Ergonomics and Human Factors
Regional Educational CEEPUS Network

I. Objectives

The Ergonomics and Human Factors Regional Educational CEEPUS Network mission is to contribute to the competitiveness of the Danube Region by providing leading-edge competency on the human-oriented product, process, and organizational innovation.

The goal of the “Ergonomics and Human Factors Regional Educational CEEPUS Network” is to strengthen the ongoing collaboration of the participating institutions, to create a formal academic structure for student exchange on bachelor, master, and doctoral level, to participate in each other’s master and doctoral programs, and to develop shared training contents, university courses, and joint doctoral programs in the long term.

The coordinators of the “Ergonomics and Human Factors Regional Educational CEEPUS Network” work together in various international ergonomics organizations, e.g. International Ergonomics Association (www.iea.cc) and the Federation of European Ergonomics Societies (www.eurerg.eu) and already have a virtual platform and modus operandi for collaboration. Most importantly, we represent our national assessment boards at the meeting of the Centre of Registration of European Ergonomist (www.eurerg.eu), which operates the professional certification system of ergonomists according to the globally agreed educational, training and continues professional development criteria.

The participating units have all the usual shared activities like a regular CEEPUS network, e.g. Erasmus+ student (Ph.D.) and teacher mobility, professional workshops, summer universities, research and educational projects, and successful international doctorandus workshops. The educational objective for the next academic year of the “Ergonomics and Human Factors Regional Educational CEEPUS Network” is to organize two virtual seminars, have a workshop, and complete at least one teacher and student mobility to and from each participating unit. Our professional objective is to explore the legal requirements of a joint safety-related doctoral program and seek a solution to shared mentoring possibilities.

Thanks to the CREE minimum requirements of ergonomists, the content of the program is quite explicit, and it should contain 50 % general ergonomics and human factors and 50 % application-oriented knowledge.

The biggest challenge for this network is to find the legal position of the proposed joint educational program in the educational administrative structure.

The root of the problem is that ergonomics/human factors are represented twice in the European educational competence structure. On the one hand, we can interpret it as an ergonomics and human factors degree with several specialisations. However, on the other hand, we can interpret it as ergonomics and human factors specialisation in various areas, e.g. mechanical, software or safety engineering.

The legal requirements of the establishment of a university programme are quite different according to these approaches which can be different in different countries.

II. Network

The participating institutions in the system have different educational profiles; however, they share the fact that ergonomics is a priority in their education program, and they perform high-quality ergonomic research and education programs, and they employ prominent ergonomists.

The composition of the network provides the institutional diversity needed to develop a program in this multi-disciplinary scientific domain. It is also common in the participating institutions that they are devoted to starting an ergonomics/human factors training based on the standard criteria of ergonomics, and they consider the Danube Region cooperation as a critical success factor.

Óbuda University, Budapest

Óbuda University Donát Bánki Faculty of Mechanical and Safety Engineering
Gyula Szabó PhD, Eur. Erg.

Our faculty participates in several CEEPUS networks in mechanical engineering and mechatronics, so we intend to create similar mobility opportunities for our safety technology engineering students and teachers as well.

Our mayor training is on security engineering since we have a bachelor and master degree in security engineering and our doctoral schools have been established in the field of safety science too. In the field of safety science, we are actively involved in domestic professional life, play a vital role in the adaptation of international knowledge and practice, and actively participate in worldwide professional cooperation. The Ergonomics and Human Factors Regional Educational CEEPUS Network will extend our potential to fulfil our domestic role.

The enormous advantage of networking is that we can access the research infrastructure of other universities, gain full access to their scientific achievements, and adopt good practices through personal contact. We can implement our research and development innovation programs at a higher level and internationalise them through the network. The network provides an opportunity to conduct international research and level the educational research potential of participating institutions.

Primary safety and security research topics in the faculty:

- IT safety and security
- Organisational culture and behavioural safety

- Human reliability
- Security technology
- Biometric identification
- Critical infrastructure protection
- Occupational safety and health
- Fire protection and industrial safety

We want to become a valuable member of the network and enable students at partner institutions to complete their PhD subjects. We have developed e-learning courses in Hungarian and English to various safety-related and ergonomics topics. We offer a postgraduate course on fire protection engineering, rehabilitation engineering and health and safety.

Our PhD school in Safety Science has over 100 students from different countries thanks to various grants, e.g. Stipendium Hungaricum.

