

# Long Program Description - application for the academic year 2024/25

## Network Title: Intelligent Automation for Competitive Advantage

Network code: RS-0065-00-2425

### 1. Introduction

#### 1.1 *IntACA Network Short Description*

**The IntACA** is one of the oldest CEEPUS networks, currently involving 18 universities from 9 countries. The network aims at improving, innovating, validating and harmonizing the quality of teaching, training, and scientific and practical work with activities covering all relevant fields for Intelligent Automation and Production Management. The main expected outcomes of the network are (1) Diversifying teaching and research topics and methods, (2) Increasing research cooperation and scientific capacity of PPUs, and (3) Raising professional capabilities for Intelligent Automation and Production Management by getting properly educated young professionals.

To achieve this, PPUs will exchange their knowledge and know-how. This exchange will include the supervision of a joint doctoral thesis, student/young researcher training through workshops and summer schools, practical work, and lectures on the various subjects devoted to the multidisciplinary field of production management.

#### 1.2 *Network Background*

Since the network was established in the CEEPUS 05/06 network round the IntACA is continuing joint work with broadening the network with new PPUs: from Austria (Graz, Vienna), Poland (Krakow), North Macedonia (Skopje) and Slovakia (Kosice) in 2007, from Bosnia and Herzegovina (Zenica) in 2008 and from Hungary (Budapest) and Croatia (Slavonski Brod) in 2009; in 2011 we added a new partner from Bosnia and Herzegovina (Sarajevo); in 2012 we added two new partners from Romania (Cluj-Napoca) and Moldova (Chisinau); in 2013 we added one new partner from Austria: CAMPUS 02 - University of Applied Sciences (Graz); in 2014 we added Transilvania University of Brasov, Romania (Brasov); in 2015 we added University of Istocno Sarajevo, Faculty of Production and Management from Bosnia and Hercegovina (Trebinje); in 2016 we added University of Split, Faculty of Economics, Croatia (Split) and University of Kragujevac, Faculty of Technical Sciences, Serbia (Kragujevac); in 2018 we added two new partners: Polytechnic of Rijeka, Croatia (Rijeka) and Czestochowa University of Technology, Poland (Czestochowa); in 2019 we added one new partner: University of Kragujevac, Faculty of Engineering, Serbia (Kragujevac) and for the academic year 2023/2024 we are expanding the network with two new

partners that expressed the interest to join the network: the University of East Sarajevo, Faculty of Mechanical Engineering from Bosnia and Herzegovina (East Sarajevo) and the University "Goce Delcev", Faculty of Informatics, North Macedonia (Stip).

During these 18 years (17 active years and one year with the umbrella status), the network was expanded with many new PPUs interested in joining the network, but also some of the PPUs left the network due to their institutional transformation or the retirement of the local coordinator.

The ongoing success of this network is based on the long-term educational, scientific and personal connections, the similarities in structure and organisation, the common history, and the similar mission of the PPUs.

### **1.3 Participating Units**

The network for 2024/2025 round includes 17 participating units from 9 countries:

1. University of Novi Sad, Faculty of Technical Sciences, Department of Industrial Engineering and Management, SERBIA
2. University of Kragujevac, Faculty of Economics, SERBIA
3. University of Kragujevac, Faculty of Engineering, SERBIA
4. University of Kragujevac, Faculty of Technical Sciences Cacak, SERBIA
5. Technology, Information Technologies & Business Informatics, AUSTRIA
6. University of Sarajevo, Faculty of Mechanical Engineering, Department of Mechanical Production Engineering, BOSNIA AND HERZEGOVINA
7. University of East Sarajevo, Production and Management Faculty, BOSNIA AND HERZEGOVINA
8. University of East Sarajevo, Faculty of Mechanical Engineering, BOSNIA AND HERZEGOVINA
9. University of Split, Faculty of Economics, Business and Tourism, CROATIA
10. University of Slavonski Brod, Mechanical Engineering, CROATIA
11. Polytechnic of Rijeka, Polytechnic of Rijeka, CROATIA
12. Ss. Cyril und Methodius University in Skopje, Faculty of Mechanical Engineering -Skopje, Institute of Production Engineering, NORTH MACEDONIA
13. University "Goce Delcev" - Stip, Faculty of Informatics, NORTH MACEDONIA
14. Budapest University of Technology and Economics, Department of Networked Systems and Services, HUNGARY
15. University of Maribor, Faculty of Mechanical Engineering, SLOVENIA
16. Czestochowa University of Technology, Department of Technology and Automation, POLAND
17. Cracow University of Technology, Faculty of Mechanical Engineering, POLAND

