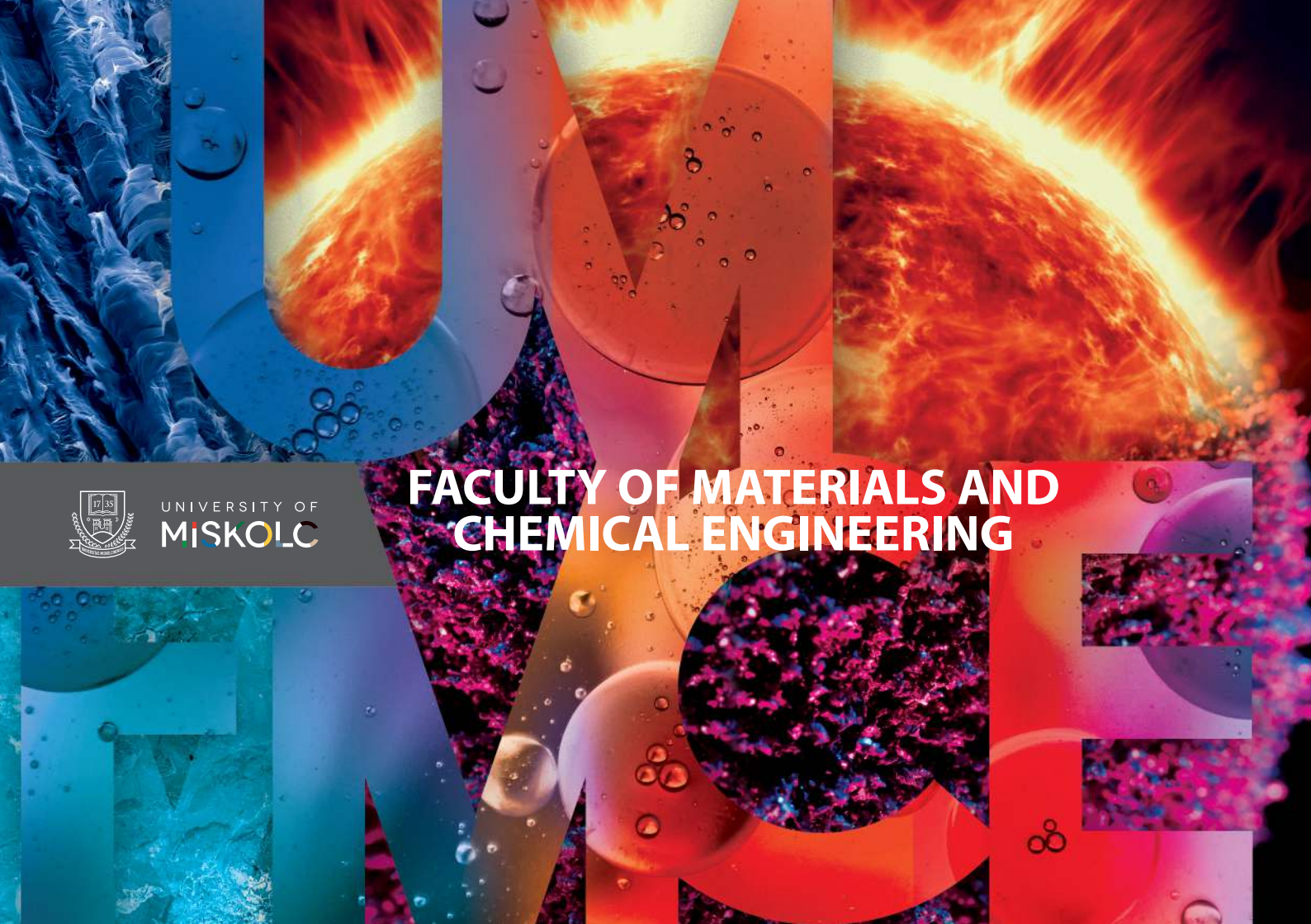

UNIVERSITY OF MISKOLC

FACULTY OF MATERIALS AND CHEMICAL ENGINEERING

CONTENTS

UNIVERSITY OF MISKOLC
FACULTY OF MATERIALS AND CHEMICAL ENGINEERING
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GREETINGS

Materials science and chemistry are fast-growing fields worldwide. Those who choose these fields as a career will learn not only about the structure and properties of materials but also about the environmentally friendly and energy-saving technologies needed to produce, manufacture, and modify them. Our faculty has been at the forefront of creating and disseminating materials engineering education in Hungary and has become a national center for training.

In our everyday life, we encounter more and more frequently special materials (e.g., shape-memory alloys, ceramics containing nanoparticles, metals, polymers and composites made from them, magnetic fluids, etc.), that most people first hear about after starting their studies n Materials Engineering or Chemical Engineering at the University of Miskolc. Today, the Hungarian chemical industry is based in Miskolc and a surrounding area of 30 km, including Kazincbarcika (BorsodChem), Sajóbábony (KISS Group), and Tiszaújváros (MOL MPK), where the demand for well-trained professionals is growing. This is one of the reasons why we decided to launch a bachelor's degree in chemical engineering in September 2019. Our first Master's degree in chemical engineering was awarded in the spring of 2023.

Those who choose engineering as a career and take their studies seriously can look forward to a secure livelihood and many rewarding professional challenges. Our graduate engineers have a range of attractive job opportunities to choose from. Companies are looking for ambitious young engineers with high-quality technical skills, both nationally and internationally.

Our university offers a tranquil environment, state-of-the-art training facilities, modern infrastructure, and varied and attractive leisure activities in a beautiful natural setting. Our students also benefit from the care we take to uphold our historical traditions (dating back to 1735), which foster a sense of professionalism and community. The relatively small size of the faculty creates a family atmosphere, with a close student-teacher relationship. Our students' outstanding results and achievements in national student research projects (TDK) are mostly due to this fact. The President of the Hungarian Academy of Sciences and the Minister of Higher Education regularly award the Pro Scientica Gold Medal to our most outstanding students and the Master Teacher Gold Medal to our most outstanding supervisors.

We are proud that engineers graduating from our university have an outstanding reputation, and that prestigious companies specifically seek engineers from Miskolc. The Faculty of Materials and Chemical Engineering pays special attention to serving the needs of industry and students. This is demonstrated by the fact that in 2015 we were among the first to launch dual BSc courses. We recommend this type of tuition for dedicated students who want to enter the workforce as a graduate with several years of industrial experience. The University of Miskolc is a leader in dual education nationwide, with the largest number of dual partner companies per bachelor's degree in the country. Students can choose from nearly 60 companies to study in a dual education program. The large number of companies that have joined this collaboration shows the value and prestige of the diploma we offer.

I am convinced that our faculty, with its centuries-old historical tradition, offers the quality of knowledge expected in the 21st century, and thus our students can become professionals with a promising future. If this opportunity appeals to you, apply to the Faculty of Materials and Chemical Engineering; we look forward to welcoming you!

Prof. Palotás Árpád Bence
Dean

OUR UNIVERSITY'S HISTORY

The history of the University of Miskolc can be traced back to 1949 when the Hungarian Parliament ordered the establishment of the Technical University of Heavy Industry in Miskolc to develop higher technical education. The University started with the Faculty of Mining and Metallurgical Engineering, which had been relocated from Sopron, and the newly established Faculty of Mechanical Engineering. The first classes were held in 1949, and by 1950 the current location of the university had been designated. Construction began in 1951, and the first academic buildings were ready for use in the autumn of 1951. The first graduation ceremony, where 236 students received their diplomas, was held in 1953.

