2009

ANNUAL REPORT
BRNO UNIVERSITY OF TECHNOLOGY

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ

THE BRNO UNIVERSITY OF TECHNOLOGY 2009 ANNUAL ACTIVITY REPORT

is submitted as required by Act no. 111/1998 Coll. on universities. It has been set up on the basis of the 2009 University Guidelines published by the Ministry of Education, Youth, and Sports. It presents a wider public with data and substantial outcomes of all the activities related to Brno University of Technology as part of the Czech and international educational, research, and social space.

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RECTOR'S WORD

In 2009 Brno University of Technology marked the 110th anniversary of its founding. This was an opportunity to recall the university`s history since 1899 while discussing its basic strategic development plans for the near future. The Czech universities exist in an environment that certainly needs a reform of the entire system of tertiary education and research. The necessity of a reform as such is recognized by almost all the Czech academic community. What is not so uniformly accepted is the particular objectives, methods and procedures required to effect changes supporting the flexibility of universities while maintaining the traditional academic freedoms. However, adjustments of the system of tertiary education in this country leading to improvements in the quality and efficiency of all the basic activities carried out at universities are inevitable and should be guided by the strategic goal of building a knowledge society. The leading officials should bear in mind that this strategic goal cannot be attained if the funding of our universities has continually been given little priority.

Like the previous years, the year 2009 was also marked by a deficit approach of society to education and research. Cuts in education funding keep coming; in 2009 they amounted to as much as 25 % on the previous years. It is natural that this situation should also partially affect the financial health of the university. Despite this, however, our university can still be thought of as financially healthy and strong. To a certain extent, this is the result of the increased efforts at many faculties to make up the financial deficits by having the research projects funded from external – domestic or international – research grant agencies. Here, some faculties were very successful in 2009. In technically oriented faculties, the grants received for research projects and cooperation with the commercial enterprises made up 30% to 40% of the faculty research budgets. In 2009 Brno University of Technology was also successful in drawing on the European Structural Funds. We have been among the most successful Czech universities regarding operative programmes such as Research and Development for Innovation, Education for Competitiveness. More than two billion CZK went from these funds to BUT.

Despite the fact that the external economic environment can hardly be called favourable to the development of university education and support for research activities, Brno University of Technology is still a respected and recognized institution both in Europe's and world's educational space. The ECTS Label and DS Label, prestigious certificates for 2009 to 2013 issued by the European Commission and received by Brno University of Technology testify to the university`s excellence as a higher-education institution in the field of education. BUT was given the ECTS Label as one of the two Czech universities (the other was University of Economics, Prague). Only ten European universities were among the recipients of this award.

Last year, BUT was party to almost a hundred active bilateral inter-university agreements with the numbers of international students and teachers it hosts increasing and the amount of joint research projects growing. In the internationally recognised annual THES-QS World University Rankings published by The Times covering about 18,000 universities, BUT and Charles University in Prague have long ranked among 3 percent of the world`s best higher-education institutions. It is only logical that BUT`s strategic goal is similar to that of other universities of world renown – to maintain and improve its position among the group of the world`s elite universities.

Finally, I would like to thank my colleagues for the everyday work they put in for Brno University of Technology. The university management knows well that, without them, Brno University of Technology could never be a respected educational and research institution as it no doubt is today in the Czech Republic as well as in Europe. In this way we continue the work done by our predecessors over 110 years, which is a moral commitment for all of us.

prof. Ing. Karel Rais, CSc., MBA

2009

SIGNIFICANT EVENTS AT BUT

BUT commemorated the 110th anniversary of the founding of a Czech Technical University in Brno. On 19th September 1899, Franz Joseph I, emperor of Austria and Hungary, signed an edict ordering the foundation of a first Czech technical university in Brno.

At a special meeting held at the campus of the Faculty of Information Technology on 21st September 2009, the rector, following a proposal by the BUT Scientific Board, bestowed honorary doctorates on three personalities of world renown: Ing. Jaroslav Doležal, CSc., director general of Honeywell Laboratories, Honeywell, s. r. o., for the Czech Republic, physicist doc. RNDr. Petr Lukáš, CSc., and economist Professor Jan Švejnar.

To commemorate BUT's 110th anniversary, the VUTIUM Press published Chapters from the History of Brno University of Technology, a book written by doc. PhDr. Jiří Pernes, Ph.D. Describing the history of this university, it was also exhibited at the Book World fair in Prague.

An exhibition held under the motto **110 years of study at the Faculty of Civil Engineering** was one of the events commemorating this anniversary. The exhibition presented pictures of the life and work of all the university's students.

The highlight of the 110th anniversary celebrations at the BUT Faculty of Civil Engineering was a special gathering of the faculty academics and staff held in November. SIGNUM EXCELLENTIAE gold, silver, and bronze medals were given to persons who significantly pushed ahead the development of the faculty.

The BUT Faculty of Architecture marked the 90th anniversary of its establishment. On this occasion, a number of events were held in 2009 culminating in an Architects' Party, attended by several hundreds of alumni and friends of the faculty.

The BUT Faculty of Electrical Engineering and Communication marked its 50th anniversary. The gala evening at the Brno Municipal Theatre was attended by the officials of the faculty and other partner faculties, students, government officials, chief executives and top research workers. Rector Awards and Commemorative Letters were given to personalities having the merit of promoting the faculty.

Rector Election

On 27th October 2009 the BUT Academic Senate elected prof. Ing. Karel Rais, CSc., MBA as candidate to be appointed for the office of BUT rector from February 2010 to January 2014.

New Deans

Academic senates of four faculties elected candidates to be appointed for the offices of deans from 2010 to 2014. Prof. Ing. Rostislav Drochytka, CSc., was elected at the Faculty of Civil Engineering on 18th November 2009, doc. Ing. Jaromír Havlica, DrSc was elected for the second time at the Faculty of Chemistry on 9th December 2009 , doc. RNDr. Miroslav Doupovec, CSc. was elected for the second time at the Faculty of Mechanical Engineering on 10th December 2009 and prof. Ing. Jarmila Dědková, CSc. was elected at the Faculty of Electrical Engineering and Communication on 15th December 2009.

Brno University of Technology received the ECTS Label and DS Label prestigious awards for 2009 – 2013 in appreciation of its quality as a higher-education institution.

The ECTS label is an appreciation of the correct application of the credit system to all Bachelor's and Master's programmes to fulfil the objectives of the Bologna process.

The DS Label received by BUT certifies that the diploma supplements received by the graduates free of charge are correct. Both the labels certify that BUT meets the strict higher-education criteria imposed by the European Union.

Opening the reconstructed buildings at the campus of the BUT Faculty of Information Technology

During the reconstruction of the building called Manor House, historic layers of mortar, decorative paintings, and building structures were uncovered. Archaeologists showed that the structures preserved were those of a former Gothic palace of Jan Jindřich Lucemburský, a Moravian margrave, and the oldest of the whole complex. The Gothic masonry (part of a cooper's workshop) was built before 1363 thus dating back to a time before the Luxemburg kings and being older than the margrave's palace. For this reason, all the structures were restored, structurally fixed, treated, and made accessible.

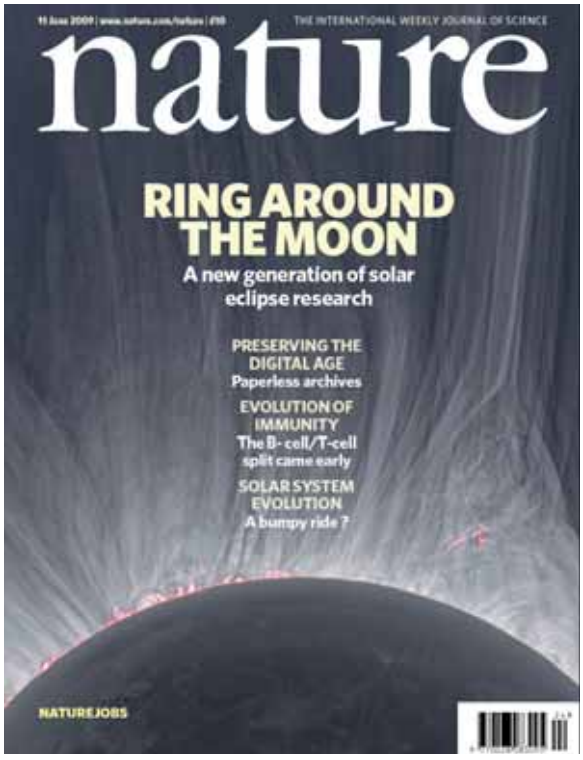
Also this year, the BUT Faculty of Chemistry co-organized the Night of Scientists.

This is a Europe-wide event organized by the Researchers in Europe EC initiative since 2005. It aims to dispel the myths of scientists being eccentrics presenting them as "ordinary people". This year's event took place on 25th September. In the evening of this day, scientists addressed the public presenting their work in a non-traditional way, taking part in performances, and inviting the visitors to join them in their amusing experiments and observations.

The success of this event was enormous as testified by an audience of over 600.

CONFERENCES, EXHIBITIONS, BOOKS, PROJECTS, AWARDS

A photograph of the solar corona created by a research team of the BUT Faculty of Mechanical Engineering led by prof. RNDr. Miloslav Druckmüller, CSc., appeared on the title page of an issue of the prestigious Nature journal. The team created special numerical methods enabling the image processing needed to visualize the solar corona. The picture, created by a unique mathematical procedure processing hundreds of photographs taken during a solar eclipse in the Gobi desert, Mongolia and near Novosibirsk, Russia, captures layers of hot gases enveloping the Sun.



On 10th September 2009, prof. Ing. Antonín Píštěk, CSc., director of the Institute of Aerospace Engineering at the BUT Faculty of Mechanical Engineering, received a "letter of recognition and gratitude" from the Czech Parliament in recognition of his lifelong work for the Czech aviation as a university teacher, researcher, and aircraft designer.

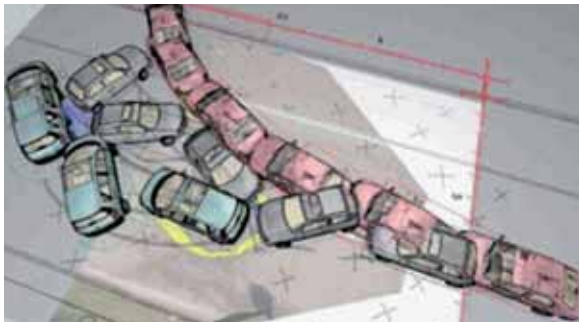
Together with the New York Business School, the BUT Faculty of Business and Management co-hosted an 11th prestigious Global Business and Technology Association (GBATA) conference on the world trade and new technologies. Taking place in Prague, the conference was held under the motto Prosperity and Humanity identical with that of the Faculty of Business and Management. It was attended by 290 experts from 45 countries of the world. The papers presented at the conference were concerned with the current economic situation, but also with long-term aspects and modelling of economic behaviour. Each year, the conference is hosted by a different country. The Faculty of Business and Management established contacts with business and management universities in Europe, USA as well as South America and Asia.

Attended by leading theorists and experimenters from MIT, NIST, Columbia University, UMASS, and Université de Lyon, a workshop on polymer nanocomposites was held at the BUT Faculty of Chemistry in May. The themes discussed concerned the preparation, characterization, and application of polymer nanocomposites.

International WEEK at the BUT Faculty of Business and Management

Significant outcomes: bilateral agreements signed between the Faculty of Business and Management, the Faculty of Management at the Cracow University of Economy, and the Faculty of Economics and Management at the Kaunas University of Technology as well as research and publication-sharing cooperation agreements with universities of a similar type in Poland, Lithuania, Latvia, Estonia, Ukraine, Russia, and United Kingdom.

As part of AUTOSALON 2009 XIV, a fair taking place in Brno on 5th and 6th June 2009, to mark BUT's 110th anniversary, the BUT Institute of Forensic Engineering, the Brno based Czech Association of Forensic Experts and Assessors, and the Hamburg based European Association for Accident Research and Analysis (EVU), its Brno-based national group, held an annual international scientific conference of accident analysts. "TOPIC ISSUES OF ACCIDENT ANALYSIS" was the main theme of the conference. The subjects of the papers presented by over 60 participants of the conference included analysis of the position of the car occupants before an accident, insurance frauds, and use of digital tachograph records in analysing technical failures and other interesting issues.



On 4th February 2009 the Faculty of Civil Engineering hosted an 11th JUNIORSTAV international conference of doctoral students. Endorsed by FCE dean prof. RNDr. Ing. Petr Štěpánek, CSc. and BUT rector prof. Ing. Karel Rais, CSc., MBA, the event was attended by 359 doctoral students including 85 participants from abroad.

An exhibition entitled Far Away and At Close Quarters on medieval imports in Moravian and Silesian collections by PhDr. Kaliopi Chamonikola Ph.D., head of the Department of Theories at the BUT Faculty of fine arts, held at the Moravian Gallery in Brno, presented about 70 works of art (mostly board pictures and polychromed woodcarvings) from an art collection dating from late 15th and early 16th centuries related mostly to the geographic areas of today's Germany, Austria, and the Netherlands by their origin. In this territory, these artefacts appeared without ``proofs of origin" and, therefore, little is known of their past. They had been reconstructed from fragmentary records and mostly by means of art historical criticism.

Sculptures in the Streets – Brno Art open 09, organized by the Brno House of Arts. Among the fifteen authors from the Czech Republic, Slovakia, Poland, and Germany were also prof. ak. soch. Michal Gabriel and MgA Milan Houser, teachers of the Faculty of Fine Arts. With the sculptures placed in the town centre, the aim of the event was for the public to meet work of arts outside the confined space of an art gallery.

Book: Bedřich Rozehnal – by Vladimír Šlapeta and Petr Pelčák

This voluminous publication is an important contribution to architectural research. Presenting the creation of Bedřich Rozehnal, a prominent Moravian architect and pedagogue and his dramatic life resounding to the turbulent history of this country, the book documents his works with original black-and-white photographs of buildings, reproductions of original drawings, detailed analyses as well as narrations of his contemporaries, personal letters, and period writings.

Specialised monograph: Natural Building Materials – by Josef Chybík

The book is intended for architects, designers, materials engineering experts, university students, builders of environment-friendly buildings. It provides a complete overview of natural renewable building materials of both plant and animal origin such as straw, reed, cannabis, sheep's wool, cellulose, products from wood, cork, and clay. This is the first book on such a subject to be published in the Czech Republic. Even on a European scale, the book can be thought of as being extraordinary. Publisher: Grada Publishing, Prague, number of copies 1500, coloured print. The book has been shortlisted for the 2009 GRADA award.

Initial Public Offering Providing Funds for Company Development – by Tomáš Meluzín and Marek Zinecker

The book is the outcome of grant project no. 402/09/P134 on companies financed through initial public offerings. The book was published by Computer Press with an edition of 1,000 copies. This proves the topicality of the subject and interest in the research outcomes.

Evolution Hardware – by Lukáš Sekanina et al.

From automatic generation of patentable inventions to self-modifying machines. This monograph summarizes the present state of research in and applications of evolution hardware. In addition to a theoretical exposition, the book brings samples of typical applications such as a controller of an artificial limb that adapts itself to a particular patient, an aerial used during the ST5 space mission, and robots guided by a controller made of liquid crystals. This is the first Czech monograph published on evolution hardware. Academia Praha, 328 pages, 2009

Sharing Experience and Best Practices in Analysing and Preventing Road Accidents – is the title of a Czech-Austrian cross-border cooperation project launched at the BUT Institute of Forensic Engineering in 2009. It had been selected to receive funding from the Fund of Small Projects South Moravia – Lower Austria with solution co-provided by the IFE and Institut für ganzheitliche Unfall und Sicherheitforschung (EPIGUS); the project aims to promote cooperation with the Austrian partner on a series of dynamical measurements of drivers' perception of and reactions to pedestrians in poor visibility. The project's outcomes will also be presented at the 19th annual EVU 2010 conference in Prague.

During work on the E!3838 international project of the applied research programme at the BUT Faculty of Civil Engineering, a measuring apparatus was made consisting of a device measuring the impedance of the environment, measuring probes, and user software. Both the measurement and the measuring equipment have undergone laboratory tests – measuring water level in earth at the Laboratory of Water Management Research of the BUT Faculty of Civil Engineering and CNR IRSA Bari, Ital) as well as in situ measurements (the Kobeřice reservoir dam, the Jevíčko pond dam,

the Rýzmburk mud-settling pond, the Svratka golf course, a drinking water region in Switzerland, application to measuring the ground water level in a river plain at Michalovce, Slovakia).

Dana Lodrová, Martin Drahanský (BUT Faculty of Information Technology): Utility design: Testing finger alertness by causing optical changes; ÚPV-19364. This is the design of an alertness-testing module, which can be integrated into fingerprint contact optical sensors or operated as a standalone sensor. Alertness testing is based on detecting changes in skin colour and papillary line width caused by finger pressure.

Major Student Achievements

A team of Aircraft Design Master's degree students at the BUT Faculty of Mechanical Engineering (Bc. Matěj Machovík, Bc. Jaroslav Bartoněk, Bc. Jan Przeczek, and Bc. Luboš Janhuba) is through to the finale of the „Fly Your Ideas" competition organized by Airbus for university students and attended by 235 teams from all over the world. Taking place on 18th June 2009, this competition was an accompanying event of the „Paris Air Show" Le Bourget 2009. Getting to the finale was a big success for the Institute of Aerospace Engineering at the BUT Faculty of Mechanical Engineering.

A team of Institute of Automotive Engineering students at the BUT Faculty of Mechanical Engineering was the winner of an AV AWARDS 2009 competition organized by AV Engineering in the category of technical universities for their design of a Formula Student vehicle using a Pro/Engineer CAD system. The award is the result of efforts to prepare the students for their future jobs in the best possible way teaching them how cooperate in a team.

The Maurice Godet prize for the best paper on tribology went to Ing. Petr Šperka, a doctoral student at the Institute of Machine and Industrial Design of the BUT Faculty of Mechanical Engineering. The prize was awarded by the Laboratoire de l´NSA de Lyon et CNRS on the occasion of a 36th Leeds-Lyon Tribology Symposium. Ing. Petr Šperka is the first among young Central and Eastern European scientists to receive the prize

Bc. Michal Kubáň and Bc. Kornel Mazur, members of a Mixka team from the Faculty of Electrical Engineering and Communication took the first place in a regional round of ING.race 2009, won the Central European competition in Vienna and finished in the 5th place in the EBEC 2009 European finale, Ghent, UK, in August 2009.

The Siemens Prize (announced in Prague on 9th December 2009) went to Ing. Jan Verner for his degree project, SOFTWARE DEVELOPMENT PROCESSES METRICS, and Ing. Michal Bidlo, Ph.D. (both from the Faculty of Information Technology) for his thesis, EVOLUTIONARY DESIGN OF GENERIC STRUCTURES USING INSTRUCTION-BASED DEVELOPMENT.

The first place in the Networking Academy Games 2009 in the UNI category went to Bc. Martin Danko from the BUT Faculty of Information Technology. The games focused on networking skills and were attended by 50 students of the Cisco Networking Academy programme from seven Central and Eastern European countries.

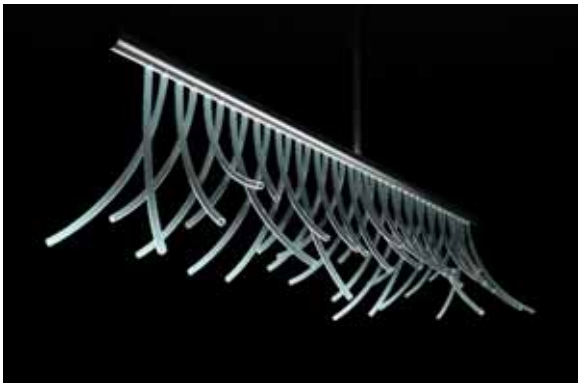
Students of the BUT Faculty of Civil Engineering received awards in a „2008 Construction of the South Moravian Region" competition announced in 2009 to find the best civil-engineering doctoral project. In three categories, Per Fabík, Ing. Petr Mauer, Ing. Zbyněk Děckuláček finished in first places, Helena Fládrová received an honourable mention.

Like in the previous years, the BUT Faculty of Chemistry nominated its representative in Prix de Chimie 2009, a competition of doctoral chemistry students co-organized by the French Embassy and Rhodia CR, s. r. o. Its candidate Ing. Kateřina Hynštová finished second with her paper, "The Crystallization Kinetics in Semicrystalline Nanocomposites". In addition to prize money, she won a one-month study stay in France.

Six BUT Faculty of Architecture students received prizes in the Best South Moravian Region Building competition (April 2009). Organized annually by the South Moravian Building Society of the Association of Building Entrepreneurs of the Czech Republic and endorsed by the South Moravian Region, the competition aims to present and promote good development projects in the South Moravian Region and show the best construction projects and their authors to a wider public. Part of the competition is devoted to projects by architecture and civil-engineering faculty students. The winners were decorated by commissioner of the South Moravian Region Michal Hašek and chairman of the board of directors of the South Moravian Building Society doc. Lubomír Mikš in a ceremony held as part of the Brno Building Fairs 2009.

The following BUT Faculty of Architecture students were decorated in a 2009 ROCKHOUSE Czech-Low-Energy-House competition: second prize – Bc. Tomáš Hlavsa, third prize – Ondřej Chybík, reward – Ondřej Stehlík. Organized by Rockwool, a. s., this architectural contest aims to promote low-energy buildings as a modern trend respecting both the environment and economic development. Prof. Ing. arch. Eva Jiřičná, C.B.E., an architect with world renown, was sitting on the jury decorating the winners.

Bc. Matěj Říčný, Studio of Product Design, BUT Faculty of Fine Arts, Prize for Good student design, for a Thirty-Nine-Eyes lamp, and prize of the director of the Institute of Art and Design at the University of West Bohemia.



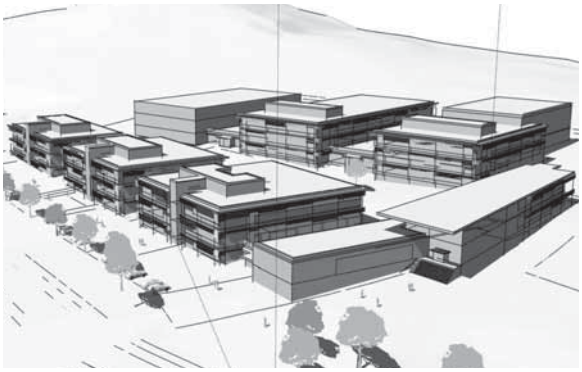
Bc. Petra Kinclová, a BUT Faculty of Business and Management student participated in a text-processing competition in Beijing, China. Contestants from 30 counties competed in three age categories: pupils – up to 16 years, juniors – up to 20 years, seniors – over 21 years. In the senior category, in a strong competition of the world's best, she finished second in Combination (versatility), third in Text-Correcting, third in Correspondence and Recording, sixth in Text Copying, 10th in Multilanguage Shorthand, and 11th in Word Processing.

Jana Jahodová, a second-year tax-consultancy student of the BUT Faculty of Business and Management, took the second place in the International Students' Olympiad in St. Petersburg, Russia.

IMPORTANT PROJECTS

In late 2009, a project team finished the preparation of a Central European Institute of Technology (CEITEC) project submitting a complete project application for evaluation by the Ministry of Education, Youth, and Sports. Together with BUT, three more Brno universities, two academy of sciences departments, and one departmental research institute cooperate as partners on this project. They plan to jointly build a top research centre concentrating on life science and advanced materials and technologies, which should promote the Czech science to a world level.

