



### Industry

Academia

### Business Issue

Training tomorrow's business leaders

### Solution

SAS/STAT® and SAS® Enterprise Guide™

### Benefits

Graduates immediately able to add value for their employer



**Iveta Stankovicová**  
Faculty of Management,  
Comenius University

## Exacting standards in higher education

Comenius University in Bratislava is the oldest university in the Slovak Republic, but its roots go back much further, following the university tradition of the Academia Istropolitana, which was established in Bratislava by Matthias Corvinus, the Hungarian king, in 1465. It is an internationally oriented centre of excellence and a national university that values its intellectual relationship with the Slovak nation.

The second newest of Comenius University's 13 faculties, the Faculty of Management, was founded in 1991. Its main focus is on business management with the goal of developing a new generation of leaders for Slovak business. Lecturer Iveta Stankovicová is using SAS software for research and teaching to help students develop the necessary skills to compete.

Collaboration between SAS and Comenius University began in 1999 when the University acquired 50 SAS software licences as part of SAS' Academic Initiative, a programme which makes software available to students, researchers and professors in more than 3,400 academic institutions worldwide.

University lecturers such as Stankovicová are simultaneously using SAS for their own research programmes while teaching its application as a business solution. The Faculty of Management, which has half of the University's SAS licences, is very strong in quantitative methods: most of its teaching staff

have a background in mathematics or statistical economics; the Dean, Prof. RNDr. Jozef Komornik, DrSc. is himself a statistician, and many of the staff, including Iveta Stankovicová herself, have considerable practical experience in SAS.

The Faculty of Management teaches statistics in three compulsory undergraduate courses: Introduction to Statistics (first year, summer term), Statistical Methods (second year, winter term) and Statistics on the PC (second year, summer term). In these compulsory courses, students are introduced to mathematical statistical methods in the core modules of SAS software. Students can then choose more advanced courses in their third year: first, Quantitative Methods, covering logistic regression, principal components analysis, cluster analysis and discriminant analysis using SAS/STAT® and SAS Enterprise Guide™; and second, Time Series Analysis, a course which focuses on ARIMA models, using SAS Enterprise Guide. Altogether, there are approximately 230 students in the Faculty of Management studying statistics with SAS.

Comenius University does not simply teach SAS, but also integrates practical activities into the study. For example, within each course students engage in their own projects. In the third year, students are invited to take part in a Student Professional Activity Competition. "We receive roughly 15 entries per year, and the standard of the work is very high," says Stankovicová. Advanced students at the University have based their



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diploma theses on research with SAS into information systems, data analysis and scorecarding, and Comenius students and teachers participate in the annual SAS Forum hosted by the SAS office in Bratislava.

"There is no doubt, knowledge of SAS makes our students more marketable," says Stankovicová. "Companies in the Slovak Republic and beyond are looking for people who can apply these skills and this knowledge to solve real business problems."

Iveta Stankovicová is currently working on her own final PhD thesis, entitled Statistical Methods in Data Mining, which will be submitted at the end of 2003. Her objective is to demonstrate to commercial organizations in the Slovak Republic the power of data mining in revealing previously unknown and profitable information in vast quantities of operational data. She explains: "Data mining is a new concept in the Slovak Republic and companies are hesitant about being the first to make a serious commitment to the methods and techniques that are available. My aim is to demonstrate the competitive advantages that financial institutions in particular can obtain from statistical methods in data mining." At present there is no literature on data mining available in the Slovak language – so Stankovicová's work represents an important breakthrough for the country's businesses. As part of the Academic Initiative, SAS sponsors PhD and other research students with the software.

The analytical tools that Stankovicová is exploring include statistical methods such as linear and logistic regression, multidimensional methods and time series analysis. She says that some of these methods in SAS "border on artificial intelligence (AI) techniques". The study also covers non-statistical methods such as neural networks and genetic algorithms, and mixed methods such as classification and regression trees.

Comenius University's Faculty of Management has plans to extend the teaching of SAS to further courses covering topics such as Marketing Research, Data Mining, Financial Analysis, Quality Control and Operational Management. The emphasis is on a seamless combination of the theoretical and the practical. "Our students are tomorrow's business managers, not programmers or statisticians. What is important is that they should understand the benefits that they can expect from various analytical and statistical methods, and they must be able to read and interpret the outputs. Our undergraduate courses give students this basic grounding. So when they face real business problems, either as research students or in the commercial world, they can make valid judgements about the application of SAS software. In today's world it is increasingly important to be able to validate business decisions with the appropriate quantitative methods," says Stankovicová.

"We want our students to have a good feel for business, but we want them to be exact in their approach. This is what will make them highly marketable individuals, because only a minority of management school graduates offer a thorough knowledge of quantitative methods.

"SAS is the best possible support for such an approach."



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