Study Program: Physics
Type and level of studies: Bachelor studies
Course name: Mathematics 3
Lecturer**: Jelena Z. Vujaković**
Status: Compulsory
ECTS: 8
Attendance prerequisites: **Mathematics 1, Mathematics 2**

Course aims

Introduction to the basic concepts of ordinary differential equations of functions of one real variable, probability theory and statistics, as well as numerical analysis. Acquiring knowledge necessary for other subjects within the study program.

Course outcome

The students have the basic concepts of differential equation theory, probability and statistics, and numerical analysis. They have developed the ability to apply mathematical theories in solving specific problems in the domains of mathematics and natural sciences.

Course content

Theoretical part

Differential equations. First-order differential equations: general concepts, existence, uniqueness and stability of the solution. Elementary methods of equation solving. Implicit equations. Systems of differential equations: linear systems, homogeneous linear systems, inhomogeneous linear systems, linear systems with constant coefficients. Linear higher-order equations. Solving differential equations using power series. Equations of mathematical physics.

Elements of probability theory. Experiments with random outcomes, probability, random variables, functions of random variables. Multidimensional random variables. Mathematical expectation, dispersion, correlation coefficient. Moments, median and mode. Laws of large numbers, Central limit theorem. Introduction to the basics of statistics.

Elements of numerical mathematics. Error theory. Interpolation. Least-squares method. Regression and empirical formulas. Numerical differentiation. Numerical integration. Solving systems of linear and nonlinear equations. Numerical solution of differential equations.

Practical Part:

Topics discussed in auditory lectures are in accordance with theoretical classes.

Literature

1. С. Јанковић, Диференцијалне једначине, ПМФ Ниш, Ниш 2004.
2. С. Јанковић, Ј. Кнежевић-Миљановић, Диференцијалне једначине – задаци са елементима теорије, Математички факултет Београд 2003.
3. Ш. Ушћумлић и други, Збирка задатака из математике 3, Универзитет у Београду, Београд 1995
4. В. Јевремовић, Вероватноћа и статистика, Универзитет у Београду, Математички факултет; Београд 2009
5. Д. Херцег, Н. Крејић, Нумеричка анализа, Универзитет у Новом Саду, Нови сад 1997
6. Д. Херцег, Н. Крејић, Нумеричка анализа 1, Збирка задатака Универзитет у Новом Саду, Нови Сад 1998.

Number of active classes				Other classes
Lectures: 3	Practical classes: 2	Other forms of teaching:		

Teaching methods

Classroom teaching, combined with classical methods and interaction with the students. During exercises, the students deal with typical mathematical problems and practice solving them.

Assessment (maximum 100 points)			
Course assignments	**points**	Final exam	**Points**
Lectures	5	oral exam	30
Practical classes	5		30
Term tests	30	....	
Total	**30**		70