IMC University of Applied Sciences Krems

International Relations
Prof. (FH) Mag. Michael Reiner

We will participate for the very first time in a CEEPUS networks. We intend to create mobility opportunities for students as well as for lecturers and researchers. We also would like to extend our international network with the opportunity for our students to cooperate with different nationalities and other degree programes as we think interdisciplinary is a key function in success today.

We do have several Departments that would be available for cooperation including Bachelor and Master degrees (no PhD). Our main departements include degrees like “business administration”, “export-oriented management” “tourism and leisure management” “informatics” “mediacl and pharmaceutical biotechnology” and “applied chemistry” to name only the engish run bachelor degree programmes. On our master level, we do offer “Advanced nursing practice” “digital business innovation and transformation” “marketing” “management” to name a few that are run in English language.

We do have several research fields of wich several would be active within the Ergonomics and Human Factors Regional Educational CEEPUS Network, e.g.

- New World of Work
- Scan to VR
- Train@train
- Consumer studies and innovation management
- Digital transformation and organisational development

- Tourism marketing and technology
- Innovative teaching methodology for business

We do not have a PhD program as we are currently under the Austrian law not able to run PhD programs. We do have several cooperations with int. Universities where our alumni can go to start their PhD.

Technical University of Varna

Faculty of Shipbuilding
Assoc. Prof. PhD Eng. Tihomir Dovramadjiev

The Technical University of Varna (TU-Varna), Bulgaria is the second largest technical university in Bulgaria. TU-Varna is a state university and is divided into four academic Faculties – with 22 departments, 2 colleges and Department of Mathematics and Foreign Languages:, Faculty of Shipbuilding; Faculty of Computer Sciences and Automation, Faculty of Electrical Engineering, Faculty of Manufacturing Engineering and Technologies.

In the last 53 years more than 50 000 students graduated in 23 specialities. The university diplomas are with European acceptance in 24 bachelor and 48 master degree programs and PhD studies.

The strategy of TU-Varna in scientific research aims to establish the institution as an innovation and technology center. The following activities are realized:

- Stable connections with leading companies;
- Creation of specialized laboratories;
- Organization of business-incubators and High-Tech centers;
- Creation of virtual labs at the university. TU-Varna has student hostels for 1500 students, University library, Sport center.

TU-Varna is a leading research center in Advanced technologies in design, Software technologies, Internet and web-applications, Smart technologies in telecommunications and computer networks. There are several centers in TU-Varna: ‘Advanced technologies in design center’, ‘CAD-CAM Lab’, ‘Applied technologies in health center’, ‘Samsung Innovation Lab’, ‘Naval architecture and marine technology center’, ‘Mikrotik Lab’. TU-Varna collaborates closely with Municipality of Varna in projects dedicated to ‘science in the society’ and citizenship.

We believe that the Ergonomics and Human Factors Regional Educational CEEPUS Network will add value to TU-Varna existing contacts in research and didactical areas with many leading universities of Europe and outside Europe.The common activities for ongoing collaboration are:

- setting up exchange programs between TU-Varna and other partners
- teach and improve skills of the students and support professors in ergonomics, modern communications network technologies and design science fields;

- offer double diplomas;
- improve the curricula structure;
- development of training courses and conduct lectures in English;
- support with actual material-technological base, labs and center simulators incoming students for working on their Bachelor, M.Sc. or Ph.D. thesis.
- writing teaching books, making educating presentations and science articles in colaboration;
- inviting partner's experts in the PhD public defense and participation in examnation comittees;
- building and exchanging contact information between TU-Varna and other partners directly with information and technological industries sectors;
- support publishing of science articles of students and lecturers for free in local science annual journal AJTUV featured with DOI (Crossref) to ensure their unique identification on the Internet and the ability to quickly access their content (ISSN 2603-316X (Online);

TU-Varna is a Member of: EUA and BSN Black sea network, Certificated in ISO 9001.

The Technical University of Varna will seek to support internationalization through active dialogue with CEEPUS partners, exchange of information and promotion of ergonomic activities. TU-Varna will actively participate in the cultural exchange with partner countries through exchange at contact level.

The mobility of teachers, doctoral students and students will be adjusted to the setting of specific goals and objectives in order to optimize the use of contacts, exchange of experience, knowledge and specific joint initiatives into ergonomics and science related fields. TU-Varna will strive to deepen the professional relations with the partners by creating opportunities for realization of joint international projects and programs. TU-Varna, together with the university partners, will support in the preparation of double diploma degree programs.

TU-Varna will promote the individual and joint publication with the partners in the local scientific journal AJTUV ISSN 2603-316X (Online), providing appropriate conditions for the participants, timely publishing of the prepared reports and preparation of individual DOI, recognized by the leading digital platforms.