18. Technical University in Košice, Department of Environmental Engineering,  
SLOVAKIA

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**University of Novi Sad, Faculty of Technical Sciences, Department of Industrial Engineering and Management, SERBIA** – The University of Novi Sad is the second-largest state university in Serbia, comprising 14 faculties and two research and developmental institutes. UNS is multidisciplinary, committed to excellence, producing well-qualified and competent graduates who find their place in the labour market. The Faculty of Technical Sciences is the biggest in the region, fostering the continuous development of HE, science and the economy. Moreover, the Faculty of Technical Sciences is active in international collaboration, participating in educational and research projects (ERASMUS +, HORIZON Europe, IPA, etc.). Department of Industrial Engineering and Management is one of the 13 departments on the Faculty. It consists of 4 chairs, including (1) Production system, organization and Management, (2) Information and Communication Systems, (3) Quality, effectiveness and logistics and (4) Mechatronics, Robotics and Automation. Department has 4 study programs at all three levels, including MBA studies.

[www.ftn.uns.ac.rs](http://www.ftn.uns.ac.rs)

**University of Kragujevac, Faculty of Economics, SERBIA** – The University of Kragujevac is the oldest and largest institution in Western Serbia. The contemporary centralized university was founded in 1976 and today is organized into 12 constituent faculties. The university offers 118 study programs in natural sciences, mathematics, social and human sciences, medical sciences, engineering, and arts. The Faculty of Economics is a source of knowledge, skills and competencies in the field of economics, arising from consideration of the current and future needs of Central Serbia's social and economic life. Since its establishment, the Faculty has strived to create an important position in the country and the region by educating economists and managers and encouraging the scientific work of its staff, who conducted their research projects in fundamental and applied research. The teaching process at the Faculty of Economics is performed by 80 teachers and teaching assistants who currently educate more than 3.800 students distributed across Bachelor, Master and PhD programs having all the necessary conditions to study.

[www.ekfak.kg.ac.rs](http://www.ekfak.kg.ac.rs)

**University of Kragujevac, Faculty of Engineering, SERBIA** – The University of Kragujevac is the oldest and largest institution in Western Serbia. The contemporary centralized university was founded in 1976 and today is organized into 12 constituent faculties. The university offers 118 study programs in natural sciences, mathematics, social and human sciences, medical sciences, engineering, and arts. The Faculty of Engineering comprises a group of the most distinguished and prestigious scientific-educational institutions from technical sciences. Education at the Faculty of Engineering includes a spectrum of modern and contemporary technology development by European trends, ideally placed for the practical profession and as a basis for efficient, creative work. The Faculty consists of 6 departments, including (1) the Department of Electrical Engineering, (2) the Department for Production Engineering, (3) the Department for Motor Vehicles and Motors, (4) Department for Mechanical Constructions and Mechanization, (5) Department for Energy and Process Engineering and (6) Department for Applied Mechanics and Automatic Control. The Faculty offers studies at all three levels. The role of the Faculty of Mechanical Engineering is to rationalize, test and develop innovations in the field of engineering or technical sciences, as well as to help the development of the region and more comprehensive, through scientific and technical support to qualify the leaders who will lead the progress of industry in the area and

throughout the country and young professionals able to engage in cooperation with universities in the entire world.

[www.mfkg.rs](http://www.mfkg.rs)

**University of Kragujevac, Faculty of Technical Sciences Čačak, SERBIA** – Faculty of Technical Sciences Čačak is a member of the University of Kragujevac with a mission to educate future engineers in the field of Electrical and Computer engineering, Information technology and Management, and master professors in the field of Technics and Informatics, as well as to contribute to scientific research and development of the economy by transferring the acquired knowledge. The institution's accreditation with its bachelor, integrated, master and PhD studies confirmed that the education and teaching process of the Faculty fully complies with the European education system. The teaching process at the Faculty of Technical Sciences is interactive and based on the application of professional and scientific achievements; it encourages students to be creative and apply the acquired knowledge in future tasks. The participation of the teachers and students in many national and international projects, as well as constant investments in computers, laboratories and other types of equipment, testify to the continuous process of modernization of working conditions and high quality of education and scientific research. Due to constant innovations in teaching, our engineers are prepared to solve specific problems and create technical and other innovative solutions that will improve and develop business processes. Cooperation with leading national and international companies such as Oracle, Microsoft, Intergraph, Fujitsu, and Schneider-Electric, enables our students to complete professional training programs at well-known companies and recognises our graduates for a high degree of knowledge and ability to apply modern technologies.

