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COURSE: *Computational Mathematics*

LECTURER: Kateryna Osypenko, PhD

LANGUAGES OF EDUCATION: Ukrainian, Russian, English

THE SUBJECT: students are introduced to calculation errors, basic concepts of function approximation, interpolation polynomials, numerical differentiation, and integration.

THE AIM *of the course includes the formation of the following students'* ***abilities***:

- ❖ Ability to approximate different functions;
- ❖ Ability to solve differential equations;
- ❖ Ability to integrate using polynomial interpolation, quadrature formulas;
- ❖ Ability to solve systems of linear and non-linear equations;
- ❖ Ability to solve the optimization and control problems;

THE MAIN TASK OF THE EDUCATIONAL COURSE
To provide students with basic knowledge on the fundamental methods, techniques, and algorithms of numerical methods use for applications of mathematics, electronics, circuitry, analysis, and synthesis of electronic systems.

Knowledge:
- ✓ general principles of the numerical methods used for applications of major classes of computational mathematics problems
- ✓ basic numerical methods of solving algebraic, mathematical analysis, probability theory, and mathematical statistics problems
- ✓ algorithms and methods for numerical methods constructing

Skills:
- ✓ creating the algorithms and applications of numerical methods for implementation on a computer; use packages of applied mathematical software
- ✓ program implementation of solving various equations that describe processes in electronic circuits

Experience:
✓ to make the adequate choice of numerical methods to solve specific application problems; analysis of numerical methods in terms of convergence and stability; assessment calculation of errors that occur at different stages of the numerical methods use and their software and hardware implementation.

COURSE DURATION: 5 credits, 150 hours in total, 34 hours of lections, 51 hours of laboratory works, 37 hours of calculation and graphical work, 19 hours for own student's work.

REQUIREMENTS TO STUDENTS: knowledge in the field of "Mathematical Analysis", "Theory of probability and mathematical statistics", "Computers and the basics of programming", "Programming and algorithmic languages".