



ŽILINSKÁ UNIVERZITA V ŽILINE

Fakulta riadenia
a informatiky

Annual Report 2022

CONTENTS

1. GENERAL INFORMATION	3
1.1 Faculty address	3
1.2 Academic Officers of the Faculty	3
1.3 Overview of the most important faculty events in 2022	5
1.4 Faculty Profile and Structure	28
1.5 Faculty staff structure	32
2. EDUCATIONAL ACTIVITY	34
2.1 Overview of accredited study programmes as of 31.12.2022	35
2.2 Student numbers	36
2.3 Evolution of the number of students at the faculty over the period under review	37
2.4 Innovation in education	41
2.5 Admission procedure	51
2.6 Statistical overview of the admission procedure	53
2.7 Graduates and their employment	57
2.8 Information on theses	64
2.9 Commented student achievements	64
2.10 Student support	69
3. SCIENTIFIC RESEARCH ACTIVITIES	72
3.1 Research focus	72
3.2 Solved research tasks - domestic and foreign grants	73
3.3 International research project proposals submitted in the year/evaluation result	76
3.4 Outputs from solved research tasks - publications	77
3.5 Research for practice, the most important outputs implemented	79
3.6 Published journals	81
3.7 Scientific and professional events organised	82
3.8 Habilitation and Appointment of Professors	83
4. INTERNATIONAL COOPERATION	84
4.1 Contractual cooperation	84

4.2 Student mobility programmes	87
4.3 Staff mobility programmes	91
4.4 Foreign education and other (non-research) programmes and projects	93
4.5 Membership of faculty, departments and individuals in international organizations	98
5. DEVELOPMENT PLANS FOR 2023 IN INDIVIDUAL AREAS	102
5.1 Education	102
5.2 Research area	104
5.3 Area of international cooperation	107
5.4 Management and organisation	107

1 General information

The Faculty of Management Science and Informatics (FRI) of the University of Žilina is an established faculty recognized both at home and abroad. This is evidenced by independent evaluations as well as the interest of students, employers and partners. The Faculty's distinctiveness lies above all in the combination of study programmes that offer cutting-edge education in the fields of computer science, computer engineering and management in one place. The combination of the above-mentioned areas of education and research, supported by dedicated and competent experts, creates the prerequisites that ensure the sustainable success of the faculty.

1.1 Faculty address

Žilinská univerzita v Žiline
Fakulta riadenia a informatiky
Univerzitná 8215/1
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1.2 Academic functionaries of the faculty

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Ing. Marta Rešetková, PhD.

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Academic Senate of the Faculty:

The Chair: Ing. Michal Varga, PhD.

Secretary: Ing. Veronika Olešnaníková, PhD.

Members:

Staff part of AS FRI:

Ing. Marek Moravčík, PhD.

doc. RNDr. Katarína Bachratá, PhD.

RNDr. Hynek Bachratý, PhD.

Ing. Juraj Dubovec, PhD.

Ing. Tomáš Majer, PhD.

Ing. Veronika Olešnaníková, PhD.

Ing. Lucia Pančíková, PhD.

Ing. Mária Prikrylová

doc. Ing. Pavel Segeč, PhD.

doc. Ing. Peter Ševčík, PhD.

Ing. Peter Tarábek, PhD.

Mgr. Jana Uramová, PhD.

Ing. Michal Varga, PhD.

Ing. Monika Václavková, PhD.

Student part of AS FRI:

Bc. Juraj Dobrovič

Andrej Vrábek

Ing. Pavol Boško

Daniela Marušincová

Ing. Marián Šotek (predseda)

Ing. Michal Mulík

Peter Kolok

Scientific Council:

The Chair: prof. Ing. Emil Kršák, PhD.

Members:

prof. Ing. Miloš Poliak, PhD.

prof. Ing. Alžbeta Kucharčíková, PhD.

prof. Ing. Ivan Brezina, PhD.

doc. Ing. Pavel Čičák, PhD.

prof. Ing. Pavol Špánik, PhD.

doc. Ing. Mária Ďurišová, PhD.

prof. Mgr. Ivan Cimrák, Dr.

doc. Ing. Ondrej Karpiš, PhD.

prof. RNDr. Jaroslav Janáček, CSc.

prof. Ing. Ľudmila Jánošíková, PhD.

prof. Ing. Martin Klimo, PhD.

doc. Ing. Michal Koháni, PhD.

doc. Ing. Viliam Lendel, PhD.

prof. Ing. Vitaly Levashenko, PhD.

prof. Ing. Karol Matiaško, PhD.

doc. Ing. Peter Márton, PhD.

prof. Ing. Ivan Kotuliak, PhD.

prof. Ing. Jaroslav Porubän, PhD.

prof. Ing. Jozef Ristvej, PhD.

doc. Ing. Pavel Segeč, PhD.

doc. Ing. Peter Ševčík, PhD.

prof. Ing. Karel Šotek, CSc.

prof. Ing. Milan Kubina, PhD.

prof. Ing. Liberios Vokorokos, PhD.

doc. Ing. et Ing. Renáta Myšková, Ph.D.

doc. RNDr. Ing. Marcel Jiřina, Ph.D

1.3 Overview of the most important events at the Faculty in 2022

At the ceremonial meeting of the Dean's Collegium of the FRI UNIZA, which took place on 28 February 2022, the Rector of UNIZA, prof. Ing. Jozef Jandaček, PhD., **inaugurated the Dean of the Faculty of Management Science and Informatics of UNIZA doc. Ing. Emil Kršák, PhD.** for the term of office from 1.4.2022 to 31.3.2026.



Fig. 1 Inauguration of the Dean of the FRI UNIZA

On 12-14 October 2022, **GRIFO 2022** took place in Prague - a traditional meeting of the faculties of informatics of technical colleges and universities in the Czech Republic and the Slovak Republic, which was also attended by the management of the Faculty of Management Science and Informatics of UNIZA. It was hosted by the Faculty of Information Technology of the Czech Technical University in Prague. In the individual sections (Deans; Studies; Science, Research and Cooperation with Industry; Foreign Relations, Strategy and Development; Secretaries), the representatives of the faculties exchanged good practices implemented at the faculties and agreed to deepen mutual cooperation in the fields of education, science and research.



Fig. 2 Delegation of FRI UNIZA at the meeting of the faculties of computer science of technical colleges and universities in the Czech Republic and Slovakia

The largest neutral peering node in the Czech Republic, NIX.CZ, which also operates the Slovak peering node NIX.SK, has established cooperation with the Faculty of Management Science and Informatics of the University of Žilina in Žilina. The first step of closer cooperation between the two institutions was the handover of unused Nexus 7010 switches for the needs of practical teaching.



Fig. 3 Handover of Nexus 7010 switches for practical training

On the basis of the decision of the UNIZA Scientific Council of 25 November 2021, the Rector of UNIZA awarded the **honorary title "Professor Emeritus"** to two of our colleagues. The laureates were **prof. Ing. Martin Klimo, PhD.** and **prof. RNDr. Jaroslav Janáček, CSc.**



Fig. 4 Laureates of the honorary title "Professor Emeritus" (left Prof. Klimo, right Prof. Janáček)

The faculty hosted the ninth and tenth edition of the **IT Marketplace** event (April 28, May 5 and November 29, 2022). The event creates an exceptional space for meeting quality IT students with quality IT companies not only from the Žilina region, but also from all over Slovakia. The aim of the event is to enable prospective young people who see their future in IT, to meet companies' representatives who are interested in expanding their teams with smart people. A record number of companies (18) participated in the tenth edition of the event.

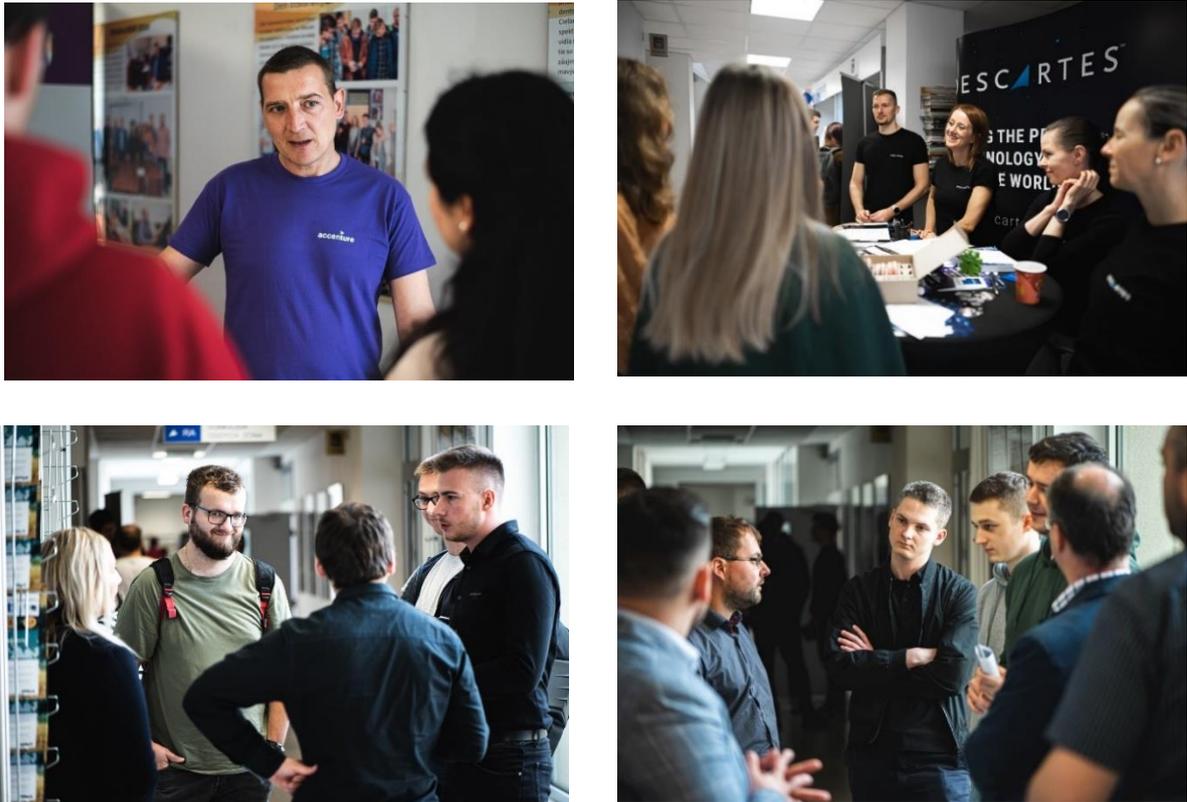


Fig. 5 Successful realization of the ninth and tenth edition of the IT Marketplace event

During the year 2022, two interesting reports were broadcasted in the programme called VAT on RTVS. Our colleagues presented their research, which they are doing at the faculty together with their colleagues:

- **Neural Networks (VAT) - prof. Mgr. Ivan Cimrak, Dr.:** a report on the use of neural networks in the diagnosis of cancer and setting the right treatment.
- **Informatics in Railway Transport Management (VAT) - prof. Ing. Emil Krak, PhD.:** a report on the use of informatics in railway transport management and on successful cooperation with an industrial partner in the development of information systems for railway transport management.



YouTube



YouTube



Fig. 6 Presentation of the research carried out at FRI UNIZA in the VAT session

Graduates of the Faculty of Management Science and Informatics of UNIZA have been highly demanded on the job market in a long term. This has been presented by the ranking of faculties according to the demand of companies for graduates in 2022, which is regularly published by profesia.sk. **Our faculty ranked 3rd out of all 117 faculties in Slovakia in terms of interest in graduates. We are the only non-Bratislava faculty in the TOP 5.** At the same time, we are proud to have the annual increase of smart high school students interested in studying at our faculty.

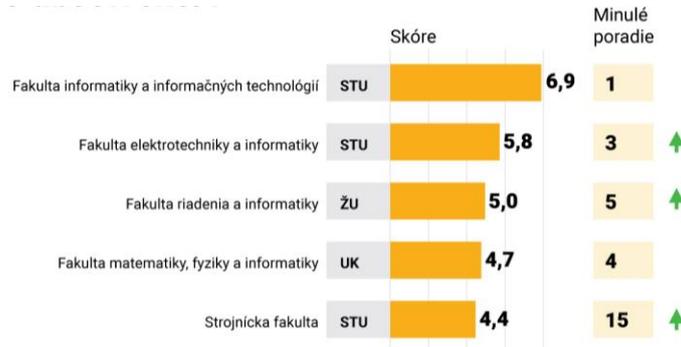


Fig. 7 Ranking of faculties according to companies' interest in graduates in 2022 (source: profesia.sk)

On 20 April 2022, the **ADOIT certificate giving out ceremony** took place. ADOIT is a tool from BOC Group supporting the alignment and improvement of business goals and strategy with IT. The platform enables to manage and analyze the dependencies between enterprise assets, analyze, plan, manage and implement enterprise IT architecture.



Fig. 8 ADOIT certificate giving out ceremony

Students of the Faculty of Management Science and Informatics of UNIZA (**Martin Šponiar, Martin Androvič, Filip Perďoch and Juraj Hofer**) received **Fortinet Network Security Expert 4 (NSE 4) industry certificates** worth 400 USD. Thanks to the cooperation with Fortinet, an international company that develops software and devices for cybersecurity, our students have the opportunity to obtain this prestigious certificate for free within the course **Network Security with Fortinet Devices**, in which they can prepare for certification.



Fig. 9 Fortinet Network Security Expert 4 certificate giving out ceremony

In 2022, the Faculty of Management Science and Informatics of UNIZA also offered the attractive **webinars - popularization lectures and workshops for primary and secondary school teachers** within the national project IT Academy. During 2022, secondary school teachers had a unique opportunity to participate in webinars organized by our colleagues from the Faculty of Management Science and Informatics of UNIZA within the framework of the national project IT Academy. The portfolio of webinar topics was really rich (Table 1).

There was a great interest from secondary school teachers and both beginners and experienced teachers found the topics interesting for them. FRI UNIZA finds the cooperation with secondary school teachers very important.

Table 1

Popularization lectures and workshops for primary and secondary school teachers - webinars		
Title of the webinar	Lecturer's name	Number of teachers
<i>Creating Presentations and Mind Maps</i>	doc. Ing. Viliam Lendel, PhD.	28
<i>Experiential Learning I - Working in a Team</i>	doc. Ing. Viliam Lendel, PhD.	22
<i>Experiential Learning II - Assertiveness and Negotiation</i>	doc. Ing. Viliam Lendel, PhD.	21
<i>Webinar with topics for continuation, covering all topics of the Cisco CCNA3 course of the latest version of the study materials 7.0 - ENSA-Enterprise Networking, Security, and Automation.</i>	Mgr. Jana Uramová, PhD. Ing. Marek Moravčík, PhD. Ing. Martin Kontšek, PhD. doc. Ing. Pavel Segeč, PhD.	3
<i>Network Security Concepts, Traffic Control Using Access Control lists, ACLs, configuration. (ENSA_03 Network Security Concepts; ENSA_04 ACL Concepts; ENSA_05 ACLs for IPv4 Configuration)</i>	Mgr. Jana Uramová, PhD.	2
<i>Current Trends In Networking - Network Programming And Network Automation. (ENSA_13 Network Virtualization; ENSA_14 Network Automation)</i>	Ing. Martin Kontšek, PhD.	1
<i>Creating Web Applications - PHP Language, Basics</i>	doc. Ing. Patrik Hrkút PhD.	16

<i>Creating Web Applications - PHP Language, Working With Database</i>	doc. Ing. Patrik Hrkút PhD.	15
<i>Web Application Development - OOP</i>	doc. Ing. Patrik Hrkút PhD.	8
<i>Creating Web Applications - AJAX Technology</i>	doc. Ing. Patrik Hrkút PhD.	8
<i>Creating Web Applications - frameworks</i>	doc. Ing. Patrik Hrkút PhD.	10
<i>3D Printing - online and in person</i>	Ing. Lukáš Čechovič, PhD.	22
<i>Information Security</i>	Ing. Peter Jankovič, PhD.	6
<i>Computer Simulation</i>	Ing. Peter Jankovič, PhD.	2
Total		164

In 2022, FRI UNIZA continued to offer **accredited training courses for secondary school teachers within the IT Academy project**. Two courses were opened, namely the *Internet of Things* course and the course *Programming of Microprocessor-Based Systems at secondary schools*. 12 secondary school teachers from all over Slovakia took the opportunity to participate. The lectures were given by the colleagues from the Department of Technical Cybernetics.

Table 2

Accredited training courses for secondary school teachers within the IT Academy project		
Course name	Lecturer's name	Number of teachers
<i>Internet of Things</i>	doc. Ing. Peter Ševčík, PhD. Ing. Michal Hodoň, PhD.	9
<i>Programming of Microprocessor-Based Systems at secondary schools</i>	doc. Ing. Peter Ševčík, PhD. Ing. Michal Hodoň, PhD.	3
Total		12

As part of the national IT Academy project, students had the **opportunity to obtain a free internationally recognised ECDL certificate** (worth EUR 100). The certificate confirms knowledge in areas such as Microsoft Windows, Word, Excel, Powerpoint and others. In 2022, 66 students took advantage of this opportunity. The ECDL courses were provided by the Department of Information Networks, namely by colleagues *Ing. Marek Moravčík, PhD. and Ing. Martin Kontšek, PhD.*

At the end of March, we had a Faculty Cleanup called **Spring Cleaning**. Together we managed to clean up the area in the outdoor staging area where the **FRI reading room with hammocks** will be built. More than 150 students participated in the faculty cleanup.





Fig. 10 Faculty Cleanup - Spring Cleaning

At the festive assembly on the occasion of Teachers' Day, our colleagues **Prof. Ing. Štefan Hittmár, PhD. DBA** and **Ing. Josef Kopecký** were awarded the **J. A. Comenius Award**, which was presented to them by the Dean of the Faculty.



Fig. 11 Teachers' Day Ceremonial Assembly

On 24.8.2022 at FRI UNIZA **MSc. Luca Lena Jansen** successfully defended her dissertation thesis. As a PhD student of the study programme Intelligent Information Systems she **is the first doctoral student within the partnership (Collaborative Doctoral Partnership Agreement No. 35372) between the University of Žilina and the Joint Research Centre of the European Commission (JRC)**. Within this partnership, doctoral students can spend 1-2 years of their doctoral studies abroad at one of the JRC sites, thus gaining valuable experience in research work abroad. Under the guidance of the supervisor prof. Ing. Ľuboš Buzna, PhD. (FRI UNIZA), supervisor of the specialist prof. Ing. Petr Bracíník, PhD. (UNIZA) and tutor Dr. Gianlucca Fulli (JRC Ispra, Italy), the PhD student worked on the topic **Assessment of Innovative Solutions for the European Electricity Market**.



Fig. 12 Successful MSc. Luca Lena Jansen with the Vice Dean for Science and Research

In May, the **most popular faculty event FRIfest** took place after a three-year break. With this event we opened the summer exam period. Great live music, tasty grilled specialties, cold beer/coffee, interesting competitions and informal conversations between students and teachers, faculty alumni, IT company representatives contributed to the record participation.



Fig. 13 Faculty event FRIfest 2022

In May the **most popular sports competition of FRI students = RUN DE JEAN DE MIJON** took place after almost a three-year break. The conditions for the run were excellent, the stations were properly scrambled, the beer regime provided and the tasks tested the knowledge of the participants. Congratulations to the winning team and to the other teams on a great participation and successful run to the finish. A big thank you to all the organisers and volunteers on the various stations.



Fig. 14 RUN Jean de Mijon 2022

The student celebration called **Fričkovica** was held on October 5, 2022 on the grassy area behind the faculty near the Forest Park. This is an event that traditionally kicks off the winter semester. The warm sunny autumn weather contributed to a record attendance of both students (almost 1500) and IT companies. The event was attended by representatives of five partner IT companies: *Siemens*, *Siemens Heathineers*, *Scheidt&Bachmann Slovakia*, *Kros* and *Brain:IT*, who besides their presence brought various attractions and interesting competitions for valuable prizes.



Fig. 15 Great ambience at the FRIČKOVICA event

In June, the Faculty of Management Science and Informatics of UNIZA had the **state examinations in face to face form** after three years of Covid restrictions. Successful graduates joined in celebrating the **state exam traditions at our faculty**: *they decorated the historical beam of our great Jean de Mijón with flowers, they rang the faculty bell loudly, they signed a roll-up banner with their fresh Bachelor / Master signature in exchange for a somfri (I am free) badge, they took a photo with classmates to keep as a memory.*



Fig. 16 State Exams traditions at FRI UNIZA

On 28th and 29th June **the Bachelor's and Master's Graduation Ceremony** took place at the Municipal Office Hall in Žilina. We are very proud of our graduates, who mastered all the challenges during their hard studies and became successful graduates of the Faculty of Management Science and Informatics of UNIZA. 129 students have successfully completed their master's study programmes and 151 students have successfully completed their bachelor's study programmes.



Fig. 17 Bachelor's and Master's Graduation Ceremony

On 22 April 2022, the **regional tournament of the FIRST LEGO League robotics competition** took place at the Faculty of Management Science and Informatics of UNIZA. It is the largest robotics competition for primary and secondary school pupils aged 9 to 16 years, whose main goal is to promote

STEM education. 14 teams consisting of approximately 100 pupils from Žilina, Martin, Bratislava, Ružomberok, Púchov, Dubnica nad Váhom, Dolný Kubín and Horné Slnovo took part in the competition.



Fig. 18 Regional tournament First Lego League at FRI UNIZA

On 30 September 2022, the **European Researchers' Night** was traditionally held with the participation of the Faculty of Management Science and Informatics of UNIZA. Our colleagues from FriDLab showed the participants how to print quickly on Voron community 3D printers, and colleagues who organize the annual First Lego League (FLL) regional robotics tournament at the Faculty introduced this global robotics competition to the general public, including opportunities to participate.



Fig. 19 European Researchers' Night

FRI UNIZA participated in the summer camp called **Automotive Junior Academy 2022** organized by **KIA Slovakia Foundation**. The colleagues from the Department of Technical Cybernetics welcomed at the faculty 29 participants, and together they assembled a robotic car. Then they paired it with an app on their phone and were able to control it.



Fig. 20 Automotive Junior Academy 2022

During two weeks in June, **18 clever pupils of the Secondary Technical School of Industry Martin** carried out **professional practice** at the Faculty of Management Science and Informatics of UNIZA. Our colleagues prepared for them interesting jobs like 3D printing, 3D modelling, maintenance of network laboratories and updating of support tools for teaching network subjects, programming of electronic system in Micropython, Internet of Things, maintenance of network laboratories and faculty server rooms.



Fig. 21 Pupils of the Technical High School in Martin on their professional practice at FRI UNIZA

In July, the **Žilina Children's University Camp** took place. We were very glad that we could contribute to its successful realization. The workshop of our colleagues *Michal Hodon* and *Miroslav Chochul* from the Department of Technical Cybernetics entitled **Disarm a booby-trapped device with your knowledge** (especially mathematical) was very interesting for the children.



Fig. 22 FRI workshop at Žilina Children's University

In October, colleagues from the Department of Technical Cybernetics and FriDLab took part in the **Trenčín Robotics Day** event. They introduced participants to fast "filament" FFF 3D printers, community 3D printers and their projects aimed at reducing the working time of 3D printers.

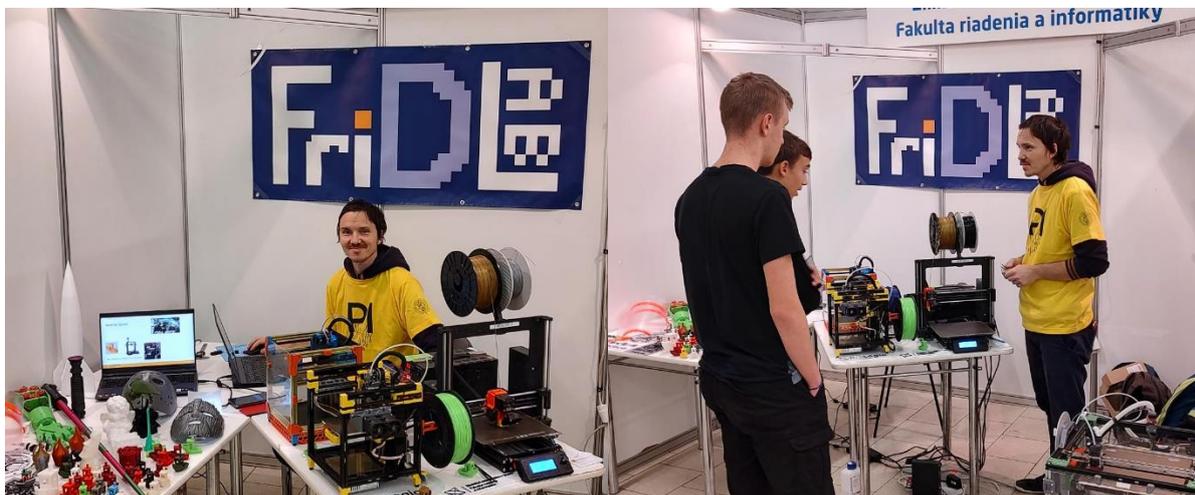


Fig. 23 FRI UNIZA at the Trenčín Robotics Day

Colleagues from the Department of Technical Cybernetics and from our 3D Printing Centre in July (6 - 8 July 2022) organized a **training for teachers of the Secondary Industrial School of Information Technologies in Kysucké Nové Mesto in the field of 3D printing**, as from 2022 they launched a new course 3D Technologies in the field of Intelligent Technologies.

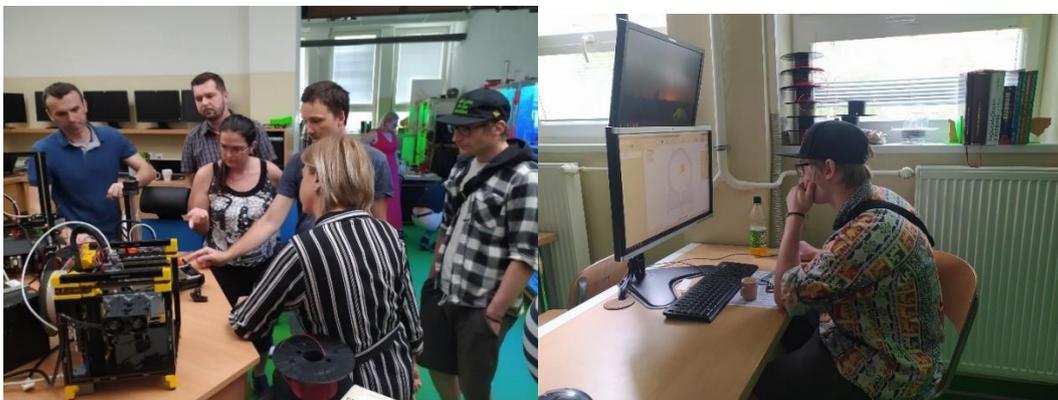


Fig. 24 Training for teachers of the SPŠ IT in KNM

On 17th February **FRI UNIZA organized the Open Day** which was held **online**. A rich programme was prepared for secondary school students, including a main presentation about the study opportunities at FRI UNIZA and interesting online webinars, where participants could work on interesting and practical tasks in the field of IT and Management.