[www.ftn.kg.ac.rs](http://www.ftn.kg.ac.rs)

**FROMAUniversity of Sarajevo, Faculty of Mechanical Engineering, Department of Mechanical Production Engineering, BOSNIA AND HERZEGOVINA** – Faculty of Mechanical Engineering Sarajevo was founded in 1958 and for over 10 years it was the only Faculty of Mechanical Engineering in Bosnia and Herzegovina. The study at the Faculty of Mechanical Engineering Sarajevo is in line with the concept and structure of the Sarajevo University Statute, which stipulates, inter alia, the adaptation of the Bologna Process studies and the evaluation of student work through ECTS credits. At the Faculty of Mechanical Engineering, in addition to knowledge from fundamental scientific and technical disciplines, it is possible to acquire knowledge, skills and practical experience needed by mechanical engineers from various technical fields. In order to expand the wide range of disciplines, the engineering of branch engineering is aimed at the gradual introduction of specific disciplines of particular mechanical engineering specialties. The focus of the Department of Industrial Engineering and Management: Industry 4.0, digitization and smart factories (smart factory), Machine learning, artificial intelligence and their application in industry, Optimization of industrial processes, Data science and experiment design, Development of quality systems in companies, lean production and logistics, Multi-criteria decision-making and financial aspects of business in industry, Development of entrepreneurial and innovative competencies, Operational management, engineering optimization techniques and risk management, etc.

[www.maf.ues.rs.ba](http://www.maf.ues.rs.ba)

**University of East Sarajevo, Production and Management Faculty, BOSNIA AND HERZEGOVINA** - Faculty of Production and Management Trebinje was established in 1995. The teaching process is conducted in two study programs in the first and second cycles. The teaching process's contemporary theoretical and practical forms are aligned with the Bologna model and the University of East Sarajevo quality assurance system. The competence of graduates of the Faculty has been confirmed in practice in engineering, energy, Management and other fields. The Faculty has a modern research laboratory,

unique in the region. The Faculty of Production and Management Trebinje realizes intensive scientific research through national and international projects, mainly through bilateral mobility projects for teachers and students. Excellent cooperation with similar faculties in the region within the inter-university cooperation agreements has been developed.

[www.ues.rs.ba](http://www.ues.rs.ba)

**University of East Sarajevo, Faculty of Mechanical Engineering, BOSNIA AND HERZEGOVINA -** The Faculty of Mechanical Engineering is one of the two public higher education institutions in the Republic of Srpska, whose primary mission is to educate mechanical engineers. The participation of teaching staff in numerous international projects and cooperation with business entities and related institutions in the country and the region is an additional indicator of openness to the environment and commitment to improving the teaching and research process.

[www.maf.ues.rs.ba](http://www.maf.ues.rs.ba)

**University of Split, Faculty of Economics, Business and Tourism, CROATIA –** University of Split, UNIST is a comprehensive scientific and teaching institution consisting of 11 Faculties, 1 Academy of Arts and 4 Departments. There are over 550 Erasmus+ cooperation agreements and 80 bilateral agreements with universities worldwide. The Faculty of Economics, Business, and Tourism (FEBT) was established in 1975. Today, with over 2,500 students and 100 employees, FEBT is one of the largest faculties in Croatia. With its university and professional study programs, lifelong learning programs, and high-quality study conditions, the institution guarantees the education of top experts capable of quick and successful integration into the global labour market. Moreover, with the high quality of its educational programs and research and with the strengthening of partnerships with other higher education and research institutions in the country and abroad, it contributes to the transfer of knowledge, the raising of competencies and the overall economic and social development.

[www.efst.unist.hr](http://www.efst.unist.hr)

**University of Slavonski Brod, Mechanical Engineering, CROATIA -** Mechanical Engineering Faculty is a part of the University of Slavonski Brod. Faculty promotes the need for the preservation and modernisation of production resources, within which training students and staff on the principles of competitiveness, ethics and creativity is defined as the primary strategic importance. Furthermore, the development of the Faculty is directed to its profiling into a leading centre of higher education in the construction of new machinery, to development of modern structural solutions, the application of new technologies, energy and environmentally sustainable development in Eastern Croatia, both at the university and professional level.

