

# Hungarian Participation in International Engineering Exchange Programs

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**ABSTRACT:** *Hungary (together with 9 other Central and Eastern European countries) joins the European Union in May 2004. This act is the end of a transition process lasting 15 years.*

*The 1<sup>st</sup> half of this period can be characterized by the adaptation of "western" higher educational methods (autonomy of institutions, increase of number of students, introduction of credit system, new programs etc.).*

*In the 2<sup>nd</sup> half most of the institutions joined the international networks, programs (e.g. EU Socrates, Leonardo).*

*The paper gives an evaluation of this period based on the experience of Budapest University of Technology and Economics (BUTE), issuing ca. 70% of engineering diplomas, considered equivalent to M. Sc., in Hungary. Several programs (newly introduced in international cooperation) are presented (creation of foreign language branches, short cycle /2 years/ engineering training forms, sandwich type education, cooperation leading to double degrees etc.), and considered mainly from the viewpoint of their sustainability.*

*A special emphasis is given to international academic and practical placement parts of these programs. A systematic analysis is given for the success stories according to the formulated main topics (language barriers, schedule differences, ..., faculty and institutional support) of the workshop.*

*The author has been actively involved in international engineering cooperation since 1990 as, project coordinator (e.g. TEMPUS, PHARE), director of Engineering Programs in French, BUTE responsible for foreign internships. He is a regular participant of ICEE conferences.*

## 1 INTRODUCTION

This paper presents the development in the last 15 years and the future plans of Budapest University of Technology and Economics (BUTE, founded in 1782, www.bme.hu), the most important Hungarian technical higher educational institution. The basic objective is to inform our existing and potential partners, to share the experience, to initiate further co-operation.

The example of BUTE is more or less typical for the whole region of Central-, Eastern European countries. Detailed information about the Hungarian educational system in English can be found on the homepage of the Ministry of Education (www.om.hu). A comparative presentation of several European countries with useful links is developed by the FACE (Forum for Advancing Chemical Education) Leonardo project (www.face.net.tc).

At the mid 80-ties BUTE used to be a "classical" technical university with 6 faculties (architecture, chemical, civil, electrical, mechanical, transportation engineering), 5 year (bac+5) study programs in Hungarian.

Nowadays the picture of Budapest University of Technology and Economics is much more diversified. BUTE defines itself as a multilingual higher educational and research institution. The basic changes (caused by adaptation of EU, USA practice, international, regional trends, development of ICT etc.) are:

- Another 2 new faculties (natural sciences, economic and social sciences) have been created.
- New training programs related to engineering (e.g. biomedical, design, engineer-manager, environmental, informatics, mechatronics), related to other fields (economics, mathematics, physics etc.) have been introduced.
- The number of students was doubled by 2000, at this moment it is ca. 15.000. The number of staff is slightly decreased, there is about 1.000 teaching and research personal.

- There are more "outputs" of the system, e.g.: bac+2 years (120 credit points - accredited higher level professional education), bac+3 (180 credit points, college), bac+5 (300 credit points, diploma engineer considered equivalent to M.Sc.), bac+8 (480 credit points, Ph. D.).
- BUTE has academic training in 5 languages: Hungarian, English, French, German, Russian. Their detailed description (together with the programs offered) can be found on the homepage ([www.tanok.bme.hu](http://www.tanok.bme.hu)).
- The students' (and professors') foreign mobility (both academic and practical placements) has been increased importantly. In the early 90-es it was supported by special regional programs (e.g. PHARE, TEMPUS). Later Hungary (and BUTE) joined the international programs (mainly European, e.g. Socrates / Erasmus, Leonardo da Vinci).
- BUTE considers the strengthening of economy - university relations as an important, permanent task. It is carried out by different, partly organised, methods (e.g. enterprise representatives at the university councils, conventions).

Some of the listed above new elements were discussed at earlier ICEE conferences [1-5] as well This paper will concentrate on the basic structure, activities related to the incoming and outgoing international exchange. The slogan related to this field is "*Study abroad is no longer a luxury, but a necessity*". The international education concerns mainly 4 languages. Their short summary:

- ENGLISH (started in 1984). BUTE has a 4-year International Secondary Grammar School, a 1-year Pre-Engineering School, B. Sc. (4-year, 240 credit points), M. Sc. (2 year, 120 credits), Ph. D. (3 year, 180 credits) programs. The full programs are paid (the tuition fee is from 1500 EURO to 5000 EURO / semester depending on the training), but it is free for part time studies of exchange students (mainly from EU and USA). Most of the participants are foreign citizens, the total number of learners enrolled is ca. 750.
- FRENCH, GERMAN (founded in 1991,1992). These are 4 semester training courses (bac+2, 120 credit points). The ca. 300 (100+200) participants are mainly Hungarian citizens. There is no tuition fee.
- RUSSIAN (from 1989). M. Sc., Ph. D. level training in robotics for about 30 students from Russia (and some other countries of the former Soviet Union).

