

MECHANICAL ENGINEERING

@ UNIVERSITY OF BELGRADE



215 years

UNIVERSITY OF BELGRADE
1808-2023



75
YEARS
1948-2023

SHAPING THE FUTURE OF MECHANICAL ENGINEERING
2024

76 years
Faculty