[www.sfsb.unisb.hr](http://www.sfsb.unisb.hr)

**Polytechnic of Rijeka, Polytechnic of Rijeka, CROATIA -** Polytechnic of Rijeka is one of the largest polytechnic institutions in Croatia with departments in Rijeka, Poreč, Pazin, Pula, Otočac, Gospić and Ogulin. It was founded in 1998. The Polytechnic of Rijeka offers potential students interesting study programs at two levels of professional study programs: first (undergraduate) and second (graduate) level. All study programs have been modernized and are by the demands of the Bologna process. The Polytechnic of Rijeka is a centre of excellence in dealing with highly professional and scientific work in technical, biotechnical and social sciences, providing high-quality education services based on learning outcomes and lifelong learning. Active cooperation with the economic sector and participation in the European Higher Education Area and European Research Area will remain one of the main features of the Polytechnic of Rijeka in the future.



[www.veleri.hr](http://www.veleri.hr)

**Ss. Cyril and Methodius University in Skopje, Faculty of Mechanical Engineering - Skopje, Institute of Production Engineering, NORTH MACEDONIA** - Faculty of Mechanical Engineering was established within the Ss. Cyril and Methodius University with two divisions: Electrical Engineering and Mechanical Engineering. The faculty of Mechanical Engineering offers an educational process incorporating new trends in the European Higher Education Area as an ECTS and postulates of the Bologna Declaration. The provided study programs are to the demand of the industry sector for advanced engineering technologies and competitive economic growth of the Macedonian industry sector. The Faculty has six institutes and one department: the Institute of Production Mechanical Engineering, an Institute of Thermo technology and Termoenergetics, an Institute of Hydro technology, Pneumatics and Automatics, an Institute of Welding and Welding Constructions, an Institute of Mechanics and a Department of Mathematics and Information Technology. Since its establishment, the Faculty of Mechanical Engineering has maintained an intensive international collaboration, which has been realized through participation in joint research projects, congresses, symposia, seminars and conferences, which have been organized by international institutions and by the Faculty itself.

[www.mf.ukim.edu.mk](http://www.mf.ukim.edu.mk)

**University "Goce Delcev" - Štip, Faculty of Informatics, NORTH MACEDONIA** - The Goce Delčev University of Štip is a public university in North Macedonia. Founded in 2007, the university has 12 faculties and three academies, and it offers over 100 study programs in three cycles of studying. The Faculty of Informatics implements European development trends in scientific research and professional and educational activities. The implementation of modern trends is carried out in all areas of activity: Organization and execution of study programs, Increasing efficiency in the academic and scientific-research process, Connecting educational, scientific-research and professional activities, Building and improving the internal organization, At the same time, the Faculty actively cooperates with scientific, higher education and business partners in the country and abroad. We stand for increasing the mobility of students and teachers, rational use of human and material resources and development of scientific-teaching activities and professional work.

[www.fi.ugd.edu.mk](http://www.fi.ugd.edu.mk)

**Budapest University of Technology and Economics, Department of Networked Systems and Services, HUNGARY** - The Budapest University of Technology and Economics (BME) is a public higher education institute operating, and education, research, innovation and direct additional services are proceeded by eight faculties. The Faculty of Electrical Engineering and Informatics is BME's most prominent faculty. The Faculty is currently training in two undergraduate courses (electrical engineering, computer engineering), four master's degree programs (electrical engineering, computer engineering, health engineering, business informatics) and two doctoral schools (electrical engineering, computer science). The research activities focus on the following areas: telecommunications networks and 5G, 6G, cybersecurity, energy, robotics, industry 4.0, predictive maintenance, space technology, microelectronics, artificial intelligence, quantum computing and communications, autonomous vehicles and systems. The Department of Networked Systems and Services focuses on the key areas of networking and networked systems: analysis and design of wired and wireless networks, new network architectures and protocols, mobile communication systems and services, multimedia networking and media distribution systems and services, cryptography and network security. Additional strengths that complement the key areas include quantum computing and communications, acoustics and studio technologies, signal processing, and financial information systems.

[www.hit.bme.hu](http://www.hit.bme.hu)

**University of Maribor, Faculty of Mechanical Engineering, SLOVENIA** – The Faculty of Mechanical Engineering is one of the most successful members of the University of Maribor in terms of the number of students, their success rate, the number of graduates at both study levels, the number of finances generated from industry projects, good laboratory equipment, internationally renowned lecturers and an exceptionally well-organised international exchange and cooperation. At the moment, the Faculty educating students in undergraduate study programs in Mechanical Engineering, Engineering Management in Mechanical Engineering, Mechatronics, Environmental Engineering, Textile design technologies and Design and textile materials, as well as master study programmes in Mechanical Engineering, Engineering Management in Mechanical Engineering, Mechatronics, Environmental Engineering, Product Design and Design and textile materials.