The funding should be provided by the Structural Funds, particularly its Research and Development for Innovation operative programme, priority axis one – European Centres of Excellence.



IT4Innovations Centre of Excellence

IT4Innovations is a unique project aiming to build a national centre of excellent research of information technologies. This new centre will help concentrate a number of information-technology-related research fields to accelerate their development.

The project envisages buying a very powerful supercomputer to be put into operation by 2014 ranging among the world's 100 most powerful supercomputers.

The project is jointly prepared by five institutions: Vysoká škola báňská-Technical University Ostrava, University of Ostrava, Silesian University in Opava, Brno University of Technology, and the Institute of Geonics of the Czech Academy of Sciences.

The IT4Innovations Centre of Excellence should combine the function of a research centre for academic purposes with that for applications. Computing will form the core of the foreseen centre having a key position among other scientific disciplines and being concentrated into four interrelated key areas:

1) IT4People (Information for People) – research for improved quality of life thanks to modern information technologies.

2) SC4Simulations (Supercomputing for Simulations) – supercomputers for calculations needed in industrial problems, modelling in natural sciences and nanotechnologies (shape optimizations, material design, biomechanical simulation,

3) EC4Innovations (Embedded Computing for Innovations) – research and development of embedded control systems applied in mechatronics and innovative medicine,

4) Theory4IT (Theory for Information Technology) – area of basic research focusing on the development of new non-traditional computing methods (knowledge mining, theory of anthills).

Currently, the project is being judged at an international level, a financial approval by the European Committee is expected in the second half of 2010.

A NETME Centre project of the BUT Faculty of Mechanical Engineering (New Technologies for Mechanical Engineering) to use 750 million CZK from the EU funds for building a modern research and development centre with direct links to applications, was evaluated in 2009 as the Czech Republic's best prepared project for various regional research and development centres. NETME Centre is also the first project in Brno to receive an advance payment from the EU funds. Thus, within another three years, a centre will be created specialising in the research and development of competitive mechanical engineering and related areas.

The bulk of the centre's programme will be provided by the Faculty of Mechanical Engineering in cooperation with selected departments of other BUT faculties. Important will be cooperation with CEITEC, mainly concerning materials, and with the South Moravian Innovation Centre to coordinate the supporting activities in the region.

The NETME Centre consists of six divisions reflecting inter-related research fields:

1) Power, Process and Environmental Engineering (PPE)
2) Mechatronics (M)
3) Virtual Machine Design and Testing (VMDT)
4) Aircraft and Automotive Technology (ATT)
5) Manufacturing Technology (MT)
6) Advanced Metallic Materials (AMM)

New experimental VUT 001 MARABU aircraft

At the end of the last year, the BUT Institute of Aerospace Engineering finished the work on an experimental VUT 001 Marabu aircraft. The aircraft fuselage is made from composite materials; the aircraft has an all-metallic wing and a horizontal tail assembly. It is driven by a piston engine with a thrust-arrangement propeller. In addition to this drive unit, the aircraft is equipped with a small jet engine, which is placed asymmetrically above the left half of the wing.

VUT 001 Marabu is designed for experimental verification of the equipment and installations developed primarily for pilotless airplanes. The reason for such verification is the regulations to come, under which the development and operation of pilotless airplane will be possible. A number of applications are expected in which

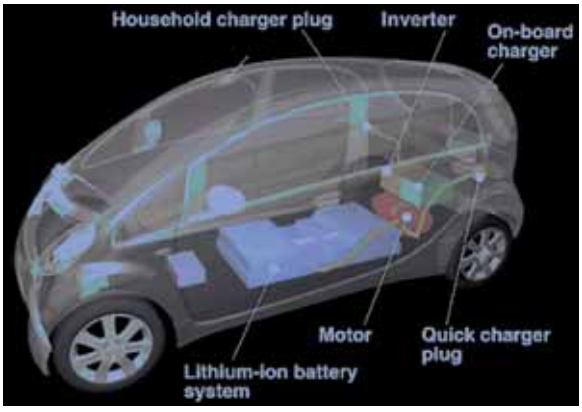
pilotless means of transport will be used to advantage. The Institute of Aerospace Engineering has cooperated on VUT 001 Marabu with numerous industrial partners receiving support from the Ministry of Industry and Trade, which proves the considerable interest commercial enterprises have in this area. The above jet engine, for example, is produced by the První brněnská strojírna Velká Bíteš company (developed, among others, for pilotless vehicles) and its flight parameters will be tested on the aircraft. Also when the relevant laws come into effect, the necessity to flight-test new equipment before it is mounted on a purely pilotless aircraft may be expected. Thanks to VUT 001 Marabu, BUT will be able to carry out numerous flight experiments and measurements for further research programmes.

E3Car Nanoelectronics for an Energy Efficient Electrical Car (BUT Faculty of Electrical Engineering and Communication)

The project should enable major advances in nanotechnologies, parts, miniaturized systems for generations of electric vehicles to come and accelerate the industrial and commercial use of electric vehicles and cars. It should also increase the energetic efficiency by enhancing the mobility by 35 percent compared with the existing technologies. Thus there will be less consumption of the primary energy and raw materials while cutting the carbon-dioxide emissions down to a virtual zero by using the solar energy.

The E3Car project focuses on research and development of power and high-voltage electronic and nanoelectronic circuits and intelligent microsystems for electric cars, in particular power and high-voltage technologies, parts, and circuits for energy conversion and renewal, output control, power modules, use of a network of supply stations and electronic systems for increased flexibility and faster upgrade.

The E3Car Nanoelectronics for an Energy Efficient Electrical Car project as part of the EU FP7 programme is coordinated by Reiner John from Infineon Technologies AG, Germany. The entire solution consortium consists of 33 European partners including two universities and six research institutes and associations.



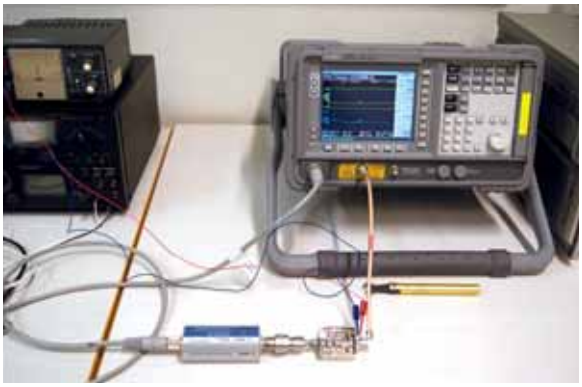
The basic modules of the E3Car electric vehicle

Research of new communication structures for experimental satellite communication, BUT Faculty of Electrical Engineering and Communication

Development of communication systems for commanding (controlling a satellite) and a transponder continued for the Phase 3E satellite. The satellite will have a high elliptic orbit. Investigated was the possibility of modelling the useful signals

degraded by phase noise transmitted mostly in the satellite communication systems. A model was created enabling the distortion of an ideal useful signal by arbitrary phase noise. By its parameters, phase noise is defined in the frequency domain; the resulting degraded signal is generated in the time domain. The model is verified by evaluating three types of Allan variances in the time domain and, at the same time, by performing direct recalculations between the frequency and time domains. It was used to simulate a simplified communication chain to judge the simultaneous effect of the phase noise of the transmitter and receiver on the useful signal transmitted.

Investigated were also microwave amplifiers with extremely small basic noise at ambient temperature (see the picture). Methods were further developed of the design of planar circuits with defected ground structures (DGS).



Creation of nanostructures used to study the nanoworld

In the dustfree laboratories of the Institute of Physical Laboratories at the BUT Faculty of Mechanical Engineering, nanostructures are created and investigated enabling the study of nanoworld physical phenomena.

Studying such nanostructures opens new areas of physics such as plasmonics and spintronics. Figure 2 shows an example of such a nanostructure that can be used to study the speed of the movement of magnetic domain walls. These nanostructures (magnetic nanowire produced in cooperation with TESCAN Brno) are being diagnosed in the above-mentioned dust-free laboratory as well as by foreign partners such as in the Louis Néel laboratory in Grenoble, France. In this connection, the institute provides solutions to such research projects as Research Plan (MSM0021630508), Centre of Basic Research (LC06040) and the Nanotechnology for Society programme project employing over twenty-five doctoral students and young scientist. Also students are involved in the creation of nanostructures who worked on their own projects included in the institute's NPVII – Human Resources Development (MSMT2E08017) programme, offering an average of 100,000 CZK for each of the 32 junior projects.

Laboratory of surfaces, thin layers, and nano-technologies, Institute of Physical Engineering, BUT Faculty of Mechanical Engineering

The research project, 1H-PK2/57 **New generation of durable concrete structures with increased resistance to aggressive environment**, was worked on from 2005 to 2009 receiving support from the Czech Ministry of Industry and Trade as part of a Progress programme.

The following results were among the project's outcomes:

- Development of concrete reinforcement based on Fibre Reinforced Polymers (FRP), which can be used instead of the classic steel reinforcement in specific cases. The reinforcement can be used as passive (non-pre-stressed) or active (pre-stressed).
- Development of a new generation of FRP-reinforced concrete elements. The new concrete elements are more durable, viable, and resistant to the degradation processes and intensive attacks of aggressive substances. Another advantage they offer is that they require less maintenance and redevelopment than the elements reinforced classically.
- Creation of methodology to design a new generation concrete elements, concrete structures with extended service life and resistance reinforced by non-metallic materials to be used for concrete structures in the Czech Republic and in EU.

Ceiling panel: preparing reinforcement pre-stressing and measuring equipment

AdMaS

In 2009, the BUT Faculty of Civil Engineering prepared and submitted an Advanced Materials, Structures and Technologies AdMaS Centre project to make fundamental changes in the outdated research infrastructure at the faculty. The funding for this project to build a regional AdMaS research centre will be drawn from the EU Structure Funds via the Research and Development for Innovation Operative Programme in the priority axis 2 – Regional R&D Centres. The basic idea is to build a centre integrating the findings from various fields of research covering materials, technology, and design (which in many departments runs in parallel) to enable their theoretical and practical verification. Such a centre is still lacking in the Czech Republic as well as in some other neighbouring countries (Slovakia, Hungary, and Poland).

The centre is designed as a unit consisting of three closely linked divisions:

- Advanced Building Materials (ABM),
- Advanced Structures (STR),
- Mathematical Modelling (MM) applied to topical problems in materials theory, building structures, as well as to applied research for practice.

Within each division, research is conducted in narrowly specialised laboratories.

Successful completion of a project to introduce new methods of monitoring xenobiotics in the water treated in selected plants in Brno

Successful completion of a project to introduce new methods of monitoring xenobiotics in water flowing from selected waste-water-treatment plants in Brno The outcomes of the project, which is part of a larger international research project

(COCT Action 636, project OC 183) were presented at a Xenowac 2009 international conference arousing much interest, being also included in a monograph published recently.

Orpheus-AM Robotic System

Medical and rescue teams must often work in dangerous conditions. They have to operate even in danger areas round damaged buildings, contaminated by dangerous biological or chemical agents, affected by radiation leakages or bomb threats or even during military actions. This all endangers the rescuers' lives and health and may substantially reduce the efficiency of the operation. Therefore, a new Orpheus-AM robotic system is being developed to help find persons in dangerous conditions, determine their survival chances, communicate with them, or bring them the needed medicaments. The Orpheus-AM robot is ready to operate in virtually all weather conditions, capable of locating a person in complete darkness being resistant both to contamination and the decontamination process. Moreover, because of the special sensors it uses, the chances of finding a person are much higher.

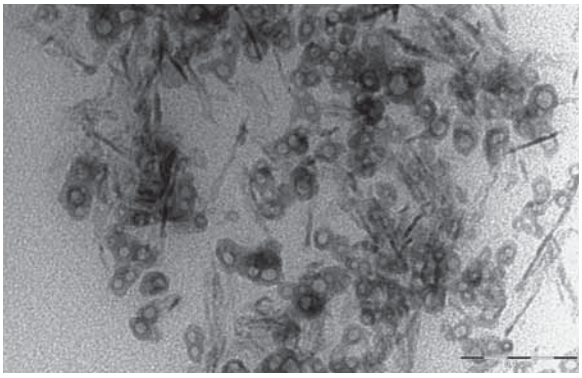
The Orpheus-AM robotic system incorporates the long-standing experience of the Department of Control and Instrumentation at the BUT Faculty of Electrical Engineering and Communication in producing mobile robots designed to explore dangerous and inaccessible areas, locate persons determining their vital functions.

It may be remotely controlled using a wireless or a cable and meets the very strict military MIL-STD standards in terms of the EMC, mechanical resistance, environment and special impacts.

The BUT Faculty of Chemistry prepared and in 2009 submitted a project called Materials Research Centres at the BUT Faculty of Chemistry as part of the Research and Development for Innovation operative programme, priority axis 2 (Regional R&D Centres). The project aims to use the major enhancements of the faculty device infrastructure to promote cooperation in research with the industries improving the conditions for students' creative activities. Thematically, the project consists of two major parts: inorganic materials and transport systems and sensors. The first part establishes links to the traditional fields of the silicate industry with an aim to develop new materials with properties tailored to meet a particular application. The second part responds

to the new born chemical technology trends that could be referred to as nanomedicine. These include, for instance, the development of new types of medicaments or sensors for diagnostics. It is in biological applications and hybrid materials that both trends will meet. The project has also initiated the preparation of a new medical nanobiotechnologies degree programme based on the requirements of the industrial partners.

A TEM image of the nanocomposite of a poly-vinylacetate matrix and hydroxyapatite plate filler with the particles having an average diameter of 20nm. This is the first time ever that this technique was used to visualize the phase interface connected with the immobilization of polymer chains on the surface of the HAP nanoparticles. After publishing this and other results of the research of polymer nanocomposites, the Institute of Chemistry received 1.5 million CZK in a research contract from Volkswagen AG for the development of polymer nanocomposites for automotive applications. Wear-resistant finishing of plastic components, floor coverings and production of tissue substrates for treating deformities and disturbances of the human skeletal system are among the first applications of polymer nanocomposites investigated at the Institute of Materials Chemistry.



1 BASIC DATA

1. 1. Full name of the public higher-education institution, acronym used, address, names and addresses of all BUT faculties

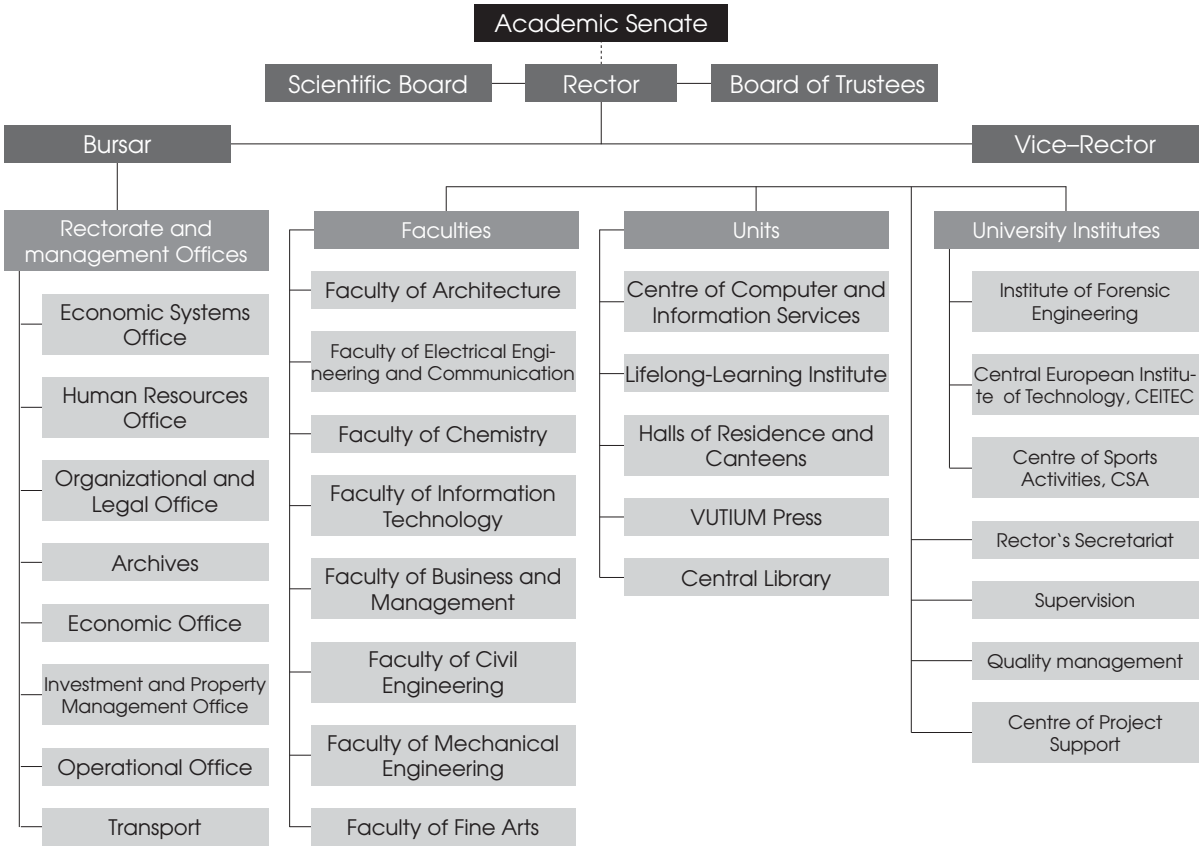
Brno University of Technology, BUT
Antonínská 548/1, 601 90 Brno http://www.vutbr.cz
BUT Faculty of Architecture, BUT FA,
Poříčí 237/5, 639 00 Brno http://www.fa.vutbr.cz
BUT Faculty of Electrical Engineering and Communication, BUT FEEC,
Údolní 244/53, 602 00 Brno http://www.feec.vutbr.cz
BUT Faculty of Chemistry, BUT FC,
Purkyňova 464/118, 612 00 Brno http://www.fch.vutbr.cz
BUT Faculty of Information Technology, BUT FIT,
Božetěchova 1/2, 612 66 Brno http://www.fit.vutbr.cz

BUT Faculty of Business and Management, BUT FBM,
Kolejní 2906/4, 612 00 Brno http://www.fbm.vutbr.cz
BUT Faculty of Civil Engineering, BUT FCE,
Veveří 331/95, 602 00 Brno http://www.fce.vutbr.cz
BUT Faculty of Mechanical Engineering, BUT FME,
Technická 2896/2, 616 69 Brno http://www.fme.vutbr.cz
BUT Faculty of Fine Arts, BUT FFA,
Rybářská 125/13/15, 603 00 Brno http://www.ffa.vutbr.cz

University Institutes

Central European Institute of Technology, CEITEC
Antonínská 548/1, 601 90 Brno, http://www.ceitec.cz
BUT Centre of Sports Activities, BUT CSA
Technická 2896/2, 616 69 Brno, http://www.cesa.vutbr.cz
Institute of Forensic Engineering, BUT IFE,
Údolní 244/53, 602 00 Brno, http://www.usi.vutbr.cz

1. 2. BUT Organizational Chart (university structure and its parts)



1. 3. BUT Scientific Board, Managerial Board, Academic Senate and other BUT bodies (including changes in 2009)

BUT SCIENTIFIC BOARD MEMBERS

Name	Position, workplace	Field of research
prof. RNDr. Vladimír Aubrecht, CSc.	vice-dean, BUT FEEC	physics of plasma
prof. Ing. Vladimír Báleš, DrSc.	rector, Slovak Technical University	chemical engineering
Ing. Aleš Bartůněk	general manager, IBM Česka Republika, s. r. o.	information technology
prof. Ing. Jan Bujňák, CSc.	rector, University of Žilina	steel and concrete structures
prof. RNDr. Milan Češka, CSc.	vide-dean, BUT FIT	information technology
Ing. Ivan Dobiáš, DrSc.†	Czech Academy of Sciences, Institute of Thermomechanics	non-linear dynamic systems
Ing. Jaroslav Doležal, CSc.	Honeywell, s. r. o.	management automation
prof. Ing. Rostislav Drochytka, CSc.	vide-dean, BUT FCE	construction materials engineering
prof. RNDr. Miloslav Druckmüller, CSc.	BUT FME	applied mathematics
prof. Ing. Jaroslav Fiala, CSc.	vice-rector, BUT	materials sciences and engineering
Ing. Josef Hájek*	Skanska DS, a. s.	design and transport sciences
prof. Ing. Jan M. Honzík, CSc.	vide-dean, BUT FIT	information technology
Mgr. Tomáš Hruda	Constantia Privatbank	project manager
prof. Ing. Tomáš Hruška, CSc.	dean, BUT FIT	information technology
prof. RNDr. Josef Jančář, CSc.	BUT FC	macromolecular chemistry
prof. Ing. Pavel Jura, CSc.	vice-rector, BUT	cybernetics, automation, and measurement
RNDr. Petr Kantor	AutoCont CZ, a. s., Brno	mathematical informatics and theoretical cybernetics
prof. Ing. Jiří Kazelle, CSc.	BUT FEEC	electrical and electronic technology
Mgr. Rostislav Koryčánek	Director, The Brno House of Arts	architecture
prof. RNDr. Michal Kotoul, DrSc.	vice-rector, BUT	applied mechanics
prof. Ing. Vladimír Kučera, DrSc.	Czech Technical University in Prague, Faculty of Electrical Engineering	technical cybernetics

prof. RNDr. Miroslav Liška, DrSc.	BUT FME	applied physics
doc. RNDr. Petr Lukáš, CSc.	director, Academy of Sciences, Institute of Materials Physics	materials physics
doc. Ing. Lubomír Mikš, CSc.	Chairman of the Board of Directors, Qualiform, a.s.	technology of construction
prof. Ing. Ladislav Musílek, CSc.	vice-rector, Czech Technical University in Prague	experimental physics
prof. Ing. arch. Alois Nový, CSc.	vice-rector, BUT	architecture
prof. Ing. Drahomír Novák, DrSc.	BUT FCE	structure mechanics, reliability of structures
prof. Ing. Ladislav Omelka, DrSc.	vide-dean, BUT FC	physical chemistry
prof. Ing. Emanuel Ondráček, CSc.	advisor to rector of BUT	mechanics of solids, computer mechanics
prof. Ing. Karel Rais, CSc., MBA	rector, BUT	business and management
prof. Ing. Petr Sáha, CSc.	rector, Tomas Bata University in Zlin	materials engineering
prof. PhDr. Jan Sedlák, CSc.	BUT FFA	architecture
prof. RNDr. Eduard Schmidt, CSc.	Masaryk University in Brno, Faculty of Science	solid state physics
prof. Ing. Vladimír Smejkal, CSc.	forensic engineer, Prague	business and management
prof. Ing. Jana Stávková, CSc.	dean, Faculty of Business and Economics, Mendel University in Brno	statistics
prof. Ing. Petr Stehlík, CSc.	BUT FME	process engineering
prof. Ing. arch. Jilji Šindlar, CSc.	BUT FA	architecture
prof. Ing. arch. Vladimír Šlapeta, DrSc.	dean, BUT FA	architecture
prof. RNDr. Ing. Petr Štěpánek, CSc.	dean, BUT FCE	concrete structures
prof. Ing. Petr Vavřín, DrSc.	BUT FEEC	cybernetics, automation, and measurement
prof. Ing. Radimír Vrba, CSc.	dean, BUT FEEC	electrical and electronic technology
prof. RNDr. Ing. Jan Vrbka, DrSc.	BUT FME	mechanics of solids

** in 2009 handed in his resignation from the BUT Scientific Board*
† died in 2009

BUT MANAGERIAL BOARD

Ing. Jiří Bělohlav
Valentin Girstl
Mgr. Michal Hašek
Ing. Miroslav Hošek
RNDr. Barbora Javorová
Ing. Vladimír Jeřábek, MBA – vice-chairman
Ing. Jiří Škrla
Ing. Michal Štefl
Bc. Roman Onderka, chairman
Ing. Pavel Suchánek
RNDr. Věra Šťastná
doc. Ing. Otakar Smolík, CSc., MBA
Ing. Oldřich Kratochvíl, dr. h. c., CSc.

