MATH 1005-A
Differential Equations and Infinite Series for Engineering or Physics
Summer 2020

Instructor: Dr. Farzane Amirzade Dana
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Office hours: Tues & Thurs 17:35-18:25 pm.

Textbook: Ordinary Differential Equations and Infinite Series, by Sam Melkonian

Lectures: Tues & Thurs: 18:35-21:25 p.m. Online
classes begin Thur July 2, and classes end at Fri. 14.

Tutorials: Thurs 17:35-18:25 pm. starting on Thur. July 2

Evaluation:
10% Tutorial attendance
30% Test (on Aug, 26)
60% Final Exam

Note:
Non-graphic, non-programmable calculators are permitted during the test and the final examination.

Term Test

There will be a 100-minutes test held
Wednesday, July 26 at 5:30 pm

No make up, early, or delayed tests. The missing test will be counted as zero. It is your responsibility to pick up the tests in the following tutorial hour.

Final Examination

The final examination is a 3 hour exam scheduled by the University. It will take place during the examination period. It is your responsibility to find out the correct date and time of the exam and the room where it takes place. The final exam is worth 60% of your final grade. When the exam is written, the students are allowed to make an appointment with the instructor to view their exam within two days of the examination period. This examination review is for educational purposes only.

Topics

I Ordinary Differential Equations

1. Introduction
    - 1.1 Basic concepts
2. First-Order Equations
    - 2.1 Separable Equations
        - 2.1.1 Orthogonal Trajectories
    - 2.2 Homogeneous equations
    - 2.3 Linear equations
        - 2.3.1 Bernoulli equations
    - 2.4 Functions of Two Variables

2.4.1 Partial derivatives
2.4.2 The Chain Rule
2.5 Exact equations
2.5.1 Integrating Factors
3. Second-Order Equations
3.1 Basic Definitions
3.2 Linear Homogeneous Equations
3.2.1 Equations with Constant Coefficients
3.2.2 Cauchy-Euler Equations
3.3 Linear Nonhomogeneous Equations
3.3.1 The Method of Undetermined Coefficients
3.3.2 Variation of Parameters
5. Linear Systems (2×2 systems only)
5.1 Homogeneous Systems
5.1.1 General Theory
5.1.2 Systems with Constant Coefficients, Complex Eigenvalues, Generalized Eigenvectors

II Infinite Series

6. Sequences and Series
6.1 Sequences
6.2 Series
6.2.1 The Integral Test, Approximations of Series
6.2.2 The Comparison Tests
6.2.3 Alternating Series, Approximations of Alternating Series
6.2.4 Absolute and Conditional Convergence
7. Taylor Series
7.1 Power Series
7.2 Representations of Functions by Power Series, The Binomial Series, Taylor Polynomials and Approximations
8. Fourier Series
8.1 Fourier Series of Periodic Functions
8.2 Fourier Series of Functions on Finite Intervals

The Tutorial Centre (1160 HP, in the tunnel) This is a drop-in centre providing a one-to-one tutorial service for Q-year and first year students on a "first come first serve" basis. It is open starting Jan 20, at the following hours: Monday to Friday: 10:00 - 16:00.

Pregnancy obligation: Write me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the **Student Guide.**

Students with disabilities requiring academic accommodations in this course must register with the Paul Menton Centre for Students with Disabilities (PMC) for a formal evaluation of disability-related needs. Documented disabilities include but are not limited to mobility/physical impairments, specific Learning Disabilities (LD), psychiatric/psychological disabilities, sensory disabilities, Attention Deficit Hyperactivity Disorder (ADHD), and chronic medical conditions. Registered PMC students are required to contact the PMC every term to have a Letter of Accommodation sent to the Instructor by their Coordinator. In addition, students are expected to confirm their need for accommodation with the Instructor no later than two weeks before the first assignment is due or the first in-class test/midterm. If you

require accommodations only for formally scheduled exam(s) in this course, you must request accommodations by the official accommodation deadline published on the PMC website.

There will be no make-up tests. Non-graphic, non-programmable calculators are permitted during the tests and the final examination.