In November, our colleagues at the Faculty of Management Science and Informatics of UNIZA organized **traditional preparatory meetings for the Olympiads in Mathematics and Informatics**. During the sessions, they discussed with the secondary-school students the problems of the local round in category A, they solved some tutorial problems and also shared some tricks that could be helpful while solving the Olympiad tasks.



Fig. 25 Traditional preparatory meetings for Mathematics and Informatics Olympiads at FRI UNIZA

Also in 2022, the Faculty of Management Science and Informatics of UNIZA continued to build and develop relationships with our business partners. In January, a **Memorandum of Cooperation** was signed **with a long-standing partner of the faculty - the company IPESOFT** which expanded the list of authorities from the practice. They help the faculty to improve the quality of its study programmes.



Fig. 26 Signing of the Memorandum of Cooperation (for Ipesoft - CEO Ing. Florián Kevický)

On 15 December, the Faculty of Management Science and Informatics of UNIZA signed a **Memorandum of Cooperation with the company Stredoslovenská distribučná**. The main area of cooperation will be data analytics. The cooperation will bring great opportunities for students such as

lectures from business partners, participating in the project teaching, tutoring in the thesis and internships.



Fig. 27 Signing of the Memorandum of Cooperation with Stredoslovenská distribučná

The management of the Faculty of Management Science and Informatics of UNIZA **condemned the aggression and violation of the territorial integrity of Ukraine** and joined the calls for the cessation of the military conflict and peaceful resolution of the situation. There are a number of Ukrainian students studying at the Faculty of Management Science and Informatics, to whom our support and solidarity has been expressed. In 2022, they were given full support in dealing with the problems and crisis situations arising from the situation in Ukraine, and were also given an extraordinary one-off



scholarship to help them in the current war situation.



Also in 2022, the traditional **Faculty Hiking to Minčol** was held on 7-8 May 2022 to commemorate the establishment of the Faculty of Management Science and Informatics of UNIZA (32 years).

The Faculty of Management Science and Informatics of UNIZA is fully devoted to the field of 3D printing, as evidenced by the implementation of several successful projects. The subject of 3D printing enjoys great interest among students.

That is why the **3D Printing Centre (FriDLab)** has been established at the faculty, where students can also engage in 3D printing outside the classroom and carry out their own projects. We are extremely pleased that thanks to our **partner GlobalLogic Slovakia, the faculty has acquired new 3D printers and parts for maintenance and expansion of existing printers and much-needed consumables in 2022.**



Fig. 28 Donation of 3D printers and parts by GlobalLogic to the 3D Printing Centre at FRI UNIZA

EBV Elektronik donated **30 pieces of development kits containing the top novelty from STM with Arm Cortex-M33 core, namely the STM32U microcontroller** to the Department of Technical Cybernetics. The kits were used to teach the courses like Interconnected Embedded Systems and Technical Means of Control and Information Systems and in project-based learning. Students could use the kits to learn embedded systems programming and the basics of operating systems for embedded systems.



A unique SMART location has been built in the Solinky housing estate, which you won't find anywhere else in Slovakia. **Adaptive control of street lighting** automatically responds to the current lighting conditions and mobility of citizens. Because each luminaire is controlled independently, adapting to actual needs the control helps to save electricity and increases safety. The University of Žilina deployed its **own traffic intensity meter** in the project as part of the cooperation. Our colleagues from the Department of Technical Cybernetics were also involved in the development of that SMART location.



Fig. 29 Adaptive control of street lighting - Solinky housing estate (photo: city of Žilina)

In April, a book launch was held for the book **Come to know! Programming 8-bit microcontrollers of the AVR family**. The authors of the university textbook are prof. Ing. Juraj Miček, PhD. and Ing. Michal Hodoň, PhD. from the Department of Technical Cybernetics. The godfather of the publication is prof. Ing. Karol Matiaško, PhD., Vice-Rector for Information Systems of UNIZA.



Fig. 30 A book Launch Come to know! Programming 8-bit microcontrollers of the AVR family

From 25 to 29 April, our colleagues *Ing. Michal Hodoň, PhD.* and *doc. Ing. Peter Ševčík, PhD.* from the Department of Technical Cybernetics organized a workshop within the Erasmus+ KA203 -**Teach4Edu4** project. At this workshop, which took place at the Croatian partner faculty in Varaždin (Faculty of Organisation and Informatics, University of Zagreb), they presented the **concept of teaching embedded systems and the Internet of Things used at our faculty.**



Fig. 31 Teach4Edu4 Workshop

On the feast of St. Nicholas we did not forget to **to bring the joy to the littlest patients at the University Hospital with Polyclinic in Žilina.** Thanks to all the contributions at the popular faculty event FRI Punch 2022, the contribution from the Faculty of Management Science and Informatics of UNIZA and the FRI Club, together we managed to collect 270 € and thanks to that we were able to make all the children in the paediatric ward happy with St. Nicholas presents. Thanks to the FRI Club for great organizing, to our colleagues from FriDLab for printing the beautiful name tags and to all of those who contributed to the FRI Christmas collection.



Fig. 32 FRI Mikuláš in the University Hospital with Polyclinic in Žilina

In the week from 12th to 16th December, the Faculty of Management Science and Informatics of UNIZA held an **ONLINE School of Management and IT Skills** in Microsoft Teams platform. There was a great interest in participating, 53 secondary school students came from all over Slovakia. They attended joint lectures and group work with interesting topics such as team communication, managerial games and simulations, creating of presentations and mind maps, business negotiation and bargaining, creating google advertising campaigns and many more.

Feedback from the participants of Online School of Management and IT Skills

I am happy I have learnt new information and knowledge useful for my future. The lecturers were all nice which made a pleasant atmosphere. All the topics were clearly presented. I had fun participating in the activities which were well prepared. I highly recommend it!

Dominik, Secondary Vocational School of

I learnt a lot about new things from Marketing and team work. The lecturers were nice and there was a pleasant atmosphere, it was beyond my expectations.

Ondrej, a student of Secondary Industrial School of Electrical Engineering, Piešťany

Fig. 33 Feedback from participants of the ONLINE School of Management and IT Skills

From 20 to 24 June, the Faculty of Management Science and Informatics hosted the third edition of the **Become a Manager Summer School**. 13 secondary school students had the opportunity to develop their managerial skills. They were working in a team to solve practical tasks while competing for valuable prizes donated by the Faculty's partners GoodRequest and ORiWiN.



Fig. 34 Third edition of the Become a Manager Summer School organised by the Department of Management Theories

In 2022, the Faculty of Management Science and Informatics of UNIZA hosted a **large number of interesting and attractive lectures by graduates, practitioners and colleagues from foreign partner universities and colleges**. The following table presents some of them.

Table 3

Open lectures at FRI UNIZA		
Speakers	Title of lecture	Institution
Ivana Ramljak	<i>Spectrum sensing in Cognitive Networks Matlab - a simulation of signal detection</i>	Logos Centar College Mostar (Bosnia and Herzegovina)
Anna Sobczyk-Kolbuch	<i>Contemporary market - innovative or traditional?</i>	Katowice Business University (Poland)
Peter Kulich, Ján Suchal	<i>Public money = public code and software</i>	Slovakia.digital
Adela Vrtkova	<i>Data analysis in R - about dependencies , about visualization (and maybe even about one snake)</i>	FEI, VŠB - Technical University Ostrava (Czech Republic)
Sven Fröhlich	<i>Traffic Management Data and Applications</i>	Technische Universität Dresden (Germany)
Željko Stević	<i>Software Computations in Operational Research</i>	University of East Sarajevo (Bosnia and Herzegovina)
Tomas Strba	<i>Automation of financial analyses</i>	IBM Slovakia
Lucia Haaszová Martina Trojáková	<i>Wellbeing activities and company benefits system</i>	IBM Slovakia
Maria Jose Molina-Prados	<i>Basic medical terminology in the field of genetics, cancer and pathophysiology</i>	University of Valencia (Spain)
Anton Kováč	<i>Data Mining in Healthcare</i>	Siemens Healthineers
Adrián Petrik	<i>Information systems for healthcare facilities</i>	STAPRO
Michal Chovanec	<i>Current issues in reinforcement learning</i>	Tachyum
Muhamed Begovic	<i>Protocol layering and reference models in communication networks</i>	University of Sarajevo (Bosnia and Herzegovina)

Open lectures at FRI UNIZA		
Speakers	Title of lecture	Institution
Ján Letko	<i>Digitalisation of Slovak football</i>	Slovak Football Association
Róbert Chovanculiak	<i>Progress without permission</i>	INESS
Tomas Vrabček	<i>Agile in practice</i>	Goodrequest
Jarmo Reponen	<i>Backoffice for eHealth: Electronic Patient Records - key concepts and elements</i>	University of Oulu (Finland)
Ah-Lian Kor	<i>Clustering and Association</i>	Leed Beckett University (United Kingdom)
Paulo Soda	<i>From unimodal to multimodal (deep) learning for personalized oncology</i>	Università Campus Bio-Medico di Roma (Italy)
Thomas Deserno	<i>Health Enabling Technologies</i>	Peter L. Reichertz Institut für Medizinische Informatik (Germany)



Fig. 35 Open lectures at FRI UNIZA

On 25 November 2022, the **XI. Faculty of Management Science and Informatics** organized the **XI. Faculty of Management Science and Informatics Representative Ball** with a record attendance (620 participants). Traditionally, there was a great entertainment, a rich raffle, student prices in the buffet, an interesting program, the announcement of the poll results for the best lecturer/lecturer, best practitioner/practitioner, the most useful subject, as well as the best IT Master's thesis by Accenture and the best IT Bachelor's thesis by Brain:IT.



YouTube



Fig. 36 XI. Representative Ball of the Faculty of Management Science and Informatics

In the category of **long-term contribution to the Faculty of Management Science and Informatics** the awards were given to the **colleagues from the Projects and External Relations Department Ms. Mária Prikrylová, Ms. Brita Endersová and Ms. Anna Ševčíková.**



Fig. 37 Giving out the awards for a long-term contribution to the Faculty of Management Science and Informatics of UNIZA

At the end of winter semester of the academic year 2022/2023, a traditional Christmas event called **FRI PUNCH** took place on 7 December at the FRI, during which the faculty's teachers together with students decorated the Christmas tree. It was the 11th round, which was held after a three-year pandemic break. There were competitions, informal conversations with a glass of tasty mulled wine, music and also stalls with Christmas products of the ŽIVENA association. The event also included a voluntary collection for

FRI St. Nicolas presents for children in the University Hospital with Polyclinic in Žilina and for a Dog Rescue Charity in Žilina. The Dean awarded students for their successful representation of the faculty at the Central European round of the programming competition ACM ICPC - CERC.



Fig. 38 Christmas Mulled Wine event - FRI PUNČ

1.4 Faculty Profile and Structure

The Faculty of Management Science and Informatics is one of the seven faculties of the University of Žilina. Currently, it benefits from the symbiosis of both Informatics and Management studies. It has 108 employees and 1 657 students.



Fig. 39 Faculty of Management Science and Informatics

The faculty community formed by both students and staff members benefits from modern approaches to Management supported by the information technologies. This is reflected not only in the shaping of

the study programmes, but also in the management of the faculty itself. The FRI has traditionally cultivated a culture of high demanding approach and is known among the professional community for the quality of its outputs, which are research project solutions, study programmes and, most importantly, its successful graduates. During the academic year, the faculty hosts traditional and very popular events such as: FRIfest, FRIples and FRIpunch, which creates almost family atmosphere. The organisational structure of the faculty consists of a dean's office, seven departments and three special purpose specialised departments.

These are:

- Department of Information Networks
- Department of Informatics
- Department of Macro and Microeconomics
- Department of Management Theories
- Department of Mathematical Methods and Operational Analysis
- Department of Software Technologies
- Department of Technical Cybernetics
- Information Technology Centre
- Information Centre
- Project Centre

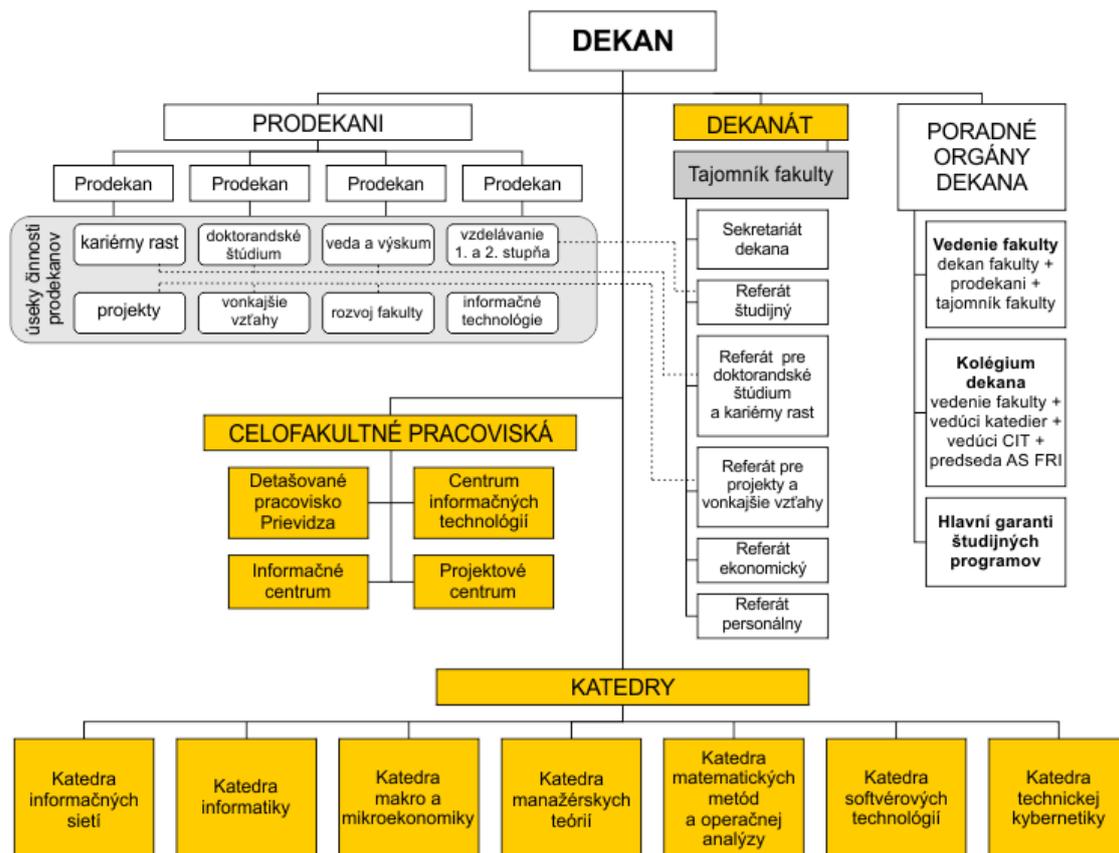


Fig. 40 Organisational structure of the faculty

Department of Information Networks

The Department provides education and research in the field of Information and Communication Networks with an emphasis on deeper knowledge of computer communication networks based on Internet Protocol (IP). The department staff has been actively involved in the standardization of NGN architecture, protocols and services (ETSI). Currently, they focus their educational and research activities on the area of cybersecurity in IP networks, also with the application of machine learning methods, on the area of cloud computing and the issue of cloud federation or software-driven approaches to the management of IP networks.

Department of Informatics

The department develops pedagogical activities in the areas of fundamentals of computer science, programming, work with database systems, spreadsheets, data structures, operating systems, programming techniques and the design of large-scale software systems. The scientific research activity is oriented on the problems of creation of information and control systems for transport, development of distributed information systems, database resources, investigation of reliability of systems, knowledge mining, applications for high-performance computing and specialized software resources. In research work, the department cooperates with other departments and faculties of the University of Žilina and with faculties of most Slovak universities.

Department of Macro and Microeconomics

The Department delivers teaching of Economic disciplines to the extent enabling the definition of conditions and requirements for the analysis and design of information systems and their effective application and use in the management of economic entities. Courses provided by the department are oriented on economic theory, the transformation process of an enterprise, the environment of an enterprise and the application of the mathematical-statistical apparatus for forecasting macro and microeconomic development by econometric methods and soft computing technologies. Within the framework of education, the department participates in terms of the graduate profile in the study programmes of Informatics, Management, Computer Engineering, Information Systems. The scientific and research activity of the department in the context of international economic development is oriented towards solving the problem of ensuring the efficient use of production inputs at the macro, micro and regional level, with the application of machine learning methods in modelling and forecasting of economic and financial data.

Department of Management Theories

The Department is a scientific-pedagogical workplace providing teaching and research of management disciplines in all programmes accredited at the faculty. The Department is a workplace that guarantees the university studies of the first, second and third degree level in the management study programme and is also involved in guaranteeing habilitation and inauguration procedures in the management programme. The Department is the Faculty's exclusive workplace for the comprehensive teaching of management and related subjects (management, marketing, human resources management, operations management, business information systems), which are scientifically developed and taught both in general and in terms of the graduates' employability in the job market.

Department of Mathematical Methods and Operational Analysis

The Department is a main workplace for educational and scientific activities in the field of mathematical foundations of management. It provides teaching of algebra, mathematical analysis, probability theory and statistics, operational analysis, mathematical modelling and simulation of systems and in other disciplines related to its research activities, such as information theory, cryptography, data structures, computer graphics and geographic information systems. The research activities of the Department focus

on the development and application of optimization and simulation methods in decision support systems for planning and process control. The research activity of the Department focuses on the development and application of optimisation and simulation methods in decision support systems for planning and process control.

Department of Software Technologies

The department provides teaching of courses in the field of object technologies, software engineering, computer science, web technologies, information and control systems and their supporting tools. Further, in the field of mathematical subjects with a focus on their use in informatics, mathematical analysis and biomedical informatics. The scientific activities of the department are focused on the solution of optimization tasks in the field of transport and communications with the application of means of transmission and computing, applied mathematics and informatics. Emphasis is mainly placed on the analysis and modelling of technological processes taking place in transport and communications, their control and computer support of decision-making. The scientific activities of the department are further focused on modelling, simulation and applications of artificial intelligence in biomedicine. Cell biomechanics models are being developed with applications in the design and development of microfluidic devices used to detect cancer cells in blood samples. The neural network models under investigation have applications in several medical fields of radiology and blood disease diagnostics. Another direction of the scientific activity of the department focuses on biomedical modelling and simulation and on applications of artificial intelligence in biomedicine. Cell biomechanics models are developed with applications in the design and development of microfluidic devices for, among other things, cancer cell separation. Neural network models developed in the department are applied in specific medical fields such as histopathology, mammography, and general radiology.

Department of Technical Cybernetics

The Department provides teaching in the areas of analysis, modelling, simulation and design methodology of technical and software support of control and information systems. The scientific activity of the department is oriented in the field of development of new control algorithms, designing of elements and parameters of computer networks, development of methods of algorithms and technical means of digital signal processing, analysis of dynamic properties of transport processes and means of movement between nodes and modelling of human dynamics in control of technical systems.

The Department of Technical Cybernetics has developed a very efficient teaching system based on a modular architecture called Yrobot. The developed system is an Open HW platform on which students can learn the fundamentals of electronics, computer science and computer engineering. Yrobot is intended to serve as a basis for the development of further extension applications. Unlike typical Open HW systems such as Arduino and Raspberry PI, the Yrobot system also includes a motion subsystem that allows the designed and implemented algorithms to be verified in an engaging way. In 2018, the next stage of development was worked on.



YVOLÚCIA



1.5 Personnel Structure of the Faculty

The staff structure of the Faculty of Management Science and Informatics of UNIZA for the period 2008 - 2022 is presented in the table below.

Table 4

Calculated number of employees for the period 2008-2022													
Year	prof.	prof.	h.prof.	doc.	OA	OA	Asiss.	lector	teachers	research	Total:	pom.	Total:
	f.m.	titul		f.m.	s.ved. hodn.	bez ved.h.			total	s VŠ	teachers + research	staff	Zam.
31.10.2008	11	6	0,48	12	47	17,33	1	6	94,81	10,88	105,69	44,66	150,35
31.10.2009	10	5	0,48	14,5	57,8	12,83	0	5	100,61	6	106,61	44,67	151,28
06.12.2010	9,6	5	0,18	14,67	58,8	11,30	0	4,75	99,27	6,33	105,6	44,71	150,31
31.10.2011	8	5	-	17	52,33	9	-	4	90,33	6	96,33	44	140,33
31.10.2012	8	6	-	17,75	56,70	8,33	-	3,67	94,45	5,17	99,62	41,15	140,77
31.10.2013	10	6	-	16	55,666	5	-	2	90,666	4	94,666	38,333	132,999
31.10.2014	10	8	-	22,5	49,499	-	-	5	86,999	3,5	90,499	39,133	129,632
31.10.2015	11	9	-	22,5	53,666	0,80	-	2	89,966	3	92,966	22	114,966
31.10.2016	12	10	-	20,1	48,333	1	-	3	84,433	2	86,433	22	108,433
31.10.2017	12	10	-	23,1	50,933	1	-	3	90,003	3	93,003	23	116,003
31.10.2018	12	11	-	24,3	50,600	1,90	-	3	91,800	3	94,800	22	116,800
31.10.2019	13,8	12,8	-	26,5	49,267	1	-	2	92,567	3	95,567	20	115,567
31.10.2020	11,0	10,0	-	26,0	56,094	1	-	1	95,093	3	98,093	21	119,093
31.10.2021	12,1	9,1	-	25,1	46,334	0	-	1	84,535	3	87,535	21	108,535
31.10.2022	11,6	11	-	24,1	48,5	0	-	1	85,198	2,5	87,698	20	107,698

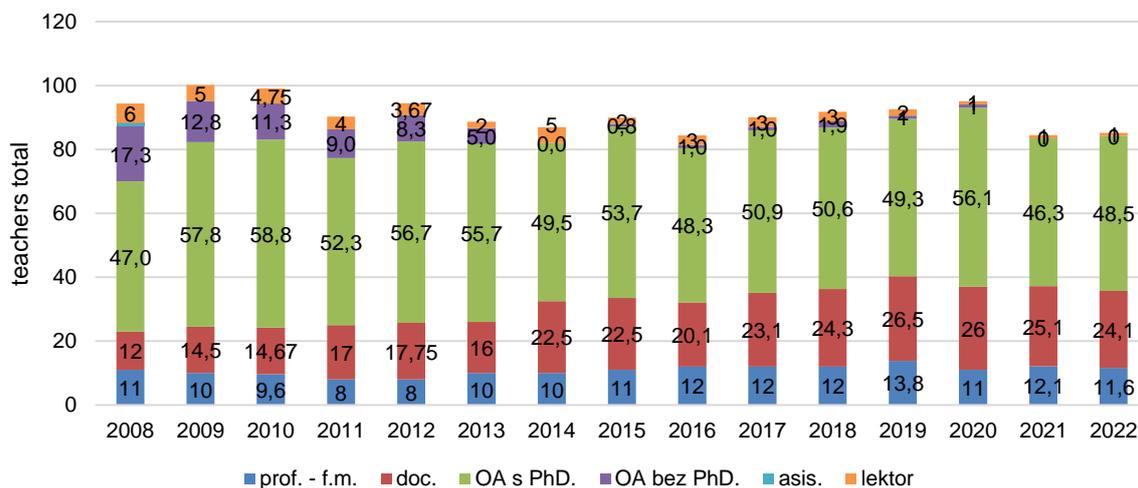


Fig. 41 Trend in number of teachers at the Faculty of Management Science and Informatics of UNIZA

The following table shows the trend of the value of the assessment criterion over the period 2008-2022.

Table 5

Criterion: number of students in the study programmes of the first and the second study cycle over calculated number of higher education teachers						
Year	Students			total	Calculated number of higher education teachers	Students/ teachers
	Full time	External	calculation			
2008	1363	0	0	1363	94,81	14,37
2009	1234	0	0	1234	100,61	12,27
2010	1301	0	0	1301	99,27	13,10
2011	1324	32	9	1333	90,33	14,75
2012	1383	24	8	1446	94,45	15,31
2013	1403	22	7	1410	90,66	15,55
2014	1448	0	0	1448	86,99	16,65
2015	1501	0	0	1501	89,97	16,68
2016	1524	0	0	1524	84,43	18,05
2017	1493	10	3	1496	90,00	16,62
2018	1302	4	1	1303	91,80	14,19
2019	1272	23	8	1280	92,57	13,83
2020	1424	55	18	1442	95,09	15,17
2021	1524	67	22	1546	84,54	18,29
2022	1558	71	23	1581	85,2	18,56

Table 6 shows the trend of the indicator number of students per teacher, but also per each category of the academic ranks of teachers.

Table 6

Trend – students and academic ranks of teachers						
Year	Students/ Teachers	Students / PhD. and higher	Students / Professors	Students/ Associate Professors	Students / OA with PhD.	Students / Prof.+Assoc.Prof.
2008	14,37	19,34	118,73	113,58	29,00	58,05
2009	12,27	14,91	117,75	85,10	21,35	49,40
2010	13,10	15,63	133,03	88,68	22,13	53,21
2011	14,75	17,24	166,63	78,41	25,47	53,32
2012	15,31	17,54	180,75	81,46	25,50	56,16
2013	15,55	17,27	141,00	88,13	25,33	54,23
2014	16,65	17,66	144,80	64,36	29,25	44,55
2015	16,68	17,22	136,45	66,71	27,97	44,81
2016	18,05	18,95	127,00	75,82	31,53	47,48
2017	16,62	17,39	124,67	64,76	29,37	42,62
2018	14,19	14,99	108,58	53,62	25,75	35,89
2019	13,83	14,29	92,75	48,30	25,98	31,76
2020	15,17	15,49	131,09	55,46	25,71	38,97
2021	18,29	18,51	127,77	61,59	33,37	41,56
2022	18,56	18,78	136,29	65,6	32,60	44,29

2 Educational activities

The study programmes of the faculty are interdisciplinary and the faculty follows more than twenty-five years of successful traditions in the education of students in the study field of cybernetics in transport and communications at the former Faculty of Mechanical and Electrical Engineering of the University of Science and Technology in Žilina and the long-standing traditions in the study fields of Information and Control Systems and Applied Mathematics at the Faculty of Management Science and Informatics of University of Žilina (FRI). The activities of FRI are determined by the new trends in development of information and communication technologies, while the priority task of the faculty is to ensure a continuous link between research, education and the employability of graduates in the job market.