BUT ACADEMIC SENATE

doc. Dr. Ing. Petr Hanáček – chairperson
doc. ing. Jana Korytárová, Ph.D. vice-chairperson and chairperson of the Chamber of Academics
Bc. Tomáš Krejbich – vice-chairperson and chairperson of the Chamber of Students

Chamber of Academics

doc. Dr. Ing. Jan Černocký (FIT)
doc. Ing. Eva Gescheidtová, CSc. (FEEC)
doc. Dr. Ing. Petr Hanáček (FIT)
Ing. Helena Hanušová, CSc. (FBM)
PhDr. Kaliopi Chamonikola, Ph.D. (FFA)
doc. ing. Jana Korytárová, Ph.D. (FCE)
doc. Ing. Aleš Krejčí, CSc. (FCE)
RNDr. Vlasta Krupková, CSc. (FEEC)
doc. MgA. Petr Kvíčala (FFA) from 29.09.2009
RNDr. Hana Lepková (IFE and other units – CSA)
doc. Ing. Zdenka Lhotáková, CSc. from 10.03.09
Ing. arch. Miloslav Meixner, CSc. from 10.03.09
doc. Img. Jiřina Omelková, CSc. (FC)
RNDr. Pavel Popela, Ph.D. (FME)
Ing. Jan Roupec, Ph.D. (FME)
Mgr. Blahoslav Rozbořil, Ph.D. (FFA)
until 29. 06. 2009
Ing. Stanislav Škapa, Ph.D. (FBM)
prof. RNDr. Milada Vávrová, CSc. (FC)
prof. PhDr. Hana Vykopalová, CSc. (IFE and other units – CSA)

Chamber of Students

Bc. Stanislava Dermeková (FCE)
Bc. Patrik Halfar (FIT)
Bc. Tomáš Krejbich (FBM)
Marián Maslák (FEEC)
Ing. Martin Moos (FC)
Ing. Petra Nováčková (IFE)
Bc. Viktor Odstrčilík (FA) – from 10.03.2009
Ing. Vladimír Panáček (IFE)
BcA. Samuel Paučo (FFA)

BUT AS Working Committees

LEGISLATION COMMITTEE:
prof. Ing. Eva Gescheidtová, CSc.
doc. Ing. Aleš Krejčí, CSc.
doc. Ing. Zdeňka Lhotáková, CSc. – from 10. 03. 2009
doc. Ing. Jiřina Omelková, CSc.
Ing. Jan Roupec, Ph.D. – chairman
Mgr. Blahoslav Rozbořil, Ph.D. – until 29. 06. 2009
Students: Marian Maslák
BcA. Samuel Paučo

ECONOMIC COMMTTEE:
doc. Dr. Ing. Jan Černocký
Ing. Helena Hanušová, CSc.
PhDr. Kaliopi Chamonikola, Ph.D.
doc. Ing. Jana Korytárová, Ph.D.
RNDr. Vlasta Krupková, CSc.
doc. Ing. Miloslav Meixner, CSc. – from 10.03. 2009
RNDr. Pavel Popela, Ph.D. – chairman
prof. RNDr. Milada Vávrová, CSc.
prof. PhDr. Hana Vykopalová, CSc.
Students: Bc. Patrik Halfar
Ing. Martin Moos

PEDAGOGIC COMMITTEE:
Ing. Helena Hanušová, CSc.
RNDr. Vlasta Krupková, CSc. – chairperson
RNDr. Hana Lepková
prof. PhDr. Hana Vykopalová, CSc.
Students: Bc. Stanislava Dermeková
Bc. Tomáš Krejbich
Marian Maslák
Ing. Petra Nováčková
Bc. Viktor Odstrčilík
Ing. Vladimír Panáček
BcA. Samuel Paučo

CREATIVE ACTIVITY COMMITTEE (from 10.03.2009)
prof. Ing. Eva Gescheidtová, CSc.
PhDr. Kaliopi Chamonikola, Ph.D.
doc. Ing. Jana Korytárová, Ph.D.
RNDr. Hana Lepková
RNDr. Pavel Popela, Ph.D.
doc. Ing. Stanislav Škapa, Ph.D.
prof. RNDr. Milada Vávrová, CSc. – chairperson
Students: Bc. Stanislava Dermeková
Bc. Tomáš Kreibich
Ing. Martin Moos
Ing. Petra Nováčková – from 22.12.2009

BUT REPRESENTATIVES ON THE COUNCIL OF HIGHER EDUCATION INSTITUTIONS

doc. Ing. Eva Münsterová, CSc.
CHEI presidium member
prof. RNDr. Milada Vávrová, CSc.
CHEI congress member for BUT
Bc. Patrik Halfar
CHEI Chamber of Students – from 05.05.2009
Bc. Tomáš Kreibich – substitute
CHEI Chamber of Students – from 07.042009

1. 4. BUT as represented in Czech Rectors Conference, Council Of Higher Education Institutions, international and professional organizations

Table 1.4. BUT Membership in international and professional organizations

Organization	Country	Status
Academy of International Business (AIB)	USA	member
AESOP	France	member from 1995
AIST	USA	member
American Association for Artificial Intelligence	USA	member
American Chemical Society	USA	member
American Mathematical Society (AMS)	USA	member
ASME	USA	member
Association of European Civil Engineering Faculties (AECEF)	CZ	member
Association europeen pour l'enseignement de l'architecture (AEEA-EAAE)		

Association for Business Ethics	CZ	committee member
Association for Computational Linguistics	USA	member
Association for Project Management	CZ	member
Association for Quality Assessment	CZ	senior assessor of CZ National Quality Prize by EFQM and CAF models
Association for the Development of Building Material Recycling in the Czech Republic	CZ	president
Association of Chemical Companies	CZ	member
Association of Female Entrepreneurs of the Czech Republic	CZ	vice-president
Association of Libraries of Czech Universities	CZ	member
Center of Excellence Women and Science (CEWS)	Germany	member
CERCLES – CASAJC Confédération Européenne des Centres de Langues dans l'Engseignement Supérieur		
Cesnet, z. s. p. o.	CZ	member
Computing and Informatics	SK	member of editorial board
Conference of European Schools for Advanced Engineering Education and Research (CESAER)		member
Council of Higher Education Institutions	CZ	member
Czech and Moravian Electrical and Electronic Association	CZ	member
Czech Association of Forensic Experts and Assessors	CZ	chairman
Czech Chamber of Authorized Engineers and Technicians operating in construction (ČKAIT)	CZ	member
Czech Computer Science Association	CZ	member
Czech Electrical Engineering Society	CZ	member
Czech Forging Association	CZ	committee member
Czech Foundry Society	CZ	member of executive committee
Czech Logistic Association	CZ	member of presidium
Czech Marketing Association	CZ	member
Czech Marketing Associations	CZ	member of main committee
Czech Marketing Organization	CZ	FBM is a member
Czech Mathematical Society of the Czech Union of Mathematicians and Physicists	CZ	committee member
Czech Moravian Psychological Society	CZ	member
Czech Quality System	CZ	senior management system auditor

Czech Society for Cybernetics and Informatics	CZ	member
Czech Society for Mechanics	CZ	deputy chairperson
Czech Society for New Materials and Technologies	CZ	member
Czech Society for Non-Destructive Testing	CZ	president
Czech Society for Quality	CZ	chairperson
Czech Society for Quality	CZ	founder of creativeness and innovation group
Czech Society For Research and Processing of Metal Sheets	CZ	committee member
Czech Standards Institute	CZ	member
Czech Welding Society	CZ	committee member
Czech-Moravian Society for Automation	CZ	committee member
Danube Rectors Conference	Austria	member
DILIA	CZ	collective member
EACES	UK	member
ECSB – European Council for Small Business EU	Finland	vice-president for CR
EIBA – The European Business Academy	Belgium	member
ELIA	the Netherlands	member
EMAC – The European Marketing Academy		member
EUA	Belgium	member
EUNIS-CZ	CZ	member
European Association for Architectural Education	Belgium	member since 1995
European Association for Lexicography	FR	member
European Association for Theoretical Computer Science (EATCS)	Belgium	member
European Association of Chemistry and Environment		member
European Federation of National Engineering Associations		
European Foundation for Quality Management (EFQM)	CZ	member
European Institute for Advanced Studies in Management (EIASM)	Belgium	member
European Organisations for Quality (EOQ)	CZ	member
European Photochemistry Association		member
European Society for Engineering Education (SEFI)	UK	member
European University Association (EUA)	Belgium	member

Expert group of European project "Entrepreneurship in higher education, especially within non-business studies", European commission	EU	CR representative
Federation Internationale du Recyclage (F.I.R.)	the Netherlands	board member
Federation of European Heating and Airconditioning Associations (FEHA)	Brussels	member
Forensic Engineering	CZ	editor in chief
Gesellschaft für Angewandte Matematik und Mechanik (GAMM)	Germany	member
Gesellschaft für Informatik	Germany	member
Global Business and Technology Association (GBATA)	USA	board member
Global Water Partnership (GWP)		member
Hamburg based European Association for Accident Research and Analysis (EVU)	Germany	Czech national group presidium chairman, main group presidium member
IBS	USA	member
IGeLU	internat.org.	member
Institute of Electrical and Electronics Engineers (IEEE)	CZ	IT manager of Czechoslovak section, member
International Association for Bridge and Structural Engineering (IABSE)		member since 1994
International Association for Cross-cultural Psychology	Germany	member
International Council in Building and Construction (CIB)		
International Council of the Aeronautical Sciences (ICAS)	internat. org.	member of programme committee
International Energy Agency, ECBCS Implementation Agreement	France	CR representative in Annex AIVC
International Humic Substances Society		member
International Project Management Association	internat. org.	president of national association
International Pyrotechnics Society		member
International speech communication association	FR	member
Internationale Gesellschaft für Ingenieurpadagogik	Germany	member
ISEKI-Food Association	Austria	member
Journal of Electrical Engineering	SK	member of editorial board
Journal of General Systems	USA	member of editorial board

Journal of Universal Computer Science	A	member of editorial board
Marketing and Communication	CZ	member of editorial board
Moravian Association of Female Entrepreneurs and Managers	CZ	honorary chairperson
National Register of Advisors	CZ	member
Polish Academy of Sciences, Foundry Committee	Poland	member
PRIME	Belgium	member
Quality Council	CZ	member of board of consultants
Raw Material Policy Board – a consulting body of the Ministry of Industries and Commerce	CZ	member
Royal Society for Chemistry	UK	member
SAP Public Higher Education Institutions Coordination Centre	CZ	member
Science Steering Committee RAAD	EU	member
Scientific Committee for UIA Congress	Italy	member since 2006
SKIP	CZ	member
Society for Intercultural Training, Education and Research United Kingdom (SIETAR UK)	UK	member
Society for Machine Tools	CZ	member of executive committee
Society of Plastics Engineers (SPE)	USA	member
State Testing Institute Brno	CZ	chairperson of certification committee
SUAleph	CZ and Slovakia	member
The International Society of Difference Equations	USA	member
TIES	USA	member
UNESCO/UIA – Validation Committee for Architectural Education	France	member since 1995
Union of Czech Book Sellers and Editors	CZ	member
Waste Material Management Board – a consulting body of the Ministry of Environment	CZ	member
The International Society of Difference Equations	USA	member
World Foundrymen Organisation	UK	vice president
UNESCO/UIA – Validation Committee for Architectural Education	France	member since 1995

1. 5. Women in university academic bodies

Table 1.5. Women in university academic bodies

faculties	Deans' Advisory Board	The Academic Senate	Scientific Board
FA	2/15	4/13	3/15
FCE	0/11	8/40	4/56
FFA	4/10	3/11	4/22
FC	2/11	7/13	6/33
FEEC	2/11	5/19	2/29
FIT	1/17	0/13	2/27
FBM	6/16	9/21	8/28
FME	4/11	6/36	0/37

2 QUALITY AND EXCELLENCY OF ACADEMIC ACTIVITIES

2. 1. The Academic Senate

In 2009, the BUT Academic Senate convened at 10 regular and one special session. The main themes in 2009 continued to be legislation, management, teaching with creative activities emerging as a new area of interest. Concerning legislation, standard debates were held to approve changes in the internal relations of BUT and its faculties with a number of new documents being discussed related to the establishment and activities of three university institutes. Like every year, rules of distributing BUT subsidies for 2009 and the subsequent approval of the BUT 2009 budget were among the main issues on the agenda with continuing efforts to contribute to the preparation of BUT for the new types of EU programmes. Regarding the BUT management strategy, the BUT Academic Senate took decisions concerning a number of property rights (purchase and sale of BUT land). Next in 2010 the BUT AS discussed and approved members of the BUT Disciplinary Commission, final activity and management reports for 2008, a 2010 version of the BUT mission statement with detailed discussions held on an ethical code for BUT academics.

The BUT AS 2009 activities were fully supported by the AS Office. Most of the BUT AS work was carried out by its permanent working committees where all issues were analysed in detail; the job done by the committees is decisive in judging the quality of the entire academic senate.

The BUT AS Legislative Committee (LC) convened 8 times in 2009 dealing mostly with amendments to the internal rules at BUT, its faculties and university institutes. Concerning BUT internal regulations, the BUT LC discussed and recommended that the BUT AS approve two amendments to the BUT Constitution (mainly changes related to the university institutes), an amendment to the BUT wage scale, an amendment to the BUT Scholarship Rules, two amendments to the BUT Study and Examination Rules, an amendment to the BUT AS Election Rules and Rules of Procedure, an amendment to the BUT Management and Accounting Rules, and two amendments to the organisational rules of BUT rector's office. Important was also the discussion on two proposals to establish a BUT Central European Institute of Technology (BUT CEITEC) and to transform the BUT Centre of Sports Activities into a university institute. In this regard, detailed discussion was held by the LC on the new internal rules (constitution and scientific board rules of procedure) of both of the above new institutes – these internal rules were then recommended to the BUT AS for approval.

Also new rules and amendments to the existing rules of several BUT faculties were discussed by the LC and subsequently passed to the BUT AS for approval.

In 2009, the LC activities received much support from the cooperation with the rector's administrative department, particularly with JUDr. Pavlíková.

The BUT AS Economic Committee (EC) convened 17 times in 2009. The issues in its long-term focus include: recommendation for the BUT AS concerning the approval of the rules for setting up the BUT budget; recommendation for the BUT AS concerning the approval of the annual management and accounting report and the assessment of the related documents; discussing the managerial aspects of the legislation submitted in cooperation with the LC; evaluation of the effects on BUT of changes in the rules of financing by the Ministry of Education, Youth, and Sports; managerial calculations to outline the BUT financing during the reforms in cooperation with BUT representatives in the University Council.

In early 2009, the following documents were discussed at the EC meetings and subsequently approved by the AS: rules for distributing the BUT 2009 subsidies and the following BUT 2009 budget. Like every year, the EC discussed and recommended that the BUT AS approve the BUT Annual 2008 Management Report and the 2010 version of the BUT Mission Statement. In late 2009, the EC participated in the discussion of the rules for setting up the BUT 2010 budget.

In cooperation with the new AS committee for creative activities, the EC traditionally continues to analyse the economic contributions and effects of creative activities supporting the evaluation of the effects of reducing the outcomes, implementing simulations and forecasts of creative-activity figures and financing, asking about the ROI of the technology transfer and application implementations; it also takes part in the analyses of the economic consequences of the changes in the rules of specific research. In a discussion on financing the specific research, the EC recommended that the BUT Academic Senate pass a resolution on extending the project competition deadline in order to reduce

the related risks existing before the Ministry-of-Education budget is approved.

In view of preparing the strategic projects, the EC paid more attention to building and investment at BUT (issues of building in progress, resources, return on investment); monitoring and evaluating the economic effects on BUT and risks connected with the R&D for Innovation projects (effects of co-financing, eligibility of costs, their accrued and deferred return, sustainability of projects and direct participation in projects).

Since the preparation for the R&D for Innovation and CEITEC projects culminated in 2009, the EC also discussed and passed to the BUT AS for approval about fourteen property issues concerning mostly the purchase of land in the Pod Palackého vrchem area needed for the projects and for BUT development (further buildings in Technická street) next a gratuitous acquisition of land for the needs of BUT, exchange of a piece of land, and the granting of easements. All the above documents were submitted as foreseen by the 2009 version of the BUT 2006–2010 Mission Statement and the amended "Programme for Completing the BUT Infrastructure from 2009 to 2015", which is part of the 2009 version of the BUT Mission Statement. Subsequently, the EC discussed and recommended that the BUT AS approve a loan for purchasing land and tenements at the Pod Palackého vrchem campus for strategic reasons (particularly the purchase of land for the CEITEC project). Next the EC recommended that the BUT AS approve BUT joining the "Interoperability of Railway Infrastructure" company.

The EC is also involved in discussions centring on issues related to introducing the Full Cost methodology and possibilities of reducing multiple overhead costs and addressing funding directly to academics (see TOP10 researchers and teachers, cross-faculty optional courses in cooperation with the pedagogic committee).

Other important problems addressed in detail by the EC included those concerning halls of residence and canteens, letters written to 8D, o. s. to deal with the deadlock over the issue of land at the Kraví hora and Pod Palackého vrchem campuses, problems with organizing and financing sports activities of students and teachers based on observations by BUT academics in view of the development of the CES activities, and an analysis of its multi-resource financing.

The EC also passed the following BUT management proposals to be approved by the BUT AS: to provide extra scholarships for students with excellent sports achievements paid by the rector based on justified requests by the director of CES and to release part of the BUT AS financial reserve to cover the expenses incurred by BUT students as a result of the natural disaster in Italy.

The following are the activities undertaken by the BUT AS Pedagogic Committee (PC) in 2009: a proposal was made to offer inter-faculty programmes for Master's degree students to complete their profile by their own choice of a limited number of optional courses taught at other faculties, with this proposal initiating this programme in the form of „free courses"; a draft was issued of an amendment to the BUT Study and Examination Rules concerning continual evaluation of Bachelor's degree students in courses finalized by an examination, which at present is discussed by the AS; preparation was continued of a methodology to calculate the workloads of teachers at different BUT faculties. The student members of the Pedagogic committee participated in the preparation of regulations concerning the provision of financial help for students in distress as well as in the preparation

of regulations concerning specific research and continual monitoring of doctoral programmes.

At its meeting of 10th March 2009, the BUT AS established a Creative Activity Committee (CAC). In 2009 the CAC was particularly concerned with problems regarding the use of the Result Information Register (RIV), that is, mostly discovering the most frequent input errors, next with issues related to the TOP evaluation, here cooperation was involved on setting up criteria for the eligibility of a product as the result of a creative activity of BUT academics; in addition to this, the CAC cooperated with the EC on the preparation of BUT for a new amendment to the methodology for the evaluation of R&D within the Czech Republic and matters of financing related to this.

In late 2009, members of the CAC held in-depth discussions with the vice-rector in charge of the BUT creative development concerning the financing of specific research in 2010. Based on the discussions, the BUT AS passed a resolution on the preparation of rules for setting up the BUT 2010 budget; another resolution concerned the extension of specific research project deadlines.

In view of the approaching end of the incumbent rector's office, the BUT AS announced a rectorial election to be scheduled for May 2009 approving detailed organisational guidelines for the election. On 20th October in the historic hall of the faculty of civil engineering and on 22nd October in the integrated building of the faculty of business and management, two gatherings of the BUT academic community were held at which the rectorial candidate for the next term was presented. The election of a Rectorial candidate to be appointed for the term beginning in February 2010 and ending in January 2014 took place at a meeting of the BUT AS with the existing rector prof. Ing. Karel Rais, CSc., MBA, being re-elected.

In addition to the standard legal and property issues, the preliminary financing of the R&D For Innovation projects and the related short- and long-term investment strategies were discussed at a special meeting of the BUT AS held at the Devět Skal hotel in June 2009. Next at this special meeting, the BUT AS passed a resolution on documents from Charles University in Prague concerning changes in tertiary education and university management – as part of the narrative of a new university law.

By its representatives in the Council of Higher Education Institutions, the BUT AS was well informed on the discussions over the narrative of the new university law following the period of work on the White Book of Tertiary Education. In March 2009, the BUT AS passed the documents, „BUT AS View On and Call For a New University Law", publishing them for the needs of the BUT academics and, via the Council of Higher Education Institutions, also for all Czech university academics. The BUT representatives in the Council appointed by the council to negotiate with a team of the Ministry of Education, Youth, and Sports preparing the narrative of the university law informed the BUT AS on the activities of the team as well as on other events in which they took part: a conference on the reform of tertiary education held by the ministry, talks with OECD experts on the preparation of a reform of tertiary education in the Czech Republic, preparation of a 2011–2015 Mission Statement by the ministry. The BUT AS also paid due attention to the difficult situation at the Faculty of Law of the University of West Bohemia, which was discussed in detail by a CHEI working committee for ethics in research and teaching. At several meetings, the BUT AS received a detailed report on the investigations from RNDr. Krupková. The BUT representatives in the Council of Higher Education Institutions participated in detailed economic analyses of and comments on the underlying documents for changes in the financing of universities, which are in preparation.

From the beginning of its term in 2009, the BUT Academic Senate Student Chamber (BUT AS SC) helped students in distress and turbulent academic environment. This particularly applies to completing the rules for granting scholarships to students in distress. It joined the BUT management in their effort to reinstate a line 53 bus stop. Next it dealt with the problems of the doctoral scholarships presenting them at the BUT AS special meeting. A support was found by setting up rules and model for funding from specific research. BUT AS SC representatives in the BUT Halls of Residence and Canteens supervisory board participated in efficient improvement of accommodation provided at halls of residence and meals served at canteens. In courses allowing this, via the Pedagogic committee, the BUT AS SC tries to carry out study evaluation on a continual basis. In the Council of Higher Education Institutions, it calls for rises in doctoral and accommodation scholarships, next for cancelling the 26-year-of-age limit for recognizing the status of a student via an amendment to the Act no. 111/1998 Coll., concerning universities. The BUT AS SC was active in launching a new portal at student.vutbr.cz.

2. 2. Numbers of accredited degree programmes

In 2009, BUT offered 74 full-time and combined degree programmes including 55 active ones with students actually registered. New follow-up Master's degree programmes were accredited in 2009 including System Engineering and Informatics with an Information Management study field, Production Systems with a Production Systems study field, Risk Engineering comprising study fields of Risk Management for Electric Devices, Risk Management in Companies and Institutions, Risk Management for Chemical Technologies, Risk Management for Building Structures, Risk Management for Machinery, and Risk Management for Information Systems, a new doctoral programme Physical Chemistry with a Physical Chemistry study field, and a new Risk Management and Protection of Population Bachelor's degree study field. Also new Bachelor's degree programmes were offered taught in foreign languages such as Design of Civil Engineering Structures taught in English, Produktionssysteme taught in German and Physical Chemistry taught in English.

