

## The Department of Mathematics

2020–21–A term

**Course Name** Introduction to Differential Equations A

**Course Number** 201.1.9031

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/fall2021/courses/introduction-to-differe>

**Lecturer** Prof. Alexander Ukhlov, <ukhlov@bgu.ac.il>, Office 305

**Office Hours** <https://www.math.bgu.ac.il/en/teaching/hours>

### Abstract

### Requirements and grading<sup>1</sup>

### Course topics

First order differential equations.1. Separable equations.2. Exact equations. Integrating factors.3. Homogeneous equations.4. Linear equations. Equation Bernulli.5. The existence theorem. Second order equations.1. Reduction of order.2. Fundamental solutions of the homogeneous equations.3. Linear independence. Liouville formula. Wronskian.4. Homogeneous equations with constant coefficients.5. The nonhomogeneous problem.6. The method of undetermined coefficients.7. The method of variation of parameters. 8 Euler equation.9. Series solutions of second order linear equations.1. The Laplace transform.2. Definition of the Laplace transform.3. Solution of differential equations by method of Laplace transform.4. Step functions.5. The convolution integral. Systems of first order equations.1. Solution of linear systems by elimination.2. Linear homogeneous systems with constant coefficients.3. The matrix method. Eigenvalues and eigenvectors.4. Nonhomogeneous linear systems.

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<sup>1</sup>Information may change during the first two weeks of the term. Please consult the webpage for updates