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DYNET PROJECT – DAAD JOINT CURRICULUM DEVELOPMENT IN CIVIL ENGINEERING OF UNIVERSITY OF NIŠ

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Abstract. *DYNET Project has greatly contributed to the development of high engineering education at the University of Niš, since year 2000. This project has been financed by the German DAAD program, in the framework of the South East Europe Stability Pact, and the goal of the project is primarily development of high education in the region, and education of young engineers. The project began at the Ruhr University of Bochum (RUB) in cooperation with the Universities of Niš (UN), Skopje and Sarajevo, and later expanded to other universities. The basis of cooperation is a very successful long term cooperation of two universities of RUB and UN, that dates back to 1975 and which has been managed by professor Guenther Schmid of the University of Bochum.*
A reform of the Curriculum was initiated at the Faculty of Civil Engineering and Architecture of Niš in 2000 and it has been officially underway for three years. The programs have been organized along the principles of the Bologna process. The studies are divided into three levels: Bachelor Studies, Master Studies, and Doctoral Studies.
The programs of the studies comprise study fields such as bridges, tunnels, hydraulic engineering, road and rail networks or residential, commercial and industrial buildings.
The paper promotes the benefits of the participation of the Faculty of Civil Engineering and Architecture of the University of Niš in the DYNET project, as well as the analysis and challenges which were present in the process of engineering education.

Key words: *Project, High Engineering Education*

1. INTRODUCTION

The idea about DYNET -Project arose from the needs for a long-term establishment of a network in the programme for higher education of students and graduates in Civil Engineering between Germany and the South Eastern European (SEE) region. The region needs specialized civil engineers that are deficient for the time being. This project should contribute to partial overcoming of such a deficiency by further education and advanced

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training of civil engineers. It also means physical establishment of a computer network for data exchange and access to the computer capacities of the network servers in Germany, particularly those at Ruhr- University Bochum (RUB).

This should not be limited to Bochum in Germany only. DYNET -Project founded in 2000 on the initiative of the Ruhr Univesity Bochum and Univesity of Niš, Skopje and Sarajevo, the programme houses today project partners from 7 universities in Germany (Bochum, Aachen, Braunschweig, Hamburg-Harburg, Kassel, Weimar and Wupertal) and 12 from South Eastern Europe (Niš, Skopje, Sarajevo, Beograd, Novi Sad, Subotica, Podgorica, Mostar, Iasi, Bucharest, Tirana and Sofia). The German Academic Exchange Service (DAAD) supports this project within the framework of the Stability Pact for South Eastern Europe.

Some conditions will also have to be fulfilled for the DYNET establishment. The contact between the partners participating in the project, the exchange of teaching- research material and literature shall be accomplished gradually via electronic media in the course of time. The main prerequisite for the accomplishment of the previously mentioned activities is the availability of adequate modern computer equipment to the partner universities of Southeast Europe.

2. ENGINEERING EDUCATION AND RESEARCH PROGRAMMES OF DYNET

In the framework of DYNET, fast communication should be enabled via INTERNET as an important integral part of a well functioning network. For this, an Internet connection will be created among the included faculties by means of a computer network. The equipment available at the University of Bochum shall be used and the universities in Skopje, Niš and Sarajevo shall be equipped with server client systems. This shall enable partner universities in Southeast Europe to use the high-capacity computers in Germany and establish university partnership within broad European perspectives.

The primary objectives of the DYNET network is practical improvement of research in Southeast Europe, scientific exchange, support to the teaching process and demonstration of interrelation. The following activities have been planned:

Workshop on Computational Structural Engineering and for Higher Education in Civil Engineering (Harmonizing Teaching) and Workshop for Young Engineers in Skopje, Beograd, Herceg Novi and Vlora. A successful example were the Workshop - "Harmonization of Curricula at the subject of Timber Structures and Building Structures at the universities in Southeastern Europe" organized by DYNET CENTER NIŠ, held between 16-17th October 2003 in Belgrade.

