PhD POSTGRADUATE STUDY AT THE INSTITUTE OF MEASUREMENT SCIENCE, SLOVAK ACADEMY OF SCIENCES

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INTRODUCTION

University study and subsequently postgraduate study in Slovak Republic transformed after the year 1990 according to the new law (and its modifications) relating to Slovak universities. Slovak universities are considered to be the highest educational, scientific and art establishments creating a part of scientific and research base of Slovak Republic. The main tasks of the Slovak universities are: to provide the university education and creative scientific research or creative art activities. Slovak universities have right to render the university education and an exclusive right to grant titles and academic titles to graduates of the university study. The universities have right to accomplish a scientific training by the form of doctoral study and an exclusive right to grant scientific-academical degrees.

The PhD study is the highest type of the university study in Slovakia. The goal of the PhD study is to prepare a candidate for an individual creative scientific activity.

An external educational institution is Slovak Academy of Sciences. Some of its institutes after recommendation of the Accreditation Commission and nomination by Ministry of Education of Slovak Republic gained the right to perform the PhD study in one or more scientific domain.

PhD STUDY AT THE INSTITUTE OF MEASUREMENT SCIENCE

The Institute of Measurement Science (IMS) is one of the institutes of the Slovak Academy of Sciences, which has been authorized by the Ministry of Education to guarantee the postgraduate PhD study in the following scientific specializations:

39-71-9 *Measurement Science*
39-52-9 *Bionics and Biomechanics*

The general features are as follows:
Duration of the study: 3 years, title obtained: PhD (Philosophiae Doctor)
Graduation: Faculty of Electrical Engineering and Information Technology of Slovak University of Technology in Bratislava or Technical University in Košice
Possible languages of study: Slovak, English
Requirements:

- MSc graduation certificate,
- entrance examination,
- acquirement of integrated theoretical knowledge and mastering scientific research methods,
- qualifying examination: exam from 2-3 subjects based on selected thesis themes and defence of a tractate (introduction) of the dissertation and dissertation defence.

The residency of the *Measurement Science* specialisation is the Faculty of Electrical Engineering and Information Technology, Slovak University of Technology in Bratislava. For all the postgraduate study of students accepted at the Institute of Measurement Science, the

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Institute is responsible for all the educational process. The commission for thesis defence consists of members from several universities and from 3 members from the IMS.

The residency of the *Bionics and Biomechanics* specialisation and the Joined Scientific Board (JSB) for PhD study is the Institute of Measurement Science. The members of the board are scientists from the Institute and from other 3 universities (2 technical faculties and one medical faculty). The *Bionics and Biomechanics* PhD postgraduate study is designated for students with MSc. graduation and also for students with MD degree.

The general orientation of the *Bionics and Biomechanics* specialisation is as follows: biomedical engineering, automated measuring and monitoring systems, imaging methods, image processing, modelling of biological objects and structures, sensoric systems, neural networks, artificial intelligence, biomechanics, biometrics.

In accordance with the *Bionics and Biomechanics* main orientation, the postgraduate student must pass a qualifying examination (exam from 2-3 subjects based on selected thesis themes). The following examination topics are possible:

Examination of general character:
Selected parts of mathematics; Selected parts of physics; Theoretical electrical engineering; Information and signal processing theory; Theory of electromagnetic field; Probability and mathematical statistics.
Examinations of specialisation:
Biophysics; Normal anatomy, histology and embryology; Biochemistry; Modelling, simulation and control in physiology; Biotechnology.
Electronic measuring methods, sensors and instrumentation; Imaging methods and systems; Digital processing of image and speech signals; Computerized signal processing; Analysis and processing of biosignals, Biomedical electronics; Biomechanics; Bio-cybernetics and bio-control; Bio-materials; Biomedical optics; Biological effects of non-ionizing electromagnetic fields; Medical informatics; Artificial intelligence; Applied mechanics; Rehabilitation engineering; Reliability and security of medical equipment.

Selection of examinations depends on the adviser of the particular student, on the accessibility of selected courses at the universities or at the IMS and after approval of the chairman of the scientific board. The adviser decides if the particular student have to pass examinations from two world languages. The language certificates issued by language oriented universities or by international language establishments are accepted.

The candidate in the second year of the study must defence a tractate (introduction) to the dissertation. He has to demonstrate the correct orientation of his research and to present results prepared for publications. Usually this defence is connected with examinations in front of board nominated by the chair of the JSB.

The postgraduate study is completed by a public defence of the thesis in front of a board consisting of a chair and at least 6 members of the JSB. The thesis is reviewed by 3 independent reviewers. The dean of a faculty will grant the PhD title (after approval of the scientific board of the faculty) on recommendation of the chair of the Joined Scientific Board.

References
[1] Internal materials of the Joined Scientific Board for Bionics and Biomechanics, 1998
[2] Decree of the Ministry of Education of Slovak Republic, No. 131/1997 and No. 30/1997.
[3] J.Bajcsy, V.Pavlicova, Scientific Education in Measurement in Slovakia, Journal of Electrical Engineering, 49, No.9-10, pp. 276-279