The degree programmes cover a wide spectrum of classical fields of engineering and science, architecture and arts as well as a number of interdisciplinary fields combining engineering with science, business and health care. Table 2.2a provides an overview of the accredited degree programmes, Table 2.2.a_1 lists the accredited degree programmes by faculties.

Table 2.2a Active accredited degree programmes

groups of degree programmes	degree programmes						
	Bachelor's		Master's		follow-up Master's		doctoral
	FT	C	FT	C	FT	C	
natural sciences	0	0	0	0	0	0	2
technical sciences	13	8	2	1	13	8	17
economics	2	2	0	0	1	1	1
culture and art	1	0	0	0	1	0	1
total	**16**	**10**	**2**	**1**	**15**	**9**	**21**

Table 2.2a_1 Active accredited degree programmes by faculties

faculty	Bachelor's	follow-up Master's	Master's	doctoral	total
FA	1	1	0	1	3
FCE	4	3	1	2	10
FFA	1	1	0	1	3
FEEC	2	1	0	2	5
FC	3	4	0	5	12
FIT	1	1	0	2	4
FBM	2	1	0	1	4
FME	2	3	1	6	12
IFE	0	1	0	1	2
total	**16**	**16**	**2**	**21**	**55**

2. 3. Courses taught in foreign languages, joint programmes (double degree), degree programmes of a public higher-education institution accredited in a foreign language.

Most of the courses are taught both in Czech an English with one programme taught in German. Table 2.3. lists the active programmes accredited taught in a foreign languages for which students have signed up. Also degree programmes offered jointly with foreign universities begin to be prepared for accreditation. At present there are three fully fledged joint and double degree programmes offered, with more being prepared. This is a continual process further worked on by the faculties. Table 2.3. lists BUT degree programmes taught in English.

Table 2.3. Degree programmes at BUT taught in English

groups of degree programmes	degree programmes							total
	Bachelor's		Master's		follow-up Master's		doctoral	
	FT	C	FT	C	FT	C		
natural sciences	0	0	0	0	0	0	2	0
technical sciences	2	0	0	0	3	0	2	7
economics	0	0	0	0	1	0	2	3
culture and art	0	0	0	0	0	0	0	0
total	**2**	**0**	**0**	**0**	**4**	**0**	**4**	**10**

2.4. Accredited degree programmes jointly offered by BUT and specialised institutions of higher-education

At present there is no degree programme at BUT offered jointly with a specialised institution of higher-education.

2. 5. Lifelong-Learning courses

Table 2.5. Lifelong-Learning courses offered by BUT

programme groups	profession-oriented courses			special-interest courses			U3A	total
	up to 15 hr	up to 100 hr	more	up to 15 hr	up to 100 hr	more		
natural sciences							**2**	**2**
engineering	**3**	**11**					**38**	**52**
agriculture, forestry, veterinary								
medicine, pharmacy							**11**	**11**
social sciences and services								
economics							**2**	**2**
law, public administration		**1**						**1**
pedagogy, teaching, and social welfare			**1**					**1**
psychology fields								
culture and art sciences								
total	**3**	**12**	**1**				**53**	**69**

Note: U3A – University of the third age.

2. 6. Numbers of Lifelong-Learning students

Table 2.6. Numbers of Lifelong-Learning students

programme groups	profession-oriented courses			special-interest courses			U3A	total
	up to 15 hr	up to 100 hr	more	up to 15 hr	up to 100 hr	more		
natural sciences							30	30
engineering	38	36					676	750
agriculture, forestry, veterinary								
medicine, pharmacy							215	215

social sciences and services			146					146
economics							16	16
law, public administration		45						45
pedagogy, teaching, and social welfare			23					23
psychology fields								
culture and art sciences								
total	**38**	**81**	**169**				**937**	**1 225**

U3A – University of the 3rd Age

2. 7. Interest in studying at BUT

Long term statistics show that the interest in studying at BUT is constantly growing. The number of applications submitted in 2009 reached almost twenty thousand with the students actually enrolled being by 200 more than in the autumn of 2008. The percentage of the students actually enrolled out of the total of those admitted is growing, too. This means that, of all the applications submitted to different universities, the candidates are likely to choose the one submitted to our university. Table 2.7. indicates the interest of candidates in individual degree programmes.

Table 2.7. BUT Study Candidates

programme group	number				
	applications submitted	applications registered	candidates eligible	candidates admitted	candidates enrolled
natural sciences	17	16	16	16	15
engineering	14 610	12 315	11 123	10 399	8 309
economics	4 690	3 823	2 500	1 993	1431
culture and art sciences	510	502	104	104	96
total	**19 827**	**16 656**	**13 743**	**12 512**	**9 851**

2. 8. Students In accredited degree programmes

In recent years, there has been a moderate, steady increase in enrolled student numbers. Written admission tests are still in place at all the faculties to maintain the quality of the candidates admitted. Table 2.8. shows the student numbers on 31st October 2009 arranged by degree-programme groups and levels of tertiary education. For several years, no students have been admitted to the non-follow-up programmes any longer, their numbers are very small with all the students being close to graduation. Table 2.8_1 lists total student numbers including suspended studies by

programme groups, Table 2.8_2 by programme types, Table 2.8_3 by faculties and programme type, Table 2.8_4 by study type and form, Table 2.8_5 by degree programmes. Table 2.8_6 shows the numbers of international students.

Table 2.8. Student numbers in accredited programmes on 31st October 2009

groups of programmes	student numbers in degree programmes								total students
	Bachelor's		Master's		follow-up Master's		doctoral		
	FT	C	FT	C	FT	C	FT	C	
natural sciences	0	0	0	0	0	0	44	22	66
engineering	11 263	1 193	45	34	5 059	429	1 000	935	19 958
economics	1 475	80	0	0	808	390	53	83	2 889
culture and art sciences	181	0	0	0	102	0	17	1	301
total	**12 919**	**1 273**	**45**	**34**	**5 969**	**819**	**1 114**	**1 041**	**23 214**

Table 2.8_1 Student numbers including suspended studies by programme groups

programme group	master group code	Bachelor's	Master's	follow-up Master's	doctoral	total
engineering	23 až 39	12 456	79	5 488	1 935	19 958
culture and art	14	0	0	0	66	66
science	62	1 555	0	1 198	136	2 889
economics	82	181	0	102	18	301
total		**14 192**	**79**	**6 788**	**2 155**	**23 214**

Table 2.8_2 Student numbers by programme type

programme type	programme type	full-time	combined	total
Bc.	Bachelor's	12 919	1 273	14 192
Mgr.	Master's	45	34	79
Mgr. nav.	follow-up Master's	5 969	819	6 788
Ph.D.	Doctoral	1 114	1 041	2 155
total		**20 047**	**3 167**	**23 214**

Table 2.8_3 Student numbers by faculties and programme type

faculty	Bachelor's	Master's	follow-up Master's	doctoral	total
FA	430	0	223	83	736
FCE	4 629	53	1 331	434	6 447
FFA	181	0	102	18	301
FC	548	0	277	199	1 024
FEEC	2 266	0	1 336	417	4 019
FIT	1 856	0	805	201	2 862
FBM	1 555	0	1 198	136	2 889
FME	2 727	26	1 305	553	4 611
IFE	0	0	211	114	325
total	**14 192**	**79**	**6 788**	**2 155**	**23 214**

Table 2.8_4 Student numbers by faculties, programme type, and form

faculty	programme student numbers								total
	Bachelor's		Master's		follow-up Master'		doctoral		
	C	FT	C	FT	C	FT	C	FT	
FA	1	429	0	0	0	223	54	29	736
FCE	518	4 111	34	19	24	1 307	267	167	6 447
FFA	0	181	0	0	0	102	1	17	301
FEEC	297	1 969	0	0	165	1 171	154	263	4 019
FC	61	487	0	0	51	226	69	130	1 024
FIT	0	1 856	0	0	0	805	68	133	2 862
FBM	80	1 475	0	0	390	808	83	53	2 889
FME	316	2 411	0	26	189	1 116	281	272	4 611
IFE	0	0	0	0	0	211	64	50	325
total	**1 273**	**12 919**	**34**	**45**	**819**	**5 969**	**1 041**	**1 114**	**23 214**

Table 2.8_5 Student numbers by faculties and degree programmes

fac.	pr. code	title	men	women	FT	C	total
FA	B3501	Architecture and town planning	185	245	429	1	430
FA	N3501	Architecture and town planning	116	107	223	0	223
FA	P3501	Architecture and town planning	45	38	29	54	83

FCE	B3503	Architecture of building structures	82	131	213	0	213
FCE	B3607	Civil engineering	2 962	1 155	3 657	460	4 117
FCE	B3609	Civil engineering	34	7	41	0	41
FCE	B3646	Geodesy and cartography	138	120	200	58	258
FCE	M3607	Civil engineering	43	10	19	34	53
FCE	N3501	Architecture and town planning	12	18	30	0	30
FCE	N3607	Civil Engineering	808	394	1 178	24	1 202
FCE	N3646	Geodesy and cartography	52	47	99	0	99
FCE	P3607	Civil engineering	297	115	156	256	412
FCE	P3646	Geodesy and cartography	14	8	11	11	22
FFA	B8206	Fine arts	78	103	181	0	181
FFA	N8206	Fine arts	42	60	102	0	102
FFA	P8206	Fine arts	8	10	17	1	18
FC	B2801	Chemistry and chemical technologies	157	192	310	39	349
FC	B2825	Protection of population	29	33	55	7	62
FC	B2901	Chemistry and technology of food	30	107	122	15	137
FC	N2805	Chemistry and technology of the environment	28	51	58	21	79
FC	N2806	Consumer chemistry	10	32	38	4	42
FC	N2820	Chemistry, technology and properties of materials	25	11	32	4	36
FC	N2901	Chemistry and technology of food	13	107	98	22	120
FC	P1404	Physical chemistry	16	30	33	13	46
FC	P1405	Macromolecular chemistry	14	6	11	9	20
FC	P2805	Chemistry and technology of the environment	30	38	36	32	68
FC	P2820	Chemistry, technology and properties of materials	18	17	23	12	35
FC	P2901	Chemistry and technology of food	3	27	27	3	30
FEEC	B2643	Electrical engineering, electronics, communication, and control technology	2 003	27	1 733	297	2 030
FEEC	B3930	Biomedical technology and bioinformatics	141	95	236	0	236
FEEC	N2643	Electrical engineering, electronics, communication, and control technology	1 293	43	1 171	165	1 336
FEEC	P2613	Electrical engineering and communication technology	312	25	263	74	337
FEEC	P2643	Electrical engineering, electronics, communication, and control technology	77	3	0	80	80
FIT	B2646	Information technology	1 760	96	1 856	0	1 856

FIT	N2646	Information technology	771	34	805	0	805
FIT	P2646	Information technology	32	5	2	35	37
FIT	P2651	Computing technology and informatics	155	9	131	33	164
FBM	B2608	Economics and management	434	539	911	62	973
FBM	B2609	System engineering and informatics	476	106	564	18	582
FBM	N6208	Economics and management	663	535	808	390	1 198
FBM	P6208	Economics and management	79	57	53	83	136
FME	B2341	Mechanical engineering	2 290	127	2 101	316	2 417
FME	B3901	Applied sciences in engineering	262	48	310	0	310
FME	M2301	Mechanical engineering	23	3	26	0	26
FME	N2301	Mechanical engineering	988	71	893	166	1 059
FME	N2344	Production systems	4	0	4	0	4
FME	N3901	Applied sciences in engineering	189	53	219	23	242
FME	P2302	Machinery and devices	237	16	140	113	253
FME	P2303	Manufacturing technology	41	11	20	32	52
FME	P3901	Applied sciences in engineering	81	4	45	40	85
FME	P3910	Physical and materials engineering	75	10	46	39	85
FME	P3913	Applications of natural sciences	32	7	12	27	39
FME	P3920	Metrology and testing	26	13	9	30	39
IFE	N3917	Forensic engineering	122	89	211	0	211
IFE	P3917	Forensic engineering	83	31	50	64	114
total			**17 938**	**5 276**	**20 047**	**3 167**	**23 214**

Table 2.8_6 International student numbers

programme type		international students
Bc.	Bachelor's	1 361
Mgr.	Master's	0
follow-up Mgr.	follow-up	797
Ph.D.	doctoral	168
total		**2 326**

2. 9. Graduates

Over the last two years, the number of BUT graduates has hardly changed. With the last non-follow-up Master's degree programme students finishing gradually their studies, the number of students graduating from Bachelor's and Follow-Up Master's programmes is increasing. Arranged by programmes and degrees of tertiary

education, the numbers are shown in Table 2.9., Table 2.9_1 lists 2009 graduates by faculty and programme. Table 2.9_2 lists details of doctoral graduates including their supervisors and the titles of their theses. Table 2.9_4 shows graduates with awards in 2009.

Table 2.9. Graduates from BUT accredited degree programmes from 1st January to 31st December 2009

groups of programmes	graduate numbers in degree programmes								total
	Bachelor's		Master's		follow-up Master's		doctoral		
	FT	C	FT	C	FT	C	FT	C	
natural sciences	0	0	0	0	0	0	1	2	3
engineering	2 497	104	108	26	1 224	77	19	163	4 219
economics	318	64	0	0	305	154	0	18	859
culture and art sciences	32	0	0	0	43	0	3	0	78
total	**2 847**	**168**	**108**	**26**	**1 572**	**231**	**23**	**183**	**5 158**

Table 2.9_1 Graduates from accredited degree programmes from 1st January to 31st December 2009 by faculty and programme

faculty	degree programme	men	women	including intern. students	total
FA	B3501	57	55	13	112
FA	N3501	40	30	12	70
FA	P3501	4	3	0	7
FCE	B3503	11	17	2	28
FCE	B3607	461	233	32	694
FCE	B3609	8	0	1	8
FCE	B3646	17	24	2	41
FCE	M3607	69	19	3	88
FCE	M3646	2	2	1	4
FCE	N3646	14	21	10	35
FCE	P3607	25	12	1	37
FCE	P3646	2	0	0	2
FFA	B8206	14	18	2	32
FFA	N8206	21	22	3	43
FFA	P8206	0	3	0	3
FC	B2801	24	50	8	74

FC	B2825	17	10	0	27
FC	B2901	5	42	2	47
FC	M2805	1	2	0	3
FC	M2806	0	1	0	1
FC	M2808	1	0	0	1
FC	M2901	1	7	0	8
FC	N2805	6	19	1	25
FC	N2806	4	12	0	16
FC	N2820	8	7	0	15
FC	N2901	8	42	4	50
FC	P1404	1	2	0	3
FC	P2805	1	4	1	5
FC	P2820	4	1	1	5
FEEC	B2643	584	16	67	600
FEEC	N2643	472	11	53	483
FEEC	P2613	1	0	0	1
FEEC	P2643	59	5	0	64
FIT	B2646	366	19	101	385
FIT	N2646	195	2	35	197
FIT	P2646	6	2	0	8
FIT	P2651	1	0	1	1
FBM	B6208	65	151	8	216
FBM	B6209	142	24	18	166
FBM	N6208	224	235	21	459
FBM	P6208	13	5	1	18
FME	B2341	482	27	18	509
FME	B3901	58	18	4	76
FME	M2301	27	2	2	29
FME	N2301	295	13	11	308
FME	N3901	75	27	5	102
FME	P2302	15	2	0	17
FME	P2303	5	1	0	6
FME	P3901	5	1	0	6
FME	P3910	10	2	0	12
FME	P3913	3	2	2	5

FME	P3920	3	1	0	4
IFE	P3917	2	0	0	2
total		**3 934**	**1 224**	**446**	**5 158**

Table 2.9_2 Graduates from accredited degree programmes from 1st January to 31st December 2009 by faculty

faculty	graduates in degree programmes				total graduates
	Bachelor's	Master's	follow-up Master's	doctoral	
FA	112	0	70	7	189
FCE	771	92	35	39	937
FFA	32	0	43	3	78
FC	148	13	106	13	280
FEEC	600	0	483	65	1 148
FIT	385	0	197	9	591
FBM	382	0	459	18	859
FME	585	29	410	50	1 074
IFE	0	0	0	2	2
total	**3 015**	**134**	**1 803**	**206**	**5 158**

Table 2.9_3 BUT doctoral graduates in 2009

fac.	name	theme and supervisor
FCE	Ing. Petr Bardůnek	Conversion of brewery houses. Supervisor: doc. Ing. arch. Jarmila Ledinská, CSc.
FCE	Ing. Michal Bernat Ing.	Hybrid designs of concrete-filled steel structures. Supervisor: doc. Ing. Ivailo Terzijski, CSc.
FCE	Jana Hanzelínová	Development of materials for preparing subbases using waste materials. Supervisor: prof. Ing. Rostislav Drochytka, CSc.
FCE	Ing. Pavel Kocanda	Design of a model of successfully managing the finances of a building company in real competition. Supervisor: doc. Ing. Bohumil Puchýř, CSc.
FCE	Ing. Petr Němec	Fractal geometry and its applications in engineering. Supervisor: prof. RNDr. Tomáš Ficker, DrSc.
FCE	Ing. Aleš Nevařil	Dynamics of rope side frames. Supervisor: doc. Ing. Vlastislav Salajka, CSc.

FCE	Ing. Marcela Počinková	Heating surfaces integrated in building structures. Supervisor: Ing. Karel Čupr, CSc.
FCE	Ing. Markéta Sedláková	Determining selected parameters affecting the useful properties of industrial concrete floors. Supervisor: doc. Ing. Ivan Moudrý, CSc.
FCE	Ing. Josef Stryk	Correlation between acoustic emission and damage to reinforced-concrete caused by the corrosion of metal reinforcement. Supervisor: doc. Ing. Marta Kořenská, CSc.
FCE	Ing. Petr Šimůnek	Selected problems of hourdis ceilings. Supervisor: doc. Ing. Ivailo Terzijski, CSc.
FCE	Ing. Tomáš Uhlík	Structural design of 3D rope networks using the finite-element method. Supervisor: Ing. Jiří Kytýr, CSc.
FCE	Ing. Radim Drápal	Microclimate of greenhouses and conservatories. Supervisor: doc. Ing. Jiří Hirš, CSc.
FCE	Ing. Dagmar Götzová	Ways of financing public investment with a proportion of EU funds. Supervisor: doc. Ing. Jana Korytárová, Ph.D.
FCE	Ing. Iva Holubová	Requirements of the reclamation of prefabricated buildings. Supervisor: doc. Ing. Jiří Hirš, CSc.
FCE	Ing. Petra Pospíšilová	Development of a protection system against harmful ionizing radiation. Supervisor: doc. Ing. Karel Kulísek, CSc.
FCE	Ing. Václav Račanský	Design of jet-grouting structures. Supervisor: doc. Ing. Jan Masopust, CSc.
FCE	Ing. Lenka Smetanová	Study of the glaze penetration of thin-walled dry-pressed ceramic tiles and design of a material mixture for their manufacture using flue ash. Supervisor: doc. Ing. Radomír Sokolář, Ph.D
FCE	Ing. Ludmila Vehovská	Study of the properties and application areas of flue ashes in building. Supervisor: prof. Ing. Marcela Fridrichová, CSc.
FCE	Mgr. Jana Bulantová	Moisture propagation analysis using a microwave method. Supervisor: Ing. Jan Škramlik, Ph.D.
FCE	Ing. Ondřej Anton	Development and specification of radiographic methods in building. Supervisor: prof. Ing. Leonard Hobst, CSc.
FCE	Ing. Lubomír Vítek	Radiation protection at medical diagnostic and therapeutic departments. Supervisor: prof. Ing. Leonard Hobst, CSc.
FCE	Ing. Jana Maršálová	Study of the rheological properties of the microstructure of liquefied cement composites. Supervisor: doc. Ing. Rudolf Hela, CSc.
FCE	Ing. Marek Štencel	Oxygen regime of aerobic ponds. Supervisor: prof. Ing. Jan Šálek, CSc.
FCE	Ing. Jiří Kosatík	Mathematical and economic model for planning and management at a building company. Supervisor: doc. Ing. Leonora Marková, Ph.D.
FCE	Mgr. Libor Topolář	Using an acoustic method to describing the behaviour of setting and hardening concrete building structures. Supervisor: prof. Ing. Luboš Pazdera, CSc.

FCE	Ing. Petr Zlámal	Extended use of waste in building. Supervisor: doc. Ing. Karel Kulísek, CSc.
FCE	Ing. Patrik Štancl	A pre-stressed floor bar undergoing statistical tests: numerical modelling and experiments. Supervisor: doc. Ing. Zbyněk Keršner, CSc.
FCE	Ing. Jan Eliáš	Stochastic fracture mechanics. Supervisor: doc. Ing. Miroslav Vořechovský, Ph.D.
FCE	Ing. Zdeněk Vejpustek	Analysis of joints of wooden structures with inserted gusset plates. Supervisor: doc. Ing. Bohumil Straka, CSc.
FCE	Ing. Truong Son Phan	Modelling of geotechnical tasks. Supervisor: doc. Ing. Kamila Weiglová, CSc.
FCE	Ing. Jiří Šinogl	Waste polyethylene applications for building systems. Supervisor: Ing. Libor Matějka, CSc., Ph.D.
FCE	Ing. Zdeněk Šnirch	Ways of improving the diagnostic method and rehabilitation materials used to extend the service time of natural-draft cooling towers. Supervisor: doc. Ing. Bohumil Straka, CSc.
FCE	RNDr. Jan Hollan	Passive houses and radiating energy flows. Supervisor: doc. RNDr. Ing. Stanislav Šťastník, CSc.
FCE	Ing. Zdeňka Kvasničková	Optimizing project costs at a building company. Supervisor: doc. Ing. Bohumil Puchýř, CSc.
FCE	Ing. Ladislav Bárta	General lest-squares method used to equalize networks. Supervisor: prof. Ing. Otakar Švábenský, CSc.
FCE	Ing. Vladimír Dibelka	Additional reinforcement of sheer-stressed concrete structures. Supervisor: prof. Ing. Jiří Adámek, CSc.
FCE	Ing. Ondřej Mišák	Energy certification of buildings. Supervisor: doc. Ing. Jitka Mohelníková, Ph.D.
FCE	Ing. Florentina Pernica	Modelling concrete structures including degradation aspects. Supervisor: prof. Ing. Drahomír Novák, DrSc.
FCE	Ing. Tomáš Šváb	Analysis of fathom map redrawing. Supervisor: doc. Ing. Vlastimil Hanzl, CSc.
FME	Chawalit Boonpok	Generalized closed sets in closure spaces. Supervisor: prof. RNDr. Josef Šlapal, CSc.
FME	Ing. Miroslav Bartošík	Applying AFM in nanotechnologies. Supervisor: Ing. Vladimír Cháb, CSc.
FME	Ing. Tomáš Břinčil	Discovering the causes of defects of iron-alloy casting using experimental and statistical methods. Supervisor: doc. Ing. Jaroslav Šenberger, CSc.
FME	Ing. Roman Klas	Hydraulic design of a hydrodynamic machine with inserted blades. Supervisor: prof. Ing. František Pochylý, CSc.
FME	Ing. Miroslav Kolíbal	Using the TOF-LEIS method to analyse surfaces and thin layers. Supervisor: prof. RNDr. Jiří Spousta, Ph.D.
FME	Ing. Eva Kolíbalová	Spectroscopic elipsometry of thin layers and multi-layers of solids. Supervisor: prof. RNDr. Jiří Spousta, Ph.D.

