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## **FEEDBACK AND FINAL ANALYSIS**

### **Report on the implementation of the Tempus project „Master programme in Applied Statistics“ at the University of Niš**

The implementation of the Tempus Project 511140-TEMPUS-1-2010-1-RS-TEMPUS-JPCR, *Master programme in Applied Statistics*, at the University of Niš started with a detailed analysis of the needs for human resources in the field of applied statistics in Serbia as a whole, and especially in Southern and Eastern Serbia, which is the area of responsibility of the University of Niš. Our analysis has shown that the statistics as a scientific method has found its place in various scientific fields, such as economics, medicine, psychology, pedagogy, engineering, and others. At numerous institutions of higher education there is a need to engage statisticians, for the purposes of teaching as well as for scientific research. Both in the economy and other social areas there is also a great need for specialists who are experts in the field of statistical research. Research focused on public opinion, quality of life and health, and economic indicators, are just a few examples where the existence of experts in the methods of modern complex statistical analysis is necessary in order to make valid conclusions and action planning. We found that before we began the implementation of this project in the Republic of Serbia there was no study program for education of professionals of that profile and that it is necessary to start such programs on the three largest universities in Serbia, one of which is the University of Niš. During the analysis it was also observed that the education of applied statisticians must have an interdisciplinary character, i.e., we need experts who, on one hand, have excellent knowledge of statistical methods, and on the other hand, know very well the scientific field in which these statistical methods have to be applied. In other words, we found that it is necessary to educate adequate experts in the field of applied statistics, which will be capable of using complex statistical methods and models, as well as modern IT methods and technologies to solve problems in various fields of science and society, and to be competent in independent work, research and decision making.

In addition, we have performed an analysis of human resource potential in the field of theoretical and applied statistics at the University of Niš, and we found that University of Niš a competent teaching staff which is necessary for the successful creation and implementation of a study program in the field of applied statistics.

After that, we have formed a large team of experts from five faculties of the University of Niš, who worked on the creation of a study program of master academic studies in the field of applied statistics at this university. While working on a proposal for a study program, members of this team had regular contacts with colleagues from other Serbian and foreign universities, our partners at this Tempus project. We have realized several visits of our teachers to universities in Spain, Slovakia and Austria, as well as to Universities of Novi Sad and Belgrade, Republic Statistical Office and National Bank of Serbia, and the experience gained there were of great importance for the creation of our study program. Of particular importance were the experiences of our colleagues from the University of Novi Sad, who first created the study program in applied statistics and started with its implementation.

After hard work, the proposal of the study programme of master academic studies in applied statistics at the University of Niš was created. Duration of the study program is four semesters or two academic years. In order to complete the study in this degree program a student must achieve 120 ECTS credits, after which it will acquire the professional title of Master of Applied Statistics. The study program of master academic studies in applied statistics can enroll students who have completed basic studies and have gained at least 180 ECTS credits.

Study program of applied statistics consists of four modules: Economy, Engineering, Medicine and Social Science. At the beginning of the study, each student chooses a particular module. The study program consists of 9 courses mandatory for all modules (54 ECTS), 3 courses mandatory for the selected module (18 ECTS), 3 elective courses selected from a list of 16 offered courses (18 ECTS credits), the professional practice (6 ECTS) and the preparation and defense of the final thesis (24 ECTS). All courses last for one semester. The study program offers the opportunity to choose some elective courses from another study program. Teaching is carried out through lectures, exercises, seminars, homeworks, case studies and practical work, using modern visual aids, while exercises are mostly computer-aided.

In the last two semesters of study, students are required to conduct a study research work in the area of the selected module, whose purpose is to establish and further develop previously acquired knowledge, consult the general literature, process the selected topics, conduct independent research and apply acquired knowledge to the practical, real-world problems. Students choose a research subject in consultation with the advisor, and the final result of the research is the final work, which represents the matter studied during the study, reflects the acquired theoretical knowledge, and primarily involves treatment of practical problems, providing solutions to some particular areas, through the application of statistical methods and models using appropriate IT tools and technologies.

Teaching content, forms and methods of teaching in the study program Applied Statistics offer students the opportunity to acquire fundamental knowledge in the field of statistics and its applications, as well as practical skills related to the application of statistics in practice, for the analysis of phenomena and processes in finance, economics,

industry, medicine, psychology, social sciences, and other fields. By completing this degree program, students will gain the ability of logical thinking, formulating hypotheses and draw conclusions in a formal or formalized manner. In addition, students will gain not only knowledge of general statistics, but will also learn the basic concepts and principles in the area of the selected module, and will be capable to perform statistical analysis in this area. Students will acquire the ability to communicate and collaborate with other professionals in the selected area, and will gain the skills in areas of computer science and information technology which are needed for software implementation of more complex problems.

Proposal of the study program was discussed and approved by the Academic Council of the Faculty of Sciences and Mathematics, Expert Boards of the University of Niš for Multidisciplinary Studies, Natural Sciences and Mathematics, Social Sciences and Humanities, Engineering Sciences and Technology, and Medical Sciences, and the final decision on approval of the study program Applied Statistics was adopted on July 15, 2013, by the Senate of the University of Niš.

Another important task of the project was to create the study module for lifelong learning in the field of applied statistics. This study module is intended for PhD students, master students in their final year of studies, and researchers who in their research are faced with data and their processing. It allows students getting acquainted with several modern and important areas of statistics, with methods of data collection and data analysis, in order to make relevant conclusions based on modern statistical analysis. The study module consists of six courses. The study module for lifelong learning in applied statistics was approved by the Academic Council of the Faculty of Sciences and Mathematics, on September 4, 2013, and by the Expert Board of the University of Niš for Natural Sciences and Mathematics, on September 16, 2013.

In addition to the study module for lifelong learning, from September 9 to 12, 2013, there were organized seminars on lifelong learning for students of master studies and other interested people. Lecturers at the seminars were Prof. Dr Jelena Ignjatović and Dr Aleksandar Nastić, both teachers of the Faculty of Sciences and Mathematics, University of Niš. Participants gained basic knowledge about the concept of lifelong learning, the main characteristics of lifelong learning and its role in modern society, as well as a basic knowledge of linear regression models and practical applications of linear regression. They expressed great satisfaction that they are given the opportunity to find out what are the possibilities for the continuation of their education in a less formal way, and to become familiar with some of the most advanced statistical methods and their practical application.