Organization of a master course "Earthquake Engineering" in Skopje since 2001 and "Computational Engineering" in Belgrade since 2004 and PhD Program "SEEFORM" in Skopje since 2004 (Tab. 1)

Table 1. Number of students in the Master and PhD study system from DYNET Project

Year	2000	2001	2002	2003	2004	2005	2006
Master students	0	20	42	44	37	33	18
PhD students	0	0	0	0	10	10	10

Training of students from Southeast Europe in Bochum by participation in a master course on Computational Engineering with duration of four terms and short study stays in Bochum;

Exchange of Ph.D candidates and post-graduate students;

Exchange of professors from the universities in research and teaching processes;

Lectures and seminars could be held, for instance, in the framework of the Bochum master course on Computational Engineering as well as in the framework of the master course to be held in Skopje;

Joint organization of professional sessions;

Mutual support to education process through exchange of teaching material. Advantage should be given particularly to the material from the Bochum master course which is held in English language. However, the educative material in German shall also be useful, since many of colleagues from Southeast Europe know the German language;

Concrete support to the research of Southeast Europe colleagues. This involves financing of hardware and literature, exchange of software, invitation to professional sessions;

Intensive exchange of colleagues in Southeast Europe. Particular attention should be paid to comparison of curricula in the field of Structural Mechanics and Dynamics and exchange of results from investigations;

Preparation of joint publications and their presentation on Internet.

The Ruhr-University in Bochum has had long years of contacts with the universities in Skopje, Niš, and Sarajevo that shall be the very core of DYNET -Project.

3. Development of partnership Civil Engineering faculty of the Ruhr University of Bochum and the Civil Engineering faculty University of Niš

Within the frames of the university partnership established in 1975, the Civil Engineering faculty of the University of Bochum and the University of Niš had cooperated in the field of investigation and advanced training of young scientists until politically conditioned sanctions were imposed by the European Union. The Faculty of Civil Engineering of the Ruhr-University Bochum that is currently engaged in the project has organized seminars and block-lectures at the University of Niš on several occasions. Present professors from Niš who are included in the project, stayed as researchers at the departments of their colleagues in Bochum. The successful cooperation resulted in joint publications issued by the project partners and the successful university teaching careers of two colleagues from Niš.

Particularly successful cooperation in the period 1984-1991 took place in the field of Timber Structures, where a researcher from Niš, successfully produced a doctoral dissertation at RUB, and took part in the research projects with the colleagues and professors from Bochum, and published scientific papers and books.

The link between the University in Skopje and the Civil Engineering Faculty of Bochum originated in the common teaching and research interests of the Institute of Earthquake Engineering and Engineering Seismology (University of Skopje) and the Institute for Structural Engineering at the Ruhr-University, in addition to the advantage of the small distance between the University of Skopje and the partner University of Niš and the

traditional good scientific cooperation between the two (Former Yugoslav) Civil Engineering faculties in the earthquake engineering field. In 1984, the scientific cooperation culminated with the signing of the agreement for cooperation between the two scientific institutions. The universities of Skopje, Bochum, Bristol and Milan organized master and doctoral studies (International Post-Graduate Studies in the Field of Earthquake Engineering) at the Institute of Earthquake Engineering and Engineering Seismology in Skopje in 1991 in order to improve the teaching process. However, due to political reasons, the financing of the successfully started studies was cancelled after only one year.

The scientific cooperation between the University of Sarajevo and the Ruhr-University Bochum started in 1995. The exchange of a colleague from the University of Sarajevo who worked at the faculty of civil engineering in Bochum brought about a relevant development at the University of Bochum.

Since the establishment of the Civil Engineering Faculty at the Ruhr-University, its highlights have been Structural Engineering and Soil Dynamics as well as Computer Simulations and Computer Science in Engineering. These highlights of research and teaching process have been emphasized by special spheres of research like Dynamics of Bearing Structures (1982 to 1994), post-graduate program (Computational Structural Dynamics) and the improved foreign countries-oriented master studies (Computational Engineering) through DAAD. The professors of the Ruhr-University Bochum were and are still engaged with these highlights of teaching process and research.