[www.fs.um.si](http://www.fs.um.si)

**Czestochowa University of Technology, Department of Technology and Automation, POLAND** - The Częstochowa University of Technology is the largest technical university in the Częstochowa region. It occupies a permanent place on the scientific map of the country not only as an institution educating engineers but also as an important scientific and research centre cooperating with many institutions and industrial plants.

[www.pcz.pl/en/](http://www.pcz.pl/en/)

**Cracow University of Technology, Faculty of Mechanical Engineering, POLAND** - The Faculty of Mechanical Engineering is the most prominent Faculty of the Cracow University of Technology. Cooperation with many universities and scientific centres worldwide enables joint publications and research, the exchange of students and academic teachers, and the possibility of obtaining additional certificates and double diplomas. Cooperation with industry is also well-developed, and a Technology Transfer Centre is active at the university.

[www.mech.pk.edu.pl](http://www.mech.pk.edu.pl)

**Technical University in Košice, Department of Environmental Engineering, SLOVAKIA** - the Technical University of Košice is a public college covering many educational needs not just for the East Slovak region but in many fields. It is the only science, research and education centre in Slovakia and the Central European area. The Faculty of Civil Engineering of the Technical University of Košice has more than 8,000 graduates in all three levels of study who have left the gateway to various positions, such as civil engineers and designers, structural engineers, site managers, CEOs, researchers, and teaching staff. Faculty's achievements in scientific research and education have recently ranked the Faculty among the stable and progressive faculties of the Technical University of Košice, evidenced by the EUR-ACE, an international accreditation certificate according to the criteria of the European Accreditation Agencies, which guarantees that the faculty level corresponds to the European technical universities. More than 700 students are studying for bachelor, master and doctoral degrees in civil engineering and environmental engineering.

[www.svf.tuke.sk](http://www.svf.tuke.sk)

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Many topics related to Intelligent automation and Production management require an interdisciplinary approach which can only be achieved through interactions among the PPU's of the proposed network. The interdisciplinary domains are important because they operate at the borderlines between Intelligent automation and Production

management and other sciences, opening various topics with a multidisciplinary approach, such as a) Informatics, b) Management, Business and Administration, and c), d) Environmental protection, among many others.

Furthermore, fundamental Production management is taught in almost all PPU as the main and compulsory part of the existing curricula, whereas several PPUs cover Informatics, Management, Business and Administration and Environmental protection as the main and/or compulsory part of the current curricula contributing to a multidisciplinary approach, which make the foreseen cooperation particularly fruitful.

## **2. Program Description**

### ***2.1 Rational for the IntACA Network***

Manufacturing is fundamentally concerned with transforming raw materials into finished products for sale. This activity cannot be observed separately from the economic reality of wealth creation. Indeed, most governments in developed/developing countries are acutely aware that prosperity is crucially dependent on the ability of the manufacturing industry to be competitive. Since the first use of machine tools, there has been a gradual trend toward automation, that is, making machines more efficient by combining operations and by transferring more skill to the machine, thus reducing time and labor. To meet these needs, machine tools have become complex both in design and control. With the development of computers and electronic communication equipment, various technologies have evolved to improve the efficiency of manufacturing processes and systems. Automation involves automatic handling between machines and continuous automatic processing at the machines. Automation is not a new technology. The original objective was the reduction in direct labor costs. But now other reasons are more prominent (uniform quality, safety, efficiency, etc.). Industry 4.0, a new fundamental paradigm shift in industrial production, is a result of advanced digitalization within factories, combining Internet technologies and future-oriented technologies in the field of “smart” objects (machines and products). Industry 4.0 represents a smart manufacturing networking concept where machines and products interact with each other without human control. This concept does not consider fewer employees in production; on the contrary, human resources are acknowledged as the most flexible parts of the production system, being maximally adaptive to the more and more challenging work environment. Today, IntACA partners are turning to the human side of manufacturing automation, seeking an “out of the box” approach to establishing a better quality of life by applying the cyber-physical manufacturing concepts of Industry 4.0. Products currently available on the market are so complex that they are developed very often by the number of cooperating multidisciplinary design teams in different countries. Such characteristics of product development necessitate the exchange of not only



information about the products but also knowledge about the projects and particular design phases, including the specifications, design rules, and knowledge acquired during the previous projects. The knowledge is often distributed across the boundaries of the company. The complexity of products and the distribution of the design teams enforce the use of the new software tools covering more development phases.

