Speciality "Statistics" at Uzhhorod National University

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Abstract

Historical data about Uzhhorod National University are presented. The start of scientific studies and their progress in probability theory and mathematical statistics are given. A new speciality "Statistics" at Uzhhorod National University is introduced.

1 Historical Remarks

For centuries Transcarpathia, a small territory with mostly Ukrainian population, had been torn away from Ukraine. Until 1918 Transcarpathia was a part of the Austro-Hungarian empire. For twenty years, from 1918 to 1938 the land was a part of Czeckoslovakia. Since 1938 it was once again occupied by the Hungarian troops till October, 1944. There could not be even a question about opening a higher school institution at that time.

After the liberation of Transcarpathia in October 28, 1944 it became a part of the Ukrainian SSR. In 1945 The State University in Uzhhorod was opened and consisted of the following faculties: Historical, Philological, Biological, Medical. The Physical and Mathematical Faculty was opened in September, 1950. The first mathematical departments were the Department of General Mathematics and the Department of Mathematical Analysis. The Department of Mathematical Analysis was allowed to teach a course "Probability Theory and Mathematical Statistics". Special courses connected with Probability Theory and Mathematical Statistics were delivered by B.N. Hartstein and Yu.V. Studnev. They were disciples of a founder of the Ukrainian probabilistic school Academician B.V. Gnedenko.

The Department of Mathematical Analysis started studies in the theory of random processes and fields in the 1980's with help of Prof. D.S. Silvestrov (Kyiv University) .

During 50 years the Department of Mathematical Analysis carried out practical studies in calculus, complex, functional and stochastic analysis. Much attention has been paid to those subjects that are basic for probability theory and mathematical statistics.

For teaching and scientific work the Department of Mathematical Analysis has invited Prof. Yu.V. Kozachenko (Department of Probability Theory and Mathematical Statistics of Kyiv National University) and Prof. D.V. Gusak (Institute of Mathematics of the Ukrainian Academy of Sciences). They teach special courses, supervise Bachelor and Master students in probability theory and mathematical

statistics and take part in the department's seminars and workshops. Four lecturers at the Department have obtained PhD in probability theory and mathematical statistics under the supervision of Prof. Yu.V. Kozachenko. Topics of their theses cover simulation of random processes in various spaces, estimation of modeling precision, boundary problems for differential equations with random initial conditions and construction of criteria for testing statistical hypotheses.

According to the fact that the majority of the lecturers at the Department are specialists in Probability and Mathematical Statistics, it was decided in 2006 to rename it as the Department of Probability Theory and Mathematical Analysis.

Several scientific conferences have been arranged by the Department. Among them are:

- The Second Ukrainian-Hungarian conference on new directions in the theory of probability was held in September-October 1992.

- The first Ukrainian-Scandinavian conference on theory of Probability and Mathematical Statistics was held in September-October 1995.

- The coordination meeting of National Network within the Tempus-Tacis Project "Improvement of Education in Statistical Applications in Economics" was held in May-June 2003.

2 Speciality "Statistics" at Uzhhorod National University

In 2002-2003 the Mathematics Faculty started to prepare specialists in Statistics. Experience of a three-level educational system for Bachelors, Specialists and Masters within the speciality "Statistics" at the Department of Probability Theory and Mathematical Statistics at Kyiv National University was taken into account for composing the program of courses for the speciality "Statistics" at Uzhhorod University.

On the first educational level Bachelor students follow the educational program for Bachelor of Mathematics with some additional courses of professional choice for the speciality "Statistics":

- Discrete Models in Probability Theory (108 hours)

- System Analysis (108 hours)

- Foundations of Microeconomics and Macroeconomics (108 hours)

- Financial Analysis (108 hours)

- Methods of Optimization (162 hours)

- Theory of Choice and Decision Making (162 hours)

- Foundations of Actuarial Mathematics (108 hours)

- Mathematical Economics (108 hours)

- Econometrics (54 hours)

This program also contains special courses for the specialization "Applied Statistics". Among them are:

- Applied Statistics (108 hours)

- Risk Models in Actuarial Mathematics (81 hours)

- Methods of Economic Calculation (81 hours)

- Survey Sampling Theory (81 hours).

The graduate students of the speciality "Statistics" obtain professional qualification of "Specialist of Statistics" after 5 years of training. This includes the 4 years of training on the level "Bachelor of Mathematics". The educational program includes the following disciplines:

- Additional Topics in Mathematical Statistics

- Modern Aspects of Economics

- Financial Mathematics of the Stock Exchange Market

- Time Series Analysis

- Data Bases and Information Systems.

- Computer Statistics

- Labour protection in the industry.

The total number of hours for these subjects is 702, including 152 hours in the lecture room.
Additional courses for the specialization "Applied Statistics" are:

- Random Evolution and its Applications (54 hours)

- Simulation of Random Processes (54 hours)

- Factor Analysis (81 hours)

- Multi-Dimensional Statistical Analysis (81 hours).

The Department of Probability Theory and Mathematical Analysis develops new courses in economic-statistical directions. A methodological help for new and renewed courses has been worked out. These are detailed plans with recommended literature for theory, tasks for self-practical studies and tests for checking the level of knowledge.

In 2002-2004 Uzhhorod University participated in Tempus Tacis Joint European Project "Improvement of Education in Statistical Applications in Economics" coordinated by D.S.Silvestrov (Mälardalen University, Västerås, Sweden). The Tempus Project played a very important role in further development and updating of curricula for new statistical specializations. Thanks to the Project the Mathematics Faculty had the opportunity to improve its material and technical basis and to computerize studies. The participation of the Mathematics Faculty in the Tempus Project provided opportunities to establish scientific contacts between lecturers of our University and those from the European Union.

The special course "Survey Sampling Theory" is intended for Bachelor of Mathematics (specialization "Applied Statistics") and consists of 30 hours of lectures and 16 hours of practical lessons. The two books by Chernyak, A. (2001) and Parkhomenko, V. (2001) are used as basic teaching materials.

Experience of teaching this course at Kyiv National University was taken into account for composing the program of this course.

A short program of the course "Survey Sampling Theory" is as follows

- Goals and Methods of Surveys

- General Scheme of a Survey

- Simple Random Sampling with and without Replacement

- Sampling with Unequal Probability

- Systematic Sampling

- Stratified Random Sampling

- Simple Cluster Sampling

- Multistage Cluster Sampling

- Linear Regression Models

- Jackknife and Bootstrap Methods

- Errors in Surveys, their Sources and Methods of Reduction.

The main problems that arise in teaching survey sampling are:

- We don't have a possibility to provide the students with real data.

- Teaching materials and software are not up to date.

These problems can partly be solved by learning experience from Ukrainian and foreign specialists in this area. The participation of Uzhhorod National University in the Baltic-Nordic-Ukrainian Network on Survey Statistics provide opportunities to share experience in statistical studies, to develop and introduce new methods and modern techniques in the teaching of specialists in mathematical statistics and survey sampling in particular.

References

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