In response to changing educational needs, the University started a law degree program in 1981, which became a separate faculty in 1983. After the introduction of the "modular curriculum" in 1987, the Faculty of Economics was established in 1990. The name of the university was changed to the University of Miskolc (UM) in 1990.

THE ISLAND OF KNOWLEDGE – EVERYTHING IN ONE PLACE

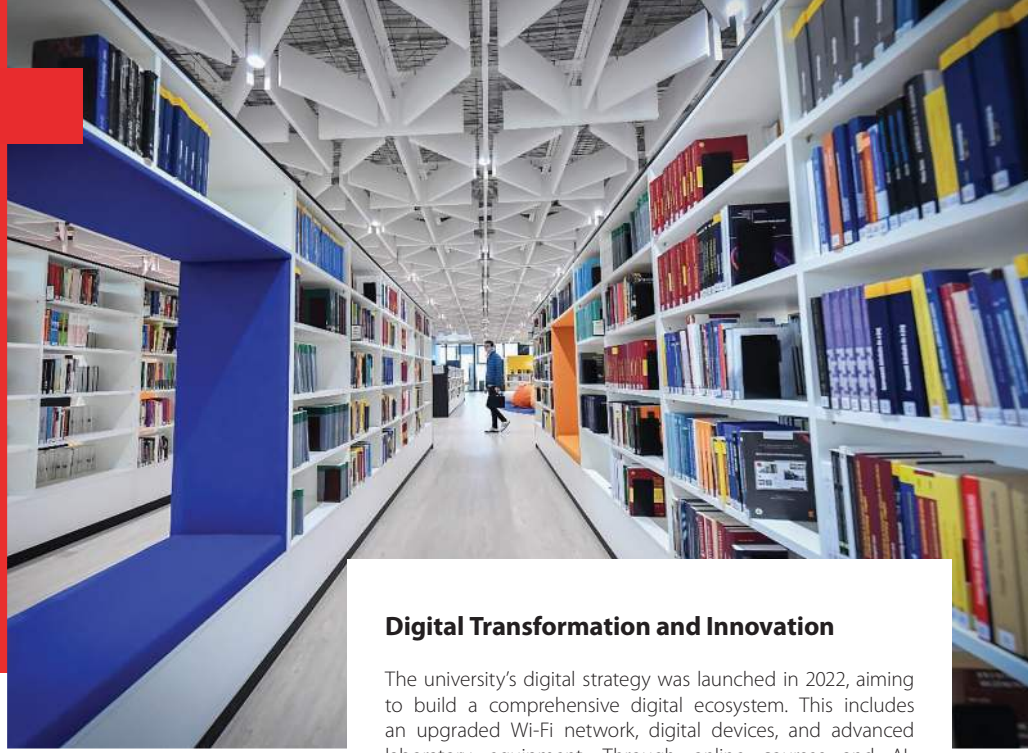
As the university has developed further, social sciences have been integrated into the curriculum, and opportunities have been created for students to study across multiple faculties and subjects simultaneously. Within the university, departments with expertise in diverse scientific fields teach a variety of faculties and subjects. The Institute of Humanities was founded in 1992 and later became a faculty, now named the Faculty of Humanities and Social Sciences. The Miskolc branch of the Liszt Ferenc Academy of Music joined the University in 1997 as the Bartók Béla Institute of Music.

The renewed technical faculties continue to operate as the Faculty of Earth Sciences (now the Faculty of Earth and Environmental Sciences), the Faculty of Materials Engineering (now the Faculty of Materials and Chemical Engineering), and the Faculty of Mechanical Engineering and Informatics. The Institute of Health Sciences was established in 2001 with a bachelor's degree program in nursing and was granted faculty status in 2005. After a name change in 2021, it continues its research and education activities as the Faculty of Health Sciences. In the same year, the Bartók Béla Institute of Music officially became a faculty, thus bringing the total number of faculties at the University of Miskolc to eight.

Modern Campus and Infrastructure

The University of Miskolc is located on an 85-hectare green campus at the foot of the Bükk Mountains. Students can study and live in a vibrant environment featuring modern lecture halls, laboratories, dormitories, sports facilities, and cultural spaces. High-speed internet and Wi-Fi are available throughout the campus, supporting both academic activities and everyday student life.

In recent years, significant infrastructure developments have taken place: dormitories are being continuously renovated, the former cafeteria has been transformed into a multifunctional event space, and a family-friendly building with a nursery has been constructed. These developments reflect the university's commitment to sustainability and student well-being.



Digital Transformation and Innovation

The university's digital strategy was launched in 2022, aiming to build a comprehensive digital ecosystem. This includes an upgraded Wi-Fi network, digital devices, and advanced laboratory equipment. Through online courses and AI-supported educational analytics, students acquire practical knowledge aligned with labor market expectations.

The University of Miskolc's research, development, and innovation activities are built around four key focus areas: Sustainable management of natural resources, Logistics 4.0 and digital technologies, Advanced materials and technologies, Innovative mechanical engineering.

International Rankings

The QS World University Rankings, one of the most recognized global higher education rankings, placed the University of Miskolc in the 1201–1400 range out of more than 5,600 institutions worldwide. Among Hungarian universities, it ranks 9th. Evaluation criteria include academic reputation, employer recognition, citation impact of scientific publications, participation in international research collaborations, and sustainability.

In the Round University Ranking (RUR) 2025, the University of Miskolc is ranked 714th, marking a 24-place improvement compared to the previous year. Among Hungarian institutions, it holds the 7th position.

FACULTY OF MATERIALS AND CHEMICAL ENGINEERING

The history of the Faculty of Materials and Chemical Engineering dates back to the founding of the university's predecessor, the Mining and Metallurgical School of Selmecbánya, in 1735. This school was established by the Viennese Court Chamber to support the production of noble metals and copper in Hungary. Their metallurgical-chemical laboratory teaching method was the first of its kind in the world and revolutionized science education, thanks to professors Nikolaus Joseph von Jacquin, Giovanni Antonio Scopoli, and Antal Ruprecht.

After the Second World War, in 1949, the Technical University of Heavy Industry was founded in Miskolc, and as part of this, the Faculty of Metallurgy moved from Sopron to Miskolc. From the early 1960s, the structure of the training was changed, and the introduction of the "modular curriculum" in 1987 broadened the sectors. In 1989, the Faculty of Engineering began offering engineering courses in collaboration with Eötvös Loránd University. On July 1, 1993, the Faculty established the Institute of Materials Science, which was the first in the country to start the training of materials engineers.

CAMPUS OF KNOWLEDGE AND COMMUNITY

The transformation of the university and new social and professional challenges have led to changes in the educational structure, resulting in the launch of new courses and specializations. In order to achieve our goals, the faculty changed its name over time. Initially, it was called the Faculty of Materials and Carbon Engineering, then it became the Faculty of Materials Engineering. Finally, in 2022, the name of the Faculty was changed to the Faculty of Materials and Chemical Engineering.

There are four institutes for education and research in our faculty: the Institute of Metallurgy, Metal Forming, and Nanotechnology; the Institute of Chemistry; the Institute of Metal Production and Casting; and the Institute of Energy, Ceramics, and Polymer Technology. As the culmination of the education, Ph.D. training is conducted by the Kerpely Antal Doctoral School of Materials Sciences and Technologies. Furthermore, our faculty carries out significant research work at the ELKH-ME Materials Science Research Group.