The aim of this paper is to present international exchange programs with BUTE participation (this activity is related especially to the foreign language education), and discuss them from the viewpoint of the topics of ICEER2004 WORKSHOP: INTERNATIONAL EXCHANGE PROGRAMS.

The contribution starts by the analyse of general elements important in all exchange programs (language, funding), it is followed by case studies (training in English, academic exchange, practical placements). A chapter is devoted to the future (plans, probable trends).

## 2 LANGUAGE

The Hungarian language is spoken only by ca. 15.000.000 people all over the world, and it is different from practically all other languages (some grammatical similarity is with Finnish, Estonian etc., but a Hungarian can not understand any foreign language without long studies). These facts determine the relation to the language issue both for outgoing and incoming students.

Outgoing students. As outside Hungary there is only a very limited higher education in Hungarian, some knowledge of at least one foreign language is evidently the minimum for any international exchange program. To obtain a diploma of BUTE is compulsory to pass medium level state exams in foreign languages (at least 1 for M. Sc. equivalent training, 2 for Ph. D.). Actually at this moment about 90% of students entering to the university have some language competence (ca. 50 % English - it is continuously increasing, ca. 30 % German). BUTE offers language courses in the first semesters to its students. The French, German Divisions have been created (among other objectives) to improve the language competence and to prepare students for foreign exchange programs.

Incoming students. As the foreign students typically do not speak Hungarian, they join one of the foreign divisions. However they are encouraged and supported to learn Hungarian (it is compulsory in secondary school, optional in higher education). Before arrival cultural, language competence can be obtained via the Internet (see e.g. [www.studyinhungary.hu](http://www.studyinhungary.hu)).

### 3 FUNDING

The funding is crucial both for training in foreign languages in Hungary (which is the base of the reception of incoming students) and for the number of outgoing students.

The Hungarian economy after a 6-7 year long period of decline (which can be explained by the privatisation, reorganisation of enterprises, etc.) has started its slow increase. But the GDP is less than the EU average, the total income of families is smaller than in the EU countries.

As a consequence the higher education is under financed (despite of the fact that the government tries to do its "best", e.g. the average salary of professors was increased in 2002 by 50%, but it is much lower than in the EU), there are permanent financial problems. There is a normative financial system depending on the number of students determined by the state. The budget is the same if the training is in Hungarian, or in a foreign language. However BUTE understands the importance of foreign language education. The education in English is self-financing, the French, German divisions and exchange activities are supported by BUTE own funds (this support in 2003 was approximately 80.000, 80.000, 70.000 EURO correspondingly).

Related to the outgoing students one can remark that BUTE joined large European programs (e.g. Socrates / Erasmus, Leonardo), entered into international organisations (e.g. AUF- Agence Universitaire de la Francophonie), signed more than 100 contracts with foreign universities (some European co-operation will be presented later, here we mention only that in the last 5 years 159 USA exchange students from 7 institutions spent at least 1 semester at BUTE). The number of scholarships is limited by the possibilities of these programs, the university typically can not support directly outgoing mobility.

### 4 ENGINEERING TRAINING IN ENGLISH

Most of the incoming students (more than 90%) attend the courses in English. BUTE created a special unit called International Education Centre (IEC) for the organisation of engineering training in foreign languages. This unit carries out the following main activities:

- *Organisation of the training* (B.Sc., M. Sc., Ph. D. courses in practically all engineering disciplines, see [www.tanok.bme.hu](http://www.tanok.bme.hu)). It should be underlined that IEC "only" organises the training (recruitment of professors, timetables of courses, educational facilities /rooms, support materials etc./), it has no teaching and research staff. The education is carried out by the professors of BUTE in part time work for some supplementary salary.
- *Management and PR activities*. The educational market is increasing world-wide, there is an important competition. There are some stable elements (e.g. a Bulletin printed each year - it can be found on the Internet as well, partners in foreign countries), and permanent renewal (exhibitions, PR campaigns).
- *Recruitment, follow up of the students* (full, part time training in Hungary). Besides the academic administrative tasks it means a continuous work with the Hungarian Foreign Ministry, Embassies abroad (visa requirements), and foreign embassies in Hungary. A personal tutorial help (for case of academic and housing, visa etc. problems) is offered to the students.

In the last decade the number of students participating in BUTE education in English is stabilised around 500-600. The data from academic year 2003/04 are: 608 students ((B.Sc. - 287, M. Sc. - 98, Ph. D. - 16, others - 207), 461 in full (paid) training, 147 part time (exchange) students. The origin of the students is in a continuous modification. In year 2003/04 the 5 mostly represented countries are Iran (115), Cyprus (105), Libya (57), USA (52), Nigeria (37). The same data for 2000/01 were: Greece (80), Israel (56), Cyprus (53), Libya (53), USA (35). Concerning the faculties the most of the students are enrolled in Electrical engineering / Informatics (174), Architecture (148), Mechanical engineering (84), Civil engineering (74).