FME	Mgr. Irena Hinterleitner	Selected special vector fields and mappings in Riemann geometry. Supervisor: doc. RNDr.Miroslav Doupovec, CSc.
FME	Ing. Jaromír Sedláček	Development of air freight service at a regional airport. Supervisor: prof. Ing. Bohuslav Sedláček, CSc.
FME	Ing. Petr Veselý	Toughness of polyolefin composites with submicroscopic particles. Supervisor: prof. RNDr. Bohumil Vlach, CSc.
FME	Ing. Vít Ficbauer	Assessment of environmental risks. Supervisor: prof. Ing. František Babinec, CSc.
FME	Ing. Jaromír Čermák	State-of-the-art abrasion-resistant coatings and their influence on effective use of cutting tools from sintered carbides. Supervisor: doc. Ing. Anton Humár, CSc.
FME	Ing. Jan Tomáš	Measuring the Hausdorff dimension of real objects. Supervisor: prof. RNDr. Miloslav Druckmüller, CSc.
FME	Jeeranunt Khampakdee, MSc.	Semi-open sets in closure spaces. Supervisor: prof. RNDr. Josef Šlapal, CSc.
FME	Ing. Petr Adamík	Determining experimentally the toughness of rivet joints and modelling them using the finite-element method. Supervisor: doc. Ing. Josef Klement, CSc.
FME	Ing. Petr Axman	Design and development of a device for solving selected biomechatronic problems. Supervisor: prof. Ing. Přemysl Janíček, DrSc.
FME	Ing. Marek Filip	Using effective apparatuses to clean combustion products in real technological lines. Supervisor: doc. Ing. Ladislav Bébar, CSc.
FME	Ing. Lucie Houdková	Efficient use of water-treatment sediments. Supervisor: doc. Ing. Jaroslav Jícha, CSc.
FME	Ing. Jan Hrabina	Detection methods of saturated absorption and fluorescence in iodine vapours. Supervisor: Ing. Josef Lazar, Ph.D.
FME	Ing. Tomáš Káňa	Quantum-mechanic study of phase stability in metal systems. Supervisor: prof. RNDr. Mojmír Šob, DrSc.
FME	Ing. Milan Klapka	Reducing the noise emission of a modern car gearbox. Supervisor: doc. Ing. Ivan Mazůrek, CSc.
FME	Ing. Jaromír Dvořák	Integrity of the interface of materials machined by progressive technologies. Supervisor: prof. Ing. Miroslav Píška, CSc.
FME	Ing. Martin Kolouch	Development and testing of a new method for measuring the toughness and absorption of joints in parallel kinematic structures. Supervisor: doc. Ing. Radek Knoflíček, Dr.
FME	Ing. Roman Kozubík	Judging mechanical-engineering products in terms of industrial design. Supervisor: doc. Ing. arch. Jan Rajlich
FME	Ing. Petr Kostelník	Study of surface structures by the LEED method. Supervisor: Ing. Vladimír Cháb, CSc.
FME	Ing. Martin Lisý	Cleaning the energogas from biomass in a catalytic high-temperature filter. Supervisor: doc. Ing. Ladislav Ochrana, CSc.
FME	Ing. Tomáš Pařízek	Reducing emissions of harmful substances in units for thermal processing of waste. Supervisor: doc. Ing. Ladislav Bébar, CSc.

FME	Ing. Petr Šesták	Structural and mechanical characteristics of the NiTi alloy determined by ab-initio methods. Supervisor: prof. RNDr. Jaroslav Pokluda, CSc.
FME	Ing. Karel Osička	Optimization of shape grinding with increased requirements of the quality of the machined surface. Supervisor: prof. Ing. Miroslav Píška, CSc.
FME	Ing. Pavel Šťasta	Using waste-water-treatment sediments as alternate fuel. Supervisor: prof. Ing. Petr Stehlík, CSc.
FME	Ing. Jiří Zablatzký	Effect of load spectrum modification on crack propagation. Supervisor: doc. Ing. Miroslav Vondrák, CSc.
FME	Ing. et Ing. Markéta Zimolová	Limit conditions in tin-coated sheet formability. Supervisor: doc. Ing. Milan Dvořák, CSc.
FME	Ing. Jan Zouhar	Design of power cutting tools using CAD/CAM and an analysis of the chip forming mechanism. Supervisor: prof. Ing. Miroslav Píška, CSc.
FME	Ing. Zdeněk Hodis	Diffusion of carbon and nitrogen in welded joints of heat-resisting and ferritic steel. Supervisor: doc. RNDr. Jiří Sopoušek, CSc.
FME	Ing. Lukáš Urban	Technological unit for thermal processing of biomass. Supervisor: doc. Ing. Ladislav Bébar, CSc.
FME	Ing. Zuzana Zúberová	Fatigue properties of the AZ31 magnesium alloy. Supervisor: prof. RNDr. Pavel Šandera, CSc.
FME	Ing. Karel Zábranský	Structure, properties and stability of prospective alloys. Supervisor: Ing. Yvonna Jirásková, Ph.D.
FME	Ing. Oldřich Ševeček	Solution of general stress concentrators in anisotropic media by combination of FEM and the complex potential theory. Supervisor: prof. RNDr. Michal Kotoul, DrSc.
FME	Ing. Lucie Šestáková	Evaluating the stability of general stress concentrators in stratified materials. Supervisor: prof. RNDr. Zdeněk Knésl, CSc.
FME	Ing. Zdeněk Majer	Fracture mechanical model of a particle composite. Supervisor: prof. RNDr. Zdeněk Knésl, CSc.
FME	Ing. Ladislav Čelko	Interaction of multiple elements in diffusion into the surface of metal materials. Supervisor: RNDr. Jan Krejčí, CSc.
FME	Ing. Tomáš Běhounek	Imaging reflectometry measuring thin films optical properties. Supervisor: prof. RNDr. Miloslav Druckmüller, CSc.
FME	Ing. Jiří Berjak	Automatic analysis and recognition of biological objects in an image via phase correlation. Supervisor: doc. Ing. Čestmír Ondrůšek, CSc.
FME	Ing. Jiří Hejčík	A highly efficient combustion gas recuperator. Supervisor: prof. Ing. Miroslav Jícha, CSc.
FME	Ing. Martin Minařík	Structural methods of object identification for the control of an industrial robot. Supervisor: doc. RNDr. Ing. Jiří Šťastný, CSc.
FME	Ing. Anna Smetanová	Energy optimization in robot motion. Supervisor: prof. Ing. Zdeněk Kolíbal, CSc.

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FME	Ing. Martin Štekl	The effect of positioning the fovea of a total hip prosthesis on the mechanical properties of the hip joint. Supervisor: Ing. Zdeněk Florian, CSc.
FME	Ing. Marek Tabas	Qualitative modelling of serious scenarios. Supervisor: prof. Ing. František Babinec, CSc.
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FEEC	Ing. Martin Minarčík	Conception design of a voltage conveyor and its application options. Supervisor: prof. Ing. Kamil Vrba, CSc.
FEEC	Ing. Jiří Přinosil	Analysis of emotional states based on image patterns. Supervisor: Mgr. Pavel Rajmic, Ph.D.
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FEEC	Ing. Zdeněk Havránek	Analyzing vibrations by acoustic holography. Supervisor: doc. Ing. Ludvík Bejček, CSc.
FEEC	Ing. Michal Macalík	Thin-layer electrodes for electrochrome elements. Supervisor: doc. Ing. Marie Sedlaříková, CSc.
FEEC	Ing. Jan Rychnovský	Study of the properties of the hyperpolarized xenon-129 for displaying by magnetic resonance. Supervisor: prof. Ing. Karel Bartušek, DrSc.
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FA	Ing. Eva Čermáková	Public space as the town's cultural and social platform. Supervisor: prof. Ing. arch. Jan Koutný, CSc.
FA	Ing. arch. Martin Kareš	Metamorphoses of light and glass in churches. Supervisor: doc. Ing. Miroslav Meixner, CSc.
FA	RNDr. Zita Kučerová	Indicators of the social pillar of sustainable development at a local level. Supervisor: doc. Ing. arch. Vladimíra Šilhánková, Ph.D.
FA	Ing. Martin Maštálka	Regionally projectable indicators of sustainable development. Supervisor: doc. Ing. arch. Vladimíra Šilhánková, Ph.D.
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FC	Ing. Jana Dvořáková	Using gas chromatography to study the permeation of toxic substances through barrier materials. Supervisor: doc. Ing. Ivan Mašek, CSc.
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FC	Ing. Jana Victoria Martincová	Assessing the environmental risks involved in transporting dangerous things. Supervisor: doc. Ing. Ivan Mašek, CSc.
FC	Mgr. Věra Mazánková	Spectroscopic study of extinguishing discharges in nitrogen and its mixtures. Supervisor: doc. RNDr. František Krčma, Ph.D.
FC	Ing. Tomáš Opravil	Preparation and properties of Roman cement. Supervisor: doc. Ing. Jaromír Havlica, DrSc.

FC	Ing. Sergii Pochekailov	Electric, optical, and sensor properties of organic semiconductors. Supervisor: prof. RNDr. Stanislav Nešpůrek, DrSc.
FC	Ing. Kateřina Tmejová	Sensoric properties of organic materials. Supervisor: prof. RNDr. Stanislav Nešpůrek, DrSc.
FC	Ing. Petr Sedláček	Hydrogels of humic acids – experimental model and application form. Supervisor: doc. Ing. Martina Klučáková, Ph.D.
FC	Ing. Renata Marešová	EPR study of radical H-transfer intermediates from oxygen, carbon, and nitrogen donors. Supervisor: prof. Ing. Ladislav Omelka, DrSc.
FC	Ing. Ladislav Bartoš	Intensification of manganate separation in potable water treatment. Supervisor: doc. Ing. Petr Dolejš, CSc.
FC	Ing. Martina Čarnecká	Molecular study of intracellular changes triggered by the reaction of microorganisms to external environment. Supervisor: doc. RNDr. Ivana Márová, CSc.
FC	Ing. Theodor Staněk	Relationship between the parameters of bellite cement preparation and its hydraulic properties. Supervisor: doc. Ing. Jaromír Havlica, DrSc.
FC	Ing. Pavel Šiler	Study of the effect of additives and admixtures on the properties of high-strength concretes. Supervisor: doc. Ing. Jaromír Havlica, DrSc.
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FIT	Ing. Ivana Rudolfová	Aggregation of protein substructures. Supervisor: doc. Ing. Jaroslav Zendulka, CSc.
FIT	Ing. Peter Pecho	Security of tamper-resistant nodes in wireless sensor networks. Supervisor: doc. Dr. Ing. Petr Hanáček

IFE	Ing. Lukáš Dřínovský	Forensic standard for assessing companies manufacturing building materials. Supervisor: prof. Ing. Rostislav Drochytka, CSc.
IFE	Ing. Jana Nováčková	Standardization and harmonization of forensic procedures used to analyse the defects and failures of newly built flats. Supervisor: doc. Ing. Jiří Brožovský, CSc.
IFE	Ing. Bc. Marek Semela	Comprehensive system for analysing a road accident – clash of two vehicles at a crossroads. Supervisor: prof. Ing. Albert Bradáč, DrSc.

Table 2.9_4 2009 Awards for students and graduates

Best Graduate Rector Award		
	FCE	Jana Kaděrová
	FFA	Vilém Novák
	FEEC	Radek Beneš
	FC	Kateřina Pařilová
	FIT	Jan Váňa
	FME	Jan Novotný
Josefa Hlávka Award		
	FFA	Slávka Paulíková
	FEEC	Josef Harant
	FC	Lenka Michlovská
	FME	Jan Finsterle
PRECIOSA Foundation Award		
	FEEC	Zdeněk Kincl
	FCC	Michaela Wirthová
	FIT	Juraj Blaho
	FME	Zbyněk Dostál
	FME	Václav Pouchlý

2. 10. University drop-outs

The relatively high number of dropouts, particularly during the first years of Bachelor's degree programmes, is a recurring problem of technical universities. Efforts to further reduce the number of dropouts by reforming the content and structure of the Bachelor's degree courses would only result in lower quality of graduates. This is characteristic of technical universities trying

to educate good, creative graduates for the industrial practice. The drop-out rate keeps the absolute number of drop outs approximately at the same level. Table 2.10. lists students that dropped out in 2009.

Table 2.10. Dropouts from accredited degree programmes from 1st January 2009 to 31st December 2009

programme group	master field code	Bachelor's		Master's		follow-up Master's		doctoral		total
		FT	C	FT	C	FT	C	FT	C	
engineering	23 to 39	2 350	627	46	4	299	104	69	178	3 677
art and culture sciences	82	8	0	0	0	4	0	0	0	12
natural sciences	14	0	0	0	0	0	0	1	3	4
economics	62	271	2	0	0	74	108	12	22	489
total		**2 629**	**629**	**46**	**4**	**377**	**212**	**82**	**203**	**4 182**

2. 11. Credit system, diploma supplements

BUT makes a full use of the European Credit Transfer and Accumulation System (ECTS) and all its compatible instruments in all the Bachelor's and Master's degree programmes. A module of the information system recommended by the EU is used. All the graduates from degree programmes are given a free English-Czech diploma with a supplement using the recommended form and content.

In 2009 Brno University of Technology received the ECTS Label and DS Label prestigious awards for 2009–2013 in appreciation of its quality as a higher-education institution. BUT is one of the only two Czech universities to be awarded the ECTS Label. It is an appreciation of the correct application of the credit system to all Bachelor's and Master's programmes to fulfil the objectives of the Bologna process.

The DS Label received by BUT certifies that the diploma supplements received by the graduates free of charge are correct. Both the labels certify that BUT meets the strict higher-education criteria imposed by the European Union. They significantly help extend student mobility opening the university to international students.

2. 12. Specialized cooperation between BUT and the region, links between theory and practice and cooperation with customers

These are the traditional long-term activities concerning the university as a whole. At the university, such activities are coordinated and supported by the Technology Transfer Office (TTO) established in 2002 as one of the first at the Czech universities. BUT makes every effort to fulfil what is called the third mission of research-oriented universities, which is the transfer of knowledge to practice and support of innovation in the commercial sphere. According to the Community Framework, every scientific and research institution must have a department concerned with technology transfer. Universities and public research institutions are recommended by the European Commission that they should have: internal rules for the protection of intellectual property (licence policy), rules for technology

transfer, and rules for cooperation with industries and research to order.

At BUT it is the Technology Transfer Office (TTO) that has been assigned the task of designing such rules. Other typical activities include searching for commercialisable ideas and outcomes of BUT activities and offering them to external customers via the EEN international database, protecting intellectual property rights, supporting the shift of research fields towards commercial use, support for technology-oriented and spin-off companies, selecting companies for the BUT Technology Incubator (activities of the Industrial Board), and selecting a suitable BUT department as a partner to a business wishing to cooperate in research, development, and innovation (first contact point at BUT).

The results of the TTO activities in 2009 included 10 patents taken out and 19 utility models registered, which is about twice as many as in 2008. This is one of the positive impacts of the BUT Development Project, particularly its patent fund used to pay for activities undertaken to protect intellectual property rights.

TTO systematically prepares the internal rules needed for each area, with a guideline being issued by the rector in 2008 on the system of commercionalizing the BUT research results, providing a legal framework to be further amended as needed. As part of the BUT Development Project, a team of transfer advisors was established at BUT consisting of experts from all major specializations.

As part of the EUPRO Ministry of Education project, a South Moravia Regional Contact Organization is operating at TTO being mostly concerned with consulting and support for the EU 7th Framework projects of the regional institutions including small and medium enterprises.

In 2009 TTO was rather successful in receiving grant projects. Four new projects support mainly technology transfer and cooperation between universities and commercial enterprises. The TT Point within the Partnership and Networks operative programme may be taken for the key project, which should support and, partially, professionalize the network of knowledge-transfer managers, transfer advisors creating a permanent network with cooperating companies in the region and a system of communication with the application sphere including the relevant databases. Prepared in close cooperation with the Institute of the Industry Union of the Czech Republic, the Support for Science and Research operative programme with a nationwide scope is another of the great projects managed by TTO. The international scope of BUT and TTO concerning technology transfer is documented by two minor international projects called IncubaTrain and Centrope TT, on which selected Central European universities and institutions cooperate.

In 2009, TTO took active part in the preparation and implementation of Innovation Vouchers, a very successful project organized by the South Moravian Innovation Centre. In 2009, this project was the best in a national competition of Czech human-resources projects. With 57 percent of submitted and 67 percent of received vouchers, BUT became the most successful Brno university in this area.

Regarding knowledge and technology transfer and commercionalization, TTO closely cooperates with the South Moravian Innovation Centre, the Brno Regional Chamber of Commerce, and with the Regional Development Agency of South Moravia. The TTO and BUT activities are also interesting for other regions, as evidenced by the cooperation agreements with the Agency for the Economic Development of the Vsetín Region and The Business Centre of Valašské Klobouky.

2. 13. BUT academics – numbers recalculated on 31st December 2009

Table 2.13. BUT academics – numbers recalculated on 31st December 2009

teachers						research staff
total	professors	senior lecturers	senior assistants	assistants	instructors	
1 125	129	268	518	209	1	29

The proportion of the total hours worked by all the employees over the period in question to the total annual working hours per one full-time employee .

2. 14. BUT academics' age structure on 31st December 2009

Table 2.14_1 BUT academics' age structure on 31st December 2009

age	teachers										research staff	
	professors		senior lecturers		senior assistants		assistants		instructors			
	total	fem.	total	fem.	total	fem.	total	fem.	total	fem.	total	fem.
up to 29					32	5	130	29			4	1
30 – 39	1		44	2	262	37	97	26	1	1	19	5
40 – 49	17		45	8	67	26	24	16			2	
50 – 59	47	5	87	9	124	63	4	2			3	
60 – 69	55	5	100	12	64	21	2	2			6	
over 70	34		32	4	6		1				3	
total	**154**	**10**	**308**	**35**	**555**	**152**	**258**	**75**	**1**	**1**	**37**	**6**

Table 2.14_2 BUT academic numbers

human resources	total	professors	senior lecturers	others	DrSc., CSc., Dr., Ph.D., Th.D. degrees
employment type	1 276	154	308	814	467
up to 30 percent	286	29	71	186	25
up to 50 percent	127	6	19	102	21
up to 70 percent	225	11	26	188	30
up to full	638	108	192	338	391

Note: Only the highest academic degree is shown, prof. XX, DrSc, is shown as prof., doc. XX, DrSc. is shown as doc.

2. 15. Education of BUT academic and other staff

Due attention is paid every year to further education of BUT academics and other staff. A number of courses are offered by the Institute of Lifelong Education to help develop managerial, language, and specialised skills and competences.

2. 16. Further education courses offered to the BUT academic staff (with numbers of their participants) (Tables 2.16. and 2.16_1)

Table 2.16. Further education courses for BUT academic staff

teaching skills courses[1]	general skills courses[2]	specialised courses[3]	total
1	2	3	6

Note: 1 teaching skills (use of different teaching methods such as ICT, use and suitability of different teaching forms, presentation of study objectives, student motivation and use of activation methods, work with different student groups, teaching styles, etc.)

2 general skills (communication skills such as the significance of communication in teaching/studying, verbal and non-verbal communication, communication noise, distorted information, communication strategy, suitable communication methods and techniques, and choice of suitable communication media; presentation – use and suitability of different presentation techniques; work in teams; project management; managerial skills; computing skills; language skills, etc.)

3 specialised courses – courses designed to improve the teacher's own specialization, development of specific knowledge

Table 2.16_1 Participant numbers in further education courses for BUT academic staff

teaching-oriented courses[1]	general-skills-oriented courses[2]	specialised courses[3]	total
17	629	45	691

2. 17. Professors and associate professors appointed in 2009

Table 2.17_1 Professors appointed in 2009

faculty	name	field	appointed on
FCE	Hobst Leonard, doc. Ing. CSc.	physical and building materials engineering	02.03.2009

FCE	Pazdera Luboš, doc. Ing. CSc.	physical and building materials engineering	02.03.2009
FCE/MU	Konečný Milan, doc. RNDr. CSc.	geodesy and cartography	18.09.2009
FCE	Smutný Jaroslav, doc. Ing. Ph.D.	design and transport structures	18.09.2009
FCE	Vala Jiří, doc. Ing. CSc.	design and transport structures	18.09.2009
FME	Křupka Ivan, doc. Ing. Ph.D.	construction and process engineering	02.03.2009
FME	Raudenský Miroslav, doc. Ing. CSc.	applied mechanics	02.03.2009
FME/AS CR	Zemánek Pavel, doc. Ing. CSc.	applied physics	02.03.2009
FME/AS CR	Dlouhý Ivo, doc. Ing. CSc.	materials sciences and engineering	18.09.2009
FME	Pavelek Milan, doc. Ing. CSc.	applied mechanics	18.09.2009
FCE/AS CR	Pavlík Miloslav, doc. Ing. CSc.	building structures	18.09.2009
FME	Píška Miroslav, doc. Ing. CSc.	manufacturing technology	18.09.2009
FME	Šeda Miloš, doc. RNDr. Ing. Ph.D.	construction and process engineering	18.09.2009
FEEC	Brančík Lubomír, doc. Ing. CSc.	theoretical electrical engineering	18.09.2009
FEEC	Gescheidtová Eva, doc. Ing. CSc.	theoretical electrical engineering	18.09.2009
FA/Lewis+ Hickkey	Votický Robert, doc. Ing. arch.	architecture	18.09.2009
FA/CTU Prague	Zavřel Zdeněk, doc. Ing. arch. Ir.	architecture	18.09.2009
FC	Pekař Miloslav, doc. Ing. CSc.	physical chemistry	18.09.2009
FBM	Koráb Vojtěch, doc. Ing. Dr. MBA	business and management	02.03.2009

Table 2.17_2 Associate professors appointed in 2009

faculty	name	field	appointed on
FCE	Malá Jitka, Ing. Ph.D.	water management and water structures	05.01.2009
FCE	Mohelníková Jitka, Ing. Ph.D.	building structures	12.01.2009
FCE	Petráková Zora, Ing. Ph.D.	building management	14.04.2009
FCE	Doležal Petr, Ing. Dr.	water management and water structures	13.07.2009
FCE	Kala Jiří, Ing. Ph.D.	design and transport structures	13.07.2009
FCE	Klusáček Ladislav, Ing. CSc.	design and transport structures	11.11.2009

FCE	Varaus Michal, Ing. Dr. techn.	design and transport structures	20.11.2009
FME	Horníková Jana, Ing. Ph.D.	applied mechanics	03.12.2009
FME	Jaroš Michal, Ing. Dr.	design and process engineering	16.10.2009
FME	Jebáček Ivo, Ing. Ph.D.	design and process engineering	16.10.2009
FME	Jan Vít, Ing. Ph.D.	materials sciences and engineering	03.12.2009
FME	Katolický Jaroslav, Ing. Ph.D.	design and process engineering	16.10.2009
FME	Malášek Jiří, Ing. Ph.D.	design and process engineering	23.01.2009
FME/AS CR	Náhlík Luboš, Ing. Ph.D.	applied mechanics	29.05.2009
FME	Novotný Pavel, Ing. Ph.D.	design and process engineering	03.12.2009
FME/AS CR	Šremr Jiří, Ing. Ph.D.	applied mathematics	29.05.2009
FEEC	Orságová Jaroslava, Ing. Ph.D.	heavy current electrical engineering and power engineering	10.12.2009
FEEC	Baxant Petr, Ing. Ph.D.	heavy current electrical engineering and power engineering	17.02.2009
FEEC	Háze Jiří, Ing. Ph.D.	electrical and electronic technology	03.12.2009
FEEC	Kolář Radim, Ing. Ph.D.	biomedical engineering	08.07.2009
FEEC	Komosný Dan, Ing. Ph.D.	teleinformatics	29.05.2009
FEEC	Kratochvíl Tomáš, Ing. Ph.D.	electronics and communication technology	15. 6. 2009
FEEC	Lazar Josef, Ing. Dr.	electronics and communication technology	29. 5. 2009
FEEC	Novák Vítězslav, Ing. Ph.D.	electrical and electronic technology	08.07.2009
FA	Poslušná Iva, Ing. arch. Ph.D.	architecture	14.04.2009
FA	Wittmann Maxmilián, Ing. arch. Ph.D.	town planning	14.04.2009
FC	Nezbedová Eva, Ing. CSc.	macromolecular chemistry	03.11.2009
FC	Kučeřík Jiří, Ing. Ph.D.	physical chemistry	03.11.2009
FIT	Kožená Marcela, Ing. Ph.D.	business and management	15.06.2009
FIT	Hladká Eva, RNDr. Ph.D.	computing technology and informatics	03.12.2009
FIT	Kreslíková Jitka, RNDr. CSc.	computing technology and informatics	13.07. 2009
FIT	Drahanský Martin, Ing. Ph.D. Dipl.-Ing.	computing technology and informatics	03.12.2009
FIT	Fučík Otto, Ing. Dr.	computing technology and informatics	03.12.2009
FIT	Janoušek Vladimír, Ing. Ph.D.	computing technology and informatics	26.06.2009

Table 2.17_3 Numbers and age averages of the professors and associate professors appointed in 2009

	number	age average
Professors appointed in 2009	19	54
Associate professors appointed in 2009	34	42

Table 2.17_4 Honorary doctorates conferred

Ing. Jaroslav Doležal, CSc.

