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# Improving Quality of Higher Education Based on Development of Multilateral Institutional Cooperation

**Project activity**
**Short-term mobility of Constantine the Philosopher University in Nitra, Slovakia; visit of pedagogues and PhD students at the University of Iceland**

**Short-term mobility of CPU Nitra students at the University of Iceland**
**September 12 – 18, 2015** (September 12 & 18 are travel days)

**Imrich Jakab PhD** Department of Ecology and Environmental Studies, Faculty of Natural Sciences, Constantine the Philosopher University in Nitra, Slovakia
experienced lecturer, researcher in GIS and national and international projects manager,
**Martin Zemko MSc** Department of Ecology and Environmental Studies, Faculty of Natural Sciences, Constantine the Philosopher University in Nitra, Slovakia
PhD student in landscape Ecology and Planning; geography and ecology teaching graduate

Lecture title: **Ways of using GIS as an effective teaching tool in the field of natural sciences and mathematics**

GIS is a system for capturing, storing, checking, manipulating, analysing and displaying data which are spatially referenced to the Earth. It includes several technological tools, applications and data, which are widely used in both scientific and commercial sector. Our ambition is to introduce GIS as an effective teaching tool for modernization of teaching process in natural sciences and mathematics education. Our lectures will introduce two concrete proposals of teaching process based on cross-curricular relations incorporating elements of discovery learning (IBL) and the World of Work through GIS.

**Project activity**
**Short-term mobility of CPU Nitra teachers at the University of Iceland**
**September 16 – 19, 2015** (16 & 19 September travel days)

**assoc. prof. Sona Ceretkova,** Department of Mathematics, Faculty of Natural Sciences, Constantine the Philosopher University in Nitra, Slovakia
associated professor in mathematics education, experienced national and international project leader, co-guarantor of PhD study program Theory of Mathematics Education, math textbooks co-author

Lecture title: **International projects in mathematics education – experience and perspectives**
Introducing and describing different ideas, activities and materials of projects connected to LLP Comenius DynaMAT (Dynamical and creative Mathematics using ICT; www.dynamathmat.eu), the MaT²SMc project (Materials for Teaching Together: Science and mathematics teachers collaborating for better results; www.mat2smc-project.eu), and the FP7 PRIMAS project (Promoting inquiry in mathematics and science education across Europe; www.primas-project.eu).

**Boris Lacsny PhD** Department of Physics, Faculty of Natural Sciences, Constantine the Philosopher University in Nitra, Slovakia
PhD graduate lecturer and researcher of physics education, experienced teacher in physics

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Lecture title 1: **Loedel diagrams in special theory of relativity**
Introduction to the special theory of relativity (STR) by a little-known geometric interpretation of Loedel's diagrams. We derive the basic relations of relativity and look at the paradoxes in the STR by using the basic knowledge of geometry and trigonometric functions. For its clearness and simplicity, the tool is very useful for teaching students in secondary schools, and is also very popular among future physics teachers.

Lecture title 2: **Microscopic model of knowledge increase**
Learning process can be also interpreted is an activation of long-term and short-term memory. There are numerous approaches that describe this process (Bao, 2006; Meltzer, 2002); our model describes the growth of knowledge level achievable in a group of students by repetition of an activity (expressing success in percentage as a function of the number of repetitions). This model is based on describing the probability of neural connections activation in brain during the process of learning. As evidence from tests conducted on students shows, the model proves to be a powerful tool in assessing the quality of educational courses, and is also useful for comparing the dynamics of learning through various instructional methods.