This training has been existing for 20 years. It can be considered as a success story, it contributed importantly to the development of the university (in many aspects from the language skills of professors to finances). The main risk, potential obstacle is the instability of the number of students enrolled in the courses with tuition fee. It depends on several unpredictable events (wars, economic crisis, terrorist attacks etc.), on events which consequences one can not see clearly (e.g. nowadays, related to the fact, that Hungary joins the EU), on other problems (e.g. there was an important interest of Chinese students to enter but it had not been realised because of visa problems).

## **5 ACADEMIC EXCHANGE (SOCRATES/ERASMUS)**

The ERASMUS program (created in 1987) is the largest student exchange activity of the European Union. BUTE (Hungary and other 6 Central and Eastern European countries) joined the program in 1998. A small unit headed by the BUTE Socrates institutional co-ordinator (I. IJJAS) has been created to carry out the tasks (preparation of bilateral agreements, publicity, selection of candidates, evaluation etc.) Last year related to the 5<sup>th</sup> anniversary of BUTE participation in the program a book [6] was published (it can be found on the internet as well, [www.tudig.bme.hu/erasmus](http://www.tudig.bme.hu/erasmus)). This summary is based on this document. The program contains several activities, this chapter is restricted to students and professor mobility based on bilateral agreements of eligible institutions.

The main conditions (abbreviated, simplified) of BUTE students' participation:

- Hungarian citizens can go only to EU countries. Non Hungarian citizens can not study in their home country. A student can take part only once at the program.
- Minimal length of scholarship is 3 months or a full training period, maximal length is one academic year.
- The main objective is to study abroad. Practical placements, research etc. can be supported only under special conditions.
- The studies in the framework of the Erasmus program must be accepted at the home institution based on a 3-lateral Learning Agreement prepared and signed before the start of the training.

A few data about BUTE participation. In 1998-2003 there were 500 outgoing (with average 6.4 months abroad) and 305 incoming students. The university has 137 institutional contracts, the first 3 countries are France (36), Germany (31), Finland (15). The outgoing students went to 12 countries, Germany (130), France (122), Finland (65) occupy the first 3 places. The more involved faculties are: Architecture (226), Mechanical engineering (84), Civil engineering (74). More than 100 incoming students came from France, about 50 from Finland, Italy, Spain.

138 professors of BUTE spent short visits (one week, 8 hours teaching load) in EU countries.

The Erasmus exchanges has been integrated into the international activities of BUTE. The risks, obstacles are of financial, organisational types. The scholarships are low (taking into account the relatively low salary level in Hungary mentioned above) 250 EURO / month for students, 400 EURO / visit for professors (in 2003). Another problem that the decision about the support was regularly after the start of contractual period. However BUTE introduced the credit system (ECTS) about 10 years ago, the departments are not flexible enough, each Learning agreement requires a long discussion. There are some attempts to improve the situation and determine the equivalence of full, or large parts of programs on bilateral, multilateral level.

## **6 INTERNSHIPS (LEONARDO)**

The LEONARDO DA VINCI program (created in 1994) is the largest student practical placement activity of the European Union. BUTE joined the program in 1999. A small (virtual) unit headed by the BUTE Leonardo institutional co-ordinator (P. MOSON) has been created to carry out the tasks (co-ordination of activities related to the program, preparation of project proposals, publicity, selection of candidates, evaluation etc.). The projects managed by this unit have a homepage (<http://tutor.nok.bme.hu>). The program contains several activities (mobility, pilot projects, networks), this chapter is restricted to the mobility of students, young graduates. It is based on annual projects proposed by BUTE in the name of multinational consortia (members are enterprises, higher educational and other institutions of EU countries).

The main conditions (abbreviated, simplified) of BUTE students' participation:

- The students can go only to the EU and some other participating in the Leonardo program countries.
- Minimal length of scholarship is 14 weeks, maximal length is one year.
- The main objective is to work abroad at an enterprise regulated on a 3-lateral agreement (enterprise, university, student)
- The projects contain a cultural, language preparation of participants, a double tutorship during the placement, evaluation.

A few data about BUTE participation in the Leonardo II. program phase (2000-2006). 11 project applications were presented (partly together with other engineering schools), 7 were accepted, 1 rejected,

3 is in the evaluation, decision period. The aim of these projects is to support outgoing mobility. There are 3 types of internships for BUTE students: "blue collar" summer work (56 students of the French Division to France), "technician - engineer" placement for students having ca. 200-250 credit points (65 students, earlier mainly in informatics to Germany, later in all disciplines to different EU countries), young graduates (a new project is presented for 15 participants). More details of some projects above can be found in [5].