The Faculty of Materials and Chemical Engineering has outstanding potential in terms of the quality of education. In addition to our many internationally recognized, qualified educators, two members of the Hungarian Academy of Sciences are actively involved in the life, research, and teaching of our faculty.

EDUCATION

Materials Engineering BSc (SH)*

Metal Technologies specialization
Ceramics and Polymer Technology specialization
Space Technologies specilaization

Chemical Engineering BSc

Ph.D. course
in materials sciences and technologies science field **(SH)**

Materials Engineering MSc (SH)*

Building materials technologies specialization
Materials Testing specialization
Polymer tehnologies specialization
Sustainable energy specialization
Waste-based Materials Technologies specialization

Metallurgical Engineering MSc (SH)*

Foundry and Metal Industry Technologies specialization
Heat treatment and Metalforming specialization
Recycling of Electronic and Battery Waste specialization

Chemical Engineering MSc

Space Engineering MSc (SH)

Nanotechnology MSc

(SH) Available to Stipendium Hungaricum scholarship holders
* Fhe faculty decides which specialization will be launched in a given year, based on the results of the admission interviews.

BACHELOR STUDIES

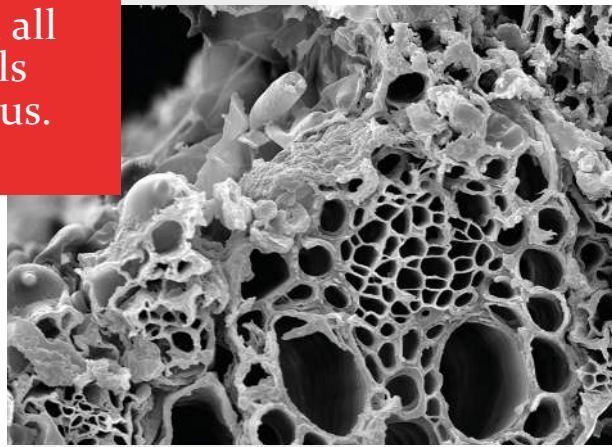
MATERIALS ENGINEERING
BSc

Pick up your mobile phone, look at the alloy rims of cars, take a step in your comfy trainers, think about eco-friendly solar panels, build with the latest bricks, and envision a Formula 1 car's brake disc glowing at over 1000 °C! All materials - and yet, thousands of creative, high-quality solutions.

Materials engineers are concerned with the structure, properties, and usability of the materials we use, both in our everyday objects and in our high-tech devices. They test and assess materials, and develop and operate innovative technologies. Our graduates are employed in successful small, medium-sized, and large companies, at home and abroad, including key sectors of the Hungarian economy, such as the internationally competitive automotive and chemical industries. We offer training in dual, cooperative, and traditional formats.

- Metal Technologies specilaization
- Ceramic and Polymer Technologies specilaization
- Space Technologies specilaization

History is there in all materials around us.



Innovative materials, sustainable technologies

CHEMICAL ENGINEERING

BSc

Our chemical engineering program offers an ever-expanding infrastructure for our constantly growing number of students. Chemical engineers are professionals involved in the operation, development, and application of industrial technologies using chemical and other processes. They are responsible for the production of new and innovative compounds in laboratory and industrial environments, as well as their analysis, property analysis, and the identification and solution of problems in the field of engineering materials science. Their daily tasks include solving global and local environmental problems across industries. Graduates can find employment in companies producing plastics, pharmaceuticals, food, special or general chemicals, cellulose paper, and petrochemicals. Training is offered in dual, cooperative, and traditional formats.

Chemical engineer education at the heart of the Hungarian chemical industry

MASTER STUDIES

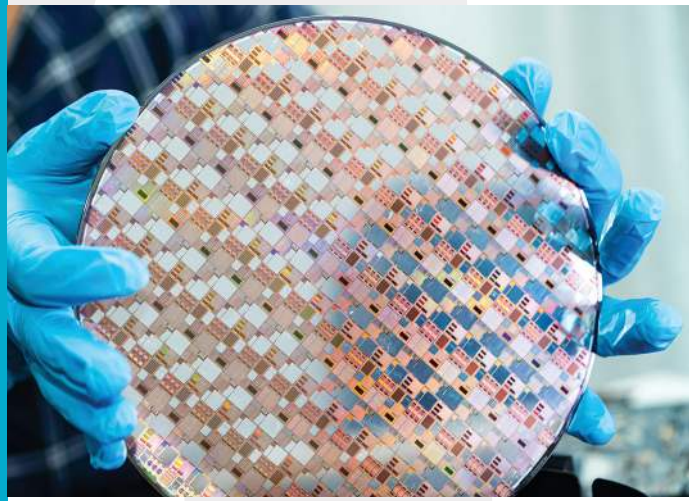
Take the lead to the future,
shape the materials of
tomorrow with us.

MATERIALS ENGINEERING

MSc

The aim is to train engineers who are able to design and operate technologies and carry out research and development tasks based on their knowledge of the basic sciences dealing with the structure, properties, and behavior of materials (e.g., metals and their alloys, ceramics and silicates, polymers and plastics). Master's candidates can choose from five specializations, and may also take the supplementary specialization in Quality Management or the MSc-level Technical Translation.

- Building materials technologies specialization
- Materials Testing specialization
- Polymer tehnologies specialization
- Sustainable energy specialization
- Waste-based Materials Technologies specialization



METALLURGICAL ENGINEERING

MSc

Students will acquire advanced knowledge of metallurgical technologies, metal production, scrap metal processing, metal forming, and casting. Graduates with a Master's degree in metallurgy are able to produce metals and alloys using metal raw materials and metal scrap, and process them into products with the properties, shapes, and sizes required by the industry. Master's candidates can choose from three specializations, and may also take the supplementary specialization in Quality Management or the MSc-level Technical Translation.

- Foundry and Metal Industry Technologies specialization
- Heat treatment and Metalforming specialization
- Recycling of Electronic and Battery Waste specialization

CHEMICAL ENGINEERING

MSc

The aim of the course is to train chemical engineers who are capable of developing, modeling, designing, operating, managing, and maintaining chemical process systems and procedures; developing chemical technologies, techniques, and new materials for energy-efficient and environmental-friendly applications of technological processes; performing leadership, management, and organizational tasks; conducting research, development, design, and innovation tasks in the field; and participating in and managing national and international engineering projects.

- Specialization in Chemical and Process Engineering
- Specialization in Materials Science