Raising professional capabilities for Intelligent Automation and Production Management by getting properly educated young professionals is of utmost importance for advancement in this area in the region.

## ***2.2 Objectives and the Expected Outcomes of the IntACA Network***

The main objectives of IntACAnetwork are:

- To diversify teaching and research topics and methods in the field of intelligent automation and Production Management,
- To increase research cooperation and scientific capacity of PPUs, and
- To raise professional capabilities for Intelligent Automation and Production Management by getting properly educated young professionals.

The foreseen network will facilitate the exchange of learning and research experience in related fields through student and teacher mobility (helping them build personal connections and broadening their professional horizon) as well as by developing and harmonising curricula. The high professional capacity of the partner institutions will be used in the best way. The complementary effect of the experts working on the different partner faculties will provide a high standard of education in this field.

Network activities will prepare students to conduct theoretical and applied research in Intelligent automation, Intelligent enterprise, Production management and Advanced manufacturing and to encourage interdisciplinary studies covering technical, educational, economic, human, environmental and social aspects.

## ***2.3 Topics covered by the IntACA Network***

The network is focused on the following educational and research topics in the Intelligent Automation and Production Management:

- Analysis of usability of intelligent automation for Small and Medium Enterprises in Central Europe (economic, human, environmental and social aspects),
- Development of 'Lot Size 1' concepts in the field of continuous production,
- Methods for development of assembly-friendly products, o Quality assurance aspects in the case of low volume - high mix of products,

- E-manufacturing and e-business, telecommunications,
- Modelling, simulation and 3D animation of manufacturing processes and systems,
- Material flow and logistics of manufacturing systems, ○ Robotics, mechatronics, ○ Technology decision support systems and definition of organizational readiness,
- Job design and work organization,
- Scheduling and planning of manufacturing systems,
- Optimization of process' parameters, ○ Information technology of Intelligent Manufacturing Systems, ○ Analytical tools for solving quantitative problems in manufacturing,
- Human and social aspects of automated manufacturing, ○ Knowledge management, ○ Agile methods in production,
- Innovation Project Management,
- Environment-friendly technologies and automation,
- Costs calculation of manufacturing processes for Central European conditions,
- Operations risk management,
- Lean Management, ○ Implementation of product development projects in geographically distributed environments with the use of PLM/PDM software (Product Lifecycle Management / Product Data Management),
- Positioning man as the crucial "player" and his (her) wealth as the crucial "goal",
- Industry 4.0, and
- Servitization in manufacturing.

The topics are interdisciplinary and specific; special attention will be given to teamwork, direct communications among partners and continuity of the research. Each partner has particular expertise in different educational and research areas. Through the IntACA network, students and teaching staff will have the opportunity to gain a truly multidisciplinary approach.

## ***2.4 Planned Activities with the Selection Criteria***

To achieve the network's main objectives, we plan the following activities:

Main activities:

### **1. Student Mobility**

PPU can recruit students through mobility calls permanently available at the official websites of the PPUs (Faculty or University website), through direct consultations with students or dissemination events organized by the network local coordinators.

Student mobility (for students who have completed at least two semesters at their home institution. Scholarships are awarded for at least three months) can be used by applicants who fulfil the following criteria:

- to be a regular student of the home university;
- have completed at least two semesters;
- prove knowledge in English (or knowledge of the language of the host country where the student is going);
- to have a plan of activities during the stay at the host PPU;
- to contact professors from the host PPU in advance;
- the compatibility of study programs or the possibility of carrying out a research plan; and
- motivation.

Short-term mobility (for PhD students, six days to 3 months) can be used by applicants who fulfil the following criteria:

- enrolled on a PhD program at their home university;
- prove knowledge in English (or knowledge of the language of the host country where the student is going);
- to have a plan of activities during the stay at the host PPU;
- to contact professors from the host PPU in advance;
- the possibility of carrying out a research plan; and
- motivation.

For the group of students from Croatia, Bosnia and Herzegovina, Serbia, and North Macedonia, it is possible to follow the lectures and do practical work in any of the national languages within the mentioned cluster.

All partners use the ECTS credit system. The network's policy is that every student's activity should result in ECTS awarded and that the student's home institution would recognize these ECTS. Students are advised to consult with the ECTS coordinator before planning the courses she/he will enroll at the host university. If a student's mobility is focused on laboratory work, a minimum of 3 credits for the first month and 4 credits/month for further stay is expected to be awarded. Undergraduate thesis work) should be awarded by ECTS, too. In addition, participation in the summer school will also be awarded ECTS and partners will be advised to recognize these credits according to their curricula.