The Leonardo da Vinci internships are popular. Here the financial support is relatively high (115 EURO / week in the first 13 weeks, one return ticket, insurance). The main task is to find the enterprise with needs corresponding to the knowledge, competence of student. Lately BUTE counts more for the individual activity of beneficiaries, professors, and on specialised European Networks, e.g. LEO-NET (Leonardo Network for Academic Mobility, [www.leo-net.org](http://www.leo-net.org)), or FACE ([www.face.net.tc](http://www.face.net.tc)) presented before. The risks, obstacles are related to the project based functioning of the program, which means that there is no guarantee for sustainability, and application, reports etc. require much efforts from the management. Some (smaller) problems are related to the length of internship, which in case of summer placements lead to schedule differences, modification of the deadlines of academic year.

## **7 FUTURE**

Hungary signed the Bologna Declaration in 1999 to join the European Educational Area, a National Bologna Committee was created in 2002. The main consequence of these facts will be the introduction of 2-cycle (B. Sc., M. Sc.) engineering training in 2005 (for some experimental courses), in 2006 ( for all higher education). According to the current (not final) version the technical higher education will be divided in 7 groups, these groups in subgroups (16 altogether). The total number of credits for the full (B. Sc. And M. Sc.) training will be uniformly 330 credits, the repartition between the B. Sc. and M. Sc. levels depends on the type (e.g. architecture, civil engineering 240+90 credit points; chemical, electrical, mechanical engineering 210+120 credit points).

The consequence of Bologna process is not clear for BUTE international education and exchange programs. If the current plans are realised then the programs of BUTE English and Russian Divisions can be easily integrated into the new system. The case of French and German Divisions is more complicated. For some professions (e.g. agriculture, economics) the practical placements are indicated in the plans. It is not the case for the technical ones. What is important that university would like to maintain the international exchange activities, and the best way probably can be found in co-operation with our partners.

Another modification concerns the introduction of a new university management system. The details are not finalised, but it will be similar to the chancellor system of Anglo-Saxon countries.

## **8 FINAL REMARKS**

This paper concentrated on the main elements of international exchange programs at BUTE (engineering education in English, largest related EU programs). In papers presented at earlier ICEE conferences some more programs were discussed [1-5]. Most of the programs are successful, sustainable (they have survived the end of the project phase). Of course there were problems, failure as well. Here we mention only the accredited higher level professional training (bac+2 years, 120 credit points, partly transferable in case of further higher educational studies). This successful training in France (IUT - Institut Universitaire Technologique) was adapted at BUTE in the mid 90-es in 3 professions (electrical, chemical, transport). This adaptation was pre-matured, the national law related had been accepted later. The programs have not been accredited, there was no stable financial background. So this training was closed in 1997. Nowadays BUTE participates in several bac+2 programs, but on new basis. The education is realised by vocational secondary schools in the Hungarian countryside under the supervision of the corresponding BUTE faculty.

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## REFERENCES

- [1] SOL CH., MOSON, P.: Strengthening the Links between Enterprises and Universities. Alternative Training of Engineers. In *Proceedings of International Conference on Engineering Education (ICEE)* Technical University of Ostrava. August 10 - 12, 1999, Czech Technical University in Prague, August 13-14, 1999 (See: <http://www.fs.vsb.cz/akce/1999/icee99/Proceedings/index.htm>)
- [2] SOL CH., MOSON, P.: Alternative Training of Engineers. Extension. In *Proceedings of International Conference on Engineering Education (ICEE 2000)*.
- [3] MAURY CL., MOSON, P.: Evaluation of Students Industrial Placements Abroad. In *Proceedings of ICEE 2001 Conference*. August 6-10, 2001. Oslo / Bergen, Norway. (ISBN-1-588-74-091-9). See CD, <http://fie.engrng.pitt.edu/icee> or <http://ineer.org> .
- [4] MOSON, P.: International Education at Budapest University of Technology and Economics. *International Conference on Engineering Education (ICEE 2002, Manchester Aug. 18-22, 2002)*. (see: <http://www.ineer.org> ).
- [5] MOSON, P.: Student Exchange Programs (academic, practical placements) in Europe. In *International Conference on Engineering Education Proceedings (ICEE 2003, Valencia, July 21-25, 2003)*. CD ISBN: 84-600-9918-0.
- [6] ÍJJAS,I. (editor): *Budapest University of Technology and Economics. Participation in the Socrates / Erasmus program*. 2003. 68p. ISBN 963 421 780 X. (See: [www.tudig.bme.hu/ersmus](http://www.tudig.bme.hu/ersmus)).