Director general, Honeywell Laboratories, Honeywell, s. r. o., leading expert in management automation and decision-making theory. .

doc. RNDr. Petr Lukáš, CSc.

Director, Institute of Physics of Materials of the Academy of Sciences of the Czech Republic, leading expert in physics of metals.

prof. Jan Švejnar

Professor, Michigan University, leading expert in economics of developing countries, co-founder and chairman of CERGE-EI, joint department of Charles University and the Academy of Sciences of the Czech Republic.

Table 2.17_5 BUT First-Degree (Gold) Medals awarded

prof. Ing. Tomáš Hruška, CSc.

Professor, Faculty of Information Technology. Medal received awarded for long-term contribution to BUT development, particularly that to the establishing of the Faculty of Information Technology.

doc. Ing. Ladislav Štěpánek, CSc.

Associate professor, Faculty of Civil Engineering. Medal awarded for his long-term contribution to BUT development and building BUT's goodwill.

Ing. Jiří Rosenfeld, CSc.

Chairman of the board of directors and director general of Slovácké strojírny, a. s., chairman of the board of directors of MEP Postřelmov, a. s., member of the BUT FME Scientific Board.

Ing. Vlastimil Krček

Chairman of the board of directors of OSC, s.r.o., Brno. Member of the Steering Committee of the Centre of Applied Computer Science, he has always cooperated with the institutes of automation at the BUT faculties of mechanical and electrical engineering.

prof. Ing. Dr. Jaromír Horák, DrSc.

Graduated from the Technical University of Eduard Beneš in Brno in 1950 (chemical engineering) and received a doctor degree in 1952. He was among the founding and key professors of the faculty setting the direction of its development.

Ing. Dr. Adolf Gustav Pokorný, CSc.

He worked at the Research Institute of Macromolecular Chemistry in Brno and at the Research Institute of Building Materials in Brno. He cooperated on the re-establishment of the BUT Faculty of Chemistry. He is a member of the Brno branch committee of the Czechoslovak Chemical Society.

Ing. arch. Růžena Žertová

She graduated from the BUT Faculty of Architecture and Building Structures in 1957. She has long cooperated with the Faculty of Architecture being a member of its Scientific and Artistic Board at present.

Ing. arch. Petr Uhlíř

Studying architecture and urban development, he graduated from the BUT Faculty of Civil Engineering in 1971. As a teacher, he has long cooperated with the Faculty of Architecture.

Ing. Pavel Kopečný

A former regional manager of Siemens ČR. Studying electrical machines, he graduated from the BUT Faculty of Electrical Engineering in 1964. He has always closely cooperated with experts from the BUT faculties of electrical and mechanical engineering.

2. 18. Average study length in finished months of BUT graduates in a given year by the degree programme, study type and form (excluding the time of suspended study)

Considering the different study lengths of the Bachelor's, follow-up Master's and doctoral programmes, the average study length by graduates and degree programmes can only be approximated. It is also difficult to include all the previous unsuccessful attempts at study in terms of the recognized parts or particular courses thereof recalculating the lengths in study months. Table 2.18. lists average study lengths excluding recognized studies at universities abroad and recognized lifelong-learning study parts.

Table 2.18. Average study length of university graduates in a given year by degree programme, study type and form

programme type	study form	average number of finished months
Bachelor's	combined	36
Bachelor's	full-time	43
Master's	combined	96
Master's	full-time	72
follow-up Master's	combined	26
follow-up Master's	full-time	24
doctoral	combined	71
doctoral	full-time	37

2. 19. Advancements of research, development, artistic and other creative activities at BUT and strengthening the links between such activities and education

Concerning creative activity, BUT makes every effort to meet the requirements of the evaluation of the results of R&D and the resulting institutional support for the long-term development of a research organisation as provided for by an amendment to Act 130/2002. From 2004 to 2008, BUT received 88,687 recalculated points compared with 62,100 points from 2003 to 2007. Even if this is an increase of about 43 percent, as a whole BUT lags behind the national percentage, which is about 68 percent. This may be caused by the high increase in recalculated points for products of applied research. However, some BUT faculties showed approximately the same or even higher increase in recalculated points – this is mainly the Faculty of Chemistry with an increase of 82 percent. The proportion of the publishing-type outcomes to outcomes having the nature of patents, utility-patterns, or other products listed by the 2009 Methodology of Assessing the Outcomes of R&D is about 1:2. The BUT management also tries to encourage the creative activities of its staff through organizing TOP10 BUT, and R&D competitions. The results of the second year of this competition were announced in 2009 with the best researchers financially rewarded. Announced was also the third year of this competition including, for the first time, a doctoral-programme category. Table 2.19_1 shows the points gained by the BUT faculties in 2007, 2008, and 2009.

Table 2.19_1 Result points gained by the faculties

2007	total points	J-imp	J=non-imp	J-(imp + non-imp)	B	C	B+C	D	P	Z(T)	S
FFA	0	0	0	0	0	0	0	0	0	0	0
FA	241,9	0	66	66	167,28	1,01	168,29	7,61	0	0	0
FCE	3 736,02	570,07	317,73	887,8	744,35	73,87	818,22	411,18	112,06	1 499,95	6,91

FBM	404,84	2,45	52,84	55,29	259,38	13,3	272,68	76,87	0	0	0
FME	15 050,81	3 514,96	616,95	4 131,91	333,74	121,06	454,8	288,3	7 278,66	890,17	2 006,97
FEEC	9 896,77	2 495,02	1 276,64	3 771,66	709,63	121,1	830,73	909,29	179,67	3 204,35	1 001,07
FC	3 539,93	3 187,63	133	3 320,63	91,67	31,33	123	96,3	0	0	0
FIT	1 329,22	161,72	62,19	223,91	131,44	19,34	150,78	69,32	500	356,25	28,96
IFE	0	0	0	0	0	0	0	0	0	0	0

2008	**total points**	**J-imp**	**J=non-imp**	**J-(imp + non-imp)**	**B**	**C**	**B+C**	**D**	**P**	**Z(T)**	**S**
FFA	0						0	0	0	0	0
FA	120			20			100	0	0	0	0
FCE	11 052,51			2 914,28			707,49	254,07	0	2 100	5 076,67
FBM	205,47			8			149,47	8	0	0	40
FME	20 158,94			5405,4			697,11	345,72	660	2 000	11 050,7
FEEC	21 099,54			5 070,05			482,96	1 726,53	80	6 600	7 140
FC	5 676,59			4 854,34			151,59	130,67	0	266,67	273,33
FIT	3 717,43			497,27			309,49	717,33	0	1 033,33	1 160
IFE	0			0			0	0	0	0	0

2009	**total points**	**J-imp**	**J=non-imp**	**J-(imp + non-imp)**	**B**	**C**	**B+C**	**D**	**P**	**Z(T)**	**S**
FFA	0	0	0	0						0	0
FA	52	0	12	12			40	0	0	0	0
FCE	13 220,5	2 567,45	926,05	3493,5			543	264	0	3 800	5 120
FBM	640,65	220,65	64	284,65			292	24	0	0	40
FME	24 912,91	7 549,97	1 175,45	8 725,43			670,48	577	1900	2 500	10 540
FEEC	21 979,03	4 406,22	2 435,73	6 841,95			288,54	2 315,2	373,33	5 200	6 960
FC	8 812,85	6 465,69	827,73	7 293,42			47,43	72	0	1 000	400
FIT	3 929,49	376,09	172	548,09			487,4	874	0	900	1 120
IFE	0	0	0	0			0	0	0	0	0

Legend:
J-imp – paper published in an impacted journal
J-non-imp – paper published in a Czech reviewed journal and in the SCOPUS, ERIH databases
B – book
C – chapter in a book
D – paper in proceedings
P – patent
Z (T) – pilot plant, tested technology
S – prototype, complete methodology

Last year, as in the preceding period, the research and creative activities of the BUT academic staff received funding from four main sources. The first source was institutional research funding for universities receiving subsidies mostly from the Science and Research Support programme of the Ministry of Education, Youth, and Sports of the Czech Republic. Eleven research plans were worked on at BUT in 2009 as listed by Table 2.19_2.

Table 2.19_2 BUT involvement in work on research plans

research plan title	funding received in 2009 (CZK thousand)
Progressive building materials based on secondary raw materials and their influence on the service life of structures	18 166
Waste and biomass processing systems and their control in terms of environment protection and power balance	16 140
Synthetic-polymer- and biopolymer-based multifunctional homogeneous and heterogeneous materials	23 253
Electronic communication systems and technologies of new generations (ELKOM)	27 133
Inorganic nano-materials and nanostructures: creation, analysis, properties	22 774
New trends in microelectronic systems and nano-technologies	23 482
Simulation and modelling of mechatronic systems	18 308
Energy resources, accumulation, and optimal use in the sustainable development conditions	14 722
Progressive, reliable, and durable bearing structures	15 371
Research of information technology and its safety	27 905
Intelligent systems in automation	12 988
total	**220 242**

Specific university research was a considerable financial resource for institutional research funding at BUT in 2009. The 2009 specific research subsidy was 87,988,000 CZK which was by 2.5 percent more on the 2008 subsidy (85,807,000 CZK). Institutional support for specific research as part of research conducted at a university in 2009 was closely related to education in which students participated. At BUT faculties, doctoral students could participate in grant projects. Funding was also available for supporting students' activities necessary for the completion of their studies (costs related to participation in international and national conferences, purchases of specialized literature, etc.).

Because of Act no. 110/2009 Coll. (amending Act 130/2002 Coll. on R&D support as amended) becoming effective on 1st July 2009, some essential changes were made in the rules governing the providing of support for specific university research, with this support becoming targeted support from 1st January 2010. For this reason,

following a directive issued by the government on 17th August, BUT drew up internal rules for student grant competition supporting specific research projects published at www.vutbr.cz/uploads/zdroje_financovani_vyzkumu_a_v/10272_rozh28.pdf?lang=0.

Next a grant agency was set up in the BUT information system to enable e-applications for specific research projects as well as e-reviews for the projects.

Targeted research funding was another science and research funding resource. BUT was the owner of two research centres and participated in the programmes of another ten research centres as shown by Table 2.19_3.

Table 2.19_3 1M Research Centres

fac.	centre name	solution provider	owner
FME	Centre of Aviation and Space Research	Píštěk Antonín, prof. Ing. CSc.	BUT
		solution co-provider	
FCE	Centre of Integrated Design of Progressive Building Structures	Melcher Jindřich, prof. Ing. CSc.	Czech Technical University in Prague
FCE	Centre of Integrated Research of Inorganic Composites	Štěpánek Petr, prof. RNDr. Ing. CSc.	Research Institute of Building Materials
FME	Josef Božek Research Centre of Combustion Engines and Automobiles II	Píštěk Václav, prof. Ing. CSc.	Czech Technical University in Prague
FME	Ecological Centre of Applied Research of Non-Ferrous Metals	Podrábský Tomáš, prof. Ing. CSc.	VUK Panenské Břežany, s. r. o.
FME	Research Centre of Manufacturing Technology	Kolíbal Zdeněk, prof. Ing. CSc.	Czech Technical University in Prague
FME	Centre for Production Quality and Reliability	Karpíšek Zdeněk, doc. RNDr. CSc.	Czech Technical University in Prague
FEEC	Data, Algorithms, Decision-Making	Jan Jiří, prof. Ing. CSc.	Czech Academy of Sciences, Institute of Information Theory and Automation
FEEC	Centre of Applied Cybernetics	Vavřín Petr, prof. Ing. CSc.	Czech Technical University in Prague

LC Programme Centres of Basic Research

fac.	centre name	solution provider	owner/coordinator
FME	Structures for Nanophotonics and Nanoelectronics	Šikola Tomáš, prof. RNDr. CSc.	BUT
FEEC	Centre for Quasioptical Systems and Tetrahertz Spectroscopy	Raida Zbyněk, prof. Ing. CSc.	Institute of Chemical Technology, Prague
FIT	Centre of Computer Graphics	Zemčík Pavel, doc. Dr.	Czech Technical University in Prague

Projects within the grant systems of the Grant Agency of the Czech Republic and the Academy of Sciences of the Czech Republic as well as those of ministries, mainly that of trade and industry, formed an important proportion of the specific science and research funding. Here, BUT has long been among the most successful universities with the proportion of its successfully submitted applications exceeding the national average. The third source of research funding was the participation in international projects supported by grants such as COST, EUREKA, INGO, CONTACT, 6th FP, and 7th FP. In view of research internationalization, the participation in international projects is of key importance. In international scientific and research cooperation, the number of projects is larger with the financial contribution being raised to 86 million CZK in 2009 from 59 million CZK in 2008. It should be stressed that the BUT involvement in international projects will bring not only funding, but also chances for BUT to better develop its scientific and educational activities in cooperation with other European institutions, which will enhance the professional standard of its teachers, students, and doctoral students and raise BUT's international rating. Finally, applied research funded through contracts with domestic and foreign industrial enterprises also forms a major part of research activities. Contracts with national and international businesses brought a total of 76,788 thousand CZK to finance applied research and experimental development as compared with the 75 million CZK of last year.

Table 2.19_4 Grants, research projects, patents, and other creative activities at BUT

name of grant, research project, patent, etc	source	thousands of CZK in funding
GA Standard Projects	B	90 272
GP Post-Doctoral Projects	B	17 486
GD Doctoral Projects	B	18 514
Eurocores	B	1 387
Ministry of Education Research Plans	C	220 242
1M Research Centres	C	78 110

LC Programme Centres of Basic Research	C	5 921
NPV II National Research Programme II	C	44 010
IA Grants of distinctive research character targeted at current research done mostly in the Czech Academy of Sciences	C	1 678
1Q Support for targeted research projects (National Research Programme)	C	1 832
KJ Junior and research projects	C	708
KA Nanotechnology for Society	C	11 765
FI-IM IMPULS	C	16 512
FT-TA TANDEM	C	24 066
1H – PK PROGRESS (National Research programme)	C	2 945
2A – Sustainable prosperity	C	8 053
FR-TIP	C	35 438
1F Safe and Economical Transport (National Research Programme)	C	199
CG – Support for the sustainable transport development project	C	4 459
QH – Agrarian sector research programme	C	2 759
WB Research and development serving the needs of the region	C	340
MV VD – Security research programme	C	930
SP – Research programme managed by the Ministry of Environment	C	184
NS – Departmental R&D programme – MZ II (2008–2011)	C	345
COST (OC)	C	6 762
EUPRO (OK)	C	620
EUREKA (OE)	C	1 750
INGO (LA)	C	213
KONTAKT (ME)	C	4 372
MEYS international cooperation project support programme	C	6 555
6th EU Framework Programme (6FP)	A	41 643
7th EU Framework Programme (7FP)	A	23 091
E3CAR – Energy Efficient Electrical Car	A	53
Transatlantic cooperation (EC EU)	A	98
European Office of Aerospace Research & Development (EOARD)	A	450
AKTION – research project	C	84
Bilateral international cooperation, mobility (MEB) total	C	513
total		**674 359**

Table 2.19_5 BUT Industrial Property Ownership Portfolio (patents in force, etc.) on 31st December 2009

industrial ownership protected by special regulations	subject-matters in force	patent applic. published
Domestic patent	13	0
Foreign patent	3	1
US patent	0	0
EPO patent	3	2
Japanese patent	0	0
PCT application published	x	2
CR utility pattern	38	x
Foreign utility model	3	0
Domestic industrial model	3	0
OHIM registered industrial model	0	0
Domestic trade marks	17	2
OHIM trade marks	0	0

The total funding from the first three sources (not including specific research) of science and research at BUT exceeded 674 mil., see Table 2.19_4, and together with specific research amounts to 762 million CZK, which is almost 1/3 of the total BUT budget.

The total targeted subsidy related to national grants (not including research centres) increased from 246 million CZK in 2008 to 290 million in 2009, which is an increase of about 18 percent. It should, however, be stressed that there are still great differences between faculties. These result from the actual sizes of faculties as well as from the substantial differences in the structure of funding in the average grant volumes and, above all, in the proportion of the researchers who are the owners of grant projects. In this regard, the best situation is at the faculties of mechanical engineering and electrical engineering with the most project owners.

BUT has a high percentage of funding won from departmental applied research grant agencies, in particular from the Ministry of Industry and Trade. This testifies to the growing efforts to apply the basic research outcomes in the industrial practice. The highest success rate, as in the previous years, has been reached with the Ministry of Industry and Trade and the Ministry of Transport and Communication with a total funding of 35 million CZK. Here, the faculties of mechanical engineering, civil engineering, electrical engineering, and chemistry should be mentioned as achieving the best results.

In 2009, BUT continued the cooperation with Masaryk University in Brno, other Brno universities and institutes of the Czech Academy of Sciences resulting in submitting a large CEITEC project to receive funding from the EU structural fund, which is now being judged. In addition to this activity, some faculties (FME, FEEC, FCE, FIT, FC) prepared their own R&DfI projects into priority axis 2 for small and medium R&DfI projects, which were submitted in response to the first call for projects into this priority axis. Two middle-sized projects were

approved with one being still negotiated with the Steering Body. For one project of the priority axis 2 OP R&DfI (this is a NETME project prepared by the Faculty of Mechanical Engineering), the first partial payment was received in 2009, see Table 2.19_5 where also Education for Competitiveness projects are listed. Another two priority axis 2 R&DfI projects are also being judged at present that were submitted following the second call in this priority axis (these are projects prepared by the faculties of civil and electrical engineering. In compliance with the R&DfI Operative Programme requirements, BUT builds an internal system of commercionalizing the R&D results. Creating a system of commercionalization as a whole will be the objective of a project to be submitted for the priority axis 3 of the R&DfI Operative Programmes. This will involve formalizing each step, integration into the information system, the relevant methodologies, manuals, decision-making processes, reliabilities, deadlines, etc.

Table 2.19_5 Operative programme projects in 2009 and their contribution (in thousands of CZK)

EU operative programmes	number of projects	partial funding received in 2009
EE-OP for competitiveness	18	118 907
ED-OP R&D for Innovation	1	208 689
total	**19**	**327 596**

Also in 2009 BUT was involved in work on the University Development Fund projects. Table 2.19_6 shows the subsidies in UDF project categories.

Table 2.19_6 BUT 2009 University Development Fond

Thematic area	Number of projects accepted	Capital subsidy (thousand CZK)	Ordinary subsidy (thousand CZK)	Total subsidy (thousand CZK)
A	20	33 002	0	33 002
B	0	0	0	0
C	1	0	250	250
E	0		0	0
F	71	0	13 839	13 839
G	80	0	11 279	11 279
total	**172**	**33002**	**25368**	**58370**

2. 20. BUT infrastructure (material, technical and information background), access to information and information infrastructure development (Table 2.20.)

Material background

As foreseen by the BUT 2006–2010 Mission Statement and by the programme of property reproduction no. 233340 as approved by the Ministry of Education, Youth, and Sports, the following activities were carried out in 2009. The objective of all these activities was:

- building new material structures in order to enhance the capacity for teaching, research and development at a state-of-the-art level making the activities carried out at BUT comparable with those carried out at leading domestic and international universities;
- repairing, reconstructing, and upgrading selected parts of the existing BUT infrastructure to create conditions for BUT to be competitive.

The following were the major activities carried out to enhance the material infrastructure:

- finishing the buildings called "manor house" and "cooper's workshop", and the cellars under buildings P and Q on the Božetěchova campus,
- modernizing a lift in building A1 at the faculty of mechanical engineering,
- building a lift at the faculty of chemistry,
- thermally insulating the building of the faculty of electrical engineering at Technická 8,
- repairing the laboratories (UBMI) of the faculty of electrical engineering at Kolejní 4,
- continuing to construct a building of the faculty of electrical engineering at Technická 10,
- continuing to reconstruct a training stadium, building terracing and a storeroom for athletic gear at the Pod Palackého vrchem campus,
- finishing the reconstruction of the basement of a building at the faculty of architecture at Poříčí 5,
- finishing the installation of the lighting of the stadiums at the PPV campus,
- finishing the conversion of the Kounicova canteen into BUT central archives,
- reconstructing the building in Rybkova Street to meet the needs of the faculty of civil engineering,
- modifying the bulding at Kounicova 67a to build a standby power supply and an air-conditioning system to cool the server room,
- building a guiding system at the PPV campus,
- reconstructing a unit substation and a standby power supply at Antonínská 1,
- reconstructing the garden at Antonínská 1,
- thermally insulating half of the B04 block of the halls of residence at Purkyňova 95, exchanging the windows. The following preparatory work was done:
- projects for the reconstruction of the FCE campus in Veveří and Žižkova streets.

Central Library

The BUT Central Library serves as a coordinating centre of all BUT libraries. It provides consulting services and issues methodological guidelines.

The Central Library runs and administers the Aleph500 library system. In 2009 work continued on the removal of duplicate entries, register cleaning, and some parts of the system were repaired to harmonise the existing librarian processes. A new customer service was launched – sending out notices of the approaching expiration of loan terms. This service should improve the meeting of deadlines to increase the availability of the collection. Concerning interlibrary cooperation, the involvement in the CASLIN project should be mentioned. This means contributing to the Union Catalogue of the Czech Republic and to the National Authority Files. The name authorities database has already been in use for several years, now the author registers are being harmonized to improve the database consistency and document retrievability.

Information education courses have already existed for several years at BUT. Innovated, since the academic year 2007/2008, they have been offered through a Moodle e-learning system. The Information Education was included in the new Management in Physical Culture study field in 2009. The Information Education Information Literacy courses are already offered at seven BUT faculties and units. Each year, they are attended by over 2000 students. Polls have shown that most of the students are satisfied both with the form and content of the courses. The course had been updated and preparation started of its comprehensive multimedialization – adding multimedia lectures and tests, increasing the course overall interactivity.

The BUT Central Library has become a partner to a NAKLIV project (National Cluster of Information Education). In this way, the librarians can cooperate with other information education stakeholders. The Central Library has also initiated a working group for a new e-learning course on citing. Also other universities and libraries cooperate on this project such as University of West Bohemia in Pilsen and Czech Technical University in Prague. Other activities include a workshop on work in the Moodle system organised by the Committee for Information Education and Literacy.

In 2009, the Ministry of Education, Youth, and Sports launched an INFOZ programme to secure information resources for science and research. BUT is involved in several projects. The selection preferred the availability of multidiscipline information resources and databases maintaining the existing utilization. Full-text information resources were preferred.

Preparation started of a system providing the users with remote control of such resources. Also the part of the intranet portal was changed concerned with information resources, which is mostly designed for librarians.

A University Development Fund project was completed in 2008 to build a BUT digital library. The project was also joined by some experts from the BUT Centre of Computing and Information Services. Thus a modern and robust system can be used to manage the digital collections. Employees of the Central Library also helped prepare a rector guideline on the form, submitting, publishing, and archiving of university qualification projects. In keeping with the integration plan, work started on linking the Apollo information system with the BUT digital Library. The first phase consisted of taking over the University Qualification Projects metadata records and importing them into the Digital Library along with full-text records. In the next step, the user authentication and document group access right policy was resolved. Negotiations also started on feeding further content to the Digital Library – apart from BUT News, this applies to conference proceedings, electronic journals, etc.

Table 2.20. University libraries, library-information services

Yearly collection increase	27 962
Total collection	271 791
Number of periodical titles: – paper form – electronic form (estimate)[4]	 829 100
Opening hours in a week [1] (physical)	66

Number of loans to be studied at home[2]	111 049
Number of users[3]	39 889
Number of study seats	796
Number of volumes available for free selection	108 994

1) *The opening hours of the library department with the longest opening hours. The opening hours of individual departments do not add up! Physical denotes actual visit to the library rather than electronic communication.*
2) *Including loan period extensions.*
3) *Users registered by 31st December 2009 are listed, that is natural persons or legal entities registered by the library authorized to borrow collection documents (to be studied either in a study room or at home) and have not been newly registered or re-registered over the period in question.*
4) *Only the periodical titles are listed subscribed by the library itself (or received as a donation or exchange) in paper or electronic form are included; other periodicals with full-text access by the users within consortia are not included..*

VUTIUM

VUTIUM Press took part in five book exhibitions and fairs – World of Books, Prague (May), Autumn Book Fair, Havlíčkův Brod (October), the Frankfurt Book Fair, Frankfurt am Main (October), BUCH WIEN 09 (November), and a book fair in Moscow (November).

To mark the BUT 110th anniversary, VUTIUM Press published Chapters from the History of Brno University of Technology 1899–2009 written by Jiří Pernes. Further titles published include: Treating Radioactive Waste and Burned-Out Nuclear Fuel by Zdeněk Dlouhý, Ways of Chemistry from Molecule Atom To Nanotechnologies by Milan Kratochvíl, Structure of Building Constructions II (re-edition) by Jaroslav Kadlčák & Jiří Kytýra, Mathematics for Understanding and Practice I (second edition) by Jana Musilová & Pavla Musilová.

A total of 237 ISBN's were assigned. These included 117 at VUTIUM Press (113 volumes in the "BUT Scientific Writings" edition + 5 VUTIUM's own projects) and at faculties and 120 titles in the remaining units.

Eleven issues of the BUT News journal were brought out with a yearly number of copies of 17,600.

The book Chapters from the History of Brno University of Technology 1899–2009 was presented at the World of Books in Prague to mark BUT's 110th anniversary. A press conference was held on this book in Brno.

The Department for External Relations helped install panels at the Prague exhibition to present facts commemorating BUT's anniversary.

In November, VUTIUM Press held a soirée at the Literary Café of the Brno Academia bookstore again on this book.

In 2009 the VUTIUM editorial board met in December. At the December session, a list of titles to be included in the 2010 publishing plan was submitted to the board to decide about the order of publishing the titles.

In November VUTIUM Press organised a seminar for the Czech university presses.

A meeting took place at the Frankfurt am Main book fair initiated by the Amsterdam University Press to discuss the establishment of an

Association of European University Presses. The inaugural meeting will take place in 2010.

The Czech universities were represented at the Frankfurt meeting by Brno University of Technology, Masaryk University, and Palacký University.

Centre Of Computer And Information Services (CCIS)

In 2009 the Apollo information system for staff and the Portál and Studis portals for students were further improved. The following projects were carried out:

New BUT web presentation with a new web design, editing and portal systems.

A free-course module making it possible for a student to sign up for a different course at another faculty without having to register and apply at the student's home faculty. By the end of September, 144 students signed up for 219 free courses. A total of 2,249 students clicked on the free-courses menu in the last semester, which shows a huge potential of this type of interfaculty courses.

The enquiry and student-study-assessment modules were overhauled. Enquiries may be assigned to each course, interest of students in study fields determined and, as a new feature, enquiries may also be addressed to study candidates and graduates. This has provided BUT with a powerful tool for general and targeted opinion polling among the former, present and future students. Enquiries are set and evaluated in Apollo with students answering on the web.

Designing and implementing a large-scale accreditation process module used for the first time to get the accreditation of degree programmes at the faculty of electrical engineering and communication.

At the request of most of the faculties, a system was created processing micro-payments made by students for various paid minor services such as an additional enrolment certificates or fines for late book return. Micro-payments are drawn from the BUT Halls of Residence and Canteens credit account based on internal agreements with the faculties.

Integrating the system of diploma printing in the Apollo information system to reduce the time needed to produce a diploma from data being checked by accepting clerks to the diplomas being sent to faculties to be signed by the relevant officials.

A detailed comparison analysis was made between the BUT IS and the FCE IS faculty layer, which could be used to integrate the FCE IS into the BUT IS.

In a very short time, a single pilot version of Internal Grant Agency was created in late 2009 to be used to redistribute the specific research funding.

In 2009, CCIS finished the reconstruction of a data centre at Kounicova 67a. The new data centre is equipped with a central UPS and a motor generator. Some backup central applications have been moved here from the FIT data centre. Thanks to this new data centre, information system applications are now backed up at different sites, which provides a protection against a large-scale failure at a single site.

The CESNET association installed a terabit Cisco CRS1/ 16 Carrier Routing System at the new data centre. This router is thought to be the most powerful routing system in the world. The Prague and Brno CESNET2 nodes are now connected at the rate of 40 Gb/s with a possible increase to 100 Gb/s in the future.

In 2009 KolejNet used 1.15 million CZK to upgrade and protect the servers that control the network operation improving mainly data and power-supply backups. Server virtualization began to be used on a large scale to save energy and accelerate recovery after failure.

Together with the management of halls of residence and canteens, steps were also taken to prepare the installation of new air-conditioning

units and guarantee the operation of three KolejNet data centres even in the event of a failure of the air-conditioning system. In cooperation with the halls of residence, preparations started in late 2009 for the building of backup fibre optical circuits of the KolejNet backbone network at the Pod Palackého vrchem and Purkyňova campuses. Currently, the KolejNet network runs 6,514 active connections with 7,192 student computers.

Active elements were upgraded in the BUT backbone network at Technická 2 (Faculty of Mechanical Engineering), Purkyňova 118 (Faculty of Chemistry), Údolní 19, and Rybářská 13 (Faculty of Fine Arts). In 2009, new 4x10 Gb/s cards and two OSPF protocol licences were bought for the existing backbone switches of the active elements at the Faculty of Fine Arts. Next optical LRM modules were tested and bought to enable the 10Gb/s technology for old cabling.

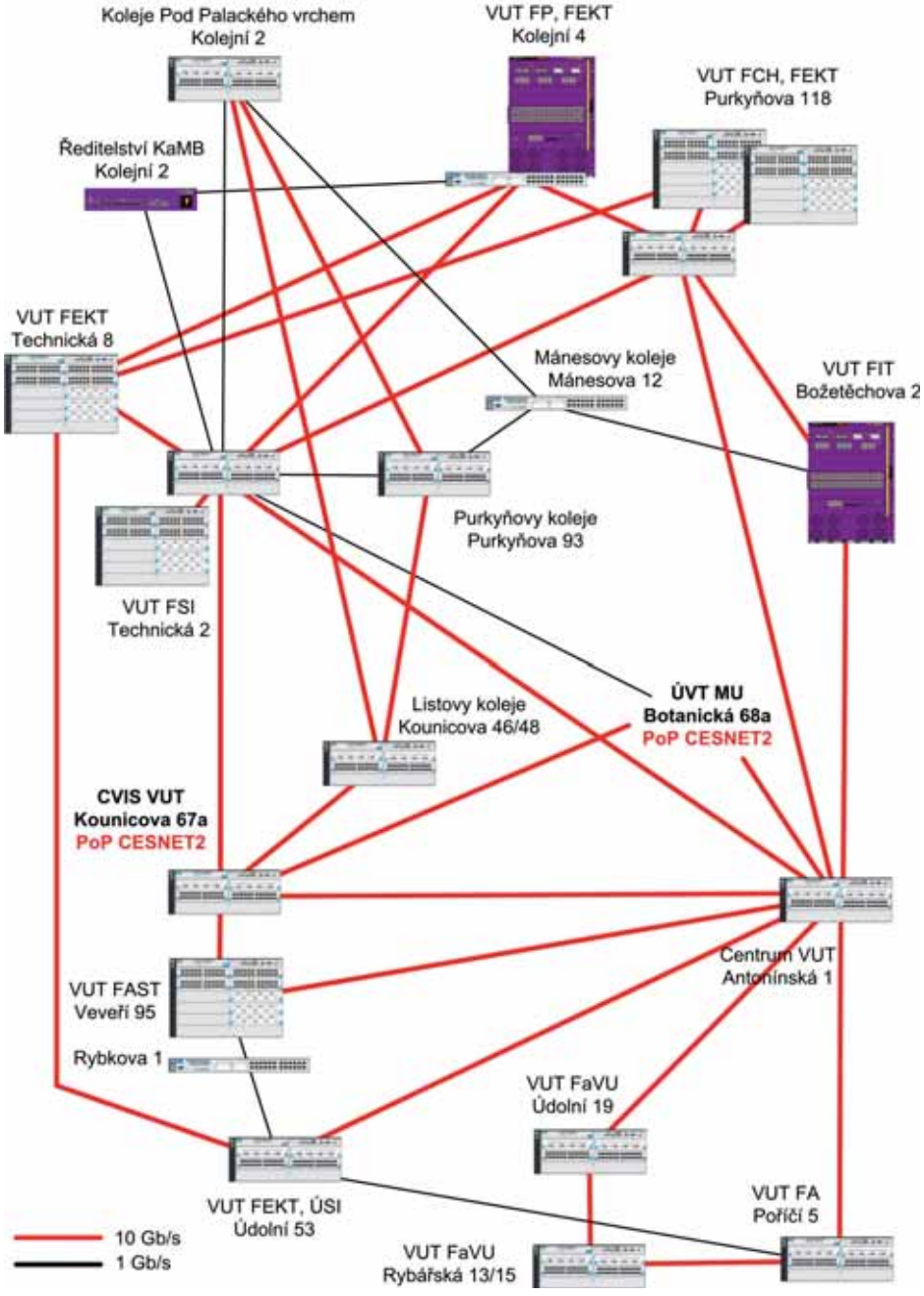
Because of the upcoming worldwide shortage of free IPv4 addresses, BUT started seriously to consider using the IPv6 protocol in the university networks. New key building modules of the IPv6 infrastructure were created to enable the operation of an IPv6 native connectivity at the centre of computing and information services. Also a dual connection was put into operation between BUT and the IPv6 CESNET2 network using a BGP4+ protocol.

In 2009, CCIS provided the services of hardware, software, and e-mail server ICT maintenance for ICV, CESA, Central Library, Rector's office, and its departments including the Centre of Project Support.

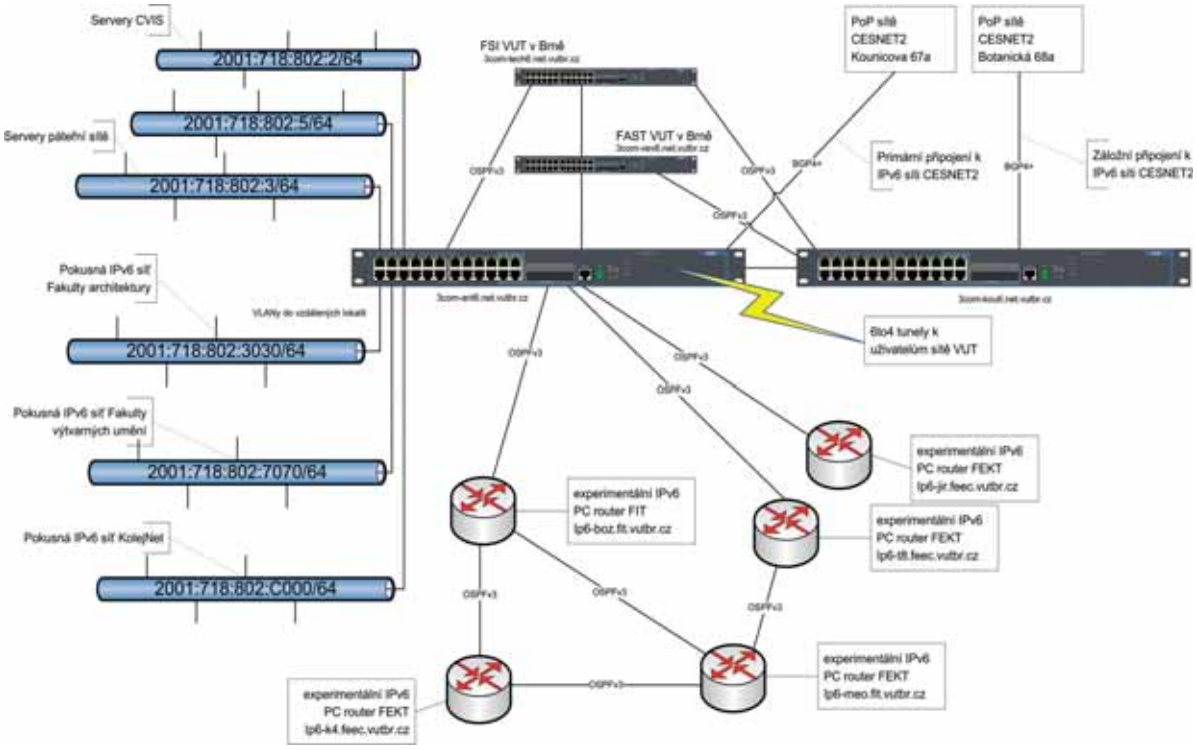
CCIS prepared projects for ICT services, hardware and software equipment of the BUT buildings incorporated in the new CEITEC project. An extendable data centre is also planed within the CEITEC project.

As complementary activity, CCIS carried out electronic elections of delegates for the Brno Regional Chamber of Commerce.

Diagram of the BUT gigabit backbone network



GbE – 2009



IPV6 – network


události

3 QUALITY AND CULTURE OF ACADEMIC LIFE

3. 1. Social affairs of students and employees

Student affairs

Under the University Act, Brno University of Technology awards 500 social scholarships and 12,000 accommodation scholarships monthly. These scholarships are paid from the targeted resources of the Ministry of Education, Youth, and Sports. If justified, social scholarships can also be granted by the deans of the faculties and the director of the university institute. Since 2009, BUT has been using rector's fund to grant scholarships to students in sudden distress.

Social Benefits of Employees

The employer grants:

– a contribution to the pension and life insurance of the employees

– a contribution to meals for employees

The employer also supports:

- sports activities of the employees through BUT Centre of Sports Activities, also offering seminars and training courses
- further education of employees through the Institute of Lifelong Learning offering various educational courses
- recreation of employees at the BUT Ramzová and Vŕšť holiday resorts

3. 2. Counselling (description of the counselling office, scope and type of counselling and/or other activities), counselling quality management (Table 3.2.)

A student counselling section is part of the BUT Institute of Lifelong Learning. The section's major activities are at present oriented towards student career counselling and cooperation with companies and organizations. Students are also advised in difficult situations and distress related not only to the studies. Counselling services include courses to help students improve their profiles, teach them self-knowledge, and other important soft skills increasing their chances in the labour market. All the services are offered to students free of charge.

Table 3.2. Counselling offered in 2009

counselling	employees/recalculated full-time employments	number of consultancy hours per week	number of counselling contacts		
			in person	by phone	by e-mail
Study	2 / 0,1	2	190	20	250
Psychological, social	2 / 0,4	8	168	30	270
Career	2 / 0,5	16	530	50	1 100
Other	2 / 0,6				320

Note: Counselling is provided by two 0.8-time employees. Students mostly receive counselling in person. In counselling by phone or e-mail the numbers men contacts including informative ones.

3. 3. Disabled candidates/students at universities

In recent years, BUT has used considerable resources of various origin to support students with different forms of disablement. Thanks to numerous reconstruction projects, almost all the buildings on the BUT campuses have barrier free access.

3. 4. Exceptionally talented students

Care of exceptionally talented students is mostly taken by the faculties. In recent years, BUT has participated in development programmes in support of talented students mostly in engineering and science fields. Active support is also given to other programmes in this area.

3. 5. Partnership and cooperation between BUT and employers in creating and implementing degree programmes (conceptions of profiles and study outputs)

BUT is active in various forms of cooperation with commercial enterprises. It has its representative in the Chamber of Commerce, which is a platform for establishing and developing contacts with commercial enterprises. Also in cooperation with the Brno Regional Chamber of Commerce, BUT works on a project within the Education for Competitiveness operative programme. In creating their degree programmes, the technical faculties cooperate with large companies in their field of specialisation, particularly the faculties of civil, mechanical, and electrical engineering.

3. 6. Accommodation and catering at BUT

Table 3.6. Student care – accommodation and meals

Total number of beds at BUT halls of residence	7 023		
Number of beds in hired facilities	0		
Number of accommodation applications submitted until 31st December 2009	9 667		
Number of accommodation applications granted until 31st December 2009	6 960		
Percentage of approved accommodation requests	72 %		
Number of bed-days in 2009	2 320 495		
Number of main meals sold in 2009	total		
	1 842 619		
	Including:		
	students	BUT staff	others
	1 674 806	86 545	81 268

**No-limit catering system*

3. 7. Use of scholarship fund

Table 3.7. Scholarship types and student numbers

scholarships	**number of students granted scholarships**
for excellent study results under Section 91, Para a)	1 490
for excellent R&D and other creation results contributing to knowledge improvement under Section 91, Para 2, Letter b).	1 441

to be used for R&D and innovative activities under Section 91, Para 2, Letter c)		252
for students in distress under Section 91, Para 2, Letter d)		446
for students in distress under Section 91, Para 3		0
in cases worthy of special attention under Section 91, Para 2, Letter e)		173
including:	accommodation scholarship	11 875
in support of study abroad under Section 91, Para 4, Letter a)		
including:	LLP/ERASMUS	564
	CEEPUS	17
	other programmes	8
in support of domestic study under Section 91, Para 4, Letter b)		
including:	AKTION	0
	CEEPUS	14
to doctoral students under Section 91, Para 4, Letter c)		1 241
other scholarships:		
including:	extraordinary doctoral scholarship	1 017

4 INTERNATIONALIZATION

4. 1. BUT Strategy in international cooperation, key priorities

Internationalization is BUT's long-term strategic objective. The university's Mission Statement sets a task for the university to be among the research universities of international renown becoming an integral part of the European research and educational space. To achieve this, steps are undertaken to attract more international students and create incentives for foreign research workers and teachers to stay at its faculties. These efforts receive much support from the South Moravian Centre for International Mobility, which is an association of legal entities (founded by Brno universities and the South Moravian Region) in the form of domestic and, above all, EU programmes it coordinates such as SoMoPro. The university is, however, also active within the organizations of which it is a member such as the European University Association (EUA), Conference of European Schools for Advanced Engineering Education and Research (CESAER), and other regional organizations such as the Danube Rectors Conference.

Agreements signed previously with foreign universities were being fulfilled also in 2009. Cooperation with the Technical University of Vienna may serve as an example providing much support for the preparation of the Central European Institute of Technology (CEITEC) joint materials research project of BUT, Masaryk University in Brno, and the Brno institutes of the Academy of Sciences of the Czech Republic. In much the same way as this university cooperation, a number of international cooperation projects were carried on in 2009 at the faculties concerning science and research as well as student mobility. For example, much appreciation by the Italian university officials was given to BUT for giving the students of one of the LLP ERASMUS programmes at the University of Ankona an opportunity to finish the courses of the summer semester at BUT after this university had been destroyed by an earthquake,

The university as well as its faculties concentrated on winning international students by offering programmes of all degrees, but specifically, as BUT aims to become a research university, on winning good international doctoral students. The services and assistance offered by the South Moravia Centre of International Mobility (SMCIM) were used to a maximum extent. In the academic year 2008/2009, SMCIM granted 31 one-year starting scholarships (including 16 for BUT) while in the academic year 2009/2010 it was 33 scholarships (including 21 for BUT). Scholarships were granted to students from Bosnia and Herzegovina, Russian Federation, Ukraine, Monte Negro, Syria, Iraq, Mongolia, and other countries. The international students whose one-year starting SMCIM scholarship had expired, were provided with similar scholarships from BUT's own resources to make it possible for them to finish their studies.

In 2009, cooperation between BUT and the SMCIM was further promoted and extended by several other projects funded by the South Moravian Region, the city of Brno and EU funds. Two lectorates of the Czech language were established abroad financed by the SMCIM providing preliminary Czech courses for foreign students wishing to study at Brno universities. The lectorate at Lugansk, Ukraine, had 21 students and the one at the Izhevsk State Technical University 40 students at the end of the year. Thanks to the good marketing of Brno's largest universities and the SMCIM, the number of applicants for starting scholarships rose to 200 in late 2009. Compared with the previous year, this is an enormous number and, even if not all the applications can be granted because of the project's financial limits, it is a guarantee of the students being the best and most motivated. What should also be mentioned is the participation of BUT in the SoMoPro programme administered by the SMCIM aiming to increase the number of the leading scientists staying at Brno universities to contribute to their internationalization and better involvement in the European and world research and educational space.

BUT activities at domestic and international educational fairs were also of significance. With an innovated university stand, BUT participated in the traditional Brno GAUDEAMUS educational fair held in 2009 for the first time with international participants. Also for the first time, the stands were judged during the fair by a jury consisting of students of three secondary schools with different specializations. BUT's stand won this contest overwhelmingly, which may be seen as big success as the competition of about a hundred state and private universities was fierce.

During the year, BUT also took part in other important fairs abroad. Thanks to the support from the House o International Services and, in some cases, from other organizations, BUT could participate in an educational fair and conference held by National Association of Foreign Student Advisers in Los Angeles, USA. For the first time,

BUT could present itself in Kiev marking enormous interest on the part of Ukrainian students and universities. Because of the geographic vicinity, similarity of languages, and the number of Slovak students studying at BUT, participation in the Academia Bratislava fair still seems to be a necessity. The university also took advantage of an activity by the Ministry of Education, Youth, and Sports in late 2009 to present itself at a number of universities in India. As a result of the visits paid, BUT now again hosts doctoral students from Syria and cooperates with universities in Jordan and Lebanon with more potential doctoral students.

BUT has signed a total of 83 teaching and research cooperation agreements with leading European and non-European universities. It is these agreements and their more consistent fulfilment that are seen by the university management as a permanent reserve that should be concentrated on to strengthen the teacher and researcher mobility in both directions.

4. 2. BUT involvement in international educational programmes

Together with foreign universities, BUT offers three accredited joint- and double-degree programmes. Each faculty can get involved in other European degree programmes as can be seen in Tables 4.3_1, 4.3_2, and 4.3_3.

4. 3. Student and teacher mobility development programmes of the Ministry of Education, Youth, and Sports

In recent years student and teacher mobility has been BUT's strategic objective. The mobility is funded by the development programmes of the Ministry of Education, Youth, and Sports, the LLP/Erasmus EU programme, BUT Mobility Scholarship fund, faculty scholarship funds, and a number of other resources. In addition to the LLP/Erasmus and the development programmes of the Ministry of Education, Youth, and Sports, the teacher mobility is also supported by the project activities at faculties.

Table 4.3_1 BUT participation in international teaching cooperation programmes – EU programmes for teaching and vocational training

programme	LLP						
	Erasmus	Comenius	Grundtvig	Leonardo	Jean Monnet	Erasmus Mundus	Tempus
number of projects	1			1			1
number of outgoing students	564			0			0
number of incoming students	383			1			13
number of outgoing teachers	245			2			7
number of incoming teachers	63			12			3
subsidy (thousand CZK)	**15 913**			**350**			**1 121**

Table 4.3_2 BUT participation in international teaching cooperation programmes – other programmes

programme	Ceepus	Aktion	others
number of projects	2	1	5
number of outgoing students	17	0	8
number of incoming students	14	0	36
number of outgoing teachers	7	1	2
number of incoming teachers	1	0	7
subsidy (thousand CZK)	271	22,5	298

Table 4.3_3 BUT participation in international teaching cooperation programmes – other study stays abroad

programme	government scholarships	direct inter-university cooperation / including development programmes	
		Europe / including development programmes	outside Europe / including development programmes
number of outgoing students	1	93/79	29/24
number of incoming students	13	50/18	1/0
number of outgoing teachers	1	77/43	15/8
number of incoming teachers	0	26/9	7/6

4. 4. Student and teacher mobility by countries

Table 4.4. Student and teacher mobility by countries

country	Number of outgoing students	Number of incoming students	Number of outgoing academics	Number of incoming academics
Australia	1	0	0	0
Austria	59	0	22	2
Azerbaijan	0	0	0	1
Belgium	30	2	11	3
Bolivia	0	1	0	0
Bosnia and Herzegovina	0	1	0	0
Brazil	2	0	0	0
Bulgaria	3	3	6	1

Canada	1	0	0	3
China	0	0	4	0
Columbia	5	0	0	0
Croatia	2	1	0	0
Denmark	56	0	7	5
Estonia	2	1	4	1
Finland	53	8	17	5
France	66	22	24	7
Germany	55	12	36	7
Greece	19	75	18	3
Hawaii	0	0	1	0
Hungary	4	1	3	4
Iceland	1	0	0	0
Israel	0	0	0	2
Italy	44	8	12	2
Japan	2	0	4	5
Jordan	0	0	1	0
Korea	0	0	0	5
Latvia	1	0	3	2
Lebanon	0	0	1	0
Lithuania	13	13	11	1
Macedonia	0	1	1	1
Malta	1	0	1	0
Mexico	1	1	1	0
Monte Negro	2	2	3	0
New Zealand	3	0	0	0
Norway	13	1	12	3
Poland	9	6	10	8
Portugal	30	86	20	6
Poland	59	0	22	2
Portugal	2	1	2	0
Rumania	2	1	2	0
Russia	14	24	3	4
Serbia	0	2	0	2
Slovakia	12	13	39	15
Slovenia	23	3	5	8

Spain	60	58	46	6
Sweden	31	0	4	0
Switzerland	16	0	6	
Syria	0	13	10	4
Taiwan	2	0	0	0
the Netherlands	16	0	0	0
total	739	406	389	145
Turkey	10	30	8	5
Ukraine	0	7	1	6
United Arab Emirates	0	0	2	0
United Kingdom	64	7	25	9
USA	11	1	5	9
Venezuela	0	1	0	0
total	**739**	**406**	**389**	**145**


BRNO UNIVERSITY OF TECHNOLOGY

5 ENSURING THE QUALITY OF ACTIVITIES CARRIED OUT AT BUT

5. 1. Education quality assessment system at BUT

Internal assessment

Education quality is assessed systematically at all BUT faculties as required by the University Act no. 111/1998 Coll. as amended and the BUT Constitution. This includes institutional assessment by the study-field and subject boards as well as individual assessment through class inspections, targeted pedagogic discussions and experience sharing between teachers. The outcomes of such activities are used immediately to innovate and modernize the content of the educational process providing it with a methodological framework, and improving the teachers` qualification.

An indispensable part of internal quality assessment at BUT faculties is the student quality assessment of the course contents or teachers and their methods carried out once or twice a year by enquiries in the form of electronic or paper questionnaires .

This assessment is organized by faculty managements in cooperation with the student

chambers of the faculty academic senates. The assessment results are considered in assigning teachers to courses and in their overall appraisal. In 2009 work was started on unifying the methods and content of the student ratings at faculties with a final objective of their integration.

External assessment

BUT graduates provide important external feedback. A systematic questionnaire enquiry is conducted once or twice a year to find out about the graduates' views on the education they have received and the jobs being offered to them. Such an inquiry was also undertaken in 2009 with interesting results; these had been incorporated in the BUT strategy, the 2010 version of the BUT Mission Statement and the new BUT 2011–2015 Mission Statement. In addition to this, the faculties' institutes and teachers attend frequent meetings with their graduates providing them with consultations or directly cooperating with them on their specialised tasks and issues, which provides feedback on the graduates' knowledge acquired and its suitability for practical jobs.

Another opportunity to better assess the quality of teaching and its outcomes is regular contacts with several companies employing the graduates. Further official opportunities are days of companies held annually at faculties where cooperation is discussed, jobs offered to students about to graduate, with the companies' HR staff informing on the profiles and competences of their prospective employees and commenting on the improvement of the present BUT offer. A good opportunity for mutual informing and experience exchange is also direct practical and research cooperation between the BUT staff and students and experts from practice.

Necessary and thus obvious is cooperation between BUT and the Accreditation Committee on the re-accreditation of degree programmes.

No external quality assessment was conducted at BUT by an international committee in 2008. Critical comments from previous external assessments (European University Association, Centre for Higher education Studies, European Centre for Strategic Management of Universities) are gradually responded to in preparation of a 2010 follow-up evaluation which, following a decision of the BUT management, was ordered from the EUA.

5. 2. Quality management and assessment in other spheres of BUT activities

Quality as part of the BUT strategy

For BUT, quality assurance is a matter of strategic priority. Regarding this area, the university conforms with the national and international documents, such as the current recommendation by OECD experts provided for the Czech higher education institutions (not only for quality management) and with the subsequent suggestions to reform the tertiary education in the Czech Republic. Also the Standards and Guidelines for Quality Assurance in the European Higher Education Area as a basic Bologna-process document were respected.

A long-term plan for quality assurance is part of the BUT 2009–2010 Mission Statement, in 2009 a process began of its incorporation in the BUT 2011–2015 Mission Statement. Particular aims and tasks are included in the annual BUT Mission Statement revisions being fulfilled within the Development Programmes of the Ministry of Education, Youth, and Sports. The fulfilment of quality assurance tasks was mostly supervised by the BUT management, Academic Senate and a BUT quality assurance task force.

Both internal and external resources were used to carry out the activities required as well as cooperation and exchange experience with other higher-education institutions including the Ministry of Education Centre for International

Services – the Bologna Experts programme; Czech Conference of Rectors; Council of Higher Education Institutions; Centre for Higher-Education Studies; Masaryk University, Janacek Academy of Music, University of West Bohemia, Technical VŠB-University of Ostrava, Jan Evangelista Purkyně University, and others). Attention was paid to quality assurance and assessment.

Efficient support from the university and faculty managements is BUT's strength in quality assurance. The yet insufficient communication with the academic community on the need of a comprehensive approach to assuring the quality of activities and environment, on the other hand, must be seen as its weakness. However, opportunities have already been created for starting the necessary education and cooperation.

Internal quality assurance

In 2009, quality was the focus of a development project, Assuring and Evaluating Quality at BUT, financed from the funds of the Ministry of Education, Youth, and Sports within development programme no. 9 designed to overcome the weaknesses of universities. As part of this project the following activities were carried out: the material, technical, organizational, and personnel background of the BUT Quality Assurance Unit was completed; an audit was carried out of the BUT internal quality assurance regulations; a recapitulation was carried out of the results of the previous internal and external quality assessments, internal and external analyses of the processes at the BUT Rectorate, the conclusions of the international university quality assurance projects in which BUT participated – a check was carried out of on the fulfilment of their tasks and recommendations, the preparation was started of the 2010 follow-up activities; a BUT Quality Council was established consisting of members of the BUT Quality Assurance Unit, representatives from faculties and other BUT units, a plan of its activities was drawn up; a BUT quality assurance and assessment plan was presented to the BUT academics; internal training was offered to all those involved in quality assurance and assessment; cooperation and experience sharing went on with partner universities, representatives from universities, Ministry of Education, Youth, and Sports, and other institutions, also concerning the BUT involvement in the international quality assurance projects.

In January 2010, a detailed report on the fulfilment of this BUT development plan, the verifiable outputs and the subsidies drawn were accepted and approved without comments by the Ministry of Education, Youth, and Sports.

Internal and external quality assurance through benchmarking and ranking

Benchmarking and ranking have already been used by BUT being seen as modern approaches to internal and external quality assurance and will further be utilized in the future.

Benchmarking

In 2009 BUT was involved in the international Curricular Reform and University Management benchmarking projects, organized by the European Centre for Strategic Management of Universities (ESMU) and the European Benchmarking Initiative (EBI) for the years 2009 to 2009. Within these projects, studies are conducted assigned on a continual basis concerning active participation in international workshops intended for establishing contacts and direct cooperation to exchange and comment on experience, to devise new approaches to problem solving to draw up project final reports evaluating and comparing the participating institutions.

Ranking

Since 2007 BUT has been systematically concerned with ranking, particularly in view of the THES–QS World University Rankings (The Times), which seems to the most frequently used ranking of universities. BUT also keeps a close watch on the rival Academic Ranking of World Universities, set up by Shanghai Jiao Tong University's Institute of Higher Education (The Economist).

Further BUT considers as noteworthy the CHE University Ranking gradually gaining ground in the EU.

BUT applies the outcomes of the ranking studies to the management and decision-making processes using them considerably to encourage and motivate the academic staff in order to achieve a prestigious ranking and improve competitiveness.

5. 3. Data on financial audit

Setting up and maintaining an efficient internal audit system.

Under Act no. 320/2001 Coll., concerning financial audits, a BUT internal auditing system including financial audits, was defined and configured by internal regulations in 2004. This created conditions for economical and purpose-fitted spending while fulfilling the BUT Mission Statement objectives.

The regulation to implement an internal auditing system, bursar's guideline no. 62/2004, had been amended in the course of the preceding years as well as in 2009 as needed to meet the real needs of BUT management.

In 2009 a Section of Inspection and Internal Audit was established at BUT with five employees. This created conditions suitable for conducting more professional internal audits and providing an optimum auditing sample with respect to the cash flow to be audited. In late 2009, this section received a certificate of quality and efficiency from an external certified auditor with the following final statement: "The BUT Section of Inspection and Internal Audit meets the requirements of the International Standards for the Internal Audit Professional Practice of The Institute of Internal Auditors – IIA, Inc. This is the best of the three possible rankings meaning that the strategies, procedures, and practices are sufficient to meet the requirements of the Standards necessary to ensure the independence, objectiveness and professional standard of an internal audit."

Since 2005, the identification and evaluation of risks resulting from carrying out the tasks set and achieving the objectives approved has become part of the internal audit system. A new IS was introduced at BUT in 2007 for setting up a risk map for each BUT faculty and department to be subsequently used to set up a BUT overall risk map. Using the results of determining the most hazardous areas, risk maps were set up becoming the basis for setting up an annual plan of internal BUT audits. The internal audits were mainly concerned with the projects receiving funding from the new ESF operative programmes.

Information on suspected and proved cases of corruption.

In connection with the audit methods, there were no cases of corruption proved at BUT.

6 BUT DEVELOPMENT

6. 1. Involvement in the University Development Fund – involvement in programmes financed by the EU Structural Funds

In 2009 BUT was strongly involved in the University Development Fund projects. Table 6.1. shows the subsidies in UDF project categories.

Table 6.1. BUT Involvement in the 2009 University Development Fund Programmes

thematic group	number of projects accepted	capital subsidy (thousand CZK)	ordinary subsidy (thousand CZK)	total subsidy (thousand CZK)
A	20	33 002	0	33 002
B	0	0	0	0

C	1	0	250	250
E	0	0	0	0
F	71	0	13 839	13 839
G	80	0	11 279	11 279
total	**172**	**33 002**	**25 368**	**58 370**

6. 2. Involvement in projects financed by the EU Structural Funds

Table 6.2. BUT involvement in the programmes financed by the EU Structural Funds

operative programme (name)	measure (name)	project	implementation time	funding received (thousand CZK) ordinary / capital	funding received (thousand CZK.) for 2009 ordinary / capital
Education for competitiveness	University education	CZ.1.07/2.2.00/07.0410	1. 5. 2009 – 30. 4. 2012	6 583	6 583
		CZ.1.07/2.2.00/07.0411	1. 6. 2009 – 31. 5. 2012	2 015	2 015
		CZ.1.07/2.2.00/07.0403	1. 5. 2009 – 31. 3. 2012	6 000	6 000
		CZ.1.07/2.2.00/07.0406	1. 5. 2009 – 30. 4. 2012	8 346	8 346
		CZ.1.07/2.2.00/07.0390	1. 6. 2009 – 31. 5. 2012	6 892	6 892
		CZ.1.07/2.2.00/07.0402	1. 6. 2009 – 31. 1. 2012	1 111	1 111
		CZ.1.07/2.2.00/07.0391	1. 6. 2009 – 31. 5. 2012	3 705	3 705
		CZ.1.07/2.2.00/07.0487	1. 6. 2009 – 31. 5. 2009	5 616	5 616
		CZ.1.07/2.2.00/07.0273	1. 5. 2009 – 30. 4. 2009	7 957	7 957
	Human resources in R&D	CZ.1.07/2.3.00/09.0228	1. 7. 2009 – 30. 6. 2012	8 370	8 370
		CZ.1.07/2.3.00/09.0162	1. 8. 2009 – 31. 7. 2012	7 610	7 610
		CZ.1.07/2.3.00/09.0067	1. 9. 2009 – 31. 8. 2012	4 892	4 892

		CZ.1.07/2.3.00/09.0222	15. 6. 2009 – 14. 6. 2012	5 954	5 954
		CZ.1.07/2.3.00/09.0105	15. 6. 2009 – 30. 9. 2011	587	587
		CZ.1.07/2.3.00/09.0092	1. 9. 2009 – 30. 6. 2012	2 879	2 879
		CZ.1.07/2.3.00/09.0031	1. 1. 2010 – 31. 12. 2012	5 209	5 209
		CZ.1.07/2.3.00/09.0214	1. 1. 2010 – 31. 12. 2012	1 739	1 739
		CZ.1.07/2.3.00/09.0224	1. 1. 2011 – 31. 12. 2013	3 982	3 982
		CZ.1.07/2.3.00/09.0115	1. 9. 2009 – 31. 8. 2012	2 787	2 787
	Partnerships and networks	CZ.1.07/2.4.00/12.0017	27. 10. 2009 – 14. 10. 2012	7 853	7 853
		CZ.1.07/2.4.00/12.0029	1. 12. 2009 – 30. 11. 2012	3 396	3 396
		CZ.1.07/2.4.00/12.0028	1. 2. 2010 – 31. 12. 2012	10 763	10 763
		CZ.1.07/2.4.00/12.0030	27. 11. 2009 – 31. 10. 2012	11 033	11 033
		CZ.1.07/2.4.00/12.0026	27. 10. 2009 – 31. 8. 2012	7 280	7 280
		CZ.1.07/2.4.00/12.0024	1. 11. 2009 – 31. 10. 2012	13 358	13 358
		CZ.1.07/2.4.00/12.0019	1. 3. 2010 – 28. 2. 2013	5 960	5 960
		CZ.1.07/2.4.00/12.0020	27. 10. 2009 – 30. 9. 2012	15 255	15 255
	Improving quality of education	CZ.1.07/1.1.02/01.0029	1. 4. 2009 – 31. 12. 2011	4 513	4 513
Operative programme total				**171 645**	**171 645**
Science and research for innovations	Regional R&D centres	CZ.1.05/2.1.00/01.0002	05/2009 – 12/2013	31 831	31 831
Total (for each operative programme)				**31 831**	**31 831**

6. 3. BUT involvement in the development programmes of the Ministry of education, Youth, and Sports

Involvement in programmes financed by the EU Structural Funds

Table 6.3. BUT Involvement in the 2009 University Development Fund Programmes

development programmes for public universities	number of projects accepted	funding received (thousands of CZK)	
		capital	ordinary
Programme of the development of equipment and state-of-the-art technologies	1	12 273	5 077
Programme of support for implementations of the national system of qualifications at individual universities	1	0	200
Programme of support for the evaluation of the restructuring and innovation of degree programmes	1	0	750
Programme of support for bidirectional student and teacher mobility	4	350	16 350
Programme of support for the preparation of operative programme projects	1	10 500	1 000
Programme of support for young people socially and/or economically handicapped or disabled before, during and , after the study	1	0	1 500
Programme of support for talented students and graduates immediately after graduation	2	0	4 930
Programme of support for senior education	1	0	1 000
Programme of support for improving the weaknesses or supporting the strengths of a university based on the SWOT analysis of the previous history, and the present situation	7	0	14 940
Centralized development projects (university as the coordinator)	4	4 521	6 890
total		**27 644**	**52 637**

7 CONCLUSION

In 2009 like in the previous years, BUT pursued a continual and positive development path in all its primary and secondary activities.

The rector as well as all the BUT officials were working on the strategy and practice of university management focussing on the development of the human resources in the lower age groups, on expertly managing changes and risks, on assuring the quality of activities and processes, on carrying out marketing activities for the university to gain more prestige and become more competitive.

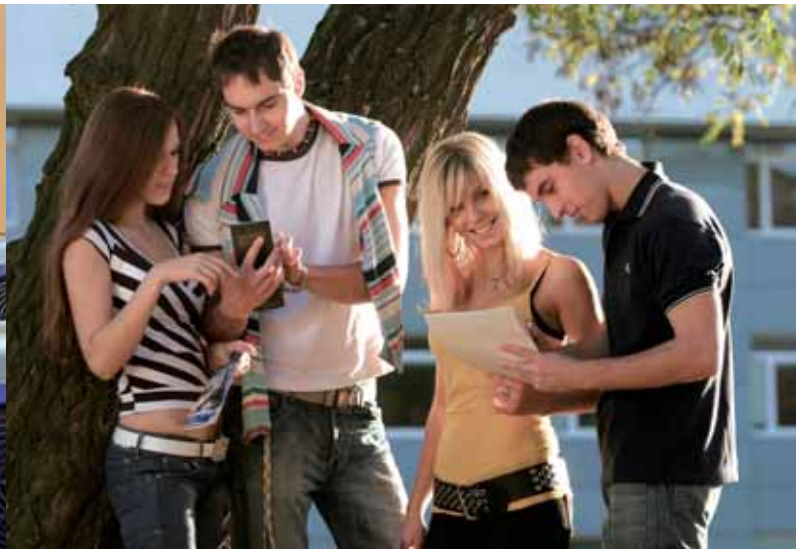
A proof of the quality education that BUT offers is the increasing numbers of study candidates, students, and graduates, despite the beginning demographic slump. This is also accompanied by increased efforts to assure the quality of education at BUT and services offered to students to improve their

professional and human profiles. The tens of accredited full-time and combined degree programmes were extended in 2009 by new Bachelor's, follow-up Master's and doctoral programmes with many being of an interdisciplinary of inter-university nature, some of them directed towards internationalization.

In the area of creativity development, the year was marked by the preparation and submission of projects financed by the structural funds. In this regard, in may be seen as a favourable development that, within the first call of the R&D for Innovation operative programme, the NETME Centre project was evaluated as the best-prepared project on regional R&D centres. This project is also the first project in Brno to receive a first advance payment from the EU funds. The potential and results of the research conducted by the BUT teachers and creative workers are illustrated by the selected projects in the first part of this report giving a good reason for optimism concerning the future creativity at BUT.

Considerable advances were also made in the transfer of knowledge to the application sphere. The BUT Technology Transfer Department and its new TTPoint project present the excellent results of the teachers and students in research and development protecting the intellectual property, giving assistance in taking out patents and offering inventions, and providing more consultancy for companies. Such activities efficiently promote the desirable convergence of the academic and practical spheres.

In late 2009, the BUT Academic Senate re-elected the existing BUT rector as candidate for a new rector appointment to be in office from 2010 to 2014. Thus, with only a partially renewed university management, he may bring closer the fulfilment of the strategic visions and plans in quick succession and in the right direction towards further BUT development.



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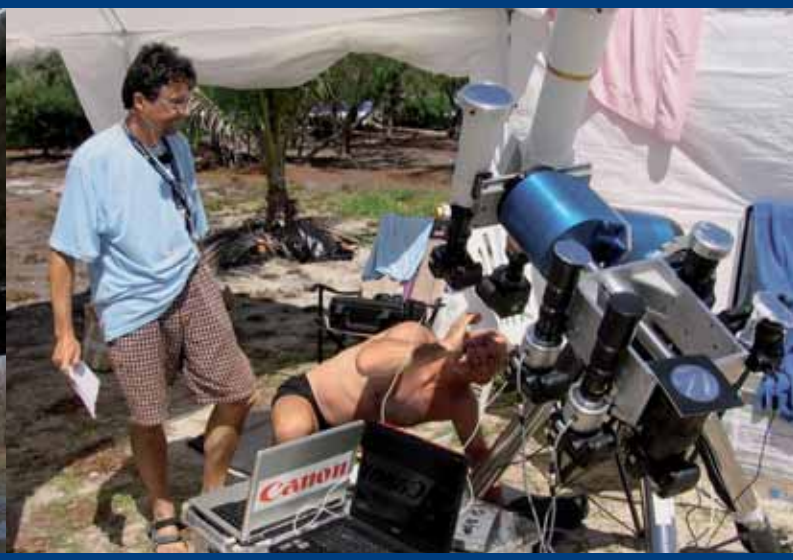
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