## **2. Teacher Mobility**

Teacher mobilities are intended for teaching staff who will teach/mentor at the host institution. In accordance with the CEEPUS III Work Programme, the condition for approving this type of mobility is six hours of teaching/mentoring per week. The

minimum duration of this type of mobility is five days or three days in case of short group mobility.

Teacher mobilities can be used by applicants who have the following:

- A completed PhD;
- A working contract with the home university at the time of the mobility;
- Adequate teaching plan/ supervision assignment (minimum 6 hours per week);
- Knowledge of the English language; and
- Interests in the educational/research fields covered by the network.

The lectures are given in English. Therefore, for students from Croatia, Bosnia and Herzegovina, Serbia, and North Macedonia, there is no problem following the courses and exercises in any of the national languages within the mentioned cluster.

### **3. Joint Supervision**

The IntACA Joint Supervision activities aim to promote PhD student and supervisor mobility, organization of PhD defence joint committees, and improvement of educational and research cooperation between western Balkans countries and Europe. Moreover, the joint activity aims to build up international dissertations and promote joint research among network PPUs.

The IntACA Joint Supervision foreseen the following main activities within the joint supervision by two supervisors and candidates: theses supervision and mentoring while implementing various research methods, collecting data, working on data interpretation, preparing joint scientific manuscripts, and structuring the theses.

The IntACA Joint Supervision program includes 3 participating units, covering 3 CEEPUS countries.

Altogether two joint programs are planned as co-tutelle joint supervision of PhD students within the network with the participation of 3 different partners in different pair combinations:

- the University of Novi Sad, Faculty of Technical Sciences - the University of Maribor, Faculty of Mechanical Engineering, and
- the University of East Sarajevo, Production and Management Faculty - the University of Novi Sad, Faculty of Technical Sciences.

### **4. Summer school for undergraduate and PhD students**

Undergraduate and PhD Students will be welcomed to participate in the IntACA Summer School organized by the PPU - University of East Sarajevo, Production and

Management Faculty with the participation of other network partners. Altogether 10 - 20 student participants will attend interactive classes covering different aspects of intelligent automation and production management. The summer school will cover domain knowledge but also the cultural aspects. The participants will visit educational institutions, research facilities, and cultural institutions and learn about the partner's culture in a way determined by the host PPU. At the end of the exchange trip, students will write a report in the appropriate language with their reflections.

During the International Summer School, students will focus on practices demonstrating the value of creative and innovative thinking and innovation and entrepreneurial behaviour.

Undergraduate and PhD students interested in presenting their research will submit a brief statement of interest containing the following:

- name,
- affiliation,
- educational background, and
- motivation to participate.

#### Review Criteria

- educational background fit with IntACA network fields of interest, and
- clear motivation.

### **5. Doctoral workshop for PhD students**

PhD students will be welcomed to participate in the Doctoral Workshop organized by the PPU - the University of Maribor, Faculty of Mechanical Engineering.

The workshop aims to help PhD student/teaching assistants develop and improve their research and build an international network of fellow PhD students and world-renowned faculty. The IntACA Doctoral Workshop is targeted at PhD students covering IntACA network fields of interest with their research.

Participating students will have the opportunity to present their research, which their colleagues and senior faculty will discuss. During the workshop, they will also benefit from talks related to methods, career development, and the publication process. At a 'Meet the editors' session, journal editors (International Journal of Simulation Modeling (IJSIMM) & Advances in Production Engineering and Management (APEM), both with The Web of Science Impact Factor) will present their ideas on how to be successful in the publication process.

PhD students interested in presenting their research will submit a brief statement of interest containing the following:



- name;
- affiliation;
- name(s) of supervisor(s);
- project title;
- brief project description; and
- an indication of where they currently are in the process of completing their doctorate.

A full research proposal or a paper that is part of the PhD dissertation and a letter of recommendation from the PhD supervisor should also be submitted. The full research proposal/paper will be reviewed, and the number of accepted proposals for the presentations will be limited to 20.

#### Review Criteria

- Topical fit with IntACA network fields of interest;
- Clarity of research purpose (relevance, objectives, and research questions);
- Review of relevant literature;
- Thoughtful discussion of research methods; and
- Stage of the research.

#### Other planned activities:

- Cooperation aimed at joint research and scientific publications;
- Cooperation aimed at preparing joint educational and research project proposals; and
- Dissemination of network activities among students and teachers.