The main educational and professional activities are:

- design and implementation of technical means for information and control systems,
- analysis, synthesis and design of integrated information and control systems,
- management, marketing, logistics, business,
- creation of transport and communication systems,
- management and optimisation of freight and passenger transport,
- management and optimization of database creation and information transfer and processing,
- geographical information systems, simulation tools for communication networks and systems and mathematical modelling,
- the area of communications network operations, design and engineering of network solutions and infrastructure,
- system and network virtualization, systems integration and network security.

Education at all levels of study is provided on the basis of the active participation of university teachers, researchers, students and doctoral candidates in scientific research work. Students actively participate in solving of the project theses, bachelor theses, diploma and doctoral theses, which follow the scientific research focus of the faculty research teams, the university research teams and cooperating organisations.

The experience of the faculty in providing education in the specializations confirms what we do is right, it is also proved by a long-term interest in offering the job opportunities for our undergraduates, while still doing their university studies. The design of study programmes is based on the assumption that they are delivered within the given field (covering a defined core of knowledge) and are more versatile, thus enabling the future graduate to adapt flexibly to the rapidly changing conditions and requirements of engineering practice and the job market.

2.1 Overview of accredited study programmes as of 31.12.2022

The Faculty provides education in accredited study programmes according to the provisions of Act No. 131/2002 Coll. on higher education and on amendment and supplementation of certain acts listed in the table below.

Table 7

Overview of accredited study programmes			
Name of study programme	FS	T	R
Informatics	D	Bc.	3/4/-
informatics and management	D	Bc.	3/-/-
information and network technologies	D	Bc.	3/-/-
Management	D/E	Bc.	3/-/4
computer engineering	D	Bc.	3/4/-
information systems	D	Ing.	2/3/-
biomedical informatics	D	Ing.	2/3/-
information management	D/E	Ing.	2/3/3
computer engineering	D	Ing.	2/3/-
intelligent information systems	D	Ing.	2/3/-
applied network engineering	D	Ing.	2/3/-
Applied Informatics	D/E	PhD.	3/4
Management	D/E	PhD.	3/4

FŠ - form of study (D - full-time, E - external), **T** - academic degree, **R** - length of study in years (standard length/equivalent study/external study)

The professional content of individual study programmes is provided by the guarantors (all levels of study), which are:

- prof. Ing. Emil Kršák, PhD. - Informatics (Bc.)
- doc. Ing. Viliam Lendel, PhD. - Information Systems (Ing.)
- doc. Ing. Michal Koháni, PhD. - Management (Bc.)
- doc. Ing. Ondrej Karpiš, PhD. - Informatics and Management (Bc.)
- doc. Ing. Pavel Segeč, PhD. - Computer Engineering (Bc.)
- - Information and Network Technologies (Bc.)
- - Applied Network Engineering (Eng.)
- prof. Ing. Elena Zaitseva, PhD. - Biomedical Informatics (Ing.)
- prof. Ing. Ľudmila Jánošíková, PhD. - Computer Engineering (Ing.)
- prof. Ing. Ľuboš Buzna, PhD. - Intelligent Information Systems (Ing.)
- prof. Ing. Milan Kubina, PhD. - Information Management (Ing.)
- prof. Mgr. Ivan Cimrák, Dr. - Applied Informatics (PhD.)
- prof. Ing. Alžbeta Kucharčíková, PhD. - Management (PhD.)

2.2 Students in numbers

As of October 31, 2022, the faculty had **1,657 students** at all three levels of study. There were *1,558 students* in full-time study and *71 students* in part-time study *in the Bachelor's and Engineer's degree programmes*. There were 550 first-year, 381 second-year and 325 third-year full-time students in the Bachelor's degree programmes. In Master's degree programmes there were 140 first-year students and

162 second-year students studying full-time. There were 28 *PhD students* (24 full-time and 4 part-time) studying in the two doctoral programmes. A detailed overview is given in the table below.

Table 8

Overview of the number of doctoral students as of 31.10.2022			
Study programme	Full time form	External form	Total
Applied Informatics	19	3	22
Management	5	1	6
Total	24	4	28

The following table provides an overall review of the number of PhD students in standard form as of 31 October 2022.

Table 9

Overview of the number of PhD students in the standard form as of 31.10.2022					
Vintage	Total	Management		Applied Informatics	
		Daily	External	Daily	External
1	7	1	0	6	0
2	10	2	0	7	1
3	10	2	1	5	2
4	1	0	0	1	0
Total	28	5	1	19	3

2.3 Trend in number of students at the faculty over the period under review

The basic quantitative indicator of student status is the number of students enrolled in each year. The trend in number of students by year is shown in the table and in the following graphs.

Table 10

Trend in number of students enrolled in each year																
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1. Bc.	385	381	354	442	445	429	410	407	448	461	403	358	336	574	594	550
2. Bc.	285	249	240	232	286	314	296	294	289	313	302	253	250	220	343	381
3. Bc.	306	324	275	285	252	284	349	339	338	336	373	360	346	324	264	325
1. Ing.	200	190	163	148	174	179	155	215	189	169	186	162	170	170	158	140
2. Ing.	213	212	199	187	177	201	215	193	237	245	203	169	170	191	165	162
Total	1389	1356	1231	1294	1334	1407	1425	1448	1501	1524	1467	1302	1272	1479	1524	1558

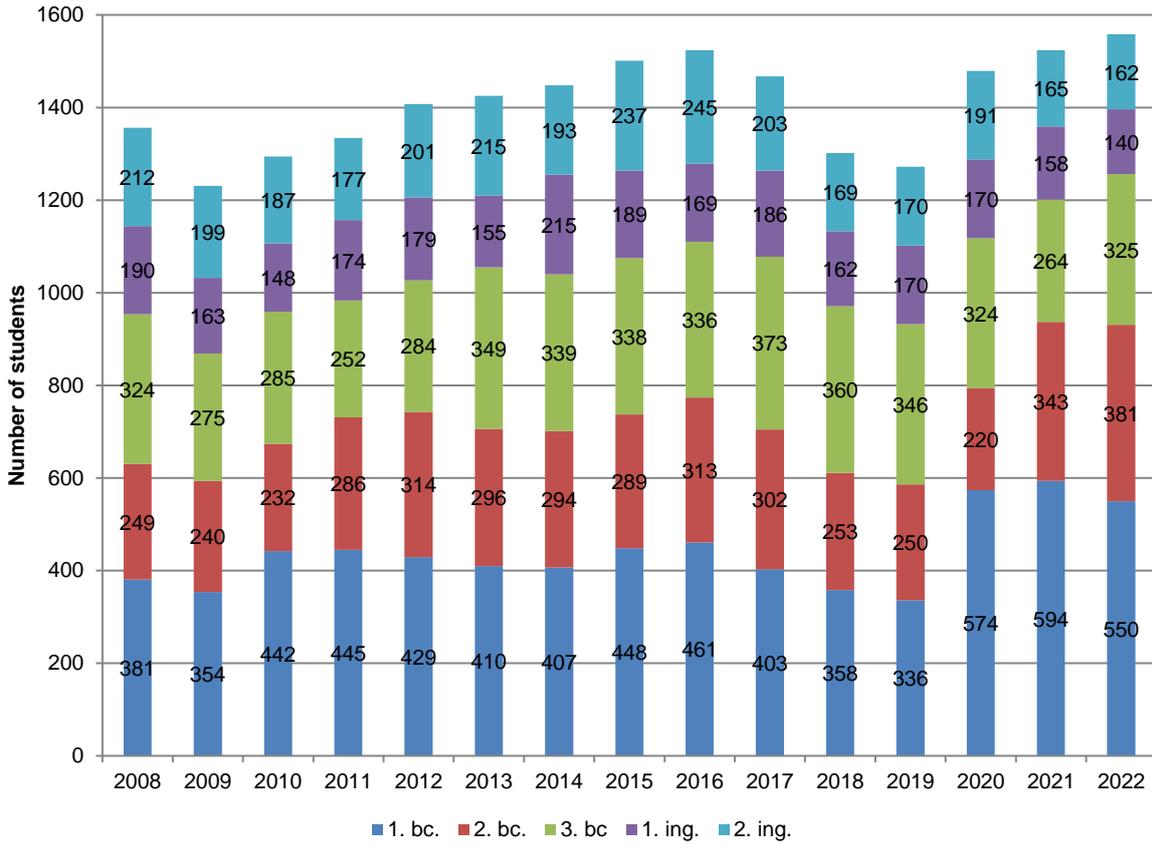


Fig. 42 Trend in number of students by year in the period under review

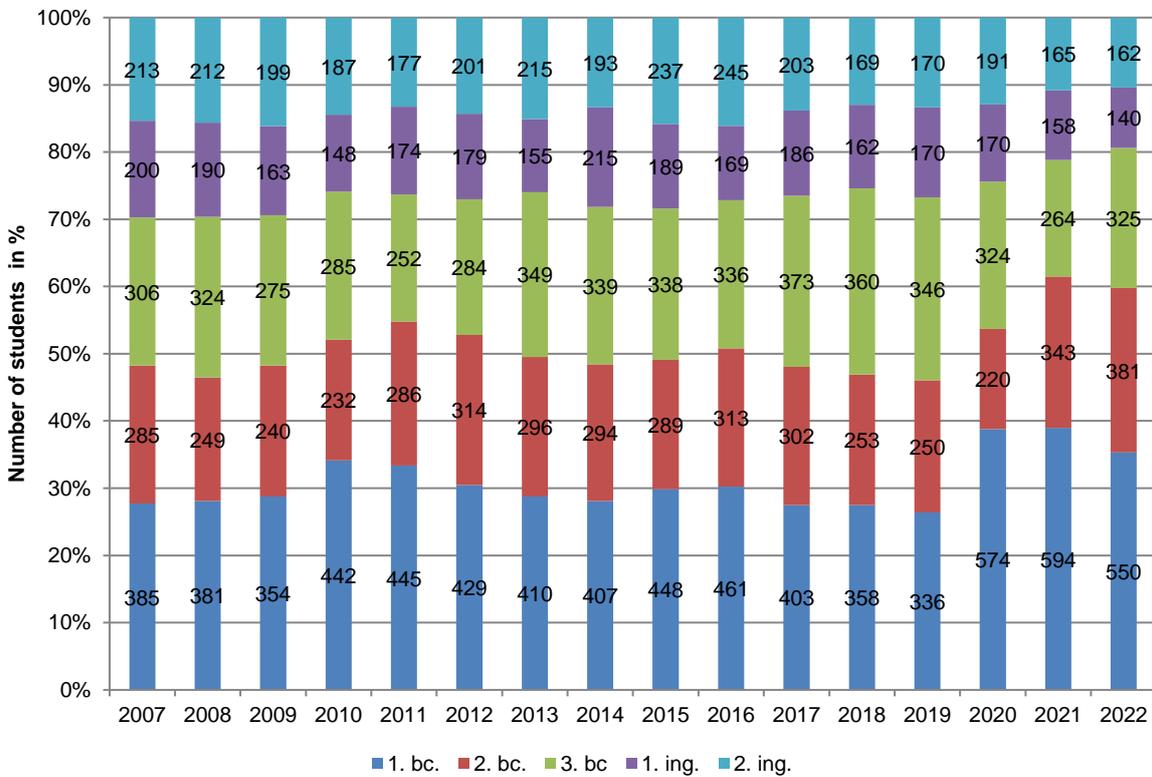


Fig. 43 Trend in number of students by year in the period under review (% share)

Table 11

Trend in number of students by the study programmes in period under review																
Full time form		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
INF (Bc.)	1. cycle A	601	509	598	609	649	690	722	743	800	768	640	641	603	561	490
	graduates	131	134	100	125	101	98	119	113	101	117	120	112	108	123	104
PI (Bc.)	1. cycle A	151	150	124	135	115	122	116	134	115	86	100	93	80	76	56
	graduates	24	33	35	44	26	26	29	25	31	19	16	21	19	22	21
MAN (Bc.)	1. cycle A	209	211	237	226	239	221	202	198	195	224	231	198	219	227	229
	graduates	59	55	48	68	57	59	65	60	59	35	52	73	71	58	38
IaR (Bc.)	1. cycle A	-	-	-	-	-	-	-	-	-	-	-	-	90	141	227
	graduates	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IaST (Bc.)	1. cycle A	-	-	-	-	-	-	-	-	-	-	-	-	97	196	254
	graduates	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IS (Ing.)	1. cycle A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2. cycle B	169	176	167	196	206	178	177	181	179	172	154	126	79	75	79
	graduates	21	63	83	64	65	84	65	51	47	56	53	46	59	37	22
ASI (Ing.)	1. cycle A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2. cycle B	-	-	-	-	-	35	39	38	38	38	40	38	34	30	30
	graduates	-	-	-	-	-	-	14	18	16	18	14	17	15	21	8
IMAN /MAN (Ing.)	1. cycle A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2. cycle B	93	97	93	92	101	106	135	143	126	103	88	115	130	117	95
	graduates	24	36	48	43	43	38	55	46	67	62	58	31	46	61	59
PI (Ing.)	1. cycle A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2. cycle B	70	69	75	66	56	51	57	64	65	50	36	28	33	33	32
	graduates	-	32	25	36	28	25	16	15	27	29	22	20	10	13	8
IIS (Ing.)	1. cycle A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2. cycle B	-	-	-	-	-	-	-	-	5	16	13	16	24	32	28
	graduates	-	-	-	-	-	-	-	-	0	0	6	2	7	4	12
BINF (Ing.)	1. cycle A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2. cycle B	-	-	-	-	-	-	-	-	-	-	-	17	35	36	38
	graduates	-	-	-	-	-	-	-	-	-	-	-	-	-	12	6
Externá forma		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
MAN (Bc.)	1. cycle A	-	-	-	32	24	22	-	-	-	-	-	-	29	27	39
	graduates	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-
IMAN (Ing.)	2. cycle B	-	-	-	-	-	-	-	-	-	10	4	23	26	40	32
	graduates	-	-	-	-	-	-	-	-	-	0	0	-	4	-	17

Legend:

INF - Informatics

PI - Computer Engineering

MAN - Management

IaR - Informatics and Management

IaST - Information and Network Technologies

IS - information systems

ASI - Applied Network Engineering

IMAN - Information Management

IIS - Intelligent Information Systems

BINF - Biomedical Informatics

The following table and graph show the trend in number of PhD students working at the faculty in the period under review.

Table 12

Trend in number of PhD students in years 2005-2022																		
Full time form	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Applied Informatics	7	7	13	16	24	28	34	35	24	19	17	16	17	21	21	16	17	19
Management	8	6	8	9	11	12	10	7	7	8	10	11	11	9	10	9	9	5
Intelligent Information Systems	0	0	0	0	0	0	0	0	0	0	0	0	1	4	4	3	1	0
external form	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Applied Informatics	17	14	16	11	14	19	12	5	6	10	11	10	5	3	2	3	3	3
Management	10	9	10	14	11	10	10	6	3	2	3	7	2	1	1	2	2	1
Intelligent Information Systems	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Spolu	76	51	64	61	69	69	66	55	42	39	41	44	36	38	38	33	32	28

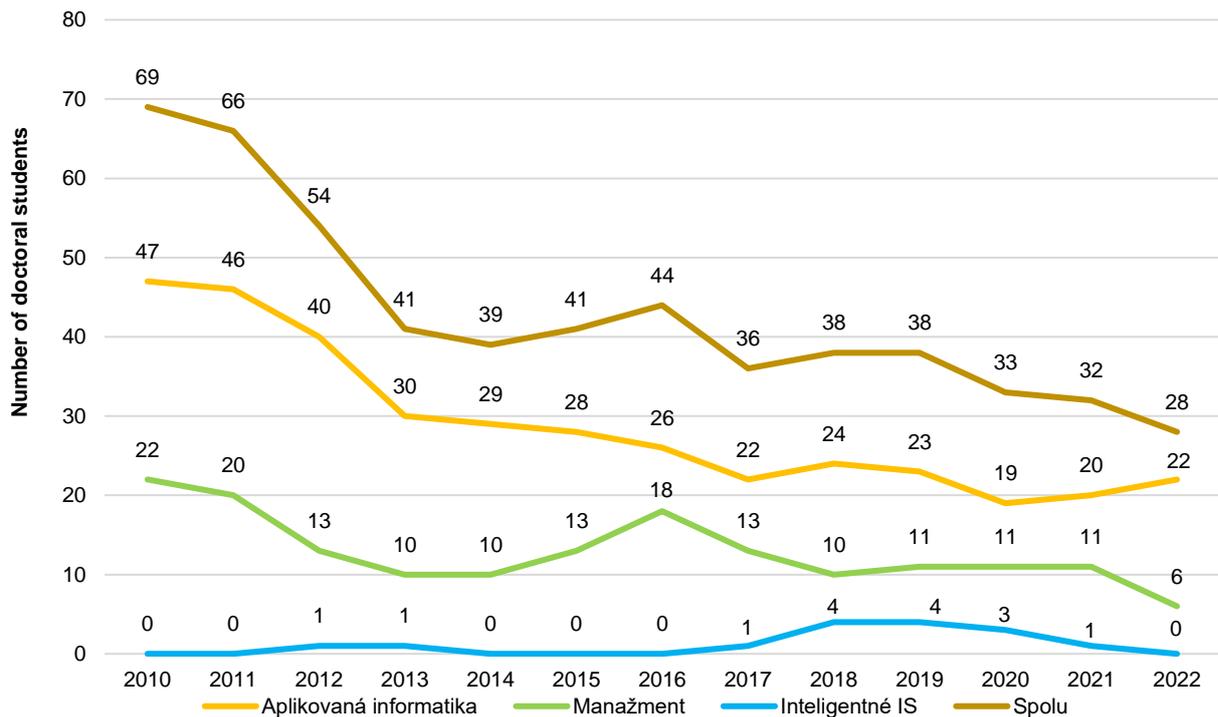


Fig. 44 Trend in number of PhD students in the period under review

2.4 Innovation in education

As part of the new compulsory study course Principles of ICS, as well as Computer Networks 1 and Computer Networks 2, students have had the opportunity to prepare for the Cisco Certified Network Associate industry certifications for free under the umbrella of the Networking Academy. The faculty also runs a similarly focused Juniper Academy.

Since 2016, the Faculty of Management Science and Informatics has been actively involved as a partner in the national project **"IT Academy - Education for the 21st Century"**. The main activities of this project are:

- Innovation in primary and secondary school education with focus on Informatics and ICT,
- Innovating of the preparation of university students for employment in the IT sector,
- education of teachers of Informatics in primary and secondary schools,
- motivating of pupils and students to study ICT,
- creating partnerships and networks of schools and IT companies.

The faculty, through its employees involved in this project, in cooperation with other project partners and representatives of IT companies, prepares innovations and updates of the content, scope, methods and forms of teaching Computer Science at secondary schools, prepares new interesting IT elective courses for secondary school students, creates new courses and innovates several courses taught in ICT-oriented study programmes for its students, implements various motivational events (IT summer camps, IT rings, conferences, competitions...) in order to motivate pupils and students of primary and secondary schools to study ICT. It is very important to deepen and expand partnerships with secondary schools and IT companies operating in Slovakia.

After three years the project "Education of Future ICT Experts Based On Smart Society Needs" (SmartSoc) has been complete. This project offered students of FRI UNIZA an exceptional opportunity - to study **an elective course focused on the acquisition of entrepreneurial skills**, within the framework of an international project in the form of blended mobility. Within the virtual part of the mobility, students had the opportunity to tackle attractive case study topics in 2022:

- Ethnophagy Smart Insect Farming,
- Boosting collaborative and smart governance in COVID times,
- Minimizing the Risk of SARS-CoV-2 Virus Infection by Assessing Virus Exposure,
- Creating learning and team building with 3D printing,
- Smart Google Street Map-based Route Analysis for People with Special Needs,
- It's Fake News. Detection of (Un)reliable Information,
- No More Food Waste. Digitalization Against Food Waste Pro Circular Economy.

In addition to working in teams to improve the business plans of virtual start-ups, interesting lectures on the latest trends in the ICT industry, the use of ICT products in business, important aspects of ICT entrepreneurship and excursions were prepared for the students during the physical mobility. During the physical mobility in Valencia (May 2022), the students had the opportunity to learn about the differences from all participating countries and to understand how those differences help to build the diversity of the European Union.

Within the project "Accelerating the transition towards Edu 4.0 in HEIs" (Teach4Edu4), teachers from FRI UNIZA were involved in testing and piloting new pedagogical methods and forms. Together with colleagues from the project consortium, they created the so-called Joint Creative Classrooms (JCC), i.e. jointly taught international subjects. They designed the content of the courses in a new interactive web application and taught a total of five international groups of students. Students from the FRI UNIZA were also involved and received credits for completing the JCC in their study plan in the form of an elective course.

On 20 and 21 January 2022, the *kick-off meeting of the Erasmus+ KA220-SCH project OOP4FUN - Object Oriented Programming for Fun* took place online. FRI UNIZA is a coordinator of the project. The responsible researcher is Ing. Michal Varga, PhD. The project is a continuation of HOOP activities. The main idea of the project is to support secondary school programming teachers in their mission of IT teaching, regardless of whether their students become IT experts or study IT at university. Therefore, the project aims to develop new or redesign existing curricula for IT-oriented subjects, including the use of innovative teaching methods, which also includes the implementation of agile methods, communication skills and teamwork. Within the project, secondary school teachers will gain the knowledge and experience of how to implement the new curricula in their own secondary schools. The project focuses on object-oriented programming, in developing which we will mainly focus on the development of games to motivate both male and female students and to increase their interest in STEM in general. Through this activity, the Faculty of Management Science and Informatics can directly influence the quality of knowledge of potential first year students studying in Bachelor's degree at the faculty. The results will be a valuable tool for developing/updating the content of the elective courses Practical Programming 1 and 2, which aim to help first year students to master the compulsory subjects Computer Science 1 and 2.

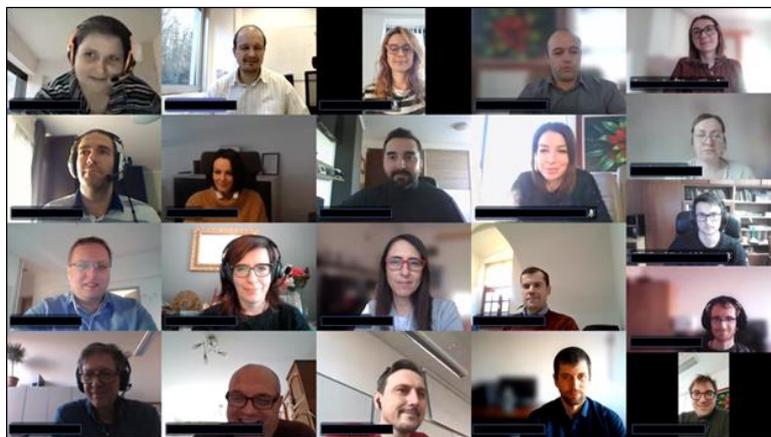


Fig. 45 Kick-off meeting of the Erasmus+ KA220-SCH project OOP4FUN

In the project consortium there are three Faculties of Management Science and Informatics - ours from the University of Žilina, the Croatian faculty from the University of Zagreb and the Serbian faculty from the University of Belgrade. Other partners from the higher education environment are the Faculty of Electrical Engineering and Informatics of the University of Pardubice and the Faculty of Mathematics and Informatics of Hochschule für Technik und Wirtschaft in Dresden. There are also five secondary

schools in the project consortium: Srednja škola Ivanec, Gimnazium Pardubice, Obchodná akadémia Považská Bystrica, Gimnazija Ivanjica and Gymnasium Dresden-Plauen.

On 26 January, the **kick-off meeting of the Erasmus+ project BEE with APEX (Better Employability for Everyone with APEX) took place**. Six universities are cooperating in the project: the SVEUCILISTE U ZAGREBU (Croatia), AKADEMIA LEONA KOZMINSKIEGO (Poland), DIETHNES PANEPISTIMIO ELLADOS (Greece), UNIVERSITAT LINZ (Austria) and the UNIVERSITY OF ZILINA. The project is coordinated by UNIVERSITY OF MARIBOR (Slovenia). The coordinator for our faculty is doc. Ing. Michal Kvet, PhD. and prof. Ing. Karol Matiaško, PhD. The aim of the project is to create a learning platform for application development through ORACLE APEX technology.

In 2022, the Department of Information Networking, in collaboration with Unicorn, offered a new elective course called **Orchestration Instruments for Containers**. This course is designed for anyone interested in immersing themselves in the world of modern technology. In recent years, these technologies have become an essential part of the portfolio of any modern IT services company. Upon successful completion of the course, the students will understand the DevOps/DevSecOps methodology, Microservices/ Nanoservices architecture, the concept of Serverless (FaaS), Terraform automated infrastructure management tool, Kubernetes container orchestration platform, tools used for Observability and Monitoring, the concept of Continuous Integration and Continuous Deployment (CI/CD). This knowledge gives the students a significant advantage over their competitors in the job market.

The Faculty of Management Science and Informatics together with the Department of Information Networks has prepared a **scholarship program** for talented TOP 10 students (top 10% of students) of the Computer Networks 2 course **to obtain the CCNA industry certificate free of charge**.

In 2022, to increase the students' interest in studying abroad, we have continued to publish a **series of testimonies from our students who took part in Erasmus+ mobilities**, outlining their experiences and the main benefits for their development. Below are the three testimonies from our students.

Our students **Pavol Štefanec** and **Michaela Pauriková** from the Bachelor's degree programme Informatics went to study at the *University of Vaasa in Finland* during the summer semester. Among the courses they studied were the Basics of Computer Games, the Basics of Social Media and, as part of the Sustainable Smart cities course, they worked in teams to create their own sustainable cities. After their mobility, they wrote a motivational article about their time spent in Finland, in which they highly recommended the Erasmus programme to all FRI students.