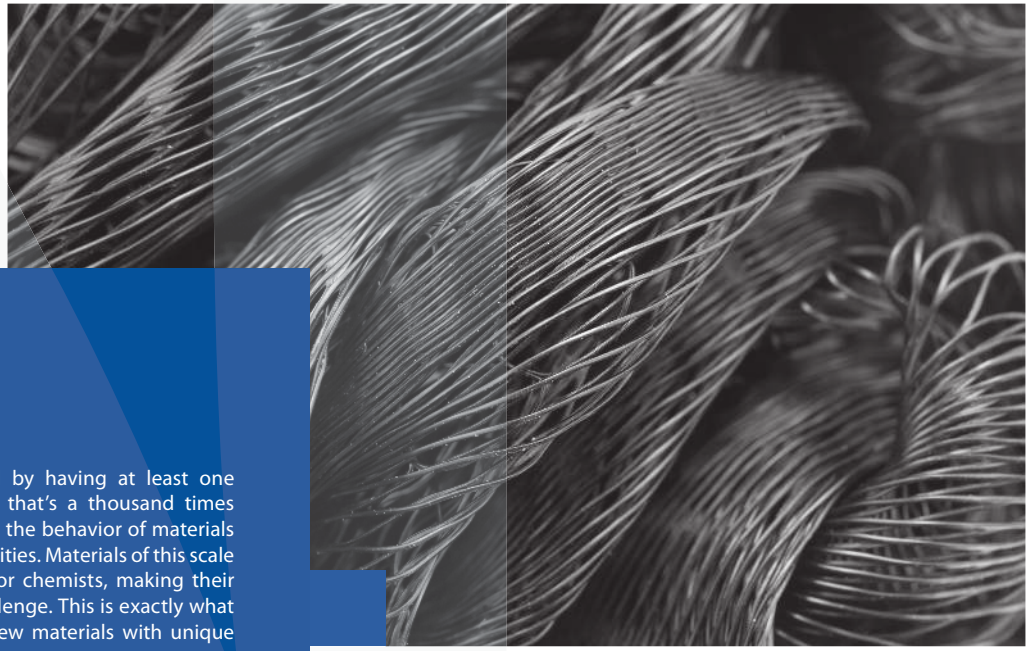
"The universe is constantly evolving, and so must we. Embrace change, adapt, and grow in alignment with the cosmic flow."

Deepak Chopra

SPACE ENGINEERING

MSc

In the latter half of the last century, we began working with non-metallic materials in addition to metals, either in combination with metals (composites) or separately (polymers, ceramics). Consequently, all types of materials are now part of our teaching and research portfolio. Our faculty is the cradle of BSc and MSc programs in materials engineering, serving as the center of materials science in Hungary. Our connections to the space industry are rooted in these foundations and have a long history spanning several decades, with numerous research projects undertaken in both metallic and non-metallic fields over the years. We have worked, and continue to work, successfully on several projects funded by the ESA (European Space Agency). The faculty maintains a close relationship with Admatis Ltd, a company with decades of experience in the space industry, and some of our lecturers and researchers are employed by this company, along with several graduates from our faculty.



NANOTECHNOLOGY
MSC

Nanostructured materials are characterized by having at least one dimension smaller than 100 nanometers – that's a thousand times thinner than a human hair! In this size range, the behavior of materials changes completely, opening up new possibilities. Materials of this scale are too small for engineers and too large for chemists, making their technological application a tremendous challenge. This is exactly what a nanotechnology engineer does: creates new materials with unique properties through smartly designed processes.

During the program, our students learn how nanostructures are made, how they can be examined, and how manufacturing processes can be optimized to be not only efficient but also environmentally friendly and cost-effective. This profession is truly a key to the future – without nanotechnology, today's most advanced medical devices, electronic gadgets, or the latest energy storage solutions would be unimaginable. Graduates in nanotechnology engineering will find opportunities both in research and industry, and they can even continue their studies in a doctoral program – and you could be the one making groundbreaking discoveries in this field!

Be Where the Future Is Born

DOUBLE DEGREE EDUCATION - AMIR CE/EM

The AMIR (The Master in Advanced Materials: Innovative Recycling) program was created in 2017 through a collaborative effort involving academia, industry, and research organizations. It was in response to the urgent need to enhance Europe's materials recycling capabilities. The AMIR program brings together leading European expertise to provide world-leading masterclasses in advanced materials and innovative recycling.

The AMIR program has been developed to address a key problem facing all advanced economies in the modern world - how do we transition to a green, circular economy that emits less CO_2?

The solution lies in developing advanced processes and technologies for recycling and reusing extremely valuable and finite raw materials.

The AMIR program aims to develop a curriculum that meets this need, enabling us to train international experts in creating innovative methods.

The AMIR program offers Hungarian and foreign students the opportunity to obtain a double degree. Students begin the first year at a university of their choice and continue the second year at another partner university. Upon successful completion of the course, our graduating engineers receive accredited diplomas from both universities.

Applicants for the AMIR program decide at the time of application which university they wish to study at:

01 Students starting their studies at the University of Bordeaux will continue their studies at the Technical University of Madrid or the Technical University of Darmstadt.

02 Those who enroll at the University of Miskolc or the NOVA University of Lisbon in the first year can continue their second year at the University of Madrid, the Technical University of Darmstadt, or the University of Liege.

You must apply via the AMIR-Master website..

For further information visit our website:: www.amir-master.com

AMIR master

DOUBLE DEGREE EDUCATION -

Montanuniversität Leoben

The Faculty of Materials and Chemical Engineering at the University of Miskolc has launched a double degree program in cooperation with the globally recognized Montanuniversität Leoben, a leading institution in materials science, mining, and metallurgy for over 180 years. The goal of this partnership is to train internationally competitive engineers who are well-versed in cutting-edge technologies and sustainable industry practices.

What does the program offer?

- Fully English-taught curriculum with a specialization in Polymer Engineering
- One year in Miskolc, one year in Leoben – two cities, two countries, countless experiences
- At the end of the program, you will receive two master diplomas of the two Universities
- An excellent foundation for a research or industry career – even abroad

This program allows students to benefit from the strengths of both institutions, gaining a broader professional perspective, international connections, and a real competitive edge in the global job market.

BEIJING UNIVERSITY OF CHEMICAL TECHNOLOGY | SCHOOL OF INTERNATIONAL EDUCATION

BEIJING UNIVERSITY OF CHEMICAL TECHNOLOGY (BUCT)

Chemical Engineer BSc

The BUCT–University of Miskolc Dual Degree Program offers an exceptional opportunity for students seeking advanced engineering knowledge in an international academic environment. The structure of the program allows students to complete their first two years at the University of Miskolc and their final two years at the BUCT. Upon successful completion, graduates receive diplomas from both institutions, giving them a strong competitive advantage in the global job market.

The program is supported by the Wanhua Chemical Group, which contributes to the practice-oriented development of the curriculum and provides a guaranteed job opportunity in Hungary after graduation. This ensures that students can begin their careers in a stable, internationally renowned industrial environment.

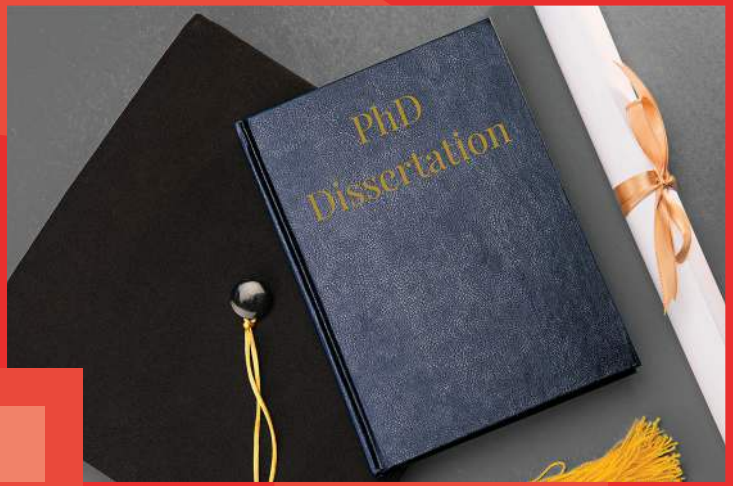
This dual degree pathway is an ideal choice for those who wish to broaden their horizons, develop intercultural competencies, and embark on their engineering career with two prestigious degrees and a secure professional future.

Study in Two Countries, Earn Two Degrees
Build Your Career Anywhere in the World!

