#### 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. |
| 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 |
| 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 |
| Mathematical concepts | * Mathematical modeling * Probability * Kolmogorov's equation * Analytical methods for model estimating * Numerical methods for model estimating |
| Addressed practice | * Master's course on Computer Science. First semester |
| Place in specific course Course name  Place of units | * Course of Modeling Systems and Processes * Module «Construction and Research of Mathematical Models » * One semester |
| Learners profile orientation, 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" |
| 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 |
| Envisioned use of digital technology | * An electronic course in distance education system Moodle * Mathcad, Wоlfram |
| 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 |
| Names of persons involved | * Iryna Mashkina |
| Course: | Modeling of systems and processes  Master 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 |
| 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. |
| 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 |
| Evaluation | * implementation of practical tasks, * passing testing * presentation of the constructed and researched model * Estimation of the correctness of the constructed mathematical model |
| **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 |
| **Student roles** | * Submission of hypotheses, formulation of questions, tasks executions, self-examinations, mutual evaluations. |