The mentioned long years of experience in Structural Dynamics and Soil Dynamics and Computer Methods as well as the newly established master studies Computational Engineering were motivated by the wish to help, within the DAAD Program - Academic Reconstruction of Southeast Europe, the colleagues in Southeast Europe to persevere in their efforts toward improving the teaching process and research as well as to improving quality and following of modern world trends.

The idea for the establishment of a regional centre for civil engineering at the University of Skopje was based on the already available infrastructure. Namely, the Institute for Earthquake Engineering and Engineering Seismology at the University in Skopje represents an excellent basis for the realization of the proposed project from both architectonic and personnel point of view. Particularly important are the existing conditions for performance of experiments, i.e., the availability of the shaking table, laboratories and other equipment. With its presentations at international professional meetings, this Institute has become world-wide recognized institution in the field of dynamics. This Institute had been a regional research and teaching centre before the clashes in former Yugoslavia and has remained such after the disintegration of Yugoslavia.

The presented long term project is based on the experience in teaching process and research at Bochum.

The proposed project has two essential objectives that are very closely interrelated. One of the objectives is establishment of network connection of German faculties and faculties of Southeast Europe that shall not be limited by political borders, leading to improvement of science and education process in the states of the Southeast Europe as well as institutionalising of exchange of scientists between the partner faculties. The network with the regional center - Skopje shall be focused on Structural Dynamics, with the name DYNET.

The main objectives of the Dynet Project are:

- Improvement of the level of knowledge, transfer of knowledge and its practical application in structural dynamics necessary for the protection of people and properties against the effects of catastrophic earthquakes;
- Elaboration of recommendations for harmonization of education, training programs and teaching materials which will finally lead to greater coherence of higher engineering degrees and diplomas;
- Increase of mobility of professors and students, which plays a major role in the process of educational, social and cultural relationships;
- Co-operation with the governmental local authorities in training of leading staff for improvement of urban planning in earthquake prone regions as well as quality control in the current design and construction practice;
- Harmonization of regulations for construction in SEE with Western European ones, for the purpose of faster integration of SEE into the European trends.

In addition to the establishment of DYNET, a Master-Course is in plan to be organized at the Institute of Earthquake Engineering and Engineering Seismology (IZIIS) at the University in Skopje to improve education of graduate students in the related field. The improvement of the teaching process and research at the high education centers included in the network shall make them attractive again for promising students in Southeast Europe. This shall have long term effects on the decrease of the rate of emigration of good students and young scientists and shall result in permanent re-evaluation of university studies and economic development of the region. The master course in Skopje should serve as an example for organization of similar courses at other faculties within the Southeast Europe network. The extension of these master courses to other important issues could be set out as further goal. The proposed project shall enable sustainable and permanently extendible offers.

DYNET should create the basis for permanent cooperation between the countries of the South East Europe and Germany, with the possibility of being extended to other countries. In addition to the support given to education of students, particularly by exchange of post-graduate students and young scientists, DYNET should contribute also to lively exchange of knowledge.

Through providing of sound scientific basis and practical education, the master course offered in Skopje shall result in well trained students that are ready to cope with engineering practice and research, which shall make them competitive with their colleagues from other parts of Europe. In the long run, these actions shall result in economic and scientific development of the region.

The Ruhr-University Bochum and the universities in Skopje, Niš and Sarajevo shall be the very core of DYNET.

In the near future, the neighboring countries in the Southeast European region shall also be included in this collaboration.

Each of the faculties participating in this project will participate in creation of educational programs, participate in educational performance, select suitable candidates for Master's and short term courses, give suggestion for Master's theses, monitor and evaluate the post graduate courses and internationally promote the collaboration.

4. DEVELOPMENT OF THE CIVIL ENGINEERING FACULTY OF THE UNIVERSITY OF NIŠ FROM ITS FOUNDATION UNTIL THE BOLOGNA PROCESS

The University of Niš was instated as an independent degree-granting institution on June 15, 1965**.**

Its establishment completed an important, in many ways pioneering, period in the more recent history of the city which started in 1960 when the first undergraduate programs commenced in Niš under the academic patronage of the University of Belgrade. They were institutionalized as the faculties of Law & Economics, Medicine, and Engineering, constituting a core from which a more and more complex and richer physiognomy of the University would systematically develop, following the demands of times and life itself.

