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

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| Pedagogic case: | * Application of IBL in the studying the module " “Сreation 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.
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| Description (including temporal scheme for design, development and implementation) | * 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
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| m of pedagogic case | * 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
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| Mathematical concepts  | * Mathematical modeling
* Probability
* Kolmogorov's equation
* Analytical methods for model estimating
* Numerical methods for model estimating
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| Addressed practice | * Master's course on Computer Science. First semester
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| Place in specific courseCourse namePlace of units | * Course of Modeling Systems and Processes
* Module «Construction and Research of Mathematical Models »
* One semester
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| Learners profileorientation, year, age, prior knowledge, other such as math anxiety, special needs, .. | * • 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"
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| Organisation of specific course study credits/hours, location, group size | * 5 credits ECTS course
* 4 hours every week , during 10 weeks
* 12 persons
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| Expected learning outcomes | * consolidation of theoretical material and competent use of the basic mathematical dependencies, methods and means of modeling in the process of solving specific problems
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| Envisioned use of digital technology | * An electronic course in distance education system Moodle
* Mathcad, Wоlfram
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| Planning of tasks | * 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
	+ Model implementation.
	+ Model research
* Summarizing, adjustment
* Conclusions, based on results obtained in the process of modeling
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| Names of persons involved  | * Iryna Mashkina
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| Course: | Modeling of systems and processesMaster Course in Computer Science |
| Learning objectives | * 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
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| Learning contents | * The concept of mathematical modeling.
* Triad "model-algorithm-program". Computational experiments.
* Formal classification of models.
* Approaches to modeling by way of object representation.
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| teaching /learning activities | * 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 | * Electronic course, computer laboratories, including on-line, software
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| Evaluation | * implementation of practical tasks,
* passing testing
* presentation of the constructed and researched model
* Estimation of the correctness of the constructed mathematical model
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| **Instructor role** | * Сontent 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
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| **Student roles**  | * Submission of hypotheses, formulation of questions, tasks executions, self-examinations, mutual evaluations.
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