Fig. 46 ERASMUS+ study mobility in Finland

Kade Mackintosh and **Patrik Grexa**, students of the Bachelor's degree programme Information and Network Technologies, spent the summer semester on an ERASMUS+ study mobility *at the Hochschule für Technik und Wirtschaft in Dresden.*



Fig. 47 ERASMUS+ study mobility in Germany

Students **Denisa Macková** and **Miloslava Nošková** of the Information Management Master's degree programme decided to spend the summer semester of the academic year 2021/2022 *at the University of Patras in Greece*, where they combined their studies with learning about Greek culture and discovering beautiful places that attract many travellers.



Fig. 48 ERASMUS+ study mobility in Greece

At the Faculty of Management Science and Informatics of UNIZA from 29 May to 30 July, **15 students from the partner university Telecom SudParis in France** participated in a **two-month Erasmus+ Internship focused on network technologies**. During the internship, the students had the opportunity to get to know the beauties of Žilina and its surroundings - during a rafting trip on the River Váh from Vrútky to Strečno. They also visited Bojnice Castle, and had a wine tasting experience of typical Slovakian wines.



Fig. 49 Foreign students from France on a two-month internship at FRI UNIZA

On February 7, 2022, the **Presentation of the Results of Project-Based Learning in Engineering - Panel Story** was held online via MS Teams. The presentation was conducted online in the form of short lectures and prepared presentations. A novelty was the **competition for the best poster of first year Master's degree project (Project 1)** and the **best poster of second year Master's degree project (Project 3)**. The event was also attended by the IT companies, whose representatives had the opportunity to see and evaluate the achievements of the students in project-based learning. After the presentations there was a chance for representatives of IT companies to communicate with students about the areas of their interest.

In April, the award-giving ceremony for the **top-ranked second year Master's project (Project 3)** presented at **PANEL STORY 2022** took place. The highest score was achieved by the project **Regularly**

updated prediction of the connection time of electric vehicles, whose researcher was *Ing. Martin Jančura* - now a successful graduate of the Master's degree study programme Intelligent Information Systems. The project was supervised by *prof. Ing. Ľuboš Buzna, PhD.* and *Ing. Milan Straka, PhD.* from the Department of Mathematical Methods and Operational Analysis.



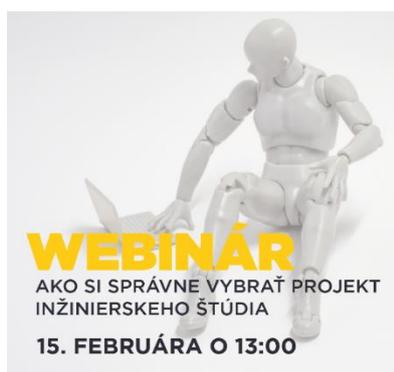
Fig. 50 Award of the best ranked second year Master's project (Project 3)

The winners of the first year of the competition for the best poster were also awarded. The winner of the competition for the best poster of the second year Master's project (Project 3) was the project **Intelligent Image Analysis and Deep Machine Learning**, whose leader was *Ing. Peter Tarábek, PhD.* and the researchers were *Ing. Ľubomír Králik, Ing. Rastislav Papšo, Ing. Anton Moysey, Ing. Terézia Mária Houbová* and *Ing. Dominik Kornhauser*. The winner of the competition for the best poster of the first year Master's project (Project 1) was the project **Medical Data Processing with Deep Machine Learning Methods**, whose leader was *Ing. Peter Tarábek, PhD., prof. Mgr. Ivan Cimrák, Ph.D.* and the researchers were *Bc. Gabika Greifová, Bc. Jakub Hôrečný*.



Fig. 51 Winners of the competition for the best poster of a Master's degree project (Project 3 - left, Project 1 - right)

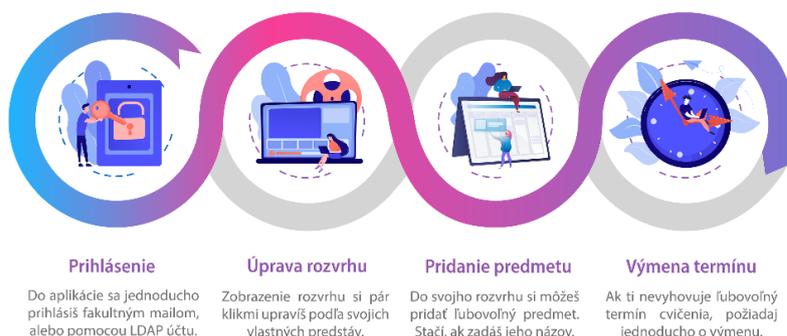
With the intention to continuously move forward and improve in the field of education, an **online discussion forum** called **"HAVE A TALK WITH THE DEAN OF EDUCATION"** has been launched, in which students showed their great interest. In the online meeting, students can ask questions the Vice Dean for Education or the Dean of the Faculty directly or anonymously via a questionnaire. In 2022, the online discussion forum was held on February 3 and October 19, 2022.



In 2022, we continued with the series of webinars in order to help students to make the right decision in choosing the mandatory, mandatory elective and elective courses, choosing a Master's degree study project, to confirm the work experience, etc. The webinars are delivered online via Microsoft Teams in a team bringing together all students of Bachelor's degree and Master's degree studies. The webinars are recorded and then available to students who had classes at the time of the webinar. The following webinars were held in 2022:

- *How to choose the right Master's study project (15.2.2022)*
- *How to choose mandatory elective and elective subjects (4.3.2022)*
- *Introduction of Master's degree study programmes at FRI (28.3.2022)*
- *How to choose the right Bachelor's degree thesis (30.9.2022)*
- *How to go on work experience (21.10.2022)*

Information meetings were held **with the guarantors of each study programmes and the Vice-Dean for Education** for students in their final year of Bachelor's and Master's degree studies. The aim of these meetings was to prepare graduating students for the process of creating and finalizing of the thesis better, to highlight the most common problems in writing and subsequent submitting the thesis, as well as to prepare graduating students for the successful passing of the state examinations.



The faculty emphasizes the link between study and practice. Students studying at FRI have the opportunity to work on specific projects connected to practice, for example, as part of project-based learning at the Master's degree level. An example is the **joint project**

"SWAPIFY", which is being developed in cooperation with the company GlobalLogic. Every year they award the graduates of the joint project with a VIP:it certificate. The cooperation of students and experts from the practice enriches not only the student but also the university, because it gives young talented students the opportunity to gain valuable experience from the top companies in Slovakia in the field of

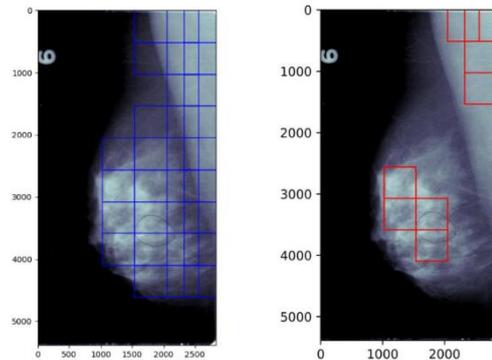
information technologies. Currently, the project is creating a web application to facilitate the exchange of practicals between UNIZA students, which is already in great demand. The web application was tested by FRI students in 2022.

In 2022, the project called **FACULTY WORK EXPERIENCE** continued at the Faculty of Management Science and Informatics. This is for all students who wish to have the compulsory course Work Experience within FRI and at the same time help the faculty in its progress. It is paid and interesting topics have been prepared. There was a high interest in the topics and they were not only taken by students but also successfully completed during the year 2022. The sixth year of faculty work experience will be ready to start in spring 2023. Some of the successfully completed faculty work experiences were:

- 3D Printing Laboratory
- Data collection and annotation for training artificial intelligence in biomedical applications
- Typographical editing of text and creation of images for the textbook
- Creating configuration guides for network objects
- Cyber Security Operations Centre
- Managerial web game

A specific example for all the above mentioned work experiences we can highlight the successful completion of the faculty work experience entitled **Data acquisition and annotation for training artificial intelligence in biomedical applications** under the leadership of *prof. Mgr. Ivan Cimrak, Dr.* Students of Informatics study programme - **Zdenko Peena** and **Toma Štulrajter** worked with the well-known and publicly available database CBIS-DDSM, which contains mammographic X-ray images capturing tumor occurrence. They were able to **train a convolutional neural network** that was

able to distinguish tumour occurrence from healthy tissue **with an accuracy of 82%**. They also discovered that there were occurrences in the database that were not annotated, which was confirmed by the doctors and experts they approached with the problem. They then created a program (figure), using their trained neural network, to search individual mammography images and identify unannotated occurrences so that they could be annotated and added to the database.



The Faculty of Management Science and Informatics continued in 2022 to build the **system of educational innovation at FRI**. Within it, the so-called "**course innovation card**" was introduced, **which** contains the results of feedback from students and measures/improvements taken within the course. Students are thus able to see directly how their feedback has been incorporated and are motivated to provide subsequent feedback on the course after the end of semester. Course innovation cards are posted on the course moodle or within the course team in the MS Teams application.

As part of the curriculum intergration process, **curriculum courses maps have** been drawn up, which clearly show the semester-by-semester mandatory, mandatory elective and elective courses, including prerequisites and colour differentiation of the respective specialisations.

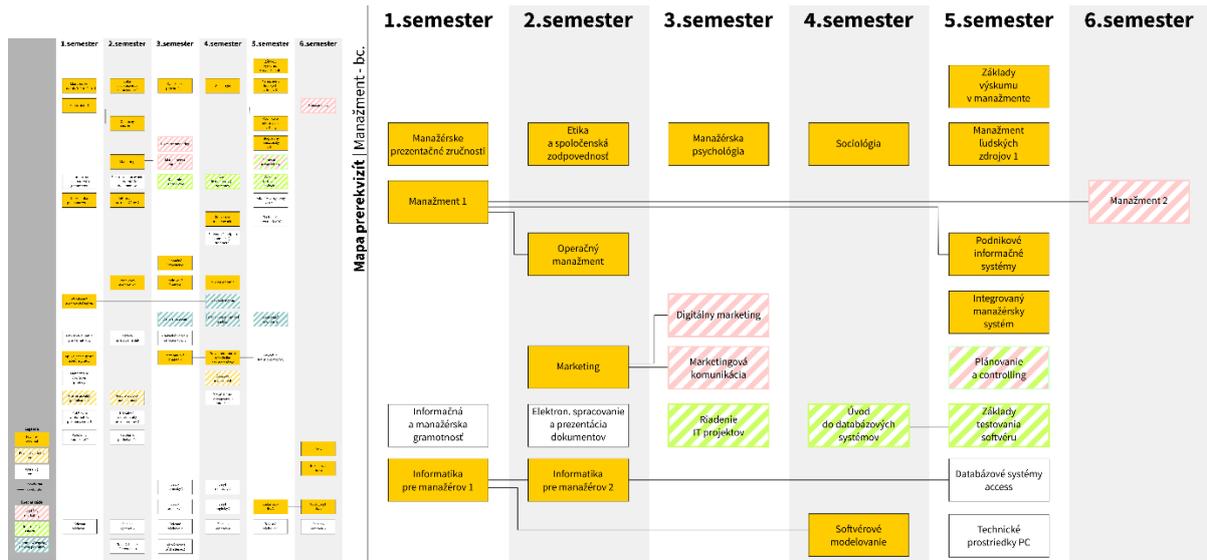


Fig. 52 Sample of the map of subjects of the bachelor study programme Management

Here is an explicit scheme of all study programmes together with the names of the guarantors for each study programme, which can help especially our graduates of Bachelor's degree level to find their way around more easily when choosing a Master's degree study programme.

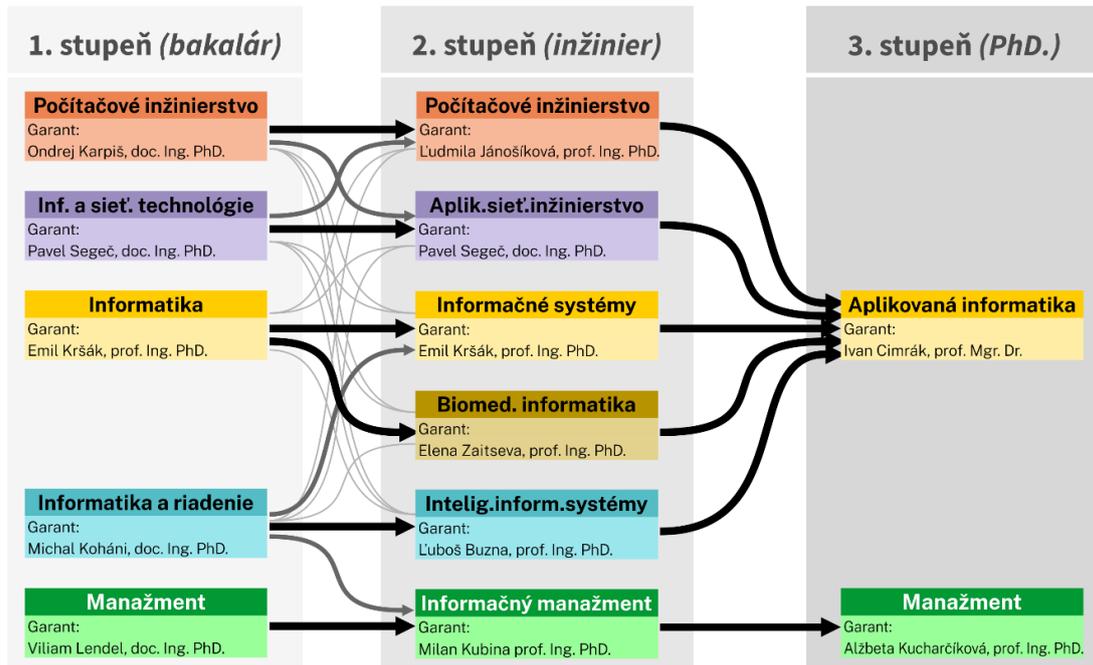


Fig. 53 Diagram of study programmes according to individual study levels at the FRI UNIZA

As a part of improving the quality of education, the 7th annual student voting was held in the categories of best lecturer/lecturer, best practitioner/practitioner and most useful subject. The results of the poll are given in the table below.

Table 13

The results of the students' questionnaire 2022		
Category	Ranking	Name of a teacher
The best lecturer	1.	RNDr. Ida Stankovianska, CSc.
	2.	doc. PaedDr. Dalibor Gonda, PhD.
	3.	prof. Mgr. Jakub Soviar, PhD.
The best tutor	1.	RNDr. Ida Stankovianska, CSc.
	2.	Ing. Michal Varga, PhD.
	3.	Ing. Maroš Janovec, PhD.
	3.	doc. Ing. Marek Kvet, PhD.
The most useful course	1.	Informatika 1
	2.	Algoritmy a údajové štruktúry 1
	3.	Algebra

The awards were given out to the teachers by the dean of the faculty during the XI. representative ball of FRI.



Fig. 54 Award-giving ceremony at the faculty's representative ball

2.5 Admission procedure

The admission exams for Bachelor's degree studies was held on 9 June 2022 and for Master's degree studies on 2 June 2022, in accordance with the admission requirements for each degree level.

Table 14

Overview of the admission exams for the first year Bachelor's degree (full-time)					
Study programme	Applicants	Admitted without taking an exam	Admitted after passing an exam	Not admitted	Didn't take an exam
Informatics	464	309	84	10	61
Informatics and Management	175	133	18	4	20
Information and Network Technologies	197	144	29	2	22
Management	181	124	31	3	23
Computer Engineering	54	34	9	0	11
Total	1071	744	171	19	137

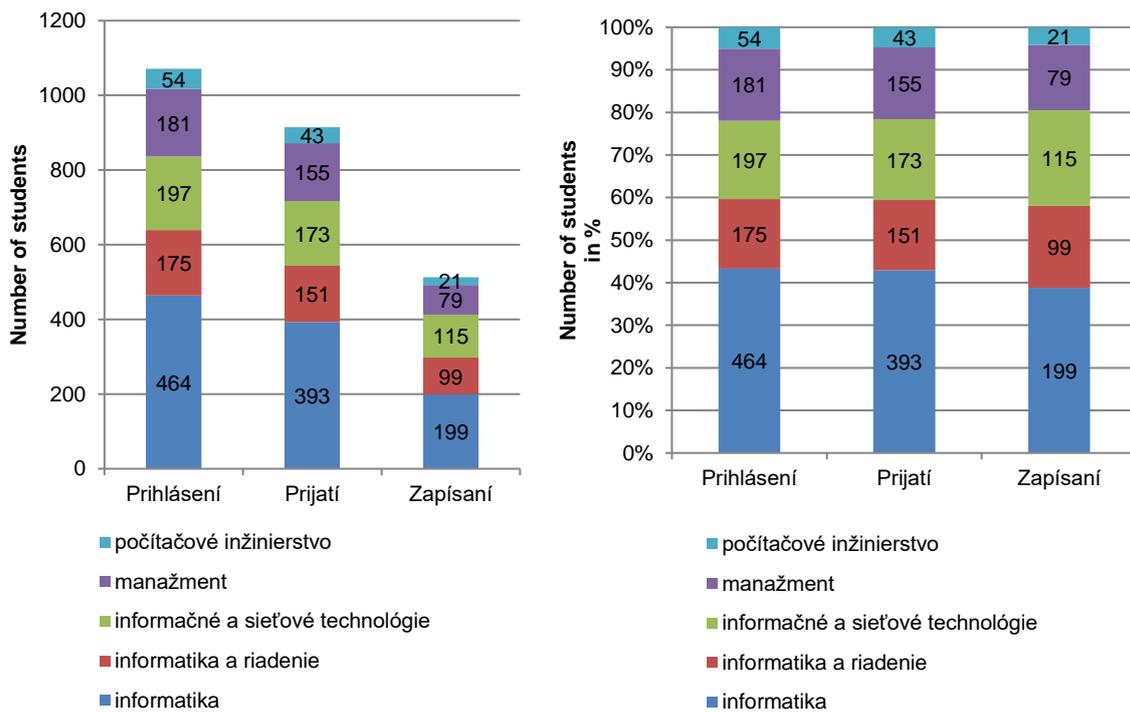


Fig. 55 Numbers of students enrolled, admitted and enrolled in the first year of the Bachelor's degree

Table 15

Overview of the admission exams for the first year Master's degree			
Study programme	Applicants	Admitted	Registered
Information Management	47	42	39
Information Management - external	20	19	12
Information Systems	67	50	40
Computer Engineering	13	12	9
Applied Network Engineering	12	10	10
Intelligent Information Systems	19	17	14
Biomedical Informatics	28	26	17
Total	206	176	141

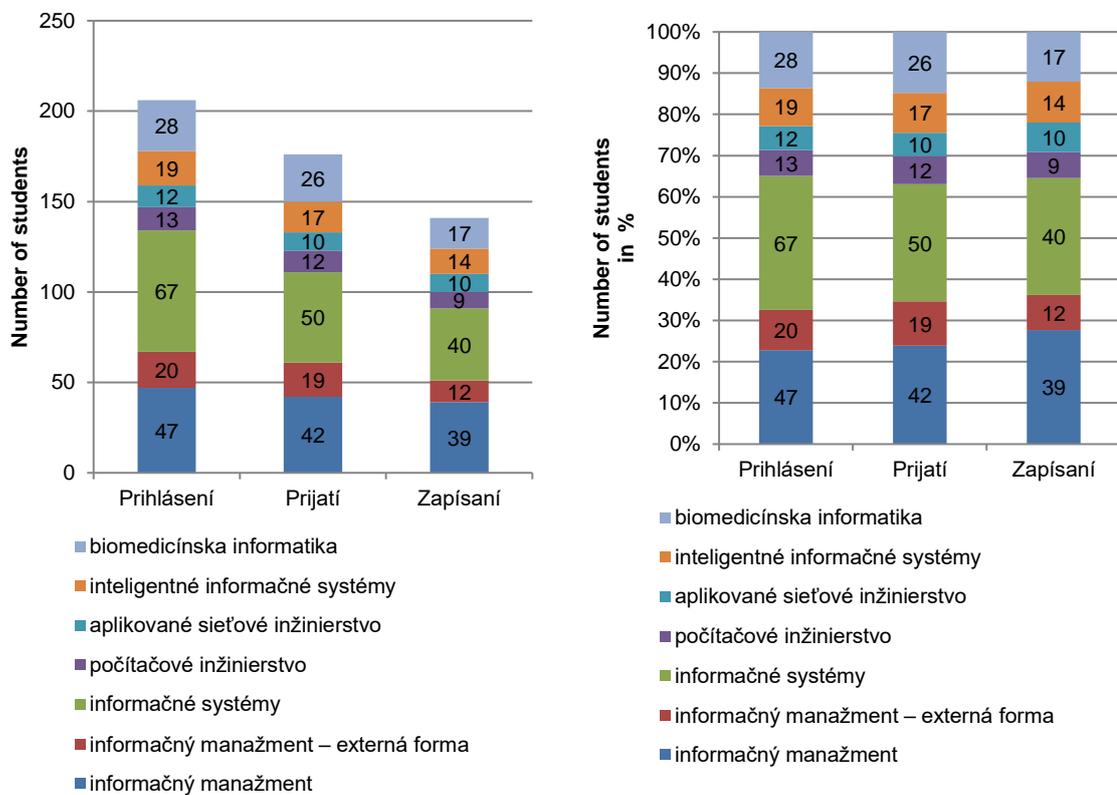


Fig. 56 Numbers of students enrolled, admitted and enrolled in the 1st year of Master studies

On 21.6.2022 and 22.6.2022, the admission interviews for Doctoral degree programs took place in accordance with the Act of the Ministry of Higher Education of the Slovak Republic No. 131/2002 on Higher Education and on Amendments and Additions to Certain Acts. Based on the admission interviews, the students listed in the following tables were admitted and started their doctoral studies.

Table 16

Admitted PhD. students in the study programme Management		
Name and surname	Form	Tutor
Ing. Patrik Boršoš	Full-time	doc. Ing. Gabriel Koman, PhD.

Table 17

Admitted PhD. students in the study programme Applied Informatics		
Name and surname	Form	Tutor
Ing. Ľubomír Králik	Full-time	prof. Ing. Martin Klimo, PhD.
Ing. Lucia Piatriková	Full-time	prof. Mgr. Ivan Cimrák, Dr.
Ing. David Matis	Full-time	prof. Ing. Martin Klimo, PhD.
Ing. Miroslav Potočár	Full-time	doc. Ing. Michal Kvet, PhD.
Ing. Michal Hraška	Full-time	doc. Ing. Jozef Papán, PhD.
Ing. Andrej Tupý	Full-time	doc. Ing. Peter Ševčík, PhD.

2.6 Statistical overview of the admission procedure

The development of the number of admitted and enrolled applicants to the Year 1 of Bachelor's degree is presented in the table and then graphically.

Table 18

Trend in number of admitted and registered students for the first year of Bachelor's degree										
Year	Admitted					Registered				
	INF	IR	IST	PI	MAN	INF	IR	IST	PI	MAN
2009	336			58	138	219			33	80
2010	355			93	164	246			65	92
2011	380			72	143	262			51	96
2012	403			49	147	243			37	89
2013	411			68	113	292			55	86
2014	401			51	100	326			41	82
2015	402			80	163	300			63	100
2016	416			59	153	306			49	92

2017	389			30	129	265			16	82
2018	373			57	117	270			47	89
2019	439			59	99	299			44	66
2020	476	132	154	62	202	210	88	96	25	107
2021	469	130	189	51	197	215	79	128	35	89
2022	393	151	173	43	155	199	99	115	21	79

Legend:

INF - Informatics

MAN - Management

laST - Information and Network Technologies

PI - Computer Engineering

laR - Informatics and Management

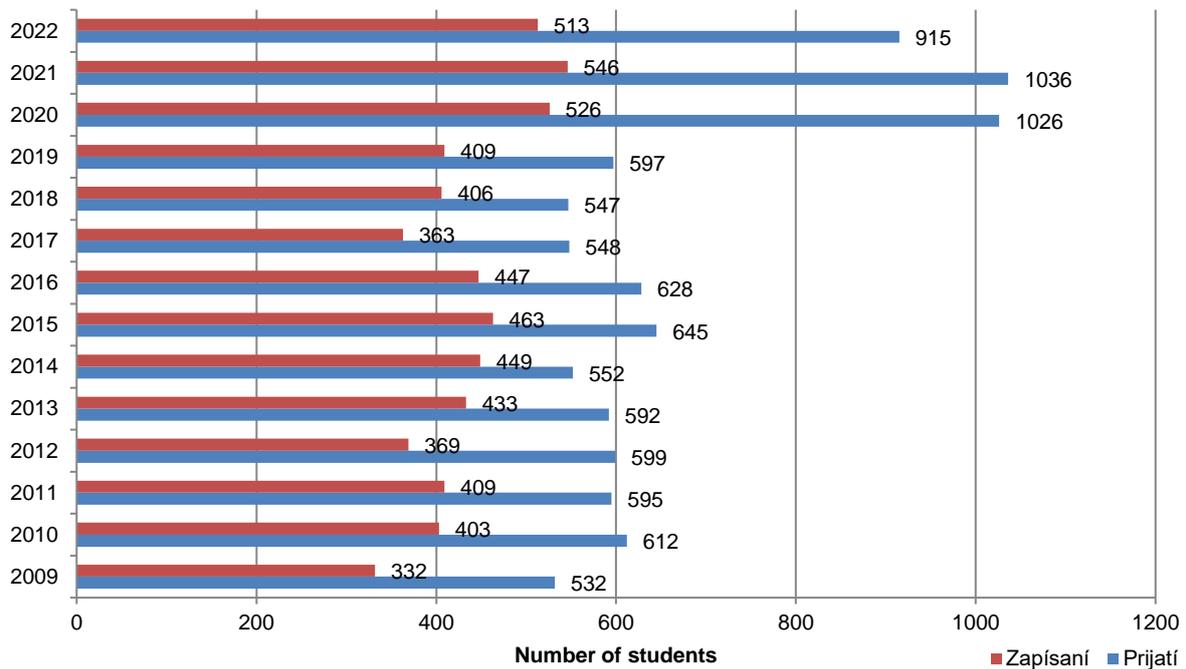


Fig. 57 Trend in number of students admitted and registered in the first year of Bachelor's degree over time

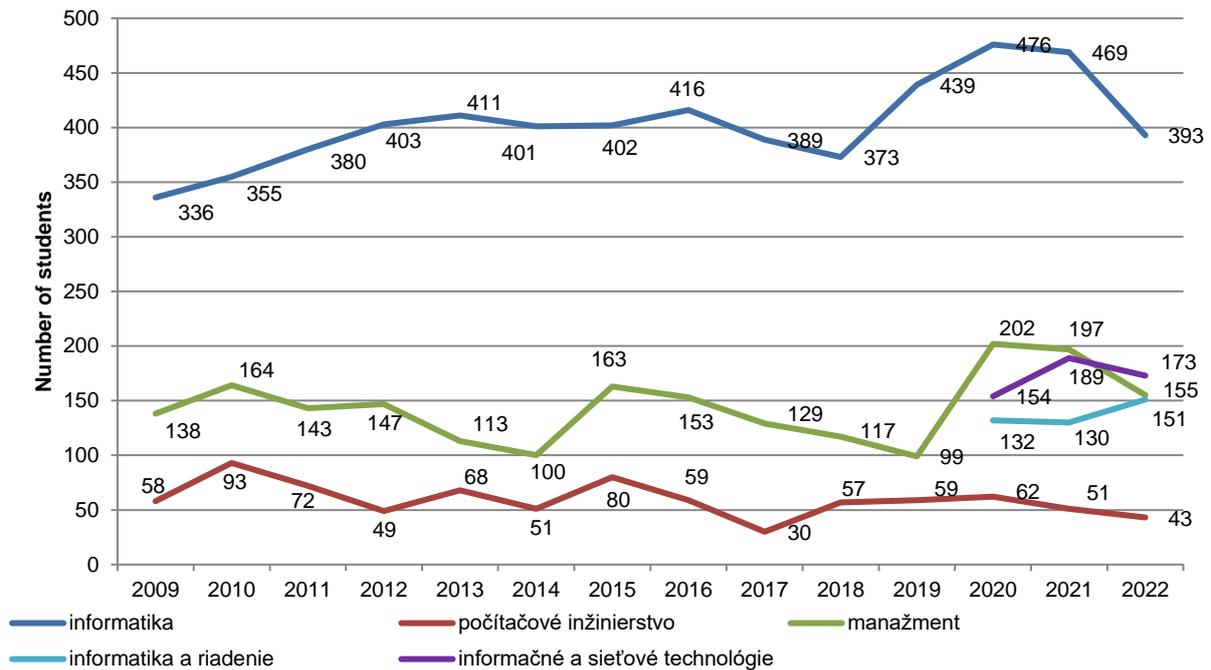


Fig. 58 Trend in number of students registered in each study programmes in the first year of Bachelor's degree over time

Trend in numbers of students enrolled, admitted and registered in the first year of Master's degree is presented in the table and then graphically.