### **2.5 Forms of Instructions**

To fulfil the objective of the network and perform the projected activities, we plan the following forms of instructions for students:

- Practical work activities;
- Lectures based on the problem-solving methods of teaching;
- Participation in virtual synchronous activities (online lectures, assistance with their thesis or dissertation, etc.);
- Supervision on master's and/or doctoral thesis.

To fulfil the objective of the network and perform the projected activities, we plan the following forms of instructions for teachers:

- Lectures/seminars;
- Participate in virtual synchronous activities (delivery of online lectures/seminars);

- Bilateral meetings aimed at discussing network development, joint activities, projects, etc.

### **3. Results and achievements of the IntACA Network (Oct. 2005 - Dec. 2021)**

Selected achievements briefly mentioned here:

1. During the 2005 - 2023 period, more than 300 papers were published in different conference proceedings (TMT, DAAAM, EurOMA, IS, Trend, ICPR, AMP, APMS, etc.), and about 130 papers in established international scientific journals. We also published 45 chapters in edited books and 20 scientific monographs.
2. The Deans of the Faculty of Technical Sciences Novi Sad and Faculty of Mechanical Engineering Maribor signed a draft version of CONVENTION FOR THE JOINT SUPERVISION OF THESIS (CONVENTION DE COTUTELLE DE THESE) in the frame of CEEPUS II IntACA network activities.
3. Faculty of Technical Sciences, Department of Industrial Engineering and Management accepted the proposal for joint curriculum development for the course Working Process Simulation (5th year of study program in Novi Sad) on the experiences of the same field from the University of Maribor.
4. The University of Maribor and the University of Novi Sad jointly implemented the "European Manufacturing Survey" research project for 2015, 2018, 2022. And they continue to cooperate in the next round – 2025.
5. Curriculum development for the course Strategic Project Management within the study program of Industrial Engineering at the Faculty of Technical Sciences (University of Novi Sad).
6. Finished election procedure of eight Professors from the University of Maribor at the University of Novi Sad.
7. Collaboration in organizing international scientific conferences MOTSP 2009, TREND 2013-2021, APMS 2020, IS 2023.
8. Improved popularity of the CEEPUS program and Danube region among students who want to add new cultural and academic value to their personal development.
9. Conducted research on around 500 projects in Slovenia, North Macedonia, Bosnia and Herzegovina, Croatia and Serbia within PhD dissertation.
10. Redesigned Industrial Engineering & Management curriculum at partner institutions.
11. Initiated scientific project 2011-2020 with international participants: Software development for the management of refit activities and assembly of braking systems of railway vehicles (awarded by Ministry of Science and Technology, Serbia).
12. Joint publication of the scientific book "Engineering Management - Challenges for the future".

13. In 2017, IntACA was recognized as a tool for the "17+1" mechanism, One Belt One Road, led by the People's Republic of China. As a result, Serbian Partner became a coordinator for the years 2018 and 2019. This is achieved as a result of this network.

#### 4. Conclusion

Seventeen successful years of CEEPUS-supported networking are behind us, plus one year with the umbrella status, and the 19th year is in front of us. We are on the excellent road in the CEEPUS III direction to create a significant move towards the increased performance of our academic institutions. From the beginning, network growth was intensive. A dynamic multilateral exchange helps with the harmonization of curricula and the organization of common courses and seminars. Connected with contracts, joint paper publishing, exchanging of students and mobility of teachers, we created a new dimension of partnership-based scientific work and student education. This dimension is flavoured with all diversities from all partners. But our strategy is unique: To gain our network and use it for students' and teachers' academic improvement.

During these 19 years, we have shown promising results by publishing papers, exchanging students, and working on multilateral projects, and we will continue this in the 20th year. We presented the results of CEEPUS-supported activities at all partner Conferences (MOTSP, TREND, IS, DAAAM, TMT, ICPR, AMP, APMS, etc.). The orientation of the network towards the technical field of study and research indicates the highest national value for all network partner countries. We create new value in professional and educational development by broadening the the scope of activities with technology transfer and innovation. In the frame of global crises, the IntACA network would like to contribute by promoting cost-cutting policy and implementing Internet-enabled communication tools. IntACA network will foster student involvement in research at all partner universities because it showed excellent results in recent years when more than 40 diploma works and master and doctoral theses were supervised, supported or guided in an international CEEPUS manner. With the man in the focus of our progress, we declare that IntACA will be the fruitful base for all members and other supporters in creating a better quality of life.