University of Zagreb

Faculty of Mechanical Engineering and Naval Architecture
Professor Tanja Jurčević Lulić

The University of Zagreb (established 1669) is the oldest and biggest university in the Republic of Croatia. With 30 Faculties and 3 Art Academies it is the flagship educational institution in the country, a place where more than 7900 teachers and 72000 students develop knowledge and acquire skills. The Faculty of Mechanical Engineering and Naval

Architecture is the oldest and the largest mechanical engineering school in the Republic of Croatia. Since the first lectures were held at the Royal Technical College in 1919, the Faculty has been providing state-of-the-art education in its mechanical engineering and naval architecture degree courses and since 1995 in the aeronautical engineering degree course too.

Our Faculty offers undergraduate, graduate and postgraduate programmes in three courses of study: mechanical engineering, naval architecture and aeronautical engineering. Specializations and sub-specializations in the mechanical engineering course are:

- Design (Medical Design, Product Design and Development, Mechanisms and Robots, IC Engines and Motor Vehicles);
- Process and Energy Engineering (Thermal Engineering, Process Engineering and Energy Engineering);
- Production Engineering (Production Automation, Machining Systems, Quality Assurance, Manufacture and Assembly, Welded Structures);
- Mechatronics and Robotics; Industrial Engineering and Management; Marine Engineering; Engineering Modelling and Computer Simulation;
- Computer Engineering (Intelligent Assembly Systems, Polymer Product Manufacture, Computer Modelling of Tools and Dies, Computer-Based System Management, Computer-Integrated Product Development, Modern Machining Systems and Processes, Quality Management, Foundry) and
- Materials Engineering.

The studies are based on the principles of the Bologna Declaration implying staff and student mobility. The assessment of students' performance is based on the European Credit Transfer System (ECTS), which is an eligibility requirement for the participation in the student mobility.

To promote ergonomics, the Croatian Ergonomics Society was established in 1974 at the Faculty of Mechanical Engineering and Naval Architecture. The Society is a member of the Federation of European Ergonomics Societies (FEES) and International Ergonomics Association (IEA).

In the Republic of Croatia, at this moment, there is no system of formal education in the field of "ergonomics" or "human factors" within the undergraduate, graduate and doctoral studies at higher education institutions. However, there are many courses in the field of "ergonomics" or "human factors" that are taught at undergraduate, graduate and doctoral curricula at the higher education institutions in the Republic of Croatia.

The objectives of the proposed networking are improvement of the curricula structures, development of training courses, conducting lectures in English, improvement of the student's skills, support for professors in the field of ergonomics and strengthen the collaboration in the field of Ergonomics and Human Factors. Participation in the network is very important in transferring good practices among countries. Networking is also important in supporting the international conferences Ergonomics that held in Croatia.

The advantages of networking are availability of other universities research infrastructure, exchange of international knowledge in the field of Ergonomics and Human Factors and sharing and adoption a good practice through personal contact. The proposed networking will strengthen the collaboration to enrich the research and education in the field of Ergonomics and Human Factors.

Research topics in the field of Ergonomics and Human Factors at the Faculty of Mechanical Engineering and Naval Architecture:

- Biomechanics in ergonomics (determination and analyses of load on the human)
- Development of assessment procedures
- Ergonomics in product and engineering design
- Improvement of human-machine-environment design
- Ergonomics in logistics (ergonomics in order-picking process.)

Our PhD education interest with the Ergonomics and Human Factors Regional Educational CEEPUS Network:

- Development of the new shared training contents and courses
- Development of PhD workshops
- Co-supervision of PhD thesis
- Participation in doctoral defense committees.

Poznan University of Technology

Faculty of Engineering Management
PhD, DSc, Eng. Eur Erg. Beata Mrugalska

Poznan University of Technology offers education at 10 faculties which provide students with a choice of 30 fields of study. It has 16,000 students of I and II cycles, Phd students and participants of post-graduate programmes. Here works more than 1,300 academic staff. Implementation of PUT's mission enables the vision to become reality - to be one of the best technical universities in Poland in terms of education quality and high level of scientific research.

In Poland Polish Ergonomisc Society was established in 1977 and since then we managed to create its 14 sub-divisions located in the whole country. We belong to the Federetion of European Ergonomics Societies (FEES) and International Ergonomics Association (IEA). In our country the National Assessment Board of European Ergonomists was established and we are a member of the Centre for Registration of European Ergonomists. The Centre for Registration of European Ergonomists (CREE) confers the professional title “European Ergonomist” to designate qualified and experienced members of the profession. The quality of their professional practice and their education has to be peer-reviewed and they must adhere to a professional Code of Conduct. CREE certified people may use the letters Eur.Erg after their name. Beata Mrugalska (Assistant Professor at Poznan University of

Technology) is a member of the board of the Centre of Registration of European Ergonomists and also a council member representing Polish Ergonomics Society.