Table 19

Trend in numbers of admitted and registered students in Year 1 of Master's degree												
Year	Admitted						Registered					
	IS	PI	IM/M	ASI	IIS	BINF	IS	PI	IM/M	ASI	IIS	BINF
2009	99	37	47	0	0		99	37	46	0	0	
2010	78	35	48	0	0		78	35	48	0	0	
2011	108	29	49	0	0		108	28	45	0	0	
2012	91	21	56	16	0		88	20	53	16	0	
2013	77	23	58	18	0		64	21	46	18	0	
2014	107	29	88	19	0		106	29	88	19	0	
2015	87	28	66	21	0		77	25	62	17	0	
2016	67	30	57	19	5		63	30	52	17	5	
2017	99	18	45	20	9		74	18	41	20	9	
2018	90	11	56	18	10		66	11	46	17	7	
2019	77	14	75	19	9		46	12	63	16	5	17
2020	42	17	76	18	17	31	26	16	62	12	14	17
2021	55	19	57	21	18	23	40	16	47	19	12	17
2022	50	12	42	10	17	26	40	9	39	10	14	17

IS - Information Systems, **PI** - Computer Engineering, **IM/M** - Information Management/Management, **ASI** - Applied Network Engineering, **IIS** - Intelligent Information Systems, **BINF** - Biomedical Informatics

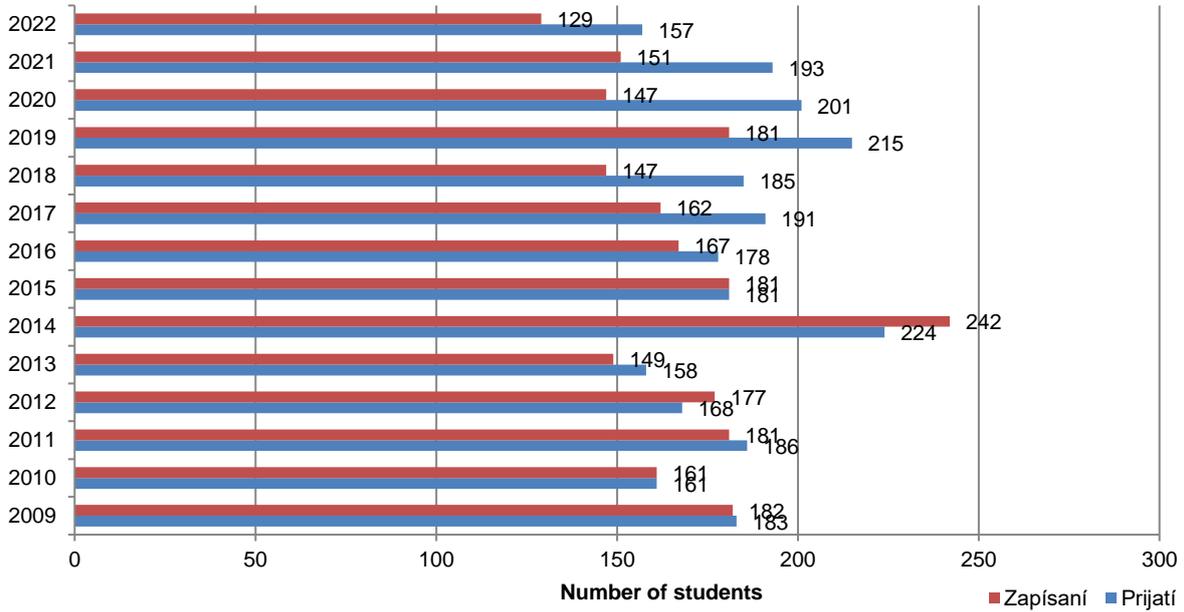


Fig. 59 Trend in number of students admitted and enrolled in the first year of Master's degree over time

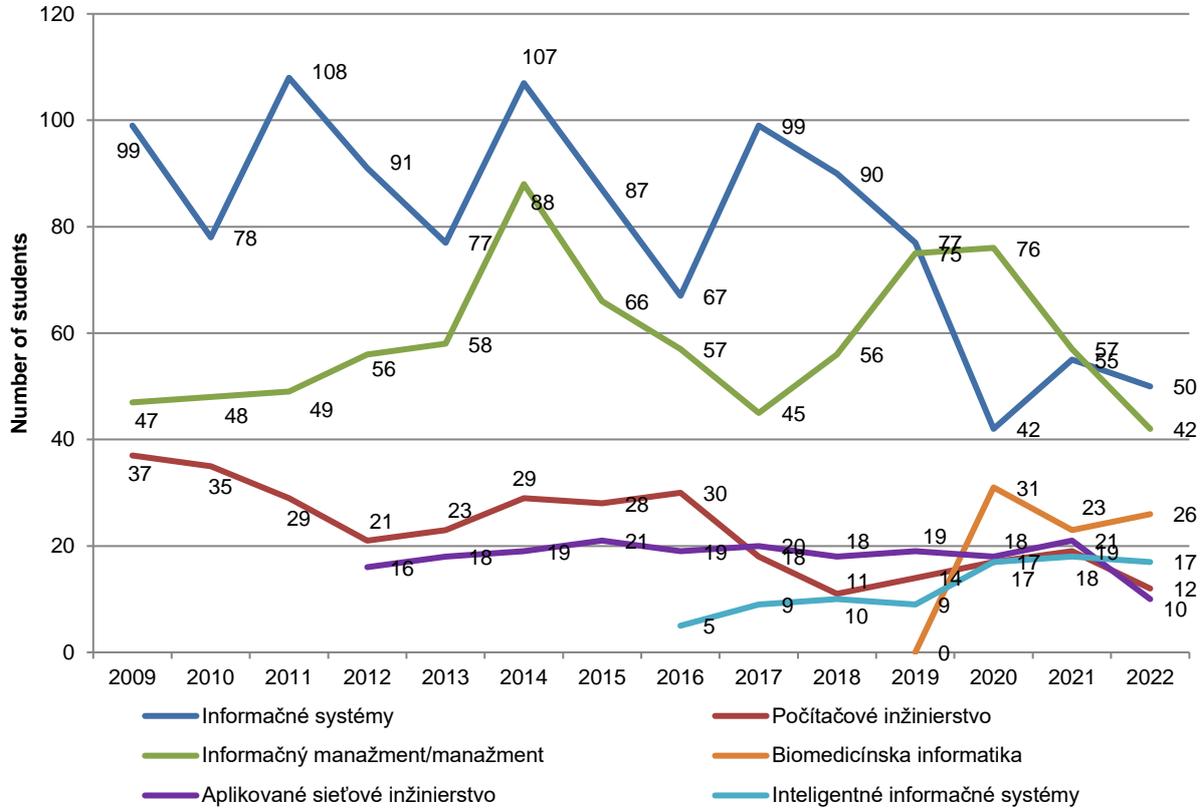


Fig. 60 Trend in number of students registered in each study programme the first year of Master's degree over time

2.7 Graduates and their employability

The Faculty currently provides education in Bachelor's degree with a standard length of study for 3 years and in Master's degree with a standard length of study for 2 years. The trend of the average duration of studies since the first entry to the respective degree is presented in the table below and in the summary for the 1st and 2nd cycle in the graph below.

Table 20

Average study period																
Form of study	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bachelor's degree	3,23	3,32	3,48	3,43	3,49	3,31	3,45	3,31	3,40	3,37	3,53	3,41	3,49	3,67	3,64	3,32
Master's degree	2,00	2,33	2,06	2,09	2,26	2,18	2,21	2,11	2,27	2,22	2,33	2,40	2,31	2,38	2,22	2,21

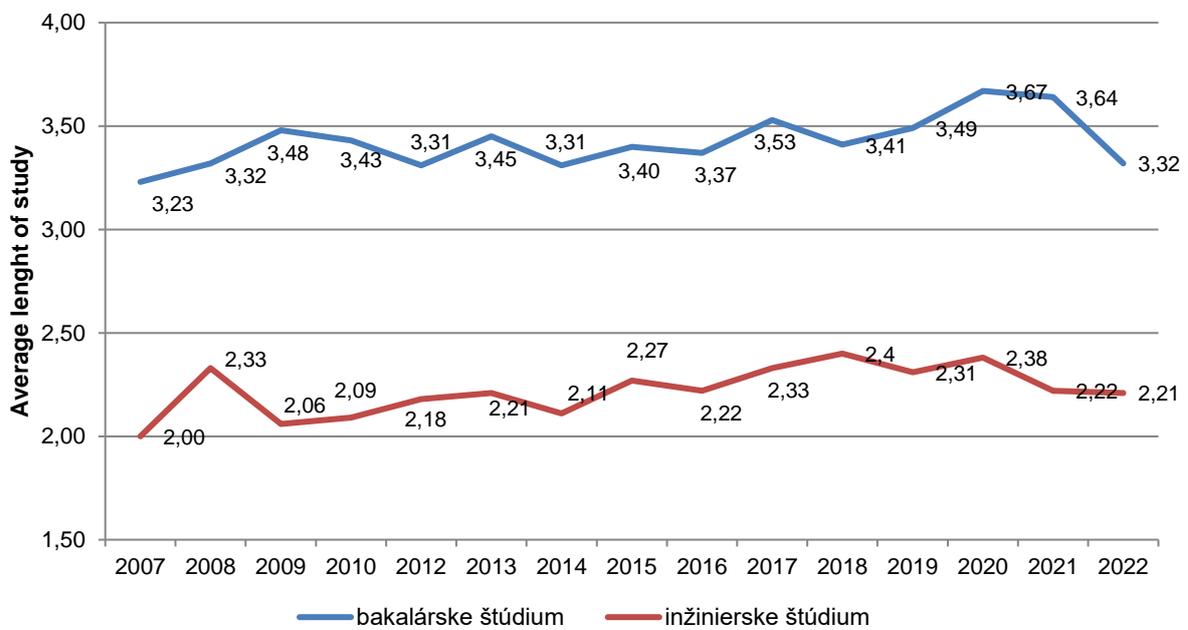
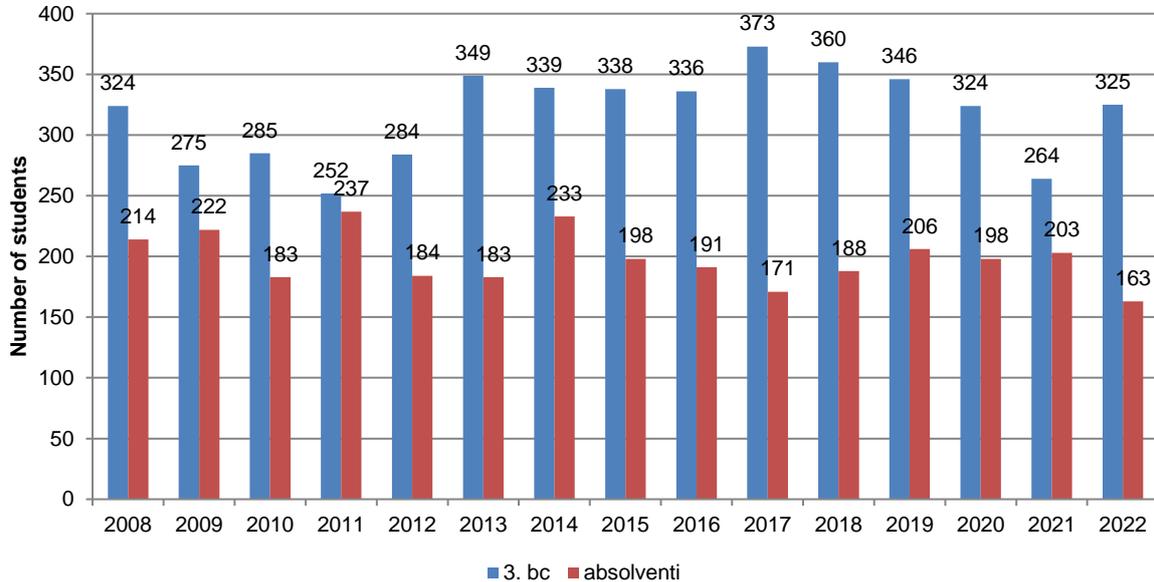


Fig. 61 Overview of the average length of studies in the both cycles of study over time

Table 21

Statistical overview of registered and graduated students			
Study programme	Registered in the first year	Graduates	Ratio
Informatics /Bc./	199	104	0,523
Informatics and Management /Bc./	99	0	0,000
Information and Network technologies /Bc./	115	0	0,000
Computer Engineering /Bc./	21	21	1,000
Management /Bc./	79	38	0,481
Information Systems /Ing./	40	22	0,550
Intelligent Information Systems /Ing./	14	12	0,857
Computer Engineering /Ing./	9	8	0,889
Information Management /Ing./	39	59	1,513
Applied Network Engineering /Ing./	10	8	0,800
Biomedica Informatics /Ing./	17	6	0,352
Total	642	278	0,433



The statistics are processed in accordance with Annex 5, point 3 of Decree 558/2007 Coll.

Fig. 62 Overview of the success rate of the final year of the Bachelor's degree over time

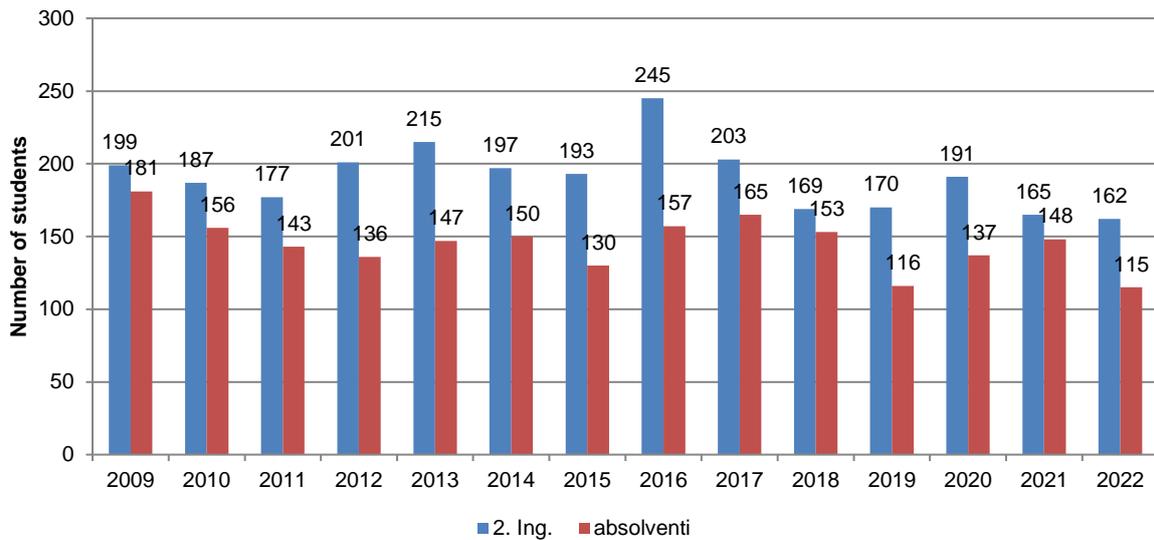


Fig. 63 Overview of the success rate in the final year of Master' s degree over time

Dissertation examinations were held in October during the period under review (i.e. till 31.10.2022). 9 students have passed the dissertation examinations. 8 students have applied for dissertation defence and they completed their PhD studies by succesfull defending their dissertation on the dates given in the table below.

Table 22

Statistics of dissertations defence	
Date	Full-time form
22. 8. 2022	Ing. Oliver Bubelíny, Ing. Irina Ďaďová, Ing. Patrícia Jánošová, Ing. Dana Kušnírová
23. 8. 2022	Ing. Milan Ondrašovič, Ing. Veronika Šalgová, Ing. Miroslav Chochul
24. 8. 2022	MSc. Luca Lena Jansen

Graduates´ employability

FRI study programmes are designed in such a way that every student who has completed his/her studies and defended the final thesis gains the required theoretical knowledge, abilities for the team work or the independent creative work, as well as practical habits and skills within the frame of the graduates´ profile. Project work is usually a team work on a project and students are expected to creatively and fully apply the acquired theoretical and practical knowledge. Thus, only a student who systematically and continuously devotes himself/herself to the study of the courses can successfully complete his/her studies. Every graduate is prepared to:

- find and present their own solutions to problems in research, development, engineering and design of software, information systems, computer systems and in general in the broader context of information technology systems,
- lead projects and take responsibility for complex solutions, adapt and implement modern information technologies in a variety of application areas, and work effectively as an individual or as a member or leader of a team.

A significant percentage of students expand their practical knowledge and skills during their studies by practical activities in various sectors of the economy as programmers, software developers and administrators, administrators and designers of computer networks, developers and designers of technical equipment, etc. After the graduation, most of those students find a job in those organisations for which they had been working during their studies, as development team leaders, independent workers or managers.

Graduates of the study programmes will find employment in the domestic and international job market in many sectors of the economy, both in private and public sectors. They will find employment in all sectors that use the methods and means of informatics and information technologies to manage and administer processes (industrial enterprises, banking, transport, health care, educational institutions, etc.). Graduates of the second degree are also prepared to study in the third-level of higher education programmes.

Bachelor's degree programmes

Informatics (field of study Informatics)

Graduates of this study programme will gain basic knowledge of computer science. They will be able to work with enterprise information systems software, participate in its creation and implementation, gain knowledge of business. Typical employment of graduates is in all industries, in public administration, in the private sector or as independent businessmen. The study prepares the professionals who are proficient in computer technologies and know how to apply modern information technologies, to they are well prepared for further qualification development in Master's degree studies.



Management (field of study Economics and Management)

Graduates of the first degree of the management study programme will gain the key knowledge, skills and competences in the field of management disciplines. They will be able to find a job as a senior employee (manager) of both lower and middle management levels in manufacturing and non-manufacturing organisations. They will become qualified experts capable of analysing existing problems in the management systems of organisations, ready to creatively propose solutions, able to improve and optimise processes in the organisation in order to create new values and achieve synergies and strategic competitive advantages.



Computer Engineering (field of study Informatics)

Graduates of the first degree of the computer engineering study programme will be ready to continue their Master's degree studies or to find a job in companies and institutions in the design, deployment, operation, maintenance and innovation of computer systems, means of communication technologies, industrial automation, measuring or diagnostic technologies. They can be employed in the development of digital systems based on microcomputers and programmable circuits, which also allow them to work as development workers, designers or technologists.



Information and Network Technologies (field of study Informatics)

Graduates of the study programme will gain knowledge in the field of computer system architectures, circuit solutions, wired and wireless networks, safety and security of computer communication, principles and management of operating systems and virtualization solutions, general and special programming techniques. Graduates are not only proficient in current technologies, but are also prepared to adapt quickly to emerging technologies. The graduates understand the principles and theoretical foundations of the field and are able to creatively apply them in practice. The graduates are prepared for the development of non-traditional ICT applications and the implementation of new technologies in the field of computer systems and networks. The study programme is designed to provide students with the opportunity to choose courses from a wide range of courses from the field of computer systems and networks, and to focus themselves in network technologies or information technologies.

*Informatics and Management (field of study Informatics)*

Graduates of the study programme will gain the necessary knowledge of Informatics. They will be able to participate in the programme implementation and operation of information systems in companies at all levels of management. They will gain knowledge primarily in the field of Informatics, but also to the necessary extent in the field of business management using the modern information technologies, thus being able to flexibly adapt to the requirements of the job market, or to independently run their own business in the field of Informatics. This knowledge will enable them to find a job as programmers capable of implementing information systems projects, programmers of web applications for corporate intranets, or IT consultants capable of working on solving IT problems in companies.

**Master's study programmes***Information Systems (field of study Informatics)*

The study programme Information Systems enables graduates to find and present their own solutions to problems in the research, development, design and design of decision support software, information systems and computer systems. They are prepared to lead, adapt and implement modern information technologies in a variety of application areas and to work effectively as individuals and as a member or leader of a team.

Information Management (field of study Economics and Management)

Graduates will gain the theoretical knowledge, practical skills and competences enabling them to integrate management, marketing management, economy and informatics with the areas of business and management systems design. Graduates of the Information Management study programme are able to use their knowledge and skills of the systems approach in the decision-making management processes of a company, to apply modern information and communication technologies in solving

difficult management problems or in use of information and communication systems. They will find a job at leadership and management positions in the public sector, manufacturing, business and services organisations.

Computer Engineering (field of study Informatics)

Graduates are ready to continue their studies at the third level or to find a job in research and development institutions focused on the field of computer systems to solve complex projects. They can also find a job in companies dedicated to the development and deployment of computing and digital systems in all areas of the economy or as developers of embedded systems based on microcomputers, FPGA circuits and other circuit devices.

Biomedical Informatics (field of study Informatics)

Graduates of the study programme will gain knowledge of Informatics and its applications in medicine and biomedicine. Thanks to this, they will be able to find employment at various levels of management and development in industrial enterprises, software companies and other institutions in both public and private sectors that are engaged in data and medical data analysis, the creation of medical information systems and the development of software for the processing of medical and biomedical data. Graduates of this study programme will gain knowledge of computer science necessary for the creation of complex information systems and, in addition, will have an overview of typical problems in the development of software for medical practice used in healthcare or biomedical laboratories. With this knowledge they will be able to design, develop, implement, extend, adapt and localise large-scale information systems for both general-purpose and special medical applications.

Intelligent Information Systems (field of study Informatics)

Graduates of the Intelligent Information Systems study programme will gain advanced knowledge of computer science and will be able to apply at various levels of management in software companies, industrial enterprises, in education, in both public and private sectors, in banking, transport, health, ecology, etc. In addition, they can be employed as application software developers, system analysts and programmers.

Applied Network Engineering (field of study Informatics)

Graduates of the study programme will find employment in the domestic and international job market in many sectors of the economy, both in private and public sectors. They will find employment in all sectors that use methods and means of informatics and information and communication technologies for management and administration of processes (industrial enterprises, banking, transport, health care, educational institutions, etc.). Graduates are also prepared to study doctoral programmes.

Doctoral study programmes

Applied Informatics (field of study Informatics)

Graduates of Applied Informatics will master the scientific methods of research and development in the field of applied informatics with a particular focus on methods, technologies and means of applied informatics for solving problems of selected application areas. They will be able to apply the principles of independent and team scientific work, scientific problem formulation (abstract formalization), methods of presentation of results and transfer of scientific results into practice, and will be familiar with legal and environmental aspects of new solutions, ethical and social aspects of scientific work. Graduate are aware of the social, moral, legal and economic contexts of his/her profession. They are aware of the need for continuous professional development and lifelong learning in order to carry out research with a high degree of creativity and autonomy, to lead large projects and to take responsibility for complex solutions. They will be able to find a job as a member of or leader of a creative team in both public and private sectors, in all sectors where there is a need for highly skilled work in the field of applied computer science.

Management (study field Economics and Management)

Graduates of doctoral degree in management studies become familiar with the general methodology of scientific research, gained the latest knowledge about the current state of scientific knowledge, build on it and move forward the current level of knowledge in the theory and practice of management through the independent scientific research work. They will master scientific methods of research and development in the field of management, focusing in particular on methods and means of operational research for solving decision-making problems of selected parts of management. Graduates will also master the principles of independent and team scientific work, scientific problem formulation (technical assignment) and its objectives, legal and environmental aspects of new solutions, ethical and social contexts. They will be aware of the social, moral, legal and economic contexts of his/her profession; the need for continuous professional development and lifelong learning in order to carry out research. They will find a job as a member of a creative team or as its leader in public and private sectors, in banking, transport, healthcare and wherever there is a need for scientific work in the field of management.

