

Survey Sampling at Vasyl Stefanyk Precarpathian National University

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Abstract

The structure of educational direction "Statistics" is considered. The teaching program for the course on Survey Sampling at the Vasyl Stefanyk Precarpathian National University is presented.

1 Introduction

Statistical science as a whole and survey sampling, in particular, are the subject of detailed interest in the leading universities of Ukraine. Sample surveys play a vital role in a modern society to provide essential information to the government, to politicians, to business and to the citizens. Now the special training course "Survey Sampling Methods" is given in the educational programme for the speciality "Statistics" of the Vasyl Stefanyk Precarpathian National University.

2 General information about speciality "Statistics"

Vasyl Stefanyk Precarpathian National University is the first university of classic type of Precarpathia. It was set up on the anniversary of Ukraine Independence by the Decree of the President. Ivano-Frankivsk Pedagogical Institute and more than 50 years of its functioning laid the foundation of at that time young educational establishment. For a short period of time of its existence university has grown into the leading center of science, culture and education of Precarpathia. Nowadays university contains 6 faculties and 8 institutes. The Faculty of Mathematics and Information Science was set up in 2002 after the reorganization of the Faculty of Physics and Mathematics, whose educational activity can be traced back to 1940. The Faculty of Mathematics and Information Science consists of 6 departments:

- Department of Mathematical and Functional Analysis;
- Department of Differential Equations and Applied Mathematics;
- Department of Algebra and Geometry;
- Department of Information Science;
- Department of Statistics and Higher Mathematics;
- Department of Information Technology.

The Faculty of Mathematics and Information Science contains 4 directions:

- "Mathematics";
- "Applied Mathematics";

- "Statistics" (since 2010);
- "Information Science".

Speciality "Statistics" of the direction "Mathematics" was opened in 2005 on the base of the Department of Statistics and Higher Mathematics. Direction "Statistics" was allocated in 2010. Now speciality "Statistics" of the direction "Statistics" has two narrow specializations: "Statistics and Actuarial Science" and "Theory Probability and Mathematical Statistics". Educational system of the direction "Statistics" has 3 levels:

- The first educational level is Bachelor of Statistics with four years of training.
- The second educational level is Specialist of Statistics with one year of training (Statistics speciality).
- The third educational level is Master of Statistics with one year of training (Applied and Theoretical Statistics speciality).

The students of the level "Bachelor of Statistics" have 2 weeks of training (statistical) and 6 weeks of working practice, take a state examination and defend a bachelor's thesis. The students of the level "Specialist of Statistics" have 6 weeks of pedagogical and 8 weeks of working practice, take a state examination or defend a diploma thesis. The students of the level "Master of Statistics" have 5 weeks of working practice, defend of master's thesis. They have working practice in statistical institutions and banks.

Certified Specialists of Statistics and Masters of Statistics can work as statisticians, system analysts, risk experts, managers, specialist on IT-technologies, scientific workers and teachers in the fields of statistics and mathematics in different government and commercial institutions.

3 The teaching program of survey sampling

The course of "Survey Sampling Methods" was introduced at the Department of Statistics and Higher Mathematics in 2005 within the speciality "Statistics". Experience of teaching this course in National Taras Shevchenko University of Kyiv was taken into account.

Special course "Survey Sampling Methods" is an additional course of professional choice for the speciality "Statistics" on the first educational level. The timing of this course is 36 hours of lectures and 36 hours of practical lessons.

The program of "Survey Sampling Methods" course includes the following topics:

- Goals and methods of survey
- General scheme of survey
- Simple random sampling with and without replacement
- Sampling with unequal probability
- Systematic sampling
- Stratified random samples
- Simple cluster samples
- Multistage cluster samples
- Linear regression model
- Variance estimation

- Regression estimation
- Errors in surveys, their sources and Methods of their reduction

The lectures on Survey Sampling are based mostly on the books:

- "Survey Sampling Technique" by Oleksandr Chernyak (2001),
- "Survey Sampling Methods" by Victoria Parkhomenko (2001).

Also we are planning to use the book by Vasylyk & Yakovenko (2010), the publication of which was supported by the Visby Program grant "Swedish-Baltic-Ukrainian-Belarusian Collaboration in Survey Statistics". It will be very useful in teaching the course on "Survey Sampling Methods" at the Vasyl Stefanyk Precarpathian National University.

During the practical lessons students have the possibility to process data using different software (Statistica, Mathematica, Excel).

References

Chernyak, O. (2001). *Survey sampling technique*. Kyiv (in Ukrainian).

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Vasylyk, O. & Yakovenko, T. (2010). *Lectures notes on the theory and methods of survey sampling*. Kyiv (in Ukrainian).