**Doctoral programs in Slovak Republic**

PaedDr. Michaela Regecová, PhD.
Department of Algebra, Geometry and Didactics of Mathematic, Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, Slovakia
mmikaela@gmail.com

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Slovakia is a young European country (establishment of the state in 1993) that is still in progress. During the 15 years of our history there were introduced changes in all areas of the society including the education.

At the Faculty of Mathematics, Physics and Informatics of Comenius University there are 19 PhD study programmes including *Theory of mathematics education* that was accredited by Accreditation Commission in 2006.

Graduates or students of the last study year of the Master, Engineer or Doctor (previous form of PhD study) university study in any study programme can apply for PhD study at the Faculty (generally they are fresh from college, rarely persons from practise). In the application the following is given by the applicant: the study programme, topic of dissertation thesis, supervisor and form of PhD study (daily form, i.e. with stipend, or external form). The topic of dissertation thesis is chosen by the applicant from the list of dissertation theses topics for applicants for PhD study.

The entrance interview consists of two parts:

a) Written test examining the basic knowledge in the field.

b) Personal interview by the entrance committee. It is aimed at attestation of the applicant's preconditions for PhD study in the selected field, a more detail specification of the supervisor's proposal and the topic of dissertation thesis and discussion on applicant's conception and plans and his/her scientific programme.

The assumption for the nearest future is to admit 2 till 5 applicants of doctoral study per year (it depends on financial resources and on personal capacity at Faculty).

Duration of daily post-graduated study in Slovakia is at least three years (humanitarian and social-science educational programs) and most four academic years (natural science educational programs). Duration is most 5 years in external form.

The PhD study at Faculty of Mathematics, Physics and Informatics consists of the *study part* and *scientific part*. Educational programs of *Theory of mathematics education* contain study and scientific parts in ratio 1:2. The study plan of each PhD student is compiled by the supervisor that manage himself periodicity of meeting with PhD student and working-out of his/her thesis. The choice of research problem depends on agreement between supervisors and PhD student. In study program *Theory of mathematics education* we prefer research problems that could be useful for secondary teaching (analyse of different subjects of secondary teaching, implementation of ICT in teaching/learning process, motivation in educational process, way of increasing effectiveness of teaching/learning process...). In Slovak Republic the supervisors have to be only appointed professors or docent.

The *study part* of the PhD study consists especially of the lectures, seminars and of individual studies of the literature, which is related to PhD thesis. Lectures and seminars are usually ended with exam. Individual study of scientific literature can be divided into the phases and is ended by tutor who gives the students the appointed amount of credits. The study part is focused on a survey of mathematical and pedagogical-psychological disciplines and on intimate knowledge of areas related to subject of doctoral thesis that the PhD student has to acquire. After studies the student should be able to enlarge and deepen knowledge acquired from mathematical disciplines of wider fundamentals of the study program – Mathematics Education, pedagogic-psychological disciplines as well as the methods of quantitative analysis (special statistical methods). He/she obtains new and deeper knowledge concerning utilization of ICT and new trends in the teaching/learning process and

he/she learns to follow them. He/she adopts methodology of work with scientific library and periodical literature and by utilizing Internet sources. He/she will manage to present the results of his/her work at domestic as well as international academic conferences.
The current subjects in study parts are Theory of Didactical Situations, Didactical software in Teaching of Mathematics, Epistemology and Cognitive Psychology, Multidimensional Relations of Didactics of Mathematics, Didactical Engineering, The experiment in Didactics of Mathematics. There are coursework studies core, but particular methods (like statistic analyze with using of CHIC) and theories (like Theory of Didactic Situations) are privileged.
The *scientific part* of the PhD study consists of individual or teamwork of the PhD student, which is bound to the theme of the dissertation. In the scientific part of study the students are led to look up and evaluate scientific information, to adopt the standard methods and forms of science-research process, to interpret and present results of their work at national and international conferences. After the studies the student should be able to apply theoretical skills in problem solving of social practice, to communicate with experts, to specify and analyze their school praxis problems and suggest them model solutions and to help with their implementation. He/she should be able to formulate mathematical problems, projects and other forms of activation tasks for students and contribute to the development of scientific discipline related with mathematics education, but also within the school subjects' relations.
In addition to theoretical knowledge and practical skills and abilities the PhD student should be able to lead on a professional level the teaching/learning process in first level university education (Bachelor's), to participate on organizing student's science work and student's symposium (included international ones), that are touched to the branch problematic, to organize science-research events, inclusive of international participation events, to involve and lead students of lower university level to the actual science problems in the branch and effectively present his/her work results by usage of modern PC tools.
In all forms of doctoral study the credit system is applied. One credit is a base value of student work and in PhD study was defined equivalently as in bachelor's, master's and doctoral study. Standard works charging during academic year are activities, which represent 60 credits. Assessment of PhD students contains study part (lectures, seminars...), creative activity in scientific field (publications, scientific work...), leading of the teaching/learning process at university and working-out of PhD thesis. To finish the PhD study successfully both in internal and external form one has to get at least 180 credits included credits of his/her doctoral thesis. PhD student can ask for the authorization process of thesis' defending when his/her supervisor recommends thesis' acceptance and as student gets 150 credits during his/her study. Requirements for the thesis include high level of analyze and syntheses of knowledge and adequate overview of scientific literature (minimally 100 and maximally 160–220 pages of thesis). The constitution of the committee for the defence of doctoral thesis is determined by a Common specialization committee (nationwide committee) according to its chairman's suggestion.
The graduates of specialization *Theory of Mathematics education* are qualified for these professions: research – pedagogic worker at University, research worker at Slovak Academy of Science and at research institutions, leader of a team in various problem fields that have application nature (e.g. Methodical centres) and manager of Education department. Participation of PhD students in the life of the Faculty after their study is low (4 years ago Dean of Faculty ensure each doctoral student to stay at Faculty in position of assistant lecturer, but in this time it is impossible because of low financial resources), candidates leave school and often go abroad or in commercial sphere.
Accredited PhD study program *Theory of Mathematics education* in Slovakia is very young. Therefore the position of PhD students in labour legislation is often changing and some particular methods and theories prevail in common core of knowledge. Also there are differences between mathematics and mathematics education thesis according to mathematicians because they refuse existence of scientific part in mathematics education. For that reason I consider the most important question of common core of knowledge that could help us to decrease differences between countries

in PhD students´ competences, to compare the range and depth of mathematics content required and manner in which research competence is acquired and so to improve international cooperation.

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