2.8 Information on theses

In 2022, a total of 303 theses were submitted for defence at the Faculty of Management Science and Informatics of UNIZA, of which 303 were defended. A total of 133 supervisors supervised the final theses. External experts from business supervised 15 theses. Detailed statistics are given in the table below.

Table 23

Theses submitted for State Exams in 2022					
Theses	Number of submitted theses	Number of defended theses	Number of tutors of theses	Number of tutors of theses without PhD degree	Number of tutors of theses (from external companies)
Bachelor	163	163	71	15	10
Master	132	132	54	5	5
Dissertation	8	8	8	0	0
Total	303	303	133	20	15

2.9 Commented achievements of students

In 2022, the students of the faculty actively participated in various competitions with the support of their teachers. As a result, they have won several major awards.

A graduate **Ing. Lucia Piatrikova** participated in the **final of the 13th year of the elite IT Spy diploma thesis competition, organized** by ACM Czech and Slovak Chapter in cooperation with Profinit and with the support of several Slovak and Czech ministries and other organizations. With her diploma thesis **Visual Detection of Counterfeit Security Features on an ID Card**, she won the **Public Award** as well as the **Magenta Award for Excellence in IT (Best Diploma Thesis - Year 2022)**, which was awarded by the competition's main partner, T-Mobile.



Fig. 64 Public Prize and Magenta Award for Excellence in IT (Best Diploma Thesis - Year 2022)

Graduates of the study programme Intelligent Information Systems **Ing. Ľubomír Králik** was awarded the **prize for the best diploma thesis on the topic of reliability by the organizer of the competition IEEE Czechoslovakia Section, Reliability Society Chapter**. The thesis was entitled *Detection of unintentional anomalies in the context of classification tasks based on deep machine learning*.

On 28 June 2022, during the graduation ceremony at the Municipal Office in Žilina, the **prestigious "Scheidt&Bachmann Award"** was presented to **Ing. Richard Labát** - graduate of the Computer Master study programme. The supervisor of the diploma thesis was Ing. Michal Hodoň, PhD. from the Department of Technical Cybernetics. The award was presented by the *proxy of Scheidt&Bachmann Slovakia Ing. Marián Koprda*. The prize was awarded to his master thesis **"Embedded system for vehicle registration number recognition"**, in which he designed and constructed a functional solution for an embedded parking system using a Raspberry Pi microcomputer.



Fig. 65 Presentation of the "Scheidt&Bachmann Award" by the company's Managing Director Ing. Marián Koprda

Our students of the bachelor's degree programme Informatics and Management **Benjamín Bekeš** and **Táňa Mišinová** with their project **ENTERTIMED** won the **Public Award in the final of the Social Impact Award programme**. It is a platform that helps you book a magician, a clown for your children or elderly, a live band or a DJ for your wedding easily and quickly. You can find everything in one place. It's like Airbnb, where you can book performers instead of accommodation.



Fig. 66 Public Award in the Social Impact Award Final

IT talents from all over the Slovak Republic have traditionally met at the **17th annual national round of the NAG 2022 competition for students in the field of network technologies**. The Faculty of Management Science and Informatics of UNIZA once again proved its high quality. The student **Jozef Galbička** (study programme Information and Network Technologies) took the **overall 1st place** and his colleague **Martin Ščasný** (study programme Applied Network Engineering) **took the excellent 6th place in the UNI category for undergraduates**.

Slovakia was represented by a 10-member team of smart high school and university students at the **European Cybersecurity Challenge 2022** in Vienna in September. The team members were selected from among the participants of three cybersecurity competitions held at the national level Guardians, CyberCompetition and CyberGame. We are very pleased that two members of the Slovak team were students of the Faculty of Management Science and Informatics of UNIZA - **Tomáš Lokša and Michal Kováčik**.

Accenture's award for the best diploma thesis went to our successful graduate **Ing. Michal Rajtek** (thesis supervisor. Pavol Štefanec, PhD., thesis supervisor: doc. Ing. Miroslav Kvaščay, PhD.) The **prize was awarded by a representative of Accenture - Milan Smieško** (Program & Project Mgmt Senior Manager). In his master thesis entitled **VR Application Enabling Control and Visualization of Model Railway States**, Michal dealt with the design and implementation of an application in a virtual reality environment (VR application), which enables control and visualization of states of a physical model railway. Detailed creation of a virtual railway model with track elements in the Blender environment with subsequent import into the Unity 3D environment. Interfacing the application with external systems such as Z21 and PLCs using TCP and UDP protocols. The virtual model simulates the movement of a virtual locomotive along a virtual railway track based on information from the physical model locomotive moving along the physical model railway track.



Fig. 67 Presentation of the Accenture Prize for the Best Thesis

The award of **Brain:IT** for the best bachelor thesis of the study programme **Computer Engineering** was awarded to our successful graduate **Bc. Dávid Pasterňák** (thesis supervisor: prof. Ing. Juraj Miček, PhD.). His bachelor thesis entitled **Wireless Proximity Sensor Based on UWB Technology** deals with the implementation of a demonstration device for measuring the distance between devices with UWB technology.



Fig. 68 Presentation of the Brain:IT Prize for the best bachelor thesis of the Computer Engineering study programme

The award of **Brain:IT** for the best bachelor thesis of the study programme **Informatics** was awarded to our successful graduate **Bc. Lenka Vaňová** (thesis supervisor: Ing. Viliam Tavač, PhD.). In her bachelor thesis entitled **iSW Invest - Implementation of the Symbol, Statistical Prices, User,**

Slack Client modules, Lenka designed and subsequently implemented a partial implementation of a software solution for managing investments in shares and securities for the company's employees.

The award of Brain:IT for the best bachelor thesis of the study programme Management was awarded to our successful graduate **Bc. Anna Oršuláková** (thesis supervisor: Assoc. Ing. Radoslav Jankal, PhD.). The aim of her bachelor's thesis entitled **Marketing communication of a selected company** was to analyse the current state of marketing communication of Elite Worker company on the basis of theoretical background, to present and evaluate the solutions introduced to improve marketing communication so far and to propose and evaluate further solutions for the future. The greatest emphasis was placed on improving online marketing tools.

The University of Žilina won **gold in floorball** at the Winter Universiade. Two of our students of the Management study programme **Michal Tulák** and **Andrej Vrábek** played in the team. Andrej also won the **Best Player of the Tournament** award.



Fig. 69 Students of FRI UNIZA Michal Tulák and Andrej Vrábek with the trophy for gold in floorball

Faculty of Management Science and Informatics of UNIZA was one of the places where the programming competition **CTU Open 2022** organized by CTU in Prague took place. Students **Lukáš Mikvík**, **Tomáš Gerát** and **Michal Kováčik** of the Master degree took **18th place**. A total of 59 faculty teams from the Czech Republic and Slovakia competed. Based on the results from the CTU Open, two teams composed of students **Lukáš Mikvík**, **Tomáš Gerát**, **Michal Kováčik**, **Miloš Murín**, **Mário Husár** and **Tobias Mítala** represented us at the **Central European round of the CERC 2022 competition**, organized by the University of Ljubljana.





Fig. 70 Students of FRI UNIZA at the Central European round of the CERC 2022 competition in Slovenia

2.10 Student support

The Faculty of Management Science and Informatics of UNIZA awards several types of scholarships to students. These are academic, extraordinary, industry, faculty or social scholarships. An overview of the amount of scholarships paid is given in the table below.

Table 24

Overview of scholarships in academic year 2020/2021		
Type of a scholarship	Paid sum	Average number of students
academic a faculty	106 285 EUR (59 400 EUR/46 885 EUR)	305
extraordinary	3 931 EUR	16
social	68 645 EUR	40
industry	145 755 EUR	214
Total	324 616 EUR	575

In the academic year 2021/2022, 255,971 EUR were paid out in benefit, exceptional, union and faculty scholarships to 535 students, i.e. the average scholarship was about 478 EUR.

Also in early 2022, the Faculty Information Centre has seen increased student demand for its services. The Information Center provides the following services to students:

- an advisory service for drawing up study plans,
- coordination of student mobility and an advisory service on study opportunities at other universities,
- library services (possibility of borrowing books, journals and theses),
- Space to work on assignments in the faculty's spare time.

In 2022, the modern computer labs RA012 and RA013 were opened and underwent a comprehensive renovation during the summer and the beginning of the semester. Their capacity was increased to 40 students. They are equipped with modern IT technology ranging from computers, interactive whiteboards to screens on the walls on which students can conveniently follow explanations and assignments.

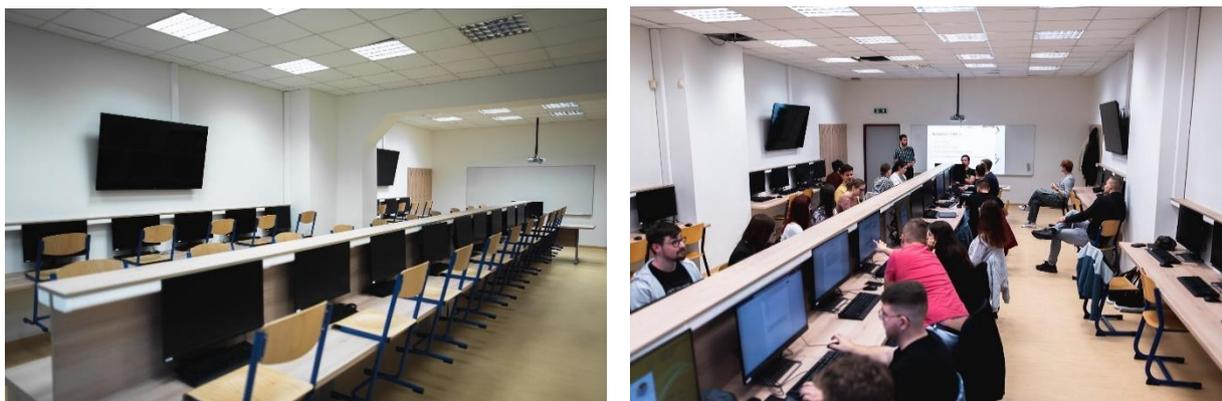


Fig. 71 New modern computer laboratories RA012 and RA013

Thanks to the **INPROP Foundation** (financial contribution of EUR 10 000), the Faculty of Management Science and Informatics of UNIZA **equipped seminar rooms and computer laboratories with modern information and communication technology to support online and hybrid learning.** Interactive projectors, tablets, webcams, conference microphones and various other accessories have contributed to improving the quality of teaching, especially during the pandemic.

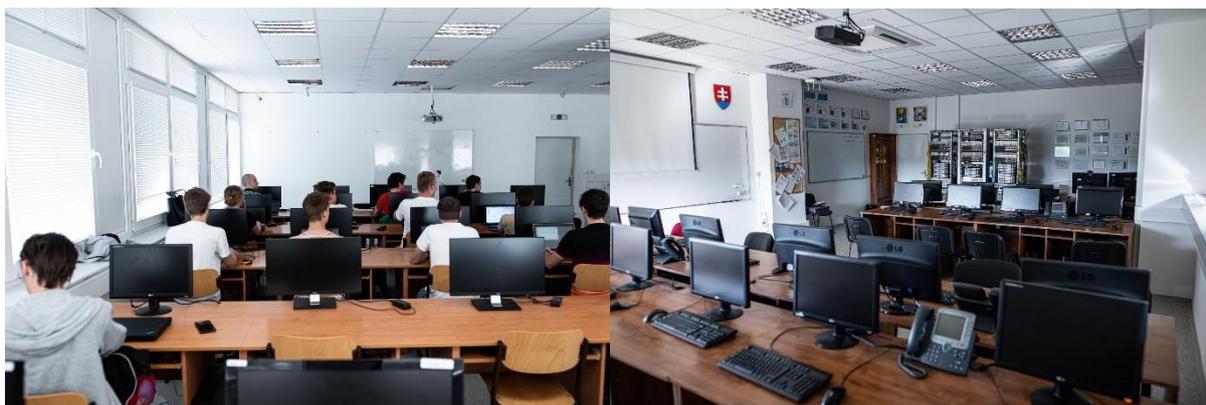


Fig. 72 Computer labs equipped with modern ICT to support online and hybrid learning

Following a **suggestion from students**, a **new modern shelter for bicycles and electric scooters was built as part of the reconstruction of the faculty square.** We are very pleased that students have taken a liking to it and are using it after the opening of the square. We have placed the original bicycle rack down in front of the side entrance to the RC009 auditorium, which is equally available to students.



Fig. 73 New modern shelter for bicycles and electric scooters

Students have the opportunity to relax and unwind in **the outdoor recreation area** behind the faculty, where they have seating and sports equipment (badminton, frisbee) at their disposal. A summer reading room with hammocks and comfortable loungers is planned to open in 2023.



Fig. 74 Popular outdoor recreation area behind the faculty

3 Scientific research activities

3.1 Research focus of departments

The research activity of the FRI is mainly oriented towards the management of complex and large-scale systems. These are mainly problems of information, control, communication and transport systems, including integrated interactive decision support systems. The faculty's areas of interest also include systems of small and regional enterprises, including managerial and economic contexts, as well as information transfer, mathematical modelling, automation and control, and systems optimisation.

The research activities of the FRI are in line with the Research and Innovation Strategy for Smart Specialisation of the Slovak Republic (RIS3 SK). Information and communication technologies and biomedicine and biotechnology are developed at the FRI in the area of defined priorities of research and development. In the field of technological priorities, industrial technologies (automation, control and robotics) are developed at the FRI. In the area of societal priorities, selected areas of social sciences are developed at the FRI.

The scientific and professional focus of the FRI is in the following areas of management of complex spatially extended systems:

1. mathematical modelling, simulation and optimisation:
 - databases,
 - information and communication networks,
 - transport of goods and passengers,
 - throughput and quality of service of communication networks,
2. information and technical support:
 - analysis and creation of database systems,
 - analysis and creation of multimedia systems,
 - multimedia information and communication services, parallel and distributed systems,
 - Next-generation communications networks and services,
 - cloud computing,
 - Cybersecurity,
 - embedded and multi-agent systems,
3. monitoring and control of transport processes:
 - analysis and development of information systems for traffic monitoring and management,
 - basic and operational management of transport processes,
 - intelligent transport systems,
4. management of human and technical resources:
 - Management, marketing, logistics and business,
 - economics and economics, evaluation and prediction of the economic situation of enterprises,
 - control automation systems,
5. analysis, synthesis and design of integrated information and control systems.

The faculty continues in scientific research activities not only the traditions in the field of theory of information and communication systems, applied informatics, mathematical methods, automation and control, but also the possibilities of extensive interdisciplinary interaction based on the broad-spectrum erudition of teachers and researchers of the faculty. Therefore, the following perspective directions can be specified as priority:

- computer science and knowledge systems,
- intelligent transport systems,
- mathematical modelling in ICT, communication systems and management,
- management (information/communication),
- information and communication technologies and information technology.

3.2 Research tasks - domestic and foreign grants

FRI research teams and staff carry out research tasks supported by various science, research and innovation support schemes:

- EU research and innovation funding programme (HORIZON 2020, HORIZON EUROPE, COST)
- Erasmus+ KA2, the EU programme to support lifelong learning activities - strategic partnerships in higher education, joint European projects for curriculum and curriculum development,
- general calls by the Agency for the Promotion of Research and Development (APVV) for support of research and development projects in individual groups of science and technology (S&T) disciplines,
- bilateral cooperation supported by APVV,
- support for project preparation from the EU's research and innovation funding programme,
- scientific grant agency of the Ministry of Education and Science of the Slovak Republic and the Slovak Academy of Sciences (VEGA),
- Cultural and Educational Grant Agency of the Ministry of Education and Science of the Slovak Republic (KEGA),
- foundations of industrial enterprises and financial institutes supporting science and research (e.g. Support for Technology - Volkswagen Slovakia Foundation, Pontis Foundation, Tatra Bank Foundation),
- University and faculty research grants for 3rd cycle undergraduate students and young researchers.

The projects are solved by individual departments, research groups combining employees from several faculties, or even research groups consisting of employees from several UNIZA departments.

European Union Funds

Table 25

Projekty H2020 at FRI in 2022				
Project number	Duration	Name of project	€	Principal Investigator
881777	2019-2023	Support to development of demonstrator platform for Traffic Management (OPTIMA)	37 625 €	Márton Peter, doc. Ing. PhD.
815001	2019-2022	DriveToTheFuture - Needs, wants and behaviour of 'Drivers' and automated vehicle users today and into the future	0 €	Márton Peter, doc. Ing. PhD.

Support for research and development from the state budget - institutional form

Table 26

Projects KEGA at FRI in 2022				
Project number	Duration	Name of project	€	Principal Investigator
009ŽU-4/2020	1/2020 - 12/2022	Creation of methodological and study materials for Biomedical Informatics - a new programme of engineering studies at the University of Žilina	11 617,00 €	Levashenko Vitaly, prof. Ing. PhD.
004UPJŠ-4/2020	1/2020 - 12/2022	Creation, implementation and verification of the effectiveness of a digital library with formative assessment tools for science, mathematics and informatics at primary school	3 667,00 €	Maceková Denisa, RNDr. PhD.
007ŽU-4/2021	1/2021-12/2023	Innovative courses to support financial and economic literacy of students of technical disciplines	5 969,00 €	Kozubíková Zuzana, Ing. PhD.
051ŽU-4/2021	1/2021-12/2023	Technologies for private cloud environments in higher education	3 607,00 €	Segeč Pavel, doc. Ing. PhD.
026TUKE-4/2021	1/2021-12/2023	Methodological and content innovation of teaching selected subjects in the field of information and communication technologies with orientation for the needs of practice based on the use of modern videoconferencing and collaboration tools	4 534,00 €	Uramová Jana, Mgr. PhD.
025ŽU-4/2022	01/2022-12/2024	Creation of an interactive programme focusing on sports management based on ICT and WEB technologies	10 444,00 €	Varmus Michal, doc. Ing. PhD.
012UCM-4/2022	01/2022-12/2024	Managing people in the digital world - a bilingual (Slovak-English) university textbook supported by e-learning modules with multimedia content	0,00 €	Kucharčíková Alžbeta, prof. Ing. PhD.

Table 27

Projects VEGA at FRI in 2022				
Project number	Duration	Name of project	€	Principal Investigator
1/0165/21	1/2021-12/2024	New approaches in reliability analysis of incoherent systems	4 343,00 €	Zaitseva Elena, prof. Ing. PhD.
1/0216/21	1/2021-12/2023	Designing rescue systems with conflicting criteria using artificial intelligence tools	15 533,00 €	Janáček Jaroslav, prof. RNDr., CSc.
1/0858/21	1/2021-12/2024	New methods for extracting knowledge from fuzzy and incompletely defined data	4 503,00 €	Kvaššay Miroslav, doc. Ing. PhD.
1/0533/20	1/2020 - 12/2023	Online reputation management: Tools and methods	5 870,00 €	Soviar Jakub, doc. Mgr. PhD.
1/0776/20	1/2020 - 12/2022	Vehicle circulation scheduling under uncertainty	7 408,00 €	Peško Štefan, doc. RNDr. CSc.
1/0077/22	01/2022-12/2024	Innovative prediction methods for optimizing public service systems	17 499,00 €	Buzna Ľuboš, prof. Ing. PhD.
1/0382/19	1/2019 - 12/2022	Building a sustainable relationship with enterprise stakeholders through value creation using information and communication technologies	5 782,00 €	Ďurišová Mária, doc. Ing. PhD.
1/0654/22	01/2022-12/2024	Cost-effective design of combined charging infrastructure and efficient operation of electric vehicles in public transport in sustainable cities and regions	9 851,00 €	Koháni Michal, doc. Ing. PhD.
1/0369/22	01/2022-12/2025	Computational modelling of nucleated cells and cancer cell clusters in complex flows	13 490,00 €	Cimrák Ivan, prof. Mgr. Dr.
1/0273/22	01/2022-12/2024	Resource efficiency and value creation for economic actors in the sharing economy	8 000,00 €	Tokračíková Emese, doc. Ing. PhD.

Table 28

Projects APVV at FRI in 2022				
Project number	Duration	Name of project	€	Principal Investigator
SK-SRB-18-002	1/2019 - 12/2022	Binary and multivalued decision schemes in complex system reliability analysis (DDiRA)	0,00 €	Zaitseva Elena, prof. Ing. PhD.
SK-FR-19-0003	2/2020 - 1/2021	Mathematical models based on Boolean and multivalued logic in risk and safety analysis	2 650,00 €	Levashenko Vitaly, prof. Ing. PhD.
PP-COVID-20-0013	9/2020 - 12/2021	Development of methods of healthcare system risk and reliability evaluation under coronavirus outbreak	0,00 €	Levashenko Vitaly, prof. Ing. PhD.
SK-PL-21-0003	01/2022-12/2023	Application of MSS reliability analysis to low-voltage electrical systems	2 000,00 €	Levashenko Vitaly, prof. Ing. PhD.
SK-UA-21-0037	01/2022-12/2023	Risk assessment of environmental disruptions using earth observation data	6 900,00 €	Zaitseva Elena, prof. Ing. PhD.
APVV-19-0441	7/2020 - 6/2024	Allocation of limited resources to public service systems with conflicting quality criteria	59 101,00 €	Janáček Jaroslav, prof. RNDr. CSc.
APVV-18-0027	7/2019 - 6/2023	Development of new methods for reliability analysis of complex systems	56 330,00 €	Zaitseva Elena, prof. Ing. PhD.
APVV-20-0481	7/2021-6/2025	Sustainability strategy of a sports organisation in the Slovak Republic	40 624,00 €	Varmus Michal, doc. Ing. PhD.
APVV-20-0004	7/2021-12/2024	The impact of the growth of anthropometric parameters of the Slovak population on the functional properties of furniture and business processes	2 572,00 €	Kucharčíková Alžbeta, prof. Ing. PhD.

3.3 International research project proposals submitted in a given year/evaluation result

In 2022, UNIZA FRI staff submitted several proposals for international projects, responding to calls for proposals from various grant schemes:

- the EU's funding programme for research and innovation (Horizon Europe)
- Erasmus+, the EU programme to support lifelong learning activities - Strategic partnerships in higher education,
- bilateral cooperation supported by APVV.

Table 29

International research projects – submitted in 2022		
Project name	Scheme	Principal Investigator
AILI: Vybudovanie európskeho AI majáka na tréning, výskum, pilotovanie a komercionalizáciu novej generácie AI	HORIZON-CL4-2022-HUMAN-02-02	prof. Ing. Ľuboš Buzna, PhD.
Liečba post COVID syndrómu založená na dôkazoch	HORIZON-MSCA-2021-SE-01	prof. Ing. Elena Zaitseva, PhD.
Pozorovanie Zeme pre včasné varovanie pred degradáciou pôdy na európskej hranici	HORIZON-MSCA-2021-SE-01	prof. Ing. Elena Zaitseva, PhD.
European Railway Joint Undertaking Academia	HORIZON-ER-JU-2022-ExplR-04	doc. Ing. Peter Márton, PhD.

3.4 Outputs from solved research tasks - publications

Table 30

Overview of publication activity at FRI in 2003 - 2021																			
Cat.	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
AAA	1	0	1	3	2	0	2	2	0	2	1	2	1	1	0	0	0	0	0
AAB	3	2	2	4	1	1	0	2	1	2	4	1	4	3	1	1	0	1	3
ABC	0	0	0	2	1	3	6	1	4	0	0	0	0	0	0	3	0	0	1
ABD	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
ACA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACB	3	4	3	6	3	6	4	5	3	3	6	9	1	4	1	7	3	2	0
ACC	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
ACD	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0
ADC	34	24	7	11	8	10	6	5	7	3	5	4	3	2	2	2	0	1	4
ADD	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	1	1	2
ADE	3	10	9	10	5	9	11	36	25	28	37	16	16	14	15	25	15	4	7
ADF	14	35	9	8	5	12	15	24	32	14	91	54	46	42	38	35	19	27	4
ADM	20	11	5	14	14	8	12	5	-	-	-	-	-	-	-	-	-	-	-
ADN	3	0	0	2	2	14	11	9	-	-	-	-	-	-	-	-	-	-	-
AEC	9	1	4	7	0	4	1	10	5	4	12	13	13	10	34	34	24	27	7
AED	0	0	0	0	5	2	10	9	2	4	35	16	10	42	34	95	54	43	0
AEE	0	0	0	0	0	0	0	0	1	0	0	0	0	30	18	27	0	0	0
AEF	0	0	0	0	0	0	0	0	0	0	0	0	0	6	24	10	0	0	0
AFA	0	0	0	2	0	0	2	0	1	0	1	1	1	0	1	0	0	0	0
AFB	0	3	0	0	0	1	1	1	3	2	1	1	2	0	0	0	0	0	0
AFC	76	62	70	85	86	113	93	81	86	51	118	110	99	84	24	0	0	0	0
AFD	80	40	68	74	63	32	55	95	76	97	69	123	87	97	64	0	0	0	0
AFE	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0

Overview of publication activity at FRI in 2003 - 2021																			
Cat.	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
AFG	0	3	1	0	2	0	0	1	4	4	2	2	1	1	3	1	0	0	0
AFH	1	7	1	0	0	0	1	2	3	1	5	5	0	0	1	0	0	0	0
AFK	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
AFL	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0
AHG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0
BAA	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
BAB	0	1	0	0	3	0	3	0	0	1	0	0	0	0	0	0	0	0	0
BCB	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
BCI	4	9	2	3	0	0	5	2	3	0	1	5	0	0	0	0	0	0	0
BDE	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0
BDF	0	0	1	1	0	0	0	0	1	8	10	5	31	42	3	0	0	0	0
BCK	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
BEC	0	0	0	0	0	0	0	0	0	0	1	3	8	0	0	0	0	0	0
BED	0	0	0	0	0	0	0	0	0	0	0	1	4	1	0	0	0	0	0
BEE	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0
BEF	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BDE	0	0	0	0	0	0	0	0	0	14	5	1	4	1	0	0	0	0	0
BFA	0	0	2	1	2	4	5	0	1	0	3	1	1	0	0	0	0	0	0
BFB	0	0	0	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0
BFF	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
DAI	1	16	12	0	9	7	0	0	15	1	0	0	0	0	1	0	0	0	0
EDI	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
FAI	4	1	3	7	3	7	6	16	4	0	0	3	0	0	0	0	0	0	0
GAI	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
GHG	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0
GII	1	1	0	0	0	2	0	1	-	-	-	-	-	-	-	-	-	-	-
Total	257	230	203	241	218	232	244	308	287	237	403	337	329	380	266	239	116	105	24

Overview of publication activity at FRI in the years 2020 - 2022 according to WoS quartile			
Quartile WoS	2022	2021	2020
Q1	12	7	2
Q2	14	26	13
Q3	7	1	6
Q4	0	0	0

Table 32

Overview of publication activity at FRI in 2022	
Category	2022
P1	6
P2	0
P3	0
V1	2
V2	124
V3	65
O1	0
O2	0
O3	0
Total	197

3.5 Research for practice, the most important outputs implemented

Main activity not subsidised

Table 33

Educational and consultancy projects at FRI in 2022				
Provider	Duration	Project name	€	Principal Investigator
MŠVVaŠ SR	09/2016 - 8/2022	IT Academy – education in 21st century	0,00 €	Lendel Viliam, doc. Ing. PhD./Segeč Pavel, doc. Ing. PhD.
Erasmus+	9/2019 - 12/2022	Innovative Open Source Courses for Computer Science Curriculum (Inovative course for Informatics study programme based on Open Source)	15 000,00 €	Kozubík Aleš, RNDr. PhD.
Erasmus+	9/2019 - 8/2022	SmartSoc - Entrepreneurship Education of Future ICT Experts Based on the Horizon Europe and Regional R3S Priorities	0,00 €	Márton Peter, doc. Ing. PhD.
Erasmus+	11/2020 - 5/2023	Accelerating the transition towards Edu 4.0 in HEIs (TECH4EDU4)	13 686,00 €	Márton Peter, doc. Ing. PhD.
Erasmus+	3/2021- 2/2023	Cloud Computing for Digital Education Innovation	15 234,00 €	Kvet Michal, doc. Ing. PhD.
Erasmus+	1/2022- 9/2024	Object Oriented Programming for Fun	0,00 €	Márton Peter, doc. Ing. PhD.
Erasmus+	11/2021- 10/2023	Better Employability for Everyone with APEX	15 499,20 €	Kvet Michal, doc. Ing. PhD.