The Poznań University of Technology:

- offers lectures in English
- cooperates with more than 100 universities all over the world
- offers double diplomas
- a member of CESAER (Conference of European Schools for Advanced Engineering Education and Research) – a European organisation that brings together the best technical schools, a member of SEFI (Societe Europeenne pour la Formation des Ingenieurs), EUA (European University Association), ADUEM (Alliance of Universities for Democracy) and IAU (International Association of Universities).

The role of the organization in the project:

- teach students and professors in ergonomics and human factor in theory and practice
- will be responsible for the exchange students (B.Sc., M.Sc. and Ph.D.), exchange professors for teaching students and training in workshops, organized by Prof. Anca DRAGHICI.
- will be responsible for co-organizing workshop in Timisora.
- will be responsible for sharing laboratories with incoming students for working on Bachelor, M.Sc. or Ph.D. thesis
- will be responsible for collaborating on comparative analysis of curriculums between CEEPUS network universities
- will contribute in preparing teaching materials and their adoption in the redesign courses
- will prepare with the partners a teaching book about ergonomics and human factor for students
- will invite partners to prepare together papers for journals
- will establish an exchange program between PUT and other partners to provide an attraction to students, bilateral knowledge transfer and industrial related student projects focused on new technologies

"POLITEHNICA" UNIVERSITY OF TIMISOARA

Faculty of Management in Production and Transportation
Prof. Anca DRAGHICI

Politehnica University of Timisoara (UPT) is the biggest technical universities from the West part of Romania, established in 1920 through a royal decree. During its 100 years of existence, mor then 118,000 engineers have graduated UPT. In the present, over 13,000

students are registered on various education levels (Bachelor, Master, Doctoral and Postdoctoral, according to the Bologna paradigm). UPT has 10 faculties; within the 25 departments of the university work nearly 700 teachers and the auxiliary and administrative personnel amount to 500 staff.

The research and education in the field of Ergonomics and Human Factors are supported by 3 faculties: Faculty of Management in Production and Transportation (industrial ergonomics field, workplace management and occupational health and safety - Bachelor, Master and PhD. programmes), Faculty of Architecture and City Planning (ergo-design filed for different types of spaces - Bachelor level) and the Faculty of Mechanical Engineering (industrial ergonomics field, robotics - Bachelor, Master and PhD. programmes).

In 2019, an initiative group from the Faculty of Management in Production and Transportation (FMPT) of UPT has established the Romanian Society of Ergonomics and Workplace Management (ErgoWork) considering the maturity level reached in education and research in the local area. The association has national coverage, having more than 50 members from universities (teaching staff and researchers from academia) and from companies (practitioners) who are specialists recognized in their local communities for their achievements in the field of Ergonomics and Human Factors. The same initiative group from the FMPT has carried out the successful national project for defining the qualification standard and for registering the profession of Ergonomist (code 226309) in the National Qualifications Register (level of studies - 4, higher studies).

The FMPT existing collaborations with the proposed CEEPUS Network's partners (through PhD. research support with Hungarian and Polish partners, conferences participation within the events organized by the Croatian partner) will be extend and strength in a coherent framework. The sporadic collaboration, most of the PhD students and teaching staff of the FMPT, has conducted to small improvements in research; there have been identified a gap in the Ergonomics and Human Factors education area, because of the lack of international knowledge exchange in the field.

Thus, in order to increase the international visibility of Romanian ergonomists and to support the international cooperation, the current Ergonomics and Human Factors Regional Educational CEEPUS Network will provide a great knowledge exchange environment. Furthermore, the network will contribute to the competitiveness increasing of the Romanian specialists in the Danube Region by providing leading-edge competency on the human-oriented product, process, and organizational innovation. The common activities are meant to strengthen the ongoing collaboration in the field of Ergonomics and Human Factors to enrich the education and research:

- Education area:
    - Improve the curricula structure and context for the Bachelor and Master levels;
    - To invite partners staff to present relevant and actual topics for the Bachelor, Master and PhD students;
    - To develop shared training contents, university courses;
- Research area:

- Identify and develop common researches in specific topics (co-supervision of thesis as joint doctoral programs in the long term);
- create a formal academic structure for student exchange on bachelor, master, and doctoral level (to develop a part of their research related to their thesis at one or more partner's organization/research laboratory);
- To invite experts from partners in the PhD. public defense (as reviewer deliver a report);
- To collaborate in develop and publish common articles to disseminate our common results (for conference proceedings and/or journals);
- Support the national conference (as invited participants to ErgoWork conference organized in Timisoara, Romania).