The increase of the student population, the development of new disciplines and the rising needs of the immediate and broader industrial and social environment brought about a reorganization of the existing faculties and foundation of new ones.

In 1968 the Department of Electronics grew into the Faculty of Electronic Engineering;

In 1970 the two departments of the Faculty of Law and Economics became independent faculties;

In 1971 the Departments of Mechanical and Civil Engineering became separate, independent faculties. In the same year, the Faculty of Philosophy was established with its seven departments: Mathematics, Physics, Chemistry, Sociology, Psychology, English and Physical Education;

In 1972 the Faculty of Occupational Safety grew out of the Faculty of Civil Engineering;

In 1979 the Faculty of Technology was founded;

In 1987 the Faculty of Philosophy grew to include the Department of Serbian Language and Literature;

In 1993 the Teacher-Training Faculty in Vranje enrolled its first generation of students;

In 1995 the Faculty of Civil Engineering expended its academic mission to include a new department - of Architecture which was consequently added to its name;

In 1998 the academic structure of the Faculty of Philosophy widened to include the Department of History. In the same year the Faculty of Fine Art and the Faculty of Applied Art and Design of the Belgrade University of Art opened their academic divisions in Niš;

In 1999 the Faculty of Science and Mathematics and the Faculty of Physical Culture grew out of the Faculty of Philosophy;

In 2000 the University family became richer for six new departments: Geography and Biology with Ecology (adjoined to the Faculty of Science and Mathematics), Philosophy, Pedagogy, Slavic & Balkan Studies and Art (attached to the Faculty of Philosophy).

On 18th May 1960 the Republic of Serbia Assembly passed a decree, based on the law, to found the Faculty of Technical Engineering in Niš, with Civil Engineering, Electronic Engineering, Mechanical Engineering and Architecture divisions, and later with the division of Occupational Safety. For the first five years the Faculty of Technical Engineering functioned within the University of Belgrade, and the first students were admitted on 1st October 1960.

The University of Niš, as a union of all the faculties in Niš, was founded in 1965. Rapid development of the Faculty of Technical Engineering brought about the forming of separate faculties from the existing divisions. Thus in 1970 the Civil Engineering division of the Faculty of Technical Engineering became the Faculty of Civil Engineering, and on 2nd February 1998, after the act of the Republic of Serbia Government, the Faculty of Civil Engineering changed its name into the Faculty of Civil Engineering and Architecture.

There are 1193 full-time and 614 part-time students studying at the Faculty of Civil Engineering and Architecture. From 1960 to 30th September 1999 2636 students graduated from the Faculty.

There are 94 teachers and assistants at the Faculty, 43 with doctor degrees and 24 with master degrees.

The Faculty is equipped with modern teaching aids, a computer centre, numerous laboratories and a library which boasts 12,000 volumes.

The freedom of professional and creative work in the field of science and education is guaranteed at the Faculty.

The Faculty is educationally and scientifically autonomous, in compliance with the Law of University. Its premises are inviolable. The Faculty activities are conducted in its premises; they can also be conducted out of the Faculty premises and abroad, with prior founder's consent. For successful accomplishment of its activities the Faculty obtains resources on the basis of the contract with its founder. For providing of scientific, professional, and educational services, as well as for its other activities, the Faculty obtains resources on the basis of contracts with the users of the above services. The Faculty of Civil Engineering and Architecture belongs to the University of Niš. The teaching process is conducted in Serbian language.

The reform according to Bologna Process started at the University of Niš -Faculty of Civil Engineering and Architecture in the academic year 2005/2006.

In the following period until 2010, a consistent concept of higher education is to be established on the European continent based on so called 'ECTS' system (i.e. European Credit Transfer System) and absolute mobility of students, teachers researchers and administrative personnel within the frameworks of European universities! This will enable all graduate students a free access to European labor market with automatic recognition of their diplomas regardless to the country and university where they were acquired.

