



THINK STATS: PROBABILITY AND STATISTICS FOR IT-ENGINEERS

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Abstract. The new approaches in teaching and learning Probability in XXI Age are investigated. Convincingly proven the need for the formation of statistical thinking for programmers. The technology education (STEM) is the new education strategy in XXI century, new learning approaches, the developing of the standardization in the IT-engineering education

Theoretical and practical values of the research are the following: there have been developed classes strategy of using active teaching methods in the discipline «Probability Theory and Mathematical Statistics» for international students of the BSUIR. The discipline PT&MS is studied by the students of all specialties and forms of education of BSUIR (2-nd and 3-d year students). After the educational standards the syllabus of this subject consists of lectures, practice classes and ways of assessment.

There are the developed classes strategy of using active teaching methods in the discipline «Probability Theory and Mathematical Statistics» for international students of the BSUIR. The developed educational resource fully complies with international standards and educational standards of Belarus and consists of lectures, practice classes and ways of assessment.

Reconsideration of the Content of Modern Natural Science and Technology Education (NSTE) is the following: two basic kinds of modern education has been joined in much better way as it is done in traditional education systems [1]. The content of General NSTE today is overcrowded with detailed professional knowledge as well as skills and follows outdated structures of the text books and other educational materials. At the same time General NSTE today traditionally proposes only learning and teaching as gaining knowledge and skills with very small attention paid to the development of corresponding attitudes or value orientation. General NSTE has to insure balanced development of human's spirit that means systemic taking care of mind, feelings and will.

In the framework of STEM-education it is presumed the Work Based Learning (WBL) and the Learn Based Problem (PBL) Approaches and Methods. A definition for the higher education level could involve any of the following work-based learning types; learning through work, learning for work and learning at work. PBL improves learning when projects require sustained engagement and collaboration. It's very important to notice, that both of this approaches are planned in the curriculums and syllabi.

Speaking about the discipline «Probability theory and mathematical statistics» it is necessary to pay attention at the two main points:

1. PT&MS is the base for studying the following disciplines for the first degree engineering education:

The Multivariate Data Analysis, Stochastic processes, Simulation Modeling of Systems, Integrated Information Systems, Mathematical Models of Information Processes and Management, Basics of Business and Law in Information Technology, Statistical

Methods of Information Processing, Expert Systems, Telegraphic Theory, Querying Theory

2. PT&MS is the base for the following new technologies and branches of the humanity activities: Artificial intelligence, Decision theory, Data Science, Data Analysis, Big Data, Data Analytics, Data Mining, Machine Learning.

The probability theory and modern technologies

Probability is a way of thinking about the world that is distinct from the modes of thought in other areas of mathematics.

Probability has a significant role to play in almost every branch of science and engineering such as:

Data mining: refers to the science of collecting all the past data and then searching for patterns in this data.

Data Science contains many other fields like Machine learning, Data Mining, big Data, statistics, Data visualization, data analytics and etc.

Data Science is a field of study which includes everything from Big Data Analytics, Data Mining, Predictive Modeling, Data Visualization, Mathematics, and Statistics.

At least, the responsibilities and competences of a data scientist: Domain understanding, Data collection from multiple sources, Data cleansing, preparation & processing, Predictive modeling, machine learning, Asking the right questions, running queries, Applying mathematical & statistical analysis.

The relevance of this problem is substantiated by the studied documents, reports, monitoring results of this problem of the world leading expert's works. UNESCO has initiated these vital tasks (the researching processes and is steadily following the adaptation and implementation course of the results).

The Republic of Belarus is an integral part of the global process. All educational and methodical documentation complies with the international standards in engineering education. The students' heuristic thinking is formed by the mastering in all sections of the discipline «Probability Theory and Mathematical Statistics». All advanced engineering developments, advanced technologies and scientific research are based on a probabilistic approach in the modern world.

References

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