There are 5 PhD supervisors in the field of Engineering and Management and 1 supervisor in the field of Economics. We are interested if there are any colleagues (PhD supervisors) that can be eligible for being members in the Commissions of the PhD thesis public defense.

University of Belgrade

Faculty of Mechanical Engineering
Dr. Aleksandar Zunjic

In its 200 year tradition, the University of Belgrade has educated more than 300,000 people. There are 31 faculties in the structure of this university. At the University of Belgrade, Faculty of Mechanical Engineering (UB-FME) European exchanges take place under the established Tempus and Socrates Programmes of the European Commission. As Faculty fully implements the European Credit Transfer System (ECTS), qualifications gained at Faculty of Mechanical Engineering are easily recognized and understood in other European countries, and vice versa. There are three levels of studies: Bachelor Studies (ECTS-180), Master Studies (ECTS-120) and Doctoral (Ph.D.) Studies (ECTS-180). BSc and MSc programs in English have been accredited with ASIIN (Akkreditierungsagentur fur Studiengange der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik e.V., Germany, http://www.asiin.de/), and also gaining EUR-ACE (European Accredited Engineering Programme, http://www.enaee.eu/eur-ace-system) label. The study program in Naval Architecture also got international verification by being accredited by RINA (The Royal Institution of Naval Architects, http://www.rina.org.uk/).

In the past period 1948-2005, at UB-FME 260 international students from 26 foreign countries received Master degree. UB-FME organizes studies in English on all levels. On studies in English, there are currently 10 international students on MSc and 30 on Ph.D. level. International students are not invited just for studying the whole prrogram in English at the Faculty, but also for the part of it. After getting international accreditation and EUR-ACE label, UB-FME is strongly offering to European students the possibility of studiyng one semestar in Belgrade, through fully recognizable ECTS system and programs internationally accredited. In accordance with the Bologna principles, students from European countries have the opportunity to spend one or more semesters at the UB-FME.

UB-FME and other participants in the Ergonomics and Human Factors Regional Educational CEEPUS Network project can achieve multiple benefits, through:

- The opportunity for students to hear lectures on ergonomic topics that interest them, by the side of the international experts in this scientific area
- Possibility to exchange knowledge and experience between international ergonomics experts, related to the education of students in the area of ergonomics
- Possibility of participation of foreign international experts in mentoring work with PhD students
- Possibility of participation of foreign international experts in the commissions for the evaluation and defense of doctoral dissertations
- Possibility to use the laboratory facilities of the greater number of foreign laboratories
- Possibility of teamwork of students from different universities in finding new solutions of modern scientific and professional problems
- Possibility of realization of practical work of students (internships) abroad
- Improvement of the foreign language through the use of professional terms
- The possibility of creating ergonomic study programs that will be common to a number of universities (colleges) in the countries participating in this project
- Creating a basis for ongoing cooperation of the entities participating in this project, which will result in continuous improvement of education in these countries especially in the field of ergonomics, as well as in the formation of quality experts who, upon completion of their studies will contribute to the development of economies in the countries where they work.

Courses of ergonomics at the UB-FME are:

- Industrial ergonomics (BSc)
- Ergonomic designing (MSc)
- Man - machine system design (MSc)
- Man - machine interface (Ph.D.)

Basic competences of Dr. Aleksandar Zunjic who is the coordinator of this project for UB-FME, Serbia:

- Full professor at the UB-FME
- Teacher of all aforementioned courses in Ergonomics at UB-FME
- President of the Ergonomics Society of Serbia
- Secretary-General of the Federation of European Ergonomics Societies (FEES)

- Member of the Board of Directors of the International Engineering and Technology Institute (IETI)
- Fellow member of IETI
- President of IETI for Belgrade branch
- Editor-in-Chief of two international journals and member of the Editorial boards of four more international journals, including one publishing house from England
- He has 6 patents, and many papers published in reputable international journals, books, monographs and conference proceedings.