The stated concept of Faculty of Civil Engineering and Architecture, anticipates so called three-cycle study system – "undergraduate : BSc (3 yrs 180 ECTS), graduate : (MSc (2 yrs 120 ECTS), postgraduate (PhD (3yrs 180 ECTS)" with the simultaneous insurance of demanded quality of studies and accreditations to higher educational institutions at the European level.

The basic idea is that students, after completing an entire university teaching cycle, receive adequate diplomas (BSc, MSc, PhD) and that they are empowered to perform certain jobs for which interest and need on the labor market exist.

5.CONCLUSION

The scientific network DYNET and the Faculty of -Civil Engineering and Architecture Graduate School for Master and PhD formation- have adopted this line considering the special requirements of the SEE academia after its reconstruction also.

The concrete activities in Faculty of Civil Engineering and Architecture that should be carried out in the following period refer to:

Evaluation of the existing curricula and programs and establishing initiating grounds for introducing ECTS, Setting up a modular way of teaching based on one-semester subjects, Introducing a larger number of elective subjects, Creating conditions for mobility, first at the level of the state union the Faculty of -Civil Engineering and Architecture, and of Serbia, and then within the Balkans and finally within Europe, and Providing conditions for permanent engineering education, so called lifelong learning.

REFERENCES

1. Hedberg, T, "The Bologna Declaration and European Engineering Education" SEFI, 2001
2. Hedberg, T, "The Implementation of the Bologna Declaration in Higher Engineering Education. A Collection of opinions through the SEFI National Representative Network", 2002, p. 26
3. Mc Grath, D, "The Bologna Declaration and Engineering Education in Europe", IEI, 2000, p. 16
4. "The European Higher Education Area - Joint declaration of the Ministers of Education Convened in Bologna", Bologna, 1999
5. DAAD, "Academic reconstruction in Sout Eastern Europe-Interim Review", Bon 2000 to 2003
6. Andjus V., Stojic D,"Engineering Education in Serbia -Problem identification and proposals for solution" Facta Universitatis, Vol 2, N 4, University of Niš, 2002, p. 273
7. Hoefer R., Hubert W. "Sustainable Reconstruction of Hihher Engineering Education in Sout Eastern Europe" Proceedings of the Vlora Workshops, Vlora- Albania 2006. p. 199
8. Andjus V., Stojic D, "Engineering Education Reform in the Universities in Serbia, International Conference on Engineering Education and Research "Progress Through Partnership", Ostrava 2004, p.179

PROJEKAT DYNET-DAAD PARNER U RAZVOJU NASTAVE GRAĐEVINSKE STRUKE NA UNIVERZITETU U NIŠU

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Dynet projekt je u velikoj meri doprineo razvoju visokog inženjerskog obrazovanja na Univerzitetu u Nišu od 2000.g. Ovaj projekat je finansiran od strane nemačkog DAAD programa u okviru Pakta za stabilnost jugoistočne Evrope, i primarni cilj ovog projekta je razvoj visokog obrazovanja mladih inženjera u regionu. Projekat je započet na Rur Univerzitetu u Bohumu (RUB) a u saradnji sa univerzitetima u Nišu, Skoplju i Sarajevu, a kasnije se proširio i na ostale univerzitete. Osnova saradnje je veoma uspešna dugoročna saradnja između dva univerziteta RUB i Univerziteta u Nišu, koja je počela davne 1975.g. i čiji je inicijator bio profesor Guenther Schmid sa Univerziteta u Bohumu.

Reforma nastave je započela 2000.g. na Građevinsko-arhitektonskom fakultetu u Nišu, a zvanično se primenjuje tri godine. Program je organizovan po principima bolonjskog procesa. Studije su podeljene na tri nivoa, Bečelor, Master i Doktorske studije.

Program studija objedinjuje oblasti kao sto su mostovi, tuneli, hidroinženjering, putevi i železnice, stambene, javne i industrijske zgrade.

Rad ističe prednosti učešća Građevinsko-arhitektonskog fakulteta u Nišu u DYNET projektu, a takođe i analizu i izazove koji su bili prisutni u procesu edukacije.