

# Modern Surveying Education in Slovakia

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**Key words:** University Education in Slovakia, Student Mobility, Harmonisation of University Education, Postgraduate Education, Diploma and Licence Acceptation in Europe.

## ABSTRACT

Present state of the university education in geodesy and cartography in Slovakia. The compatibility of study models of universities in Bratislava, Košice and Žilina, the basis of the mobility of students. Quality comparison of study models. Confrontation of models used by Slovak universities to the foreign models. Harmonisation efforts of international organisations are oriented to international mobility of surveyors and cartographers. Participation of Slovak universities at these efforts. Harmonisation in the area of diploma and licence acceptance. Post graduate education – necessary phenomena of surveyors in the future. Post graduate surveying education model of the Chamber of Slovak Surveyors and participation of STU in Bratislava on its application.

## ZUSAMMENFASSUNG

Die aktuelle Stand der geodäsie und kartographie Ausbildung in slowakischen Universitäten. Kompaktibilität der verschiedenen Studienmodelle der Universitäten in Bratislava, Košice und Žilina als Basis der Studentenmobilitäten. Qualitätsvergleich der Studienmodelle. Vergleich der slowakischen und ausländischen Studienmodelle. Die Harmonisierungstendenzen sind für die internationale Studentenmobilitäten im Bereich der Geodäsie und Kartographie orientiert. Die Teilnahme der slowakischen Universitäten auf diesen Programme. Harmonisierung in der Bereich der Diploma- und Lizenzakzeptierung. Postgraduateausbildung - ein notwendiges Phenomena der Vermessungsingenieure in der Zukunft. Das postgraduate Ausbildungsprogramm der Slowakischen Kammer der Vermessungsingenieure und Zusammenarbeit der STU in Bratislava bei dessen realisation.

## CONTACT

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## 1. CONTRIBUTION

In the last century were carried out important social, economic and political changes in Europe, which reflect in the area of university education, too. In European countries are increase the number of students at universities. We evidence more than 50% increase in many countries. These changes need the re-structuralisation of university education in whole of brightness. As challenge to this re-structuralisation can be understand the Bolonese declaration, signed in 1999 by ministers of education of many European countries.

The European university education must react the variability of student population which is coming to universities and commonly must fulfil the requirements of the praxis, to decrease the number of high educated professional staff. The praxis defines exactness the education level of the future professional staff. It needs not only theoretically educated research personal, but personal able to creative way deepen the knowledge in their area. In the light of the requirement of the continual professional development (CPD) will be increase the significance of the postgraduate form of higher education (PhD. and another form of study).

The Bolonese challenge declares the creation of the common education space in Europe, with student and education staff mobility and clear system of education levels organised in series. It is shows, that these requirements can fulfil the system of education, which is similar to the system of universities in England, or in USA, they include the bachelor, master and PhD. study. The economic conditions (possibilities) of more European countries enable the application of the pyramid system with successive reduction the number of students at the higher level of study. The study at the higher level is conditioned by successful graduation at the below level in the same area of interest and successful entrance examination.

## 2. HARMONISATION OF THE SLOVAK AND EUROPEAN HIGHER EDUCATION IN GEODESY AND CARTOGRAPHY

Geodesy and Cartography programs are in Slovakia at the Slovak University of Technology (STU) in Bratislava and at the Žilina University in Žilina (Fig.1). The first of named universities provide programs at all of education levels (bachelor, master and PhD.), the second had accreditation only for the bachelor program. In similar field of study's (mine surveying, geography, space-photogrammetry etc.) are provided study programs more than five universities, e.g. at the Komensky University in Bratislava, Technical University in Košice, Technical University in Zvolen.

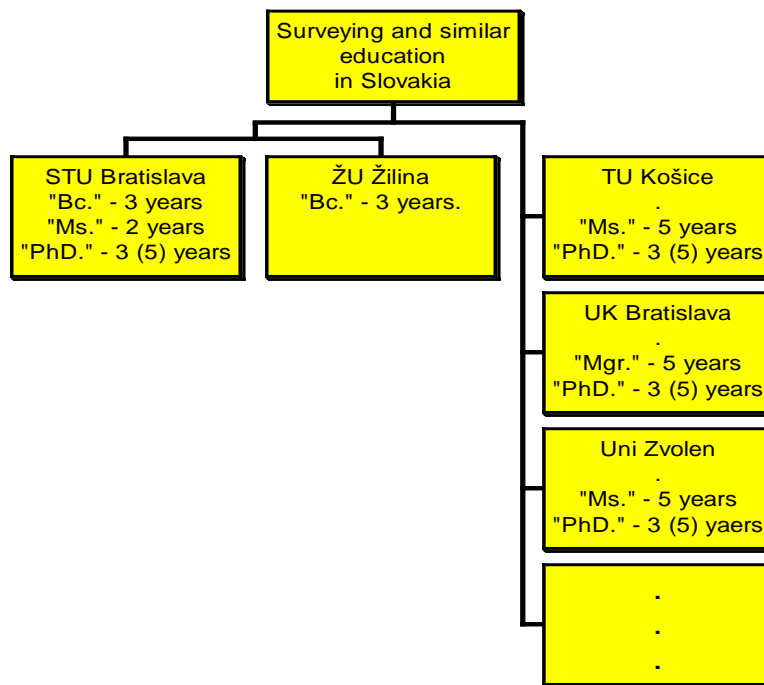


Fig.1

Various study programs, mainly their heterogeneous contents unable the mobility of students, declared by Bolonese challenge. The first step must be the harmonisation of contents in Slovakia and consecutive in European region. In Slovakia was held the first meeting of the representatives of TU Košice, ŽU Žilina and STU Bratislava in November 2000. The partners started the harmonisation at the basis of curricula contents of the STU Bratislava, which was accredited in April 2000.

At European level was started the process of harmonisation at the workshop in Delft – November 2000, which was organised by FIG Commission 2 and CLGE. At the workshop was presented the first results of the curricula contents analysis of European universities. In future will be these complete by information from universities of middle and east European countries [5].

Second important activity in the field of curricula contents harmonisation is the international project of European Faculties of Civil Engineering – EUCEET. The aim of this project is supporting of international student and education staff mobility. The project was started in 1998 with participation of more than 15 faculties. The Faculty of Civil Engineering of the STU Bratislava was participate on the EUCEET project. Our faculty completed the project data base by the curricula contents of tree Slovak civil engineering faculties, the faculties of Civil Engineering of the Žilina university of Žilina and TU Košice, too. As results of this project is the publication which included the basic information about faculties and the curricula contents of all provided study programs. In frame of this project was completed individual publications about the participated faculties, which include all information's about the faculty, their curricula contents, education staff, libraries and laboratories. In this

publication are included the information about accommodation and cultural live in the city and country, too [1].

Both international projects prepare information's they will be discuss at universities and EU Commissions. Result of this bright discussion should be the optimal model of study, they should be accepted by universities as standard in university education.

### **3. QUALIUTY OF THE HIGHER EDUCATION**

Valuation of quality of the higher education in different countries, at different universities is very complicated process. In point of view of the European mobility programs should be this problem solved in next years and minimum at the European level. Non-acceptance of international trends at university, the results of international projects lead to isolation from the community of universities and from possibility to participate on international co-operation.

The quality of the higher education in Slovakia is controlled (guaranty) from the site of government by these processes:

- by the accreditation of current and new curricula contents,
- by the evaluation of faculties with ministry commission with the period of tree years.

It is true, that both of those processes are more oriented to fulfil of the quantitative or formal criteria as qualitative criteria. The results of accreditation are the admission for the faculty to educate and give the title in relevant field of study. The faculty evaluation is the valuation process specially oriented to categorisation of evaluate subjects, to arrange the faculties for determination of the volume of financial support (budget) from the government.

The exact achievement of accreditation criteria require at first fulfil the personal requirements and at the second the material requirements. The quality criteria of the pedagogical process are so repressed (eliminated) by the evaluation process. Another way the faculty evaluation is more oriented to the quality (quality assurance). In this process is the faculty evaluated as complete and not the provided study programs at the faculty.

To this time fully absent the quality assurance of the pedagogical process from the point of view their results – the graduate students. They are missing any informations in this process about acceptance the graduate students in praxis, on the international job market. The analysis this art make self the universities or faculties only, to receive arguments for advertising of new students. New information can be given here by firms, by chamber and alumni clubs of universities.

As outgoing point can be accepted for the quality assurance of the education at universities the criteria defined by the European Association for International Education (EAIE). The complete environment for university education higher quality include [4]:

- Design of study programs and curricula contents
- Education, self development and valuation,

- Individual work with students (consultations)
- Motivation of students for effort increasing
- Materials sources for self development
- Quality valuation.

The university education higher quality is characteristic with conditions suitable for purchase of the new and permanent knowledge, with climate which stimulate the students to create and understand the relations between old and new knowledge. Creating conditions they enables creative work of students with aim to apply the new knowledge solving the problems, build model situations to encourage students to achieve their competence give knowledge another, together create environment their encourage students to achieve new and new knowledge.

Heterogeneous materials and basis for quality assurance of education process in separate countries unable the formulation of exact criteria and recommendations. The university environment enables the organisation of workshops, provides discussion and periodically sessions of university management and academic staff. The university should provide continual development and self development of education staff, support the horizontal and vertical communication inside the university. The university environment supports student networks, creates connection between research and education, organises seminars, conferences and workshops, student and education staff mobility. Supports communication between universities and their partners, users of research results and sponsors [4].

#### **4. CONTINUAL PROFESSIONAL DEVELOPMENT**

Connection to permanent technology development is remaining the requirements on professional education of surveyors and cartographers. The universities must provide not only pre-gradual study programs, but continually post-gradual programs, too. In Slovakia are provided by universities PhD. study programs (three to five years duration) and specially oriented short-time programs (courses). For the continual professional development (CPD) process are significant the continually organised seminars, conferences and presentation of research results. It will be important to support the information change and communication between professional staff of firms and universities [2].

Commonly with political changes in 1990 are new professional organisations, chambers and associations formed in Slovakia which conjugate providers of regulated profession. By organisations are exactly defined the requirements for professional development of your members. For example the membership of Chamber of surveyors and cartographers (CSC) is conditioned with short course which is graduated by examination. The course contents are defined by the CSC and the course is provide by Department of Surveying at the STU Bratislava [3].

By CSC are conjugate approximately 600 surveyors from about 5000 university graduates in the field of study Geodesy and cartography. In Slovakia exists the second group of surveyors with professional surveying education which are provided by specially oriented high schools. For the graduate of these high schools are not obligatory to take part on any of CPD program. Graduates of these schools can't so provide the profession in fully brightness. They can

provide about 80% of surveying tasks, the last 20% of tasks they can provide only under the control of the members of CSC. This situation is given by historically evolution in our country and can be interpreted as non standard from the point of view the international co-operation. Next years should be established the association of the graduates of surveying high schools and created the specially oriented CDP program.

## 5. CONCLUSION

The existence of fully obligatory system of CPD defines the quality of providing the profession in country. The actually situation in our country obliges to development the university graduate surveyors, they are presented your professional quality at many level (bachelor and master examination, diploma, examination of CSC, etc.). In another way the provider of profession with specially high school education is not oblige to professional development by any law, regulation or membership at professional association. The existing CPD system should be enhanced next years to the area where it is missing.

The harmonised professional environment, that undertake the providing of profession at higher level of quality, is one of the basic requirements of the integration the country to international structure. The participation of our country in non-government organisations must in next years focused to the active attendance in commissions and realisation of the resolutions from these sessions in our country, in area the quality assurance, too. Fulfil these aims should:

- Build in quality assurance in all education process and models
- Introduce (establish) these mechanism at universities
- Apply quality management systems developed in another countries for the development of our quality management systems to achieve high quality by surveying education,
- Assure fully acceptance and obligatory of CPD system for all surveyors in country
- Support quality management systems in surveying firms and corporations.

The universities should participate on education of management and design of quality management systems. The university staff must be prepared to accelerate and support this process. The main form of education will be post-gradual courses with typical signs of CPD.

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## **BIOGRAPHICAL NOTES**

Since 1998 Associate Professor at the Slovak University of Technology in Bratislava. Study of Geodesy and Cartography at the University of Bratislava, doctoral degree (PhD.) 1986, 1987-1998 Senior Lecturer at the Department of Surveying of the Slovak University of Technology in Bratislava. Guest lecturer and research worker at the University of Technology Budapest (Hungary), University of Technology Vienna (Austria) and the Slovak Academy of Sciences in Bratislava. Lectures at the Technical University of Dresden (Germany), Technical University of Novosibirsk (Russia), University of Technology Vienna (Austria), University of Miskolc (Hungary) and Research Institute of the Hungarian Academy of Sciences Sopron (Hungary). Member of FIG Working Group 6E, Special Commission 4 of IAG and the Proof Commission of the Slovak Board of Surveyors and Cartographers, Chairman of the TC 89 Geodesy and Cartography for STN in Slovakia 1999. Author of about 50 publications and 22 conference presentations, editor of 3 books.