Educational and consultancy projects at FRI in 2022				
Provider	Duration	Project name	€	Principal Investigator
Erasmus+	09/2022-02/2025	Including EVERYone in GREEN Data Analysis	29 780,00 €	Kvet Michal, doc. Ing. PhD.
Erasmus+	11/2022-07/2025	Application of inclusive Design Thinking in the Technicall-Oriented Subjects at HEI	15 316,00 €	Malichová Eva, Ing. PhD.
EACEA	1/2020 - 1/2023	Advanced Centre for PhD students and young researchers in informatics (ACeSYRI)	0,00 €	Zaitseva Elena, prof. Ing. PhD.
EACEA	1/2020 - 1/2023	University-Industry Educational Centre in Advanced Biomedical and Medical Informatics (CEBMI)	0,00 €	Zaitseva Elena, prof. Ing. PhD.
ŽSR Bratislava	05/2022-05/2024	Support for the operation of the IS ZONA software product	14 723,00 €	Kršák Emil, prof. Ing. PhD.
SANET	01/2022-12/2022	Provision of funding in 2022	4 944,94 €	Kršák Emil, prof. Ing. PhD.

Table 34

Research projects at FRI in 2022				
Provider	Duration	Project name	€	Principal Investigator
Slovenská pošta	4/2022-12/2022	End-to-End measurement of the delivery time performance of 2nd class letters and 2nd class registered letters in domestic traffic in 2022	0,00 €	Hrnčiar Miroslav, doc. Ing. PhD.
ŽSR Bratislava	2/2020-2/2022	Provision of operation and maintenance support for the IS ZONA software product	37 625,00 €	Kršák Emil, prof. Ing. PhD.
Správa železnic, s. r. o.	8/2021-12/2021	Development of task 30000 KANGO 2021	35 994,00 €	Kršák Emil, prof. Ing. PhD.
SUDOP Praha, a. r.	7/2021-11/2021	Services in the area of implementation of energy calculations into the GRADOP system according to the requirements of Sudop Praha	12 875,00 €	Kršák Emil, prof. Ing. PhD.
DITEC, a. s.	9/2021-7/2023	Detailed functional specifications, development, implementation, testing of given modules	155 681,00 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	10/2021-12/2021	Research and development work consisting in modification and debugging of the GTNv5.7 addressing software for the controlled areas...	21 300,00 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	11/2021-3/2022	Research and development work consisting in the implementation of the basic modules of the new GTNv6 system	160 000,00 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	01/2022-02/2022	Research and development work consisting in the modification and tuning of the GTNv5.8 addressable SW for controlled areas	33 252,03 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	12/2022-03/2023	R&D work consisting in the modification and debugging of the GTNv5.9 SW	31 694,25 €	Kršák Emil, prof. Ing. PhD.
SŽ	11/2022-07/2023	Delivery of software modification - Development of the 30000 KANGO 2022 application	33 102,73 €	Kršák Emil, prof. Ing. PhD.

Research projects at FRI in 2022				
Provider	Duration	Project name	€	Principal Investigator
AŽD Praha s.r.o.	11/2022-12/2022	Research and development work consisting in the modification and tuning of the GTNv5.8 addressable SW for the controlled area	0,00 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	07/2022-11/2022	Research and development work consisting in the analysis, design and implementation of algorithms for data processing in order to detect traffic deadlock in the framework of the HORIZON 2020 project, ShiftRail, X2Rail-4 TMS Demonstrators TRL6	0,00 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	07/2022-09/2022	Research and development works consisting in the modification and tuning of the GTNv5.8 addressing software for the controlled area	33 594,00 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	06/2022-09/2022	Performing R&D work consisting in modification and debugging of the GTNv5.8-PL software	150 000,00 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	05/2022-08/2022	Research and development work consisting in the modification and debugging of the GTNv5.8 addressable SW for the controlled areas	2 054,88 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	04/2022-04/2022	Logical checks of displayed data for TTP output files	33 799,49 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	03/2022-06/2022	R&D work consisting of modification and debugging of the GTN and ASVC addressing software in the GTNv5.8 operational application for the controlled area	21 393,97 €	Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	02/2022-08/2022	R&D work consisting of modification and debugging of the GTNv5.8 software for ASVC		Kršák Emil, prof. Ing. PhD.
AŽD Praha s.r.o.	04/2022-04/2022	Research and development work consisting in the modification and debugging of the ASVC addressing SW in the GTN operational application for the controlled area	15 749,30 €	Kršák Emil, prof. Ing. PhD.
DXC	01/2022-12/2022	Support of iKVC applications - VIS module	33 001,85 €	Kršák Emil, prof. Ing. PhD.
Operačné stredisko záchranej zdravotnej služby Slovenskej republiky	5/2021-08/2022	Optimisation of the network of emergency medical service stations	30 413,53 €	Jáošiková Ľudmila, prof. Ing. PhD.
NATO	9/2022-08/2025	Multi Cable-Driven Robot for Detecting/Detonating Unexploded Mines and Ordnance	25 300,00 €	Ševčík Peter, doc. Ing. PhD., Figuli Lucia, doc. Ing. PhD.

3.6 Published magazines

In 2022, the Faculty of Management Science and Informatics published two scientific journals, which are oriented to the research areas addressed in the conditions of the faculty:

- Journal of Information, Control and Management Systems,
- Slovak Scientific Journal Management: Science and Education ~ m:se.

Journal of Information, Control and Management Systems is a scientific journal that accepts for publication scientific papers presenting the results of original, original, theoretical, applied research and also the results of practical verified experience of authors and author teams in the field of applied informatics, information systems, computer networks, information and communication technologies, computer engineering and management systems. The editor-in-chief of the scientific journal is doc. Ing. Viliam Lendel, PhD. In 2022, the 20th edition was published in two issues.

Slovak Scientific Journal **Management: Science and Education ~ m:se** is a scientific journal, the aim of which is the presentation of theoretical and selected practical knowledge and experience in general management issues. The journal focuses on publishing original and original results of theoretical and applied research as well as practical verified experiences of authors and author teams concerning the latest trends and theories, current approaches and views on the complexity of management and its individual parts. The editor-in-chief of the scientific journal is prof. Ing. Štefan Hittmár, PhD. In 2022, the 11th edition was published in two issues.

3.7 Scientific and professional events organised

In 2022, the Faculty of Management Science and Informatics organized or participated in the organization of several scientific and professional events.

New Trends in Management and Production Engineering - Regional, Cross-border and Global Perspectives 2022

The aim of the 9th International Scientific Conference was to exchange knowledge and experience on the latest trends in management development (theory and practice). The conference is intended for university lecturers, doctoral students and researchers in economics, social sciences and other related fields. The conference focuses on management, production, socially responsible business, economic and social aspects of local and regional development as well as the development of cross-border cooperation. The conference took place in Brenna (Poland) on 9-10 June 2022. The Faculty of Management Informatics acted as a co-organiser.

Missing Maps mapathon Slovakia

The Mapathon is a mapping marathon where volunteers vectorise positioning maps from satellite imagery (remote mapping), also for the needs of humanitarian organisations in those countries where maps are missing.

Missing Maps is a project founded by 4 humanitarian organizations (American Red Cross, British Red Cross, OpenStreetMap Humanitarian Team, Doctors Without Borders) and currently has 19 members.

Volunteers use open source tools (iD editor, JOSM) in the OpenStreetMap environment for mapping. The outputs from the mapathons also help medical and logistics teams in the affected areas to deal with various emergencies (natural disasters, accidents, catastrophes, war conflicts, disease threats or famine).

In 2022, 4 mapathons were held - 24.2.2022, 2.6.2022, 6.10.2022, 8.12.2022. The Faculty of Management Informatics acted as a co-organizer.

3.8 Habilitation and appointment of professors

In 2022, the Scientific Council of the Faculty of Management Science and Informatics held one procedure for the appointment of a professor.

Table 35

Proceedings for the appointment of a professor at FRI in 2022		
Candidate's name	Study programme	Title of the inaugural lecture
doc. Ing. Pavel Segeč, PhD.	Informatics	Convergence of communication networks

The Scientific Council of the Faculty of Management Science and Informatics in 2022 discussed the award of the title of Associate Professor to one candidate. One faculty member has been appointed as Associate Professor.

Table 36

Proceedings for the appointment of Associate Professor at FRI in 2022		
Candidate's name	Study programme	Názov habilitačnej prednášky
doc. Ing. Patrik Hrkút, PhD.	Informatics	Methods for finding similarities in texts and source codes

4 International Cooperation

4.1 Contractual Cooperation

Within the framework of concluded bilateral agreements, FRI UNIZA has active cooperation with the following institutions:

- Universidad Politécnica de Valencia, Spain - cooperation in curriculum development, organisation of educational activities,
- Scheidt & Bachmann, Mönchengladbach, Germany - research in the field of smart grids, student internships, master theses, volunteering in the Missing Maps project
- University of Jyväskylä, Finland - cooperation in curriculum development, organization of educational activities,
- Szechenyi Egyetem - the University of Győr, Hungary - cooperation in curriculum development, organization of educational activities,
- United Institute of Informatics Problems, National Academy of Sciences of Belarus, Belarus - research in the field of information technologies,
- University of Zagreb, Faculty of Organisation and Informatics in Varaždin - student mobility, cooperation in non-research projects
- University of Belgrade, Faculty of Organizational Sciences - staff mobility, cooperation in science and research,
- University of Belgrade, Faculty of Transport and Traffic Engineering - staff mobility, cooperation in science and research,
- Shamon College of Engineering, Beer Sheva, Israel - cooperation in curriculum development,
- Hochschule für Technik und Wirtschaft, Dresden, Germany - staff mobility, cooperation in science and research,
- United Institute of Information Problems, National Academy of Sciences of Belarus, Belarus - organization of joint scientific conferences, research, publishing activities,
- Zaporizhzhya National Technical University, Ukraine - research in the field of intelligent systems, publishing activities,
- Telecom Sud Paris, cooperation in the field of education,
- Scientific Centre for Aerospace Research of the Earth, Institute of Geological Science National Academy of Sciences, Ukraine - staff mobility.

Foreign stays of the faculty staff took place at partner institutions within the framework of educational and scientific research activities. A significant part of foreign activities is related to participation in international conferences and workshops.

Long-term cooperation on research tasks has been ongoing with the following partners:

- IBM Research Slovakia,
- United Institute of Information Problems, National Academy of Sciences of Belarus,
- Transport Research Centre, Czech Republic,
- Red Hat Czech Republic,

- Cisco Systems, USA.
- Fortinet, USA

Within the framework of international cooperation, the FRI UNIZA also started a new Erasmus+ programme period in 2022. Within the Erasmus+ programme in 2022, students and staff could carry out mobility on the basis of more than 30 bilateral agreements. Some of the contracts are signed at university level. The Faculty of Management Science and Informatics has Erasmus+ bilateral contracts in force for cooperation with the following partner institutions:

- Czech Republic
 - Czech Technical University, Faculty of Information Technology,
 - University of Hradec Kralove, Faculty of Informatics and Management,
 - University of Pardubice, Faculty of Economics and Administration,
 - University of Pardubice, Faculty of Electrical Engineering and Informatics,
 - University of Technology and Economics in České Budějovice,
- Finland
 - University of Vaasa,
 - University of Jyväskylä,
 - LAUREA University of Applied Sciences,
- Norway
 - Molde University College - Specialized University in Logistics,
- Portugal
 - University of Porto,
 - Polytechnic Institute of Guarda,
 - ISCTE - Lisbon University Institute,
- Spain
 - Universitat Politecnica de Valencia,
- France
 - IMT Atlantique, Bretagne - Pays de la Loire,
 - Telecom SudParis, Evry,
 - IMT Business School, Evry,
 - Université de Lorraine,
 - ESIEA (Ecole Supérieure d'Informatique, Electronique et Automatique), Paris,
 - ECE Paris - Ecole d'ingénieurs,
 - Pole Universitaire Leonard de Vinci, Paris La Defense,
 - Université Gustave Eiffel,
- Germany
 - University of Applied Sciences - TH Aschaffenburg,
 - University of Applied Sciences - HTW Dresden,
 - University of Applied Sciences - TH Cologne,

- Poland
 - University of Business and Administration in Gdynia,
- Hungary
 - Széchenyi Egyetem - University of Győr,
- Slovenia
 - University of Maribor, Faculty of Economics and Business,
 - University of Maribor, Faculty of Electrical Engineering and Computer Science,
 - University of Maribor, Faculty of Organizational Sciences (Kranj),
- Croatia
 - University of Zagreb, Faculty of Organisation and Informatics (Varaždin),
 - University of Zagreb, Faculty of Electrical Engineering and Computing,
 - Polytechnic of Sibenik,
- Bosnia and Herzegovina
 - University of Sarajevo,
 - University of East Sarajevo,
 - "Logos Centar" College, Mostar,
- Serbia
 - University of Niš, Faculty of Electronic Engineering,
 - University of Belgrade, Faculty of Organizational Sciences.

In the academic year 2021/22, 34 foreign students studied at the faculty. 18 foreign students were on internship at the faculty. The sending institutions of these students are in the following countries: Bosnia and Herzegovina, Egypt, France, Croatia, Iran, Kazakhstan, Pakistan, Portugal, ROC Taiwan, North Macedonia, Serbia, Spain and Ukraine.

25 students of FRI UNIZA were on Erasmus+ study stay in the following countries - Czech Republic, Finland, France, Greece, Lithuania, Germany, Slovenia, Serbia, Spain. Two students were on Erasmus+ internship - in Germany and Spain. Another 17 students of the faculty took part in workshops abroad organized within the Erasmus+ KA203 projects. Two students were on internship - in Germany and Spain.

In the academic year 2021/2022, the faculty accepted 9 foreign teachers and researchers - from Bosnia and Herzegovina, Finland, Germany, Poland - as part of the mobility of foreign partners, mainly within the Erasmus+ programme. FRI employees carried out 18 mobilities abroad - in Bosnia and Herzegovina, Czech Republic, Lithuania, Poland, Portugal, Spain. They were financed from various sources - from the Erasmus+ KA103, Erasmus+ KA203 and also from the National Scholarship Programme of the Slovak Republic.

4.2 Student mobility programmes

The following tables show student mobility in the academic year 2021/22, i.e. students sent and received for a study stay or internship.

Table 37

Outgoing students on a study mobility				
Name of programme	No.	Surname and name	Receiving Institution, country	Number of months
Erasmus+	1.	Gorný Maroš	Universitat Politechnica de Valencia, Španielsko	5,87
	2.	Martynenko Diana	Pôle Univesitaire Léonard de Vinci, Francúzsko	3,37
	3.	Paršová Natália		8,73
	4.	Vyšinský Tomáš	Jyväskylä University of Applied Sciences, Fínsko	4,00
	5.	Suchý Matej	University of Jyväskylä, Fínsko	5,00
	6.	Piatriková Lucia	Univerzita Karlova v Praze, Česká republika	4,50
	7.	Čániová Ľudmila		4,50
	8.	Lány Adam		4,50
	9.	Staník Jozef	University of Niš, Srbsko	4,37
	10.	Čáni Ján	University of Maribor, Slovinsko	4,60
	11.	Čániová Ľudmila		4,60
	12.	Houbová Terézia Mária	University of Vaasa, Fínsko	4,73
	13.	Konštiaková Lucia		4,73
	14.	Štefanec Pavol		4,73
	15.	Pauríková Michaela		4,73
	16.	Opavská Denisa	IMT Business School, Evry, Francúzsko	4,50
	17.	Bedleková Martina		4,50
	18.	Bjeláková Aneta		4,50
	19.	Juríčková Erika		4,50
	20.	Macková Denisa	University of Patras, Grécko	4,50
	21.	Nošková Miloslava		4,50
	22.	Hrivíková Katarína	Vilnius Gediminas Technical University, Litva	4,50
	23.	Cáder Patrik	ŠKODA AUTO Vysoká škola o.p.s., Česká republika	4,50
	24.	Grexa Patrik	University of Applied Sciences HTW Dresden, Nemecko	4,60
	25.	Mackintosh Kade		3,10
Total	- 25			116,66
Women	- 15			71,39

Table 38

Outgoing students for an internship				
Name of programme	No.	Surname and name	Receiving Institution, country	Number of months
Erasmus+	1.	Doová Martina	Siete Alisios SL, Španielsko	5,33
	2.	Heczko Peter	KraussMaffei Technologies, Nemecko	7,53
Total	- 2			12,86
Women	- 1			5,33

Table 39

Outgoing students on a short mobility				
Name of programme	No.	Surname and name	Receiving Institution, country	Number of months
Erasmus+	1.	Abrahám Jakub	Universitat Politecnica de Valencia, Španielsko Projekt Erasmus KA203 „Education of Future ICT Experts based on Smart Society Needs“	12
	2.	Adamík Pavol		12
	3.	Čáni Ján		12
	4.	Gorný Maroš		12
	5.	Kušnírová Dana		12
	6.	Michalcová Timea		12
	7.	Caban Daniel	Mendelova univerzita v Brně, Česká republika Projekt Erasmus KA203 „Innovative Open Source courses for Computer Science curriculum“	5
	8.	Hodás Peter		5
	9.	Hrubizna Jakub		5
	10.	Jančíková Romana		5
	11.	Jaššová Alžbeta		5
	12.	Kostor Ján		5
	13.	Košičiar Dávid		5
	14.	Krátky Dávid		5
	15.	Majba Maroš		5
	16.	Panáková Rebeka Beáta		5
	17.	Rádiková Jana		5
Total	- 17			127
Women	- 6			44

Table 40

Incoming students on a study mobility				
Name of programme	No.	Surname and name	Receiving Institution, country	Number of months
Erasmus+	1.	Gibhart Antoine	CESI Paris, Francúzsko	4
	2.	Bouhtout Wasim	ECE Paris-Lyon, Francúzsko	4
	3.	Martyn Marie	IMT Atlantique, Francúzsko	4
	4.	Antonio Manuel Resende Lima	Iscte-University Institute of Lisbon, Portugalsko	4
	5.	Simon Kreder	Pole Universitaire Leonard de Vinci, Francúzsko	4
	6.	Sellin Olomani	South East European University Tetovo, Severné Macedónsko	4
	7.	Fjolla Baftijari		4
	8.	Dika Drenas		4
	9.	Kaca Stanimirovic	University of Belgrade, Srbsko	4
	10.	Joao Pedro Pihheiro de Lacerda Campos	University of Porto, Portugalsko	4
	11.	Elisa Antonia Ballester Marín	University of the Balearic Islands, Španielsko	4
	12.	Magdalena Dragcevic	University of Zagreb, Chorvátsko	4
	13.	Ivan Kikas	College Logos Centar Mostar, Bosna a Hercegovina	3
	14.	Queda Bedam	Polytechnic Institute of Beja, Porgugalsko	4
	15.	Cardoso Edson		4
	16.	Mamadou Cisse	ESAIP La Salle, Francúzsko	4
	17.	Khany Djemissi		4
	18.	Yeno Ngayi Rose Sharon		4
	19.	Luka Svetlecic	University of Zagreb, Chorvátsko	4,5
	20.	Karla Hlebec		4,5
	21.	Damjan Coric		4,5
	22.	Ivana Crnov		4,5
	23.	Ana Marija Trogrlic		4,5
	24.	David Slavik		4,5
	25.	Stjepan Petrovic		4,5
	26.	Julien Pinchon	ESIEA Paris, Francúzsko	5
	27.	Abigaëlle Brunet	IMT Atlantique, Francúzsko	4
	28.	Alma Jusufic	University of East Sarajevo, Bosna a Hercegovina	3
	29.	Medina Talentovic		3
	30.	Bruno Obradovic	College Logos Centar Mostar, Bosna a Hercegovina	3
	31.	Kassymzhomart Sagatbek		3

Incoming students on a study mobility				
Name of programme	No.	Surname and name	Receiving Institution, country	Number of months
	32.	Zhandos Barsay	Almaty University of Power Engineering and Telecommunications, Kazakhstan	3
	33.	Kateryna Derrii	Odessa Polytechnic National University, Ukrajina	4
	34.	Yu-Lin Wang	National University of Kaohsiung, ROC Taiwan	10
Total	- 34			140,5
Women	- 15			69,5

Table 41

Incoming students for an internship				
Name of programme	No.	Surname and name	Receiving Institution, country	Number of months
Erasmus+	1.	Bertrand-Dalechamps Samuel	Telecom Sudparis Evry, Francúzsko	2
	2.	Cadeddu Axel		2
	3.	Chardon Julien		2
	4.	Crepieux Guillaume		2
	5.	Desgranges Rémi		2
	6.	Diallo Salia-Sidi		2
	7.	Ehrle Arthur		2
	8.	Gouyen Matthieu		2
	9.	Guillemot Mathias		2
	10.	Labcir Sofiène		2
	11.	Langard Silouane		2
	12.	Levieux Clément		2
	13.	Monteforte Maxime		2
	14.	Roblain Charles		2
	15.	Sharif Saïm		2
NSP	16.	Sadiq Muhammad	Pakistan	10
	17.	Rahmani Shima	Irán	10
	18.	Elkhwesky Zakaria	Egypt	10
Total	- 18			60
Women	- 1			10

4.3 Staff mobility programmes

The following tables show staff mobility in the academic year 2021/2022, i.e. staff sent and recruited for mobility.