Basic research areas in ergonomics at the UB-FME:

- Human - computer interaction
- Ergonomics in logistics
- Safety management
- Human information processing
- Furniture ergonomics
- Anthropometry
- Ergonomics of vehicles
- Ergonomics of products

We emphasize the possibility of the participation of experts engaged in the project in consultation work with our Ph.D. students and participation in commissions for Ph.D. thesis at UB-FME, as well as the possibility of our participation in the support of work of Ph.D. students in other countries.

University of Maribor

Faculty of Logistics
Brigita Gajšek

80% of warehouses are not yet automated. In them, most of the work is done by people. Logistics sector has up to 20% more musculoskeletal disorders than other industries. Slovenia is one of the few non-FEES (the Federation of European Ergonomics Societies) and non-IAE (International Ergonomics Association) countries with no trained ergonomists. Participation in the Ergonomics and Human Factors Regional Educational CEEPUS Network is of great importance to country and Faculty of logistics in developing an educational program, transferring good practices from more advanced countries, **so** that through logistics graduates we can influence the reduction of musculoskeletal disorders in the logistics sector.

Research activities:

- Ergonomics and teachers' competences in Slovenian education programs

- The impact of the applied technology on health and productivity in manual working systems
- Towards balanced productivity and ergonomics in the pursuit of lean warehousing and production
- Use of smart glasses in logistics
- Workplace design in the industry 4.0 era from productivity and ergonomics perspective

Educational Competency:

Brigita Gajšek is an author or co-author of several scientific papers:

- VUJICA-HERZOG, Nataša, BUCHMEISTER, Borut, BEHARIĆ, Amer, GAJŠEK, Brigita. Visual and optometric issues with smart glasses in Industry 4.0 working environment. Advances in production engineering & management, ISSN 1854-6250, Dec. 2018, vol. 13, no. 4, str. 417-428, doi: 10.14743/apem2018.4.300.
- LABUS, Nina, GAJŠEK, Brigita. Use of ergonomic principles in manual order picking systems. Logistics & sustainable transport, ISSN 2232-4968. [Spletna izd.], February 2018, vol. 9, no. 1, str. 11-22, ilustr. https://www.degruyter.com/downloadpdf/j/jlst.2018.9.issue-1/jlst-2018-0002/jlst-2018-0002.pdf,
- GAJŠEK, Brigita, VUJICA-HERZOG, Nataša, BUTLEWSKI, Marcin, ĐUKIĆ, Goran. Research opportunity : incorporation of human factors in order picking system models. Zeszyty Naukowe Politechniki Poznańskiej : Organizacja i Zarządzanie, ISSN 0239-9415. [Print ed.], 2017, no. 72, str. 45-61. http://zeszyty.fem.put.poznan.pl/numery/ZN_OiZ_PP_72_04.pdf.

She researches workplaces in intra-logistics and production through the viewpoint of productivity and ergonomics. She is lecturing subjects from intra-logistics and project management.

Faculty of logistics encourages students to study the ergonomic aspect in logistics at all university level from bachelor to PhD studies. Co-mentoring from countries that systematically develop ergonomic skills would be beneficial.

Constantine The Philosopher University in Nitra

Faculty of Natural Sciences
doc. Ing. PhD. Zoltán Balogh

The Faculty of Natural Sciences was founded in 1993 when it started its activities as an independent, research and education faculty of a university type. These activities were rooted in more than 40 years of teacher training tradition in Nitra, including the teachers for national schools.

The main task of the Faculty is to provide higher education and conduct creative scientific research in natural sciences, mathematics and informatics.

The Faculty's mission is to prepare highly qualified professionals in a wide range of accredited scientific and professional study programs on the Bachelor's, Master's and Doctoral level. The Faculty has a long tradition in teacher training in science, mathematics and informatics. In cooperation with other Faculties at Constantine the Philosopher University in Nitra, it provides the broadest range of higher education teacher training programs in Slovakia in natural sciences, mathematics and informatics in combination with subjects in the field of linguistics, art, technology, humanities and social sciences.

Higher education at the Faculty is closely tied to research, development and other creative activities of its employees and doctoral students.

The Faculty is also devoted to the promotion of natural sciences, mathematics and informatics with the emphasis on youth and the general public.

The faculty is organized into 8 departments (Department of Botany and Genetics; Department of Zoology and Anthropology; Department of Chemistry; Department of Ecology and Environmental Studies; Department of Physics; Department of Geography and Regional Development; Department of Informatics and Department of Mathematics) and Institute of Management and Information Technologies.

Several research projects of Slovak Ministry of Education were and are solved at FPV. Most of Faculty members participate regularly and actively in national and international conferences, publish papers on national and international journals and books. They are also experienced in the organization of conferences and participate in different national and international networks and groups, especially national teacher groups.

