful completion of this course, the student will be able to:

1. Solve first order equations by analytical and numerical methods.
2. Use first order equations for modeling.
3. Identify and solve applications on first order equations (decay, growth, population model, acceleration and velocity problems).
4. Solve second order homogenous equations with constant coefficient and various applications on vibrations, electrical circuits.
5. Solve eigenvalue value problems
6. Solve equations by power series methods.
7. Find Laplace Transforms of a function.
8. Find inverse Laplace Transforms.
9. Solve Differential Equations by Laplace Transforms.
10. Model Special Forcing Terms using Delta functions.
11. Use system of equation to model applications.
12. Solve First Order Linear Systems by analytical and numerical methods.
13. Convert higher order equations to systems of equations.
14. Use the Runge-Kutta method for solving differential equations.

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Homework(odd numbers): This is a guide only. Assignments may vary.

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