Table 42

Outgoing staff on a teaching mobility				
No.	Surname and name	Receiving Institution, country	Number of days	Type
1.	Kucharčíková Alžbeta	Vysoká škola technická a ekonomická v Českých Budějovicích, Česká republika	4	Erasmus+ teaching
2.	Brídová Ivana	Univerzita Hradec Králové, Česká republika	4	
3.	Márton Peter	Hochschule für Technik und Wirtschaft Dresden, Nemecko	5	
4.	Malichová Eva	Polytechnic Institute of Guarda, Portugalsko	5	
5.	Tokarčíková Emese		5	
6.	Gonda Dalibor	Kirchliche Pädagogische Hochschule Krems, Rakúsko	5	
7.	Jankovič Peter	Univerzita Pardubice, Česká republika	4	
8.	Moravčík Marek	Univerzita Hradec Králové, Česká republika	4	
9.	Kozubíková Zuzana	Vysoká škola technická a ekonomická v Českých Budějovicích, Česká republika	4	
10.	Kozubík Aleš		4	
11.	Márton Peter	College Logos Centar Mostar, Bosna a Hercegovina	5	
12.	Jankovič Peter		5	
13.	Márton Peter	Universidad Politecnica de Valencia, Španielsko	5	Erasmus+ KA203 project SmartSoc
14.	Hodoň Michal		5	
15.	Malichová Eva		5	
16.	Tokarčíková Emese		5	
17.	Straka Milan	Basque Center for Applied Mathematics, Bilbao, Španielsko	120	NSP
18.	Eva Malichová	Universidad Politecnica de Valencia, Španielsko	120	
Total	- 18		313	
Women	- 8		152	

Table 43

Incoming staff on a teaching mobility				
No.	Surname and name	Receiving Institution, country	Number of days	Type
1.	Impola Jorma	Seinäjoki University of Applied Sciences, Finsko	10	Erasmus + teaching
2.	Fröhlich Sven	Technische Universität Dresden, Nemecko	5	
3.	Sobczyk-Kolbuch Anna	Katowice Business University, Poľsko	5	
4.	Gabrišová Marie		5	
5.	Ramljak Ivana	College Logos Centar Mostar, Bosna a Hercegovina	5	
6.	Kvesić Vanja		5	
7.	Stević Željko	University of East Sarajevo, Bosna a Hercegovina	5	
8.	Marek Bolanowski	Ignacy Lukaszewicz Rzeszow University of Technology, Poľsko	5	Project 027/RID/2018/19
9.	Andrzej Paszkiewicz		5	
Total	- 9		50	
Women	- 4		20	

4.4 Foreign educational and other (non-research) programmes and projects

Table 44

Foreign educational and other (non-research) projects in 2022					
Project number	Project name and objective	Contributor (contractor, coordinator, partner)	Faculty, Institute	Partner foreign institutions	Years of solution
2019-1-SK01-KA203-060789	SmartSoc - Education of Future ICT Experts Based on Smart Society Needs	University of Žilina in Žilina	FRI	Universitat Politecnica de Valencia, Spain Szechenyi Istvan University, Gyor, Hungary University of Debrecen, Hungary Technical University of Košice, Slovakia, IMT Atlantique, Bretagne Pays de la Loire, France University of Oradea, Romania, University of Zagreb, Croatia Josip Juraj Strossmayer University of Osijek, Croatia Technical University Sofia, Bulgaria University of Jyväskylä, Finland Seinäjoki University of Applied Sciences, Finland European Institute for Job and Industrial Relations, Germany	2019-2022
2020-1-HR01-KA203-077777	Accelerating the transition towards Edu 4.0 in HEIs	Sveučilište u Zagreb, Faculty of Organisation and Informatics	FRI	Tallinn University, Estonia Univesrita degli Studi dell'Aquila, Italy University of Belgrade, Serbia Universitat Politecnica de Catalunya, Spain The Open University, United Kingdom	2020-2023

Foreign educational and other (non-research) projects in 2022					
Project number	Project name and objective	Contributor (contractor, coordinator, partner)	Faculty, Institute	Partner foreign institutions	Years of solution
2019-1-PL01-KA203-065564	Innovative Open Source courses for Computer Science curriculum	West Pomeranian University of Technology in Szczecin	FRI	Mendel University in Brno, Czech Republic	2019-2022
610166-EPP-1-2019-1-SK-EPPKA2-CBHE-JP	Advanced Centre for PhD Students and Young Researchers in Informatics	University of Žilina in Žilina	FRI	University of Lodz, Poland Universite de Lorraine, France Nazarbayev University, Kazakhstan Satbayev University, Kazakhstan Zhangir khan West Kazakhstan Agrarian-Technical University, Kazakhstan Korkyt Ata Kyzylorda State University, Kazakhstan Manash Kozybayev North Kazakhstan State University, Kazakhstan	2020-2023
612462-EPP-1-2019-1-SK-EPPKA2-KA	University-Industry Educational Centre in Advanced Biomedical and Medical Informatics	University of Žilina in Žilina	FRI	Leeds Beckett University, United Kingdom Peter L. Reichertz Institut für mezinische Informatik, Technische Universität Braunschweig, Germany Universita Campus Bio-medico di Roma, Italy Universidad Rey Juan Carlos, Spain Oulun Yliopisto, Finland Universitat de Valencia, Spain Telesig Ltd, Bulgaria Stapro Slovensko s.r.o., Slovakia	2020-2022

Foreign educational and other (non-research) projects in 2022					
Project number	Project name and objective	Contributor (contractor, coordinator, partner)	Faculty, Institute	Partner foreign institutions	Years of solution
				Dr. Guido Kaufmann e.K., Germany Bioanim, Slovenia University of Ostrava, Faculty of Medicine, Czech Republic University Hospital with Polyclinic Žilina, Slovakia	
2020-1-HR01-KA226-HE-094713	Cloud cOmputing for Digital Education INnovation	University College near Sibenik	FRI	Technical University of Łódź, Poland LUISS Università Guido Carli, Italy Universidade de Aveiro, Portugal	2021-2023
2021-1-SK01-KA220-SCH-000027903	Object Oriented Programming for FUN	University of Žilina in Žilina	FRI	Business Academy Považská Bystrica, Slovakia Gymnazium Pardubice, Czech Republic University of Pardubice, Czech Republic Hochschule für Technik und Wirtschaft, Dresden, Germany Gymnasium Dresden-Plauen, Germany Gimnazija Ivanjica, Serbia University of Belgrade, Serbia Ivanec Secondary School, Croatia Sveučilište u Zagreb, Croatia	2022 - 2024
2022-1-SK01-KA220-HED-000087306	Application of Inclusive Design Thinking in the Technically-Oriented Subjects at HEI	University of Žilina in Žilina	FRI	Universitat Politecnica de Valencia, Spain Debreceni Egyetem, Hungary IMT Atlantique, Bretagne Pays de la Loire, France Sveučilište u Zagreb, Croatia	2022 - 2025

Foreign educational and other (non-research) projects in 2022					
Project number	Project name and objective	Contributor (contractor, coordinator, partner)	Faculty, Institute	Partner foreign institutions	Years of solution
				European Institute for Job and Industrial Relations, Germany Wilhelm Büchner Institut Darmstadt, Germany Tallinn University, Estonia EGGZTRA Innovation, Prague, Czech Republic	
2022-1-SK01-KA220-HED-000089149	Including EVERYone in GREEN Data Analysis	University of Žilina in Žilina	FRI	University College near Sibenik, Croatia University of Maribor, Slovenia University of Pardubice, Czech Republic Trokut Šibenik d.o.o. Incubator for New Technologies, Croatia	2022 - 2025

Table 45

Foreign educational and other (non-research) projects submitted in 2022					
Project number	Project name and objective	Contributor (contractor, coordinator, partner)	Faculty, Institute	Partner foreign institutions	Duration (non-session)
ERASMUS-EDU-2022-PI-ALL-INNO-BLUEPRINT 101111839	INTERMODS4EU	EURNEX e.V.	FRI	Remond Thomas, France Association pour le developpement de la formation, France BE Multimodal CONSULT, Belgium Ecole nationale des Ponts et Chaussees, France University of Pardubice, Czech Republic Union internationale des sociétés de transport combiné Rail-Route, Belgium New Opera AISBL, Belgium KTH Stockholm, Sweden TU Berlin, Germany Universita degli studi di Roma La Sapienza, Italy Universidad Politecnica de Madrid, Spain Sveučilište u Zagreb, Croatia Vilnius Gediminas Technical University, Lithuania	48

4.6 Membership of faculty, departments and individuals in international organisations

Staff of the Faculty of Management Science and Informatics are active in various international organisations. They are also members of scientific/programme committees of international scientific conferences, seminars and editorial boards of foreign scientific journals. In the following section, important memberships of the Faculty's staff are listed in clear tables.

Table 46

Membership of faculty staff in international organisations		
Surname, name, title	International Organization	Function
prof. Ing. Karol Matiaško, PhD.	National Evaluation and Foresigh Agency, Spain	Assesor
	Czech Society for System Integration	Member
	IEEE	Member
	ACM	Member
prof. Ing. Elena Zaitseva, PhD.	IEEE Czechoslovakia Section Reliability Society Chapter	Section Chair
	Technical Committee of European Safety and Reliability Association	Member
prof. Ing. Vitaly Levashenko, PhD.	International Association for Pattern recognition (IAPR)	Member
	IEEE	Member
doc. Ing. Michal Záborský, PhD.	Czech Society for System Integration	Member
doc. Ing. Peter Fabián, CSc.	GISIG – Geographical Information Systems International Group, Janov, Taliansko	Member of the Executive Committee
	EAIE - European Association for Internationalization of Education	Member
doc. Ing. Peter Márton, PhD.	Science Fund of the Republic of Serbia	Assesor
	International Association of Railway Operation Research	Member
prof. Ing. Martin Klimo, PhD.	IEEE	Member
	ACM	Member
	ICTC European Commission	Member
prof. Ing. Tatiana Kováčiková, PhD.	ETSI	Member
	Cost	Member
doc. Ing. Ján Janech, PhD.	IEEE: Advancing Technology for Humanity	Member
doc. Ing. Michal Varmus, PhD.	ESEA – European Sport Economics Association	Member
	EASM - The European Association for Sport Management	Member
prof. Ing. Milan Kubina, PhD.	EAI - European Alliance for Innovation	Member
	ESEA – European Sport Economics Association	Member
	EASM - The European Association for Sport Management	Member

Membership of faculty staff in international organisations		
Surname, name, title	International Organization	Function
	itSMF- IT Service Management Forum	Member
	IEEE	Member
doc. Ing. Miroslav Hrnčiar, PhD.	EQAVET – European Quality Assurance in Vocational Education	Member
	Austrian Society for Process Management	Member
	EIPA – European Institute for Public Administration	Member
doc. Ing. Miroslav Kvaššay, PhD.	IEEE	Member
	ACM	Member
doc. Ing. Michal Kvet, PhD.	IEEE	Member
doc. Ing. Jozef Kostolný, PhD.	IEEE	Member
prof. RNDr. Jaroslav Janáček, CSc.	SSOV	Member
doc. RNDr. Štefan Peško, CSc.	SSOV	Member
doc. Ing. Michal Koháni, PhD.	SSOV	Member of the Executive Committee
doc. Ing. Norbert Adamko, PhD.	European Simulation Society	Member
prof. Mgr. Jakub Soviar, PhD.	EAI - European Alliance for Innovation	Member

Table 47

Membership of faculty staff in editorial boards of foreign journals	
Surname, name, title	Name of foreign journal
prof. Ing. Elena Zaitseva, PhD.	Journal of Reliability and Statistical Studies – JRSS
	Journal Automatic Control and Information Sciences
	World Journal of Computer Application and Technology
	Journal of Radio Electronics, Computer Science, Control
	Journal of Mathematical Problems in Engineering
	Journal on Radioelectronic and Computer Systems
	ESRA Newsletter (European Safety and Reliability Association)
prof. Ing. Vitaly Levashenko, PhD.	Computer Science and Information Technology
	Computer Science and Engineering
	Automatic Control and Information Sciences
	Topics in Intelligent Computing and Industry Design
doc. Ing. Radoslav Jankal, PhD.	Journal of Radio Electronics, Computer Science
	Financial and credit activity: problems of theory and practice
	International Business Research

Membership of faculty staff in editorial boards of foreign journals	
Surname, name, title	Name of foreign journal
	International Journal of Business and Management
	Business and Management Research
	The GSTF Journal on Business Review
prof. Ing. Karol Matiaško, PhD.	Systémová integrace
doc. Ing. Peter Fabián, PhD.	Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration
prof. Ing. Ľuboš Buzna, PhD.	PLOS One
prof. Ing. Martin Klimo, PhD.	Infocommunications Journal
Ing. Zuzana Kozubíková, PhD.	Balkans Journal of Emerging Trends in Social Sciences - JETSS
doc. Ing. Anna Jacková, PhD.	AD ALTA: Journal of interdisciplinary Research
prof. Mgr. Jakub Soviar, PhD.	Advances in Economics and Business
	Sustainability – Topical Advisory Panel
Ing. Michal Hodoň, PhD.	Concurrency and Computation: Practice and Experience
doc. Ing. Emese Tokarčíková, PhD.	FORCE: Focus on Research in Contemporary Economics
	PROSPERITAS: Journal of Budapest Business School
Ing. Martin Mičiak, PhD.	JRFM - Journal of Risk and Financial Management - Special Issue: Practical Applications of Investments' Assessment in Organizations and Economies
Ing. Dominika Tumová, PhD.	
Ing. Zuzana Kozubíková, PhD.	Balkans Journal of Emerging Trends in Social Sciences – JETSS
doc. Ing. Miroslav Kvaššay, PhD.	International Journal of Computing
doc. RNDr. Katarína Bachratá, PhD.	Horizons of Mathematics, Physics and Computer Science
doc. Ing. Patrik Hrkút, PhD.	Digital Science Magazine

Table 48

Membership of faculty staff in scientific/programme committees of foreign scientific conferences	
Surname, name, title	Name of international scientific conference
prof. RNDr. Janáček Jaroslav, CSc.	14th International Conference on Strategic Management and its Support by Information Systems
doc. Ing. Tokarčíková Emese, PhD.	Hradec Economy Days 2022 (Vol. 12)
doc. Ing. Ďurišová Mária, PhD.	IX. International Strategic Research Congress
prof. Ing. Kucharčíková Alžbeta, PhD.	IX. International Strategic Research Congress
	4th International Scientific Conference, PEMF2022
doc. Ing. Jacková Anna, PhD.	Comparative European Research - CER
prof. Ing. Kubina Milan, PhD.	4th International Scientific Conference, PEMF2022
prof. Ing. Kubina Milan, PhD.	9th International Scientific Conference New Trends in Management and Production Engineering – Regional, Cross-border and Global Perspectives
doc. Ing. Varmus Michal, PhD.	Horizons of Rail Transport 2022

Membership of faculty staff in scientific/programme committees of foreign scientific conferences	
Surname, name, title	Name of international scientific conference
Ing. Holubčík Martin, PhD.	39th International Business Information Management Association (IBIMA) Virtual Conference
Ing. Brídová Ivana, PhD.	ICCCI2022, 14th International Conference on Computational Collective Intelligence
	Mobility2022, The Twelfth International Conference on Mobile Service, Resources, and User
	FedCSIS2022, 17th Conference on Computer Science and Intelligence Systems
doc. Ing. Karpíš Ondrej, PhD.	FedCSIS2022, 17th Conference on Computer Science and Intelligence Systems
doc. Ing. Kvašňay Miroslav, PhD.	Second International Workshop on Reliability Engineering and Computational Intelligence, RECI 2022
doc. Ing. Hrkút Patrik, PhD.	E-business technologies

5 Development plans for 2023 in individual areas

5.1 Learning area

The Faculty of Management Science and Informatics subscribes to the trend of increasing the proportion of the young generation with higher education in the Slovak Republic in line with the trends in the EU countries. In accordance with the strategy of research and innovation for intelligent specialization of the Slovak Republic and the development of the economy and industry of the Slovak Republic, we foresee an intensive development of entrepreneurship of small and medium-sized companies with a higher share of cutting-edge information and communication technologies, which will follow the development of large multinational companies. As a result, there is a constant need for a higher number of graduates in bachelor and Master higher education. Objectives:

- continuously improve the quality of study programmes, in cooperation with foreign partner faculties,
- Increase the intensity of the use of new knowledge from science, research and innovation in education,
- promote a personal approach to students,
- Motivate students to develop their skills and knowledge in order to increase the number of successful graduates of the faculty,
- Increase the use of English in education, especially in third and second cycle higher education,
- involve students in scientific research projects,
- Increase the proportion of international students, in particular by establishing cooperation in the provision of the same study programmes with foreign partners,
- to increase the proportion of students with study mobility abroad for one semester,
- Increase the proportion of lecturers from practice and abroad,
- Increase the proportion of faculty teachers lecturing in short-term and long-term mobility with foreign partners,
- ensure the quality process,
- create conditions for active involvement of students in quality assurance of education, as well as conditions ensuring the needs and requirements of students during all phases of their study cycle,
- the provision of supplementary education in the form of courses and lifelong learning, both full-time and distance learning,
- continuously update the Faculty regulations (statutes, study regulations, etc.) to reflect the changing processes in the field of educational provision.

Promotion of educational opportunities and recruitment of quality students will be carried out by the faculty in the form of:

- participation in education fairs in the Slovak Republic and abroad,

- organising Open Days - in the form of physical presentations of the faculty and laboratories, as well as online Open Days,
- faculty presentations on the faculty's website, the university's website and specialised websites focused on individual study programmes,
- presentation events organized in cooperation with successful companies, firms and corporations,
- close cooperation with selected secondary schools (organization of competitions, olympiads, presentations of faculty activities, etc.),
- Continuing to organise specialised courses and workshops for high school students (programming, robotics, management, etc.),
- organization of summer schools to motivate students and graduates to continue their studies at higher levels (Summer School of Machine Learning, etc.),
- promotion of research activities and research projects of the faculty,
- activities developed in cooperation with municipal and state authorities in order to develop the interest of the younger generation in studying,
- support of student activities and events, such as FRIčkovica, FRI UNIZA Ball, FRIpunch, FRIifest, Jean de Mijon's Beah and others,
- support of the FRI Club, a student organization that helps in organizing various faculty events and assists in organizing events such as open days, enrolment, etc,
- faculty presentations on social networks (Instagram, Youtube, Facebook, LinkedIn),
- FRIday events - science in the city, IT tea rooms, activities to attract girls to IT - Girls Day,
- mentoring programme,
- organising competitions for primary and secondary schools such as FLL.

The primary objectives for achieving the necessary quality of education are:

- Promote the European dimension of education, especially with regard to curriculum development, cooperation between institutions, mobility schemes and integrated study, training and research programmes.
- Create mechanisms to support the studies of top students.
- Promote European cooperation by establishing strategic partnerships with foreign partners in quality assurance with a view to developing comparable criteria and methodologies.
- Measure the quality of the institution's education by comparing its competitiveness with foreign countries.
- Focus more attention on the student.
- Promote physical mobility of students and teachers and remove barriers to free movement.
- Promote virtual mobility of students and teachers by creating joint virtual study groups with foreign partners.
- Provide students with opportunities to access learning and related services.

- Improve existing methods and ways of education by using ICT and new learning technologies.

We will emphasize the use of innovative methods and ways of education to meet the requirements of education for the knowledge economy. This will provide students with new opportunities to access learning. For this purpose, the faculty will create material conditions for:

- Publishing university textbooks and monographs also in electronic form.
- Use of e-learning systems and automated knowledge verification programs.
- To expand the number of places for independent study in the faculty campus, in the framework of the completion of existing laboratories, the construction of new laboratories, information center and rest areas.
- Create space for greater use of distance learning and consultation through telepresence systems and videoconferencing.

The faculty will continue to create conditions to support the active role, autonomy and independence of students in the process of quality assurance of education, in education and in the learning process, as well as conditions for respecting the diversity of students and their needs.

5.2 Research area

The faculty considers science, research and development (R&D) as an integral part of its mission and will build on it to provide teaching and business activities. The faculty will concentrate its activities mainly in the following areas:

- Tackling challenges within the European Research Area, such as:
 - roles within existing networks of European scientific and educational institutions, e.g. (EUA),
 - EU Framework Programme - Horizon Europe, COST,
 - the role of various other EU programmes
- Solution of tasks within long-term strategic research projects (DSV, ESIF), grants from APVV, VEGA and KEGA, other grant agencies and also work on faculty grants, which form the preparatory base for applications for external grants and projects (Horizon Europe, INTERREG, TEMPUS, COST, COPERNICUS, PHARE and others).
- Systematic cooperation on projects with industry and companies with international scope (Scheidt & Bachmann, Siemens, Deutsche Telecom, ETSI, ITU Geneva, SBB, OBB, DB, ČD, AŽD, EURNEX, KIA, Volkswagen, Siemens, Siemens Healthineers, GlobalLogic, Accenture, Detecon and others), national scope, but also with regional firms and companies (ŽSR, T-COM, IPESOFT, Kros and others).
- Activities to expand cooperation within existing innovation clusters and interest associations (Eurnex, Industry Innovation Cluster, Slovak.AI, Automotive Industry Association, Gaia-X and others).

- Creation of conditions allowing, depending on the strategy of financing science, research and innovation in the Slovak Republic, to obtain sufficient resources for the qualitative growth of the faculty.

The faculty will concentrate R&D capacities preferably on areas where there are real prerequisites for the application of human and material potential within the European Research Area ERA, or which are among the medium- and long-term priorities of the national R&D concept and the main implementation tool RIS3 SK and are supported by existing cooperation agreements. In connection with these areas, top research teams are being formed at the faculty, which will be respected at the Slovak but also international level, for the following areas:

- systems for decision support, optimization and simulation of complex transport and service systems,
- research on the resilience and safety of transport systems in crisis situations,
- Breakthrough technologies and products in healthcare - biomedical informatics - simulation of cell movement in fluid and reliability of systems,
- biomedical infrastructure support - digital biobank,
- Industry 4.0 - automation, innovation management, human potential management, use of ICT in business management,
- Macroeconomic and regional economic performance, efficiency of use of production inputs at macroeconomic, regional and enterprise levels,
- managerial decision-making (sustainable development, socially responsible business), multilateral relations of market actors,
- network security - protection of computer networks, autonomous systems for interpretation of information content,
- Big data - big data analytics, neural networks and deep learning,
- IoT and IoE - Internet of Things and Internet of Everything,
- development of algorithms and technologies in preparation of the infrastructure for the deployment of autonomous, connected and automated vehicles,
- Development of a smart network of charging and refuelling stations for alternative fuels (EV charging infrastructure, charging or refuelling stations and availability planning),
- development of systems for intelligent fleet management and predictive maintenance,
- Analysis and design of appropriate solutions for urban mobility, including data collection, data analysis and data processing using machine learning,
- visualization of data collected from industrial processes,
- transformation of real objects into digital form,
- embedded systems,
- distributed technologies (including blockchain technology),
- HPC (High Performance Computing), virtualization and cloud technologies,
- 5G networks,

- Quantum encryption and quantum information technology,
- distributed data processing systems based on WSNs (wireless sensor networks) and MAS (multi-agent systems).

Qualitative changes in science and research:

- Creation of prerequisites and rules within the internal motivational criteria to support the involvement in R&D projects and research cooperation with industrial partners and the environment for increasing the position of the faculty in the field of science, research and innovation (incentive system aimed at increasing the number of quality publications (impacted journals with a quartile in the WoS database).
- Support for qualitative evaluation of scientific and publishing activities, rewarding successful creators and researchers of projects and for publishing in major foreign and domestic journals (focusing mainly on outputs in impacted journals with Q1, Q2 and Q3 and increasing the citation index).
- Creation of an overview (supply list) of existing capacities of research laboratories of individual faculty departments.
- Co-organization of international scientific events to present the results of scientific research activities.
 - Supporting activities in the implementation of research and development results in the form of prototypes, as well as forms of their commercialisation through:
- Priority support for projects with an implementation outcome,
- project solutions based on cooperation with industrial partners,
- involvement in the solution of projects announced by ministerial bodies in the Slovak Republic,
- incubator activities for new companies, new technologies and new products,
- developing cooperation with industrial parks in the region,
- developing cooperation within innovation clusters and interest groups for networking, collaboration and exchange of experience between researchers and industrial partners.

Innovations in doctoral studies:

- Linking the objectives and tools of doctoral studies as a 3rd cycle education programme with existing science, research and innovation programmes and projects in order to increase its attractiveness and effectiveness.
- Support for the creation of joint disciplinary committees that will create a broader and more flexible space for research across multiple disciplines, with the consequence of reducing the number and broadening the focus of degree programmes.
- Offer of specialized courses aimed at e.g. supporting the teaching of mathematical methods and their application through selected software tools, project-based learning, etc.
- Inclusion of experts from abroad in the supervision of doctoral students' dissertations and doctoral courses.

- A link to an existing project or collaboration with practice will be a prerequisite for the admission of a new PhD student.

Each member of the teaching and research staff will continue to have a timetable for up-skilling and professional development, which will be drawn up and kept up to date. As before, assistant professors and assistant professors without a scientific degree will have a scientific training plan, assistant professors with a scientific degree will have a habilitation training plan and associate professors will have an inauguration training plan as part of their job descriptions.

5.3 Area of international cooperation

The faculty will pursue priority directions for international cooperation, which will be defined primarily by:

- by forming strategic partnerships with related faculties,
- creating joint study programmes with foreign universities and faculties,
- developing cooperation with traditional partners.

The Faculty will build on the rich international cooperation and cooperation agreements concluded so far. New agreements with foreign partners will be formulated in such a way that they are applicable within the framework of European mobility projects and contain specific objectives and conditions for their implementation in the field:

- international research projects,
- international non-research projects
- student exchanges for part-time study (minimum 1 semester or thesis) abroad,
- exchanges of teachers to teach specific subjects included in the curricula,
- the creation of virtual joint study groups for the teaching of specific subjects, which will be supported by Erasmus+ strategic partnership projects,
- mixed student mobility within a single course or study during a single semester.

5.4 Management and organisation

This area includes financing, business activities, faculty promotion, material and technical equipment.

Funding

The financial support for the activities of the Faculty is based on the following sources:

- state subsidy for the implementation of accredited study programmes,
- state subsidy for scientific, research and development activities,
- State subsidy for faculty development,
- Non-subsidy sources (grants, projects, etc.),
- income from business activities.

The internal distribution of the state subsidy in the conditions of the faculty takes into account the methodology of the Ministry of Education and the University.

In order to increase the evaluation value of the faculty, a portion of the salary funds will be allocated to recognize the most successful publications. In order to increase the evaluation value of the faculty, a part of the salary funds will be allocated for the recognition of international cooperation promoters.

In order to increase the grant success rate within the Slovak Republic and within the EU programmes, or other foreign programmes, we will prepare quality development projects as a potential source of inflow of funds from state and foreign sources. We will reward their researchers from the faculty's salary fund in the form of special-purpose extraordinary bonuses.

The most important element in the creation of own financial resources will be applied research and entrepreneurial activity, which enables more efficient use of human resources and faculty assets. The faculty will create conditions for increasing activities in entrepreneurial activities.

Other sources of income include entrance examination fees, other administrative fees associated with studies, sponsorship donations, bank loans and, to a lesser extent, income from the sale of surplus and unserviceable assets, etc.

Business activity

In accordance with the current legislation of the Slovak Republic and the development plans of UNIZA, we will create conditions for entrepreneurial activities that will be in line with the mission of the faculty and its activities.

The priority business development objectives are:

- expertise and consulting activities,
- project and development activities,
- building and operating joint research and commercial laboratories,
- LLL (lifelong learning),
- regional development activities
- establishment of student companies (start-ups) with the university's ownership and input,
- the involvement of sites in energy consumption and maintenance as one of the conditions of their operation.

Promotion of the Faculty

In the coming period, pay particular attention to:

- presentation of the faculty's achievements in the field of science and research,
- presenting the quality of education on the basis of acceptance by the job market.

Material and technical equipment

To manage the property entrusted to FRI UNIZA through efficient maintenance and in accordance with the strategic development plans of the Faculty and the University, to create technical and material conditions for ensuring research, development and education at the level of current needs.

In the coming period, pay particular attention to:

- maintenance, innovation and development of the faculty's laboratory equipment,
- reconstruction of faculty buildings,
- improving the technical condition of immovable and movable fixed assets and their modernisation,
- developing library information services,
- computerisation of processes using the relevant technical equipment.

The main tasks of investment and material equipment development:

- maintenance and development of laboratory equipment.
- rebuilding of the auditorium - part of the congress centre.
- redevelopment and extension of the basement of the RB building - creation of space for an innovation HUB - creation of a common space for intensive research collaboration with the external environment.
- expansion of the faculty's teaching facilities - extension of the RA building, or purchase/lease of additional premises in the RB building, which are part of the VÚD.
- creation of rest areas for faculty staff in departments.
- expansion and creation of additional rest areas for students at the faculty.
- elaboration and implementation of the investment purchase concept.
- elaboration and implementation of the long-term investment plan in accordance with the UNIZA plan.
- through development projects, state research programs and entrepreneurial activities to continue the implementation and innovation of the faculty laboratories.
- implementation of energy projects for the reconstruction, modernisation and automation of the workplace energy network.
- Information and communication technologies at the faculty will be implemented and developed as a priority in the following areas:
 - information and communication infrastructure,
 - information systems and services
 - security and data protection,
 - Application:
 - e-learning,
 - e-Research and Development (e-R&D),
 - e-business,
- electronic support for computerization of faculty processes, etc.