The main task of the Faculty of Natural Sciences is to provide university education and creative scientific research in the sphere of natural sciences, maths and informatics. In the frame of Department of Informatics CPU in Nitra realizes education in bachelor´s and master´s grades in the following study programmes: Applied informatics and Teaching academic subjects. The workplace disposes of up-to-date schoolrooms in order to provide sufficient hardware background for the realization of curricula. An ambition of the Department of Informatics is to offer to its student’s wide-spectrum knowledge so that the graduate was able to find his/her place in the practice in the shortest possible time after the graduation. At the same time students have chances to acquire practical experience during the study by means of professional practice, which is planned both in master´s and bachelor´s studies. Department of informatics has a fruitful and rich experience in cooperation with many companies.

The research at the Department of informatics is divided into three directions:

- Knowledge Discovery and Data Analysis Research Group
    - Web mining, especially data preparation techniques and modelling of information systems stakeholders’ behaviour depending on time,
    - Text mining and natural language processing is focused on data pre-processing techniques in natural language processing research field, especially in the automated evaluation of machine translation,

- Learning analytics and educational data mining, modelling the VLE stakeholders' behaviour, content analysis, learning analytics architecture, self-regulated learning approach.

- Modelling and Simulation in Specific Environments Research Group

  - This research field is focused on modelling and simulation of natural processes with emphasis on qualitative and quantitative analysis of static and dynamic systems and processes, design and development of new algorithms for solving the complex problem using neural networks, modelling parallel processes in operational systems, networks and educational processes using Petri nets.

  - Internet of Things (IoT) – research in the field of sensors network, design and modeling of a sensory network using various modeling tools; the need to address the following challenges: communication, time synchronization, localization, durability: energy intensity, reliability and security; hardware and software implementation of the sensory network; analysis and evaluation of output data from sensor networks; implementing artificial intelligence in IoT environments (eg Fuzzy logic, neural networks, optimization approaches such as evolutionary algorithms, etc.); optimization tasks to reduce the energy consumption of the sensor network in the context of IoT.

  - 3D printing is the next-generation engineering technology that is shaping designing and manufacturing fields for a better tomorrow. It is an efficient tool for engineers, designers, hobbyists, and researchers to give a distinct shape to their ideas. In the field of education of students, we introduce new technologies in the form of spatial 3D modelling and then we use the 3D printing to motivate students to better understand the issue. We use 3D printing in various subjects such as Cybernetics and Robotic systems. The contribution of the team is the erudition of the issue and the possibility of creating e-courses in the field of 3D modelling and 3D printing. We work with professional practice in the field of 3D printing like a Start-up company Pro Tec s.r.o.

- Theory of Computer Science Education Research Group

  - optimization of computer science education at primary and secondary schools with emphasis on learning programming languages,

  - web-based education,

  - adaptive and personalized learning.

Department of Informatics has many experiences in web based education using ICT tools for enriching teaching methods (e.g. blended learning, mobile learning, and flipped classrooms) and in the field of system engineering using hardware components and software development. The researchers involved in the proposed project work at the Department of Informatics providing education to prospective teachers of informatics as well as the professionals in the field of applied informatics. The educational research of the department is concerned mainly with the theory of teaching informatics and effective application of ICT in

education (development of educational software, e-learning with its methodology, implementation and evaluation covering all levels and forms of education. Every subject from the study program has its own e-course. The participation in the Ergonomics and Human Factors Regional Educational CEEPUS Network is an important sign that the Department is considered to be a pioneer in the field of e-learning (especially the blended learning), not only at the local level, but even from the national perspective.

III. Planned Activities

In the 2020/21 academic year, our primary goal is to start up and straighten the network and explore its potential. We want to become operational, visible, and we like to discover additional matching opportunities. We want to know each other education and research possibilities better.

We plan to make several teachers visit to provide the opportunity to

- guest lecturing MSc and PhD level,
- guest consultation BSc, MSc thesis,
- co-supervise MSc BSc thesis,
- pilot a twin thesis system (same or similar topics at several partners),
- project work for student-teams coming from different partners,
- short term student mobility and
- student mobility for a semester.

We plan two intensive courses, in Timisoara and Zagreb,

We launch the Virtual Doctoral Workshop, which will be the primary arena for continuous networking among students and faculty members of our network partners and beyond.

Dissemination actions:

- All members of the network will send and receive faculty members and students.
- We will provide information on the network on our websites in each participating language.
- We publish a paper on our activities and our goals.

Operational actions

- We are planning a coordinator meeting if we can raise additional resources.
- We have regular virtual coordinator meeting.

Each partner implements mutually determined actions. Additional partnership contributions are as follows:

Óbuda University, Budapest

We plan a coordinator meeting 2020 November, together with the CREE council meeting in Budapest. This international event will be a significant contribution to the ergonomics related campaign of the European Agency for Safety and Health at Work on behalf of the Federation of European Ergonomics Societies.

The Summer University on Ergonomics will be held on 7-9 July 2021, co-organised by the Hungarian and Austrian Ergonomics societies. As we have a leading role in the organisation, we will organise a joint doctorandus workshop here.

IMC University of Applied Sciences Krems

We want to establish Student and teacher exchange (all of our teachers are researchers also) with flexible short and long excursions.

Up to now, we haven´t planned a summer school, but we are open starting a summer school on topics like VR/AR.

Technical University of Varna

We implement mutually determined actions and work on the joint program.

University of Zagreb

We plan a PhD workshop during the 8th International Conference Ergonomics 2020, which will be in December 2020 in Zagreb.

Poznan University of Technology

We implement mutually determined actions and work on the joint program.

"POLITEHNICA" UNIVERSITY OF TIMISOARA

We plan a professional and a PhD workshop in Timisoara, during April 2021, when Timisoara will be European Capital Cultural in 2021.

University of Belgrade

Ergonomics is a system factor that affects the quality of work, quality of production and products. The International Labour Organization (ILO), Occupational Health and Safety Administration (OSHA) and other prominent international organisations have been recognised ergonomics as an essential factor in achieving all aspects mentioned above of quality. However, it is crucial to apply a multidisciplinary approach in education to improve all these aspects of quality. Having that in mind, planned activities related to this project connects with the achievement of this interdisciplinary approach, based on:

- short term and long term visits of ergonomic experts engaged in this project to UB-FME to realise presentations to students on contemporary topics in the area of ergonomics

- short term visits of expert(s) from UB-FME to other universities that are participants in this project to present novel approaches and methods in the area of ergonomics
- consultations directed to the improvement of the education process in ergonomics
- participation in the creation of standard courses in the field of ergonomics that will be applicable in part or in all of the countries that participate in this project
- receiving and sending ergonomic experts that will contribute through consultation to the realisation of high-quality PhD theses of students.

University of Maribor

In the 2020-21 academic year, teachers and Master students from the University of Maribor plan to get better acquainted with the Ergonomics and Human Factors Regional Educational CEEPUS Network. For this purpose, we schedule visits of foreign partners to the University of Maribor and visits of teachers of the University of Maribor to partners abroad. We organise appointments with lecturers, round tables and exchange of educational knowledge. We are extremely interested in foreign teaching practices and practice with membership in European and global ergonomics societies.

From foreign institutions, we expect shearing of ergonomics knowledge which we would like to combine with our expertise on logistics systems. Our expertise is in modelling, processes and technological equipment in modern logistics systems.

In this first year we would like to recognise the potential of incorporation of ergonomics topics in logistics curriculum, that would give us a starting point to engage master and PhD students in enriched study programs or to send them abroad to study ergonomics

Constantine The Philosopher University in Nitra

We implement the mutually determined actions and will provide the IT support the competency to virtual networking activities.

IV. Joint Program

Although we had some student and teacher exchanges, we start now the work on the joint postgraduate or PhD programme titled “Ergonomics and Human Factors specialisation”. We will see at the end of the first year what are the biggest challenges and where we can find a way forward.

The roadmap fro the implementation:

- 1st year Straightening the network, establishing links among partners
- 2nd year Need and legislation analysis
- 3rd year Drafting curricula and joint development a course
- 4th year Drafting a mutual inter-university agreement
- 5th year Mutual inter-university agreement and development of courses

- 6th year Establishment of the program in the designated country by the university selected.
- 7th starting the joint program, recruiting students
- 11th year first graduations

In the academic year 2020-21, we have three main goals to implement the joint program:

1. Define the reflection of ergonomics in doctoral schools at participating institutions, clarifying the feasibility of the joint program and the obstacles.

Starting with meetings in our institutions right this year, we plan a meeting between our partners by the end of February 2021 and the second meeting in our institutions by July.

2. We will frame the conceptual definition of the formal and substantive requirements for the joint program with the participation of CREE at the CREE meeting in November and June.

3. To involve other participating units, we will promote this possibility and involve network members not joining the Joint Program. We will use intensive courses and coordinator meetings for this activity.

By the end of the 2020-2021 academic year, we will compile a summary document.

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