DOCTORAL EDUCATION

At the Kerpely Antal Doctoral School of Material Sciences and Technologies, as in all other doctoral schools, doctoral studies can be conducted on a full-time, part-time, or individual basis, and the successful completion of the course is certified by the acquisition of the absolution. The thesis is submitted and defended at the end of eight semesters. After successfully completing these and other requirements (such as language proficiency and publication), the doctoral degree is awarded, and the doctoral diploma is conferred.

Under the new legal framework, it is not only possible to apply for a doctorate with an MSc degree but also with a BSc degree, in which case the candidate must also start the MSc program. Students admitted with a BSc degree must also obtain an MSc degree by the end of the complex examination (end of the 4th semester).



The Antal Kerpely Doctoral School of Materials Science and Technology covers eleven thematic groups:

- Casting,
- Chemical Metallurgy,
- Chemical Processes and Technologies,
- Ceramics and Technologies,
- High-Temperature Equipment and Thermal Energy Management,
- Interfacial and Nanotechnologies,
- Materials Informatics,
- Metal Forming,
- Physical Metallurgy, Heat Treatment,
- Polymer Technology,
- Space Materials Science and Technology.

INSTITUTES

Institute of Energy, Ceramics, and Polymer Technology

Institute Director: Prof. Helga Kovács

The Institute of Energy, Ceramics, and Polymer Technology covers four scientific areas. Energy and sustainable materials technologies are of major scientific and industrial interest today, and this is reflected in the research and educational activities of our Institute. In the field of energy technologies, energy generation by oxidative processes (combustion, gasification) will remain a dominant force in world energy production for the foreseeable future. At the same time, the energy carriers used are undergoing significant changes, with alternative solutions such as hydrogen technologies, pyrolysis technologies, and energy from waste becoming increasingly important. Our research in ceramics and silicate technologies addresses developments from brick-making to glass foam production. The institute is also involved in the investigation, research, and optimization of materials and related production technologies for the ceramics and silicate industries.

The field of polymer technology covers the design of polymer systems, processing technologies, additives, and the investigation and design of structural-properties. Our laboratory facilities in all three areas are unique in the country. We utilize 3D printing of various composites, using both ceramic and plastic materials. Our aim is for students to become familiar with state-of-the-art equipment of industrial size and functionality during their undergraduate years. Our fourth specialization, Quality Management and Quality Assurance, complements the specializations and technologies already listed, preparing students for the challenges of the industrial environment. We take particular care to ensure that our graduating engineers learn not only how the technologies work but also how they fit into the quality standards that are vital for companies.

Institute of Metal Production and Casting

Institute Director: Dr. János Péter Erdélyi

Our institute has nearly 60 years of experience in the field of casting and metal production. We offer the most advanced additive manufacturing techniques, from traditional to the most advanced 3D printing technologies. Today's most important issues are the environmentally friendly and sustainable use of materials in production, minimizing pollutant emissions, and maximizing waste recovery. These aspects must be integrated into production processes, and the development of technologies needs to follow these guidelines. Our institute has close ties with the automotive industry segment, for example with the major German car manufacturers (Audi, Mercedes Benz, BMW), the related foundry background is significant.

Component manufacturers serving the automotive industry (Bosch, Joyson, Hanon Systems) offer a wide range of products on the market. The electric car is undergoing a revolution, with the development of batteries and their recycling being priority technical areas.

Our institute offers the opportunity to study the entire range of technologies involved in the production of the metallic raw materials mentioned above, from their manufacture to their transformation into finished products. Through our industrial links, internships, and dual training course we provide partners for our students. Our advanced 3D additive, metallurgy, and casting laboratories are available to our students, allowing full testing of related materials. We welcome applications for the only higher education program in casting in Hungary!

Institute of Chemistry

Institute Director: Prof. Béla Viskolcz

The Institute of Chemistry works as a strategic partner with Wanhua BorsodChem Plc., MOL Petrochemicals, Kiss Group, and Bosch Group companies operating in Miskolc. With three industrial departments of its own, the Institute of Chemistry seeks to forge closer links with the region's leading chemical companies:

- Department of Chemical Technology (Wanhua-BorsodChem)
- Department of Fine Chemistry and Environmental Technology (Kiss Group)
- Department of Femtochemistry (Femtonics)
- Department of Technology and Engineering (SPL Europe)

The success of these collaborations is also demonstrated by joint winning tenders, contracts, and the dual education format. We have seized the GINOP grants as an excellent opportunity together with our industrial partners. The Institute of Chemistry plays a leading role in three major GINOP projects.

GINOP 2.2.1-15-2016-00005: Energy-efficient and environmentally friendly neutralization and recycling of chemical residues (research and innovative development of catalysts for the catalytic thermal neutralization of sodium chlorate with increased efficiency).

GINOP-2.3.2-15-2016-00058: Efficient production and use in intensive fish farms of preventive feed supplements based on immunostimulatory and hitherto unused microalgae strains.

GINOP-2.3.4-15-2016-00004: Establishment of the University-Industry Cooperation Center (FIEK) on Advanced Materials and Smart Technologies at the University of Miskolc.

The flagship project of the University of Miskolc aims to generate outstanding research, development, and innovation (RDI) results and their economic utilization. The project/FIEK identifies three focal areas or sub-projects (vertical dimension) as the area for RDI activities:

- Advanced materials and their testing
- Advanced materials technologies
- Intelligent control and automation

The first two areas build on each other synergistically and allow complementary research, in line with the partners' direct RDI themes. The third area links the two basic dimensions and offers the possibility for independent activity in the framework of Industry 4.0 research.

The members of the consortium (horizontal dimension) are the University of Miskolc led by BorsodChem Zrt., Robert Bosch Energy and Body Systems Automotive Electrical Parts Manufacturer and Distributor Ltd. (BOSCH), and ÉMI Building Quality Control Innovation Nonprofit.

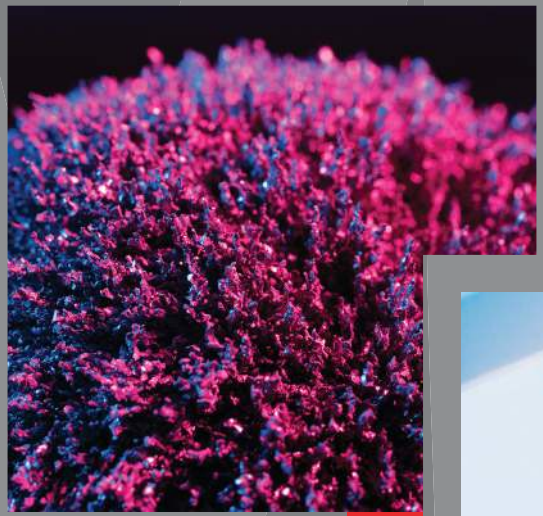
Institute of Metallurgy, Metal Forming, and Nanotechnology

Institute Director: Prof. Valéria Mertinger

Our institute is widely involved in metallurgy, forming technology, nanotechnology, and materials testing research, as well as education.

We place a strong emphasis on joint research and development with our corporate partners and are particularly proud of the large number of industrial partnerships we have with companies, which is outstanding even at the university level. We strive to serve our partners' needs for high quality with the most advanced technologies and tools available in the region, and the best-trained and motivated staff.

Over the past decade, our Institute has become one of the most successful university departments in Hungary in terms of success in European Union grants. Our researchers and teachers have won outstanding funding opportunities in many fields in major international tenders. We have an extremely wide network of national and international contacts in our research areas, and our international recognition is particularly high, both through our grant activities and our scientific publications.



We believe that the only way to provide a marketable university education is to incorporate the knowledge we have gained from our R&D projects and basic research activities into our curricula, so we pay particular attention to this. Students who come into contact with our institute (through TDK theses, BSc, or MSc thesis) are given the opportunity to become involved in our ongoing research and the opportunity to participate in the solving of real industry problems. It is perhaps also thanks to this philosophy of "let talent flourish and support it" that we are one of the most successful talent workshops in the country, as evidenced by the large number of 1st, 2nd, and 3rd place winners at national TDK conferences and, in particular, the high number of students awarded the Pro Scientia Gold Medal.

PROFESSORS

Prof. Péter Barkóczy
Metals, Heat Treatment
A former student of our faculty, Péter Barkóczy is currently working at the University of Miskolc and at FUX Plc. His main teaching and research fields include metallurgy, optical microscopy, image analysis, heat treatment, and non-ferrous metal alloys, phase transformation processes from cellular-automatic simulation to aluminum processing technology.

Prof. Péter Baumli
Nanotechnology, Physical Chemistry
Péter Baumli, a materials engineer and chemist, focuses on interfacial phenomena, particularly the wettability of aqueous solutions, salt melts, and metal melts. He is involved in nanomaterials design, metal matrix composites, nano-multilayer coatings, and the development of supercapacitors.

Prof. Márton Benke
Metals, X-ray diffraction
Márton Benke, a materials engineer, earned his Ph.D. degree from the Faculty of Materials Engineering, University of Miskolc, in 2010. His research interests include X-ray diffraction studies, solvent resistive wetting selective soldering tools development, shape memory alloys, TWIP steels, and non-destructive testing of residual stress.

Prof. György Czél
Polymer Forming Technology
György Czél, a mining engineer, contributed to the creation of the "space furnace" for NASA. Since 2000, he has researched polymer matrix biocomposites and polymer rheology. He is developing injection molding technology. He is also a patent attorney with expertise in the world of patents and an enthusiastic teacher of engineering students.

Prof. Csaba Deák
Innovation
Csaba Deák is a economist specializing in innovation as an innovator and consultant. He has been a member of ISPIM since 2006, serving as an advisory board member from 2009 to 2015 and a board member since 2015. He teaches courses in innovation, project management, and quality management.

Prof. Klára Hernádi
Nanotechnology, Physical Chemistry
Klára Hernádi, with a Ph.D. in chemistry (MTA), graduated in 2004 and has worked as a visiting researcher at prestigious universities abroad. Her research interests lie in physical chemistry, heterogeneous catalysis, and materials science, particularly nanocrystalline materials like carbon nanotubes, photoactive semiconductors, and nanocomposites.

Prof. György Kaptay
Nanotechnology, Physical Chemistry
György Kaptay, former dean of the faculty, Széchenyi Prize winner, and a full member of the Hungarian Academy of Sciences, heads the ELKH-ME Materials Science Research Group. He is the founder of the education in nanotechnology, an internationally recognized figure, and a prolific researcher. His uniqueness inspires students.

Prof. Tamás Kékesi
Metallurgy, metal extraction
Tamás Kékesi, a graduate with honors from our university in 1984, began working as a smelter the next day. Since 1986, he has focused on the theory and research of metal extraction and purification. In addition to Hungarian Candidate and Academic Doctorate degrees, he holds a Japanese doctoral degree and has received international scientific awards in the USA.

Prof. Helga Kovács
Energy Technologies
She earned her PhD in mechanical engineering sciences in 2013. Between 2015 and 2018, she worked as a researcher at the University of Utah (USA). Her main research areas include: recovery of valuable metals from combustion residues, phytomining, alternative energy production, combustion and gasification technologies. She is currently the head of the Institute of Energy, Ceramics and Polymer Technology.

Prof. Valéria Mertinger
Metals, Heat Treatment
After graduating in metallurgical engineering, she began her career as a researcher and later as a lecturer at the Department of Metallurgy. Her research focuses on the effects of flows on the structure of crystallized eutectic and martensitic transformations in shape memory metals. She received a gold medal as a master teacher.

Prof. Zoltán Mucsi
Organic Chemistry
Zoltán Mucsi is a medicinal chemist who graduated from the Department of Chemistry, ELTE TTK in 2002. He teaches organic chemistry, medicinal chemistry, and theoretical modeling of organic reaction mechanisms. His research interests include fluorescent sensor molecules, luminescence phenomena, and human diagnostics.

Prof. Miklós Nagy
Spectroscopy
He graduated as a chemical engineer-English translator (UD), later earning a degree in chemical engineering (UM). He teaches about chemical operations, process design, and polymer chemistry. His research focuses on intelligent fluorescent systems and the investigation of a proprietary family of (ICAN) dyes.

Emeritus Professors
Prof. Pál Bárczy, Prof. Zoltán Gácsi, Prof. Kálmán Marossy, Prof. Péter Mizsey, Prof. András Roósz, Prof. Tamás Török

Prof. Árpád Bence Palotás
Energetics, Combustion Engineering
He earned his degree in Metallurgical Engineering with honors from our University and his Master's degree in chemical engineering in the USA, where he researched atmospheric soot pollution abatement and the characterization of microscopic soot structures. He focuses on utilizing conventional and alternative energy sources.

Prof. Imre M. Szilágyi
Materials Science, Nanotechnology, Thermal Analysis
He graduated with honors as a chemical engineer (MSc, 2004, Budapest University of Technology and Economics – BME) and earned her PhD in 2009, also at BME. Between 2010 and 2012, he worked as a visiting researcher in Finland at the University of Helsinki. From 2012 to 2014, he led a research group at BME.

Prof. Milán Szőri
Molecular Simulation
He is a chemist with physical chemistry and high-performance computing expertise. His teaching and research span computational molecular simulations, theoretical and experimental studies of colloidal systems, and estimating two-photon excitation spectra of molecules. He also investigates oxidation reaction mechanisms of organic molecules.

Prof. Béla Viskolcz
Molecular Chemistry
Béla Viskolcz graduated as a chemist and obtained his PhD in Germany. His research at the University of Szeged focused on the effect of free radicals on molecular aging processes in living systems. Currently, he works on designing new advanced materials, developing molecular databases, and managing industrial projects.

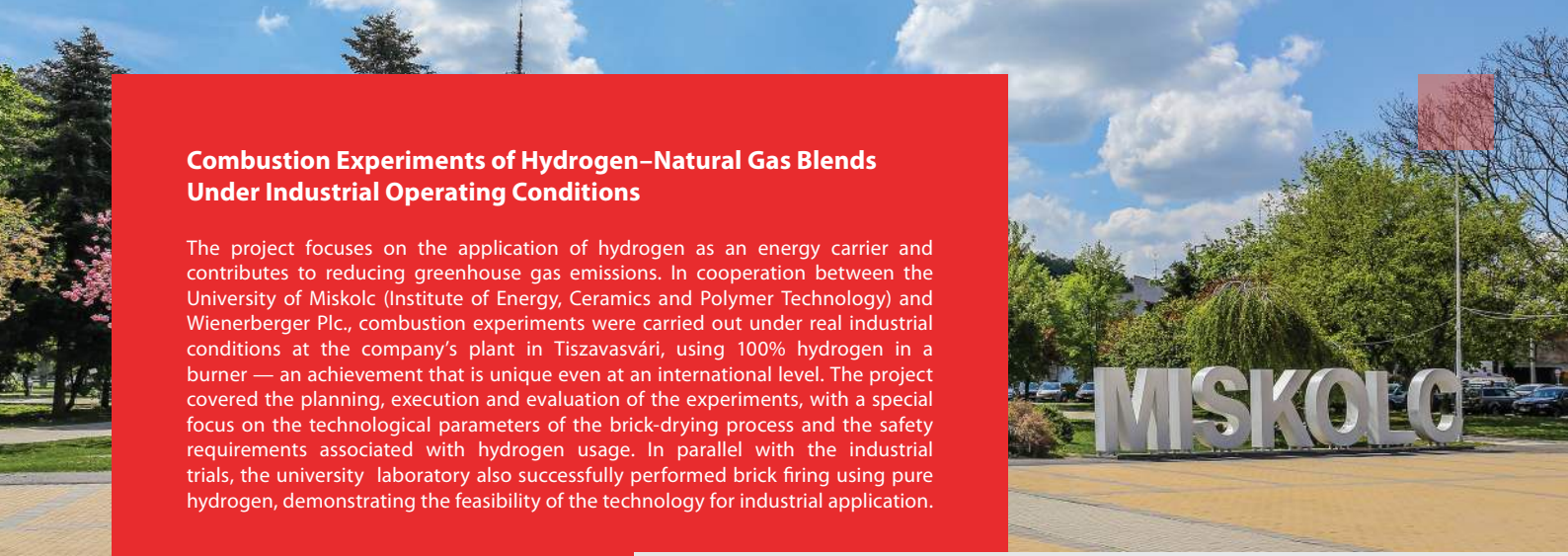
RESEARCH IN FOCUS

Life IP - Improving air quality in 8 regions by supporting the implementation of air quality plans

The project, which will run for 8 years, aims to tackle one of the most important environmental problems: the improvement of air quality in 10 Hungarian municipalities covering 8 regions. This will be achieved, among other things, by developing a decision-support air quality modeling tool, installing new air pollution monitoring stations, revising the air quality plans of the municipalities concerned, awareness-raising, information activities, local pilot actions, and a national advisory network.

Development of Z-scheme/CNT Hybrid Composites for Designing a Photocatalytic Wastewater Treatment Reactor

Water is a vital resource and an essential prerequisite for human, animal, and plant life, as well as a key factor for economic development. Increasing pollution levels pose serious risks to natural ecosystems, which is why international initiatives aim to significantly reduce water contamination by 2050. One critical challenge is the treatment of industrial wastewater before it is released into rivers or other natural water bodies. Traditional treatment methods often show limited efficiency and may even generate secondary pollution, making environmentally friendly and sustainable solutions necessary. Photocatalysis offers a green and effective approach by using light energy to break down organic pollutants. Researchers at the University of Miskolc are developing new hybrid composite materials that can purify wastewater under visible light. These materials will be tested on real industrial wastewater in Slovenia, and the results will contribute to the design of a photocatalytic reactor within a joint Slovenian–Hungarian scientific project.



Combustion Experiments of Hydrogen–Natural Gas Blends Under Industrial Operating Conditions

The project focuses on the application of hydrogen as an energy carrier and contributes to reducing greenhouse gas emissions. In cooperation between the University of Miskolc (Institute of Energy, Ceramics and Polymer Technology) and Wienerberger Plc., combustion experiments were carried out under real industrial conditions at the company's plant in Tiszavasvári, using 100% hydrogen in a burner — an achievement that is unique even at an international level. The project covered the planning, execution and evaluation of the experiments, with a special focus on the technological parameters of the brick-drying process and the safety requirements associated with hydrogen usage. In parallel with the industrial trials, the university laboratory also successfully performed brick firing using pure hydrogen, demonstrating the feasibility of the technology for industrial application.

Design of an Experimental Photocatalytic Reactor Using Z-scheme Semiconductors 2021-1.2.6-TÉT-IPARI-MA-2022-00003

The aim of this project is to develop a new generation of photocatalysts based on Z-scheme semiconductor materials, through close cooperation between the University of Miskolc and the Moroccan partner institution. The project aligns with the "water" priority of the call and combines photocatalytic reactor design with advanced materials science research. The Hungarian consortium includes Kisanalitika Ltd. (Sajóbábony), contributing significantly to the reactor design and accredited analytical testing. The project takes an interdisciplinary approach, integrating engineering (reactor development), materials science (photocatalyst synthesis), and environmental chemistry (characterisation and pollutant removal). The ultimate goal is to use the experimental reactor to degrade trace-level, hard-to-eliminate organic contaminants in wastewater — focusing on pesticide residues on the Hungarian side — and to prevent their release into the environment.

Bolyai János Research Scholarship – Recovering Energy and Valuable Raw Materials from Waste

The research focuses on how different types of waste — municipal, industrial, agricultural, and electronic — can be transformed into sources of energy and raw materials, supporting the transition toward a circular economy. Increasing waste generation poses environmental and economic challenges, yet with the right technologies, waste can become a valuable resource. The aim is to identify and optimise physical and chemical processes that enable the recovery of secondary raw materials and energy carriers. These include thermochemical methods (such as pyrolysis, gasification and combustion), which produce heat or synthesis gas, as well as chemical recycling techniques that convert plastics and other organic materials back into feedstocks. A key objective is the utilisation of by-products — such as ash, slag and metal oxides — and the extraction of valuable elements (e.g. precious or rare-earth metals). This research area is strategically import

Bimetallic Alloy Electrodeposition from Various Electrolytes: Synthesis, Modelling and Comparison

This project builds on a D1-ranked journal article published in early 2024, in which we developed a theoretical model capable of predicting the phase(s) and composition(s) of bimetallic alloys or intermetallic compounds formed at the cathode during galvanostatic electrodeposition at low current density. While our results are promising, experimental validation is necessary to demonstrate that the theoretical predictions align with real synthesis outcomes. The goal of the project is therefore to verify the model through controlled electrodeposition experiments in different electrolytes. As part of the research, we will introduce an Electrochemical Diagram that displays the equilibrium composition and the corresponding phase(s) of the cathodic product as a function of the relative mole fraction of the two electrochemically active cations, at constant pressure, temperature and electrolyte conditions.

GINOP PLUSZ-2.1.1-21-2022-00152 – Development of Cast Iron Material Grades for Automotive Brake Systems

Within the framework of the project, new brake components were manufactured using optimized material compositions. In parallel, test specimens were produced, on which various material testing methods were performed. As a result of the development, several new cast iron material grades were created, all suitable for the production of brake components. The research and development activities have successfully concluded with the creation of new materials and new products. The project is supported by continuous professional collaboration with domestic automotive companies. The associated research focuses on cast components used in vehicles. Current innovation trends in the industry include high-pressure die casting (HPDC) and additive manufacturing (AM). The related activities involve foundry technology and material testing research, such as the GigaCasting process and metal 3D printing using the SLM technology.

ARIZO 8 – Complex, Integrated Technological Development for the Production of Aromatic Isocyanate Precursors (2020-1.1.2-PIACI-KFI-2020-00121)

Funded by the NKFI Fund and carried out in cooperation between BorsodChem Zrt. and the University of Miskolc, the ARIZO project aims to develop an intelligent, tunable hydrogenation catalyst system for the efficient and economical production of aromatic isocyanate intermediates. By optimizing the noble metal composition, the catalytic process efficiency can be increased while reducing manufacturing costs and material losses. A key element of the project is the development of a cost-effective catalyst manufacturing method, including catalyst recovery and reuse. An industrial scoring system will also be introduced to support fast, informed decision-making regarding catalyst selection. The project uniquely establishes a complete catalyst development chain — from laboratory research through scale-up to industrial-level optimization — contributing to the creation of a regional knowledge hub and supporting sustainable, low-carbon chemical production.

EVENTS

KÖSZI – Community Service Office

EXPERIENCE – COMMUNITY – INSPIRATION

KÖSZI is the vibrant community space of the University of Miskolc, where Hungarian and international students meet, create, play, and learn from each other. Our free programs offer opportunities for connection, creativity, and personal growth — all in an open and welcoming environment. The program selection is constantly evolving: every semester brings new clubs, workshops, and community events.

Some are organized by student groups, others by the KÖSZI team – but they all share the same spirit of openness and good vibes. As an university student, you can take part in programs like the Multilingual World Café, Multilingual Uni Trip, Art&Craft Club, Board Game Club, Drop C Music Club, Anime Club, Reading Club, or Spanish Club – and many more waiting for you to discover!

WHERE EXPERIENCES
TURN INTO COMMUNITY!

2.0

Engineers for Sustainability 2.0
Event Series

High school awareness-raising lectures and experimental demonstrations on the role of engineering and environmentally conscious living. Our main goal is to help students understand the importance of sustainability in their everyday lives.

Finding science in materials

A group of interesting experiments where we show the true face and personality of materials. Spectacular demonstrations with ferromagnets, liquid nitrogen, flame experiments, chemical reactions, and much more. Discover the world of materials with us!

Shape Materials Science with Us
Demonstrations

The programs of the Faculty of Materials and Chemical Engineering are available throughout the year at events organized by the University of Miskolc and at individually arranged times for groups and schools. These include lectures, experimental demonstrations, laboratory visits, or even research topic presentations.

TRADITIONS

A unique heritage

The Academy in Selmecbánya boasted a set of vibrant student traditions - known as "Selmec traditions" - that has evolved into a distinctive legacy worldwide. Due to its uniqueness, students from far and wide, hailing from various provinces of the Habsburg Empire and other European countries, flocked to the Academy. Seasoned, elder colleagues aided younger peers in staying afloat and navigating their way. This involved "testing" newcomers to assess their trustworthiness and ability to meet future expectations.

This was the purpose of "bALEK education," incorporating humor alongside serious rules, as levity is essential. In most cases, these traditions were not newly invented but rather adopted from centuries-old community-bonding customs of other European universities and guilds, likely originating from medieval guilds.

Examinations, initiations of new members, communal entertainments, and group singing are familiar features found in many places. Students molded these customs to their preferences, adding and omitting elements. Occasionally, students from abroad introduced customs from their homelands, but the essence remained predominantly German and later Hungarian. Amidst the merriment, students formed their own aid societies to assist those in need, organizing charity events and providing care for sick peers. They often contributed blankets, pillows, or firewood, and even funded funerals for deceased companions.

The guiding principle throughout was "one for all, all for one." While traditions evolved over decades, the core values endured: cherishing one's vocation, aiding fellow students, and embracing the joys of student life to the fullest.

Centuries-old origin

The faculty was founded in 1735 under the name "Berg-schola", and its success led Maria Theresa to elevate the institution to a higher education status on 22 October 1762, under the name "Academia Montanistica". The term 'Montanistica' meant both mining and metallurgy. In the 18th century, the transportation of mined ore was challenging, prompting the establishment of smelters adjacent to the mines. Almost from its inception, the Academy became a renowned center for mining, metallurgy, and related sciences across Europe. As the academy evolved, the faculties of mining and metallurgy were eventually separated, first into mining and metallurgical engineering, and later into the Faculties of Earth and Environmental Engineering and Materials and Chemical Engineering in Miskolc. This led to the establishment of a historical order, with miners preceding metallurgists. The training of materials engineers in Hungary commenced in Miskolc in 1993, under the leadership of Professor Pál Bárczy, whose name is also widely known in connection with space materials research in Miskolc. Miskolc's rich industrial history provided an ideal environment for materials engineering, contributing significantly to the global metallurgy and metal industries.

Traditions

Student traditions inherited from Selmec accompany the lives of students at the University of Miskolc. Our traditions are primarily centered around friendship, mutual respect, and reverence for the profession. Students become part of this centuries-old cultural heritage from their first year.

A young person entering university, who may experience their first taste of university life during "bALEK" week, is initially considered a so-called "pagan". The highlight of our traditions is the professional ceremonies, which are enjoyable gatherings specific to each faculty but held according to strict house rules. The godparents of "bALEK" bestow upon them a „vulgo" and „alias" name, which they carry for life. While only second-year students are permitted to use the vulgo, as seniors, they are entitled to the alias. Subsequently, different ranks are conferred, with second-year students becoming "kohlenbrenner", and third-year students referred to as „FIRMA". In this role, they may also achieve the rank of „Glorious FIRMA in the Divine Light", and upon graduation, they are recognized as „veterans".

There are several reasons why these special events, called "szakestély," are organized. The bALEK baptism occurs during a bALEK baptismal ceremony. Additionally, there are ceremonies such as the kohlenbrenner (organized by second years), FIRMA toast ceremony, graduation ceremony, ribbon-stitching, ring-inauguration, and various industrial tradition ceremonies. Other traditional events include the bALEK Ball, the Selmec Students' Days, and the Salamander Festival. Student traditions form an incredibly strong bond, which extends throughout the country.

Incoming freshmen can find accommodations in the Bolyai dormitories. This is one of the largest in the country with six buildings for 1500 students in rooms with 2, 3, or 4 beds. The modern renovated student residences of the Uni-Hotel offer 603 beds, providing students with hotel-standard accommodation.

Student life

When freshmen arrive on the UM campus in September, they are amazed by the sight, which is not only impressive from a bird's eye view. Although the University of Miskolc campus is part of the city, it is a world apart in the 85-hectare park of the Dudujka Valley. Everyday life is lived in one of the most beautiful campuses in Europe.

A variety of services make life easier here. You can find something to eat on campus at the cafeteria or one of the snack bars, or drop by the on-campus bakery. For convenience, there is no need to rush to the city center for shopping - there are several ATMs, bookstores, a bookbindery, a gift shop, a health center, a taxi station, and a fitness center. Supermarkets and a small shopping center are located near campus.

The life of a first-year student is not just about learning: after class, local nightclubs are a great place to hang out, chat, make friends, and occasionally go to a concert. Big annual events such as MEN (Miskolc University Days) or RocktoberFest welcome music lovers for several days. Freshers' camp is a way to initiate newcomers, while the late autumn freshers' ball is a chance to dance the night away.

The Student Self-Governing Body (ME-HÖK) represents the interests of all students, while the Doctoral Students' Self-Governing Body (ME-DÖK) represents the interests of doctoral students. For those interested in programs and scholarships abroad, there are several student organizations. However, there are also a number of self-study groups, clubs, and activities. The MEAFC, the university sports club, is over 50 years old. There are currently 10 sports and competition sections for students outside of the curricular gymnastics hours. Its indoor sports hall is surrounded by handball, tennis, and basketball courts, football pitches, an athletics field, and football pitches, and the municipal swimming pool.

Every year you can take part in the Deer Runners' University and College Relay Race and the Selmec Memorial Run. Another important event is the AVK Faculty Sports Day, where students compete in various sports against teams of teachers.

The University of Miskolc – your best choice!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KOSSUTH