

Pedagogic case and specific course in which designed tasks and units are used

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<p>Pedagogic case:</p>	<ul style="list-style-type: none"> • Application of IBL in the studying the module " "Creation and research of mathematical models" in the course Modeling of systems and processes The course is intended for students of the Master's Degree in Computer Science.
<p>Description (including temporal scheme for design, development and implementation)</p>	<ul style="list-style-type: none"> • Mathematical modeling is the use of adequate models of the studied systems to solve problems • Learn how to apply basic mathematical dependencies, methods and modeling tools in the process of solving specific tasks by using IBL approaches, based on theoretical knowledge. • Design and development February-May 2019, implementation from September 2019
<p>m of pedagogic case</p>	<ul style="list-style-type: none"> • to reveal the connections of abstract mathematical concepts with reality, the transition from a formal mathematical problem to its interpretation • to direct the activities of students to the formulation of hypotheses and conducting their own research process using a mathematical model
<p>Mathematical concepts</p>	<ul style="list-style-type: none"> • Mathematical modeling • Probability • Kolmogorov's equation • Analytical methods for model estimating • Numerical methods for model estimating
<p>Addressed practice</p>	<ul style="list-style-type: none"> • Master's course on Computer Science. First semester
<p>Place in specific course Course name Place of units</p>	<ul style="list-style-type: none"> • Course of Modeling Systems and Processes • Module «Construction and Research of Mathematical Models » • One semester
<p>Learners profile orientation, year, age, prior knowledge, other such as math anxiety, special needs, ..</p>	<ul style="list-style-type: none"> • The first year of the Master's program "Computer Science" • Necessary knowledge: Higher Mathematics, Discrete Mathematics, Probability Theory and Mathematical Statistics, Programming, Module Course of Modeling Systems and Processes "General Principles and Approaches to Modeling"
<p>Organisation of specific course study credits/hours, location, group size</p>	<ul style="list-style-type: none"> • 5 credits ECTS course • 4 hours every week , during 10 weeks • 12 persons

Expected learning outcomes	<ul style="list-style-type: none"> • consolidation of theoretical material and competent use of the basic mathematical dependencies, methods and means of modeling in the process of solving specific problems
Envisioned use of digital technology	<ul style="list-style-type: none"> • An electronic course in distance education system Moodle • Mathcad, Wolfram
Planning of tasks	<ul style="list-style-type: none"> • Analysis of mathematical preparation for studying the course, discussion with colleagues • Setting up an IBL-based approach that requires integrated knowledge and research to find its solution.; • Requests from a teacher • Inquiries from students • Formalization of the model by known ways of formal representation • Structuring the content with phased results; • Unaided student activity <ul style="list-style-type: none"> ○ Model implementation. ○ Model research • Summarizing, adjustment • Conclusions, based on results obtained in the process of modeling
Names of persons involved	<ul style="list-style-type: none"> • Iryna Mashkina
Course:	Modeling of systems and processes Master Course in Computer Science
Learning objectives	<ul style="list-style-type: none"> • Concepts and principles of a model approach to social reality • Ability to apply modern mathematical tools for solving tasks of modeling • construction of mathematical and computer model of the research process; • processing and evaluation of modeling results
Learning contents	<ul style="list-style-type: none"> • The concept of mathematical modeling. • Triad "model-algorithm-program". Computational experiments. • Formal classification of models. • Approaches to modeling by way of object representation.
teaching /learning activities	<ul style="list-style-type: none"> • Lecture once a week for an hour, weekly 1 laboratory work (2 hours), unaided work with the materials of the electronic course in the system of distance learning Moodle (4 hours)

Media	<ul style="list-style-type: none"> • Electronic course, computer laboratories, including on-line, software
Evaluation	<ul style="list-style-type: none"> • implementation of practical tasks, • passing testing • presentation of the constructed and researched model • Estimation of the correctness of the constructed mathematical model
Instructor role	<ul style="list-style-type: none"> • Content development of the course (presentations, tasks for laboratory works) • Presentation of basic ideas, formulation of the problem • Individual consultations for students on questions that arise • Monitoring of students' achievements
Student roles	<ul style="list-style-type: none"> • Submission of hypotheses, formulation of questions, tasks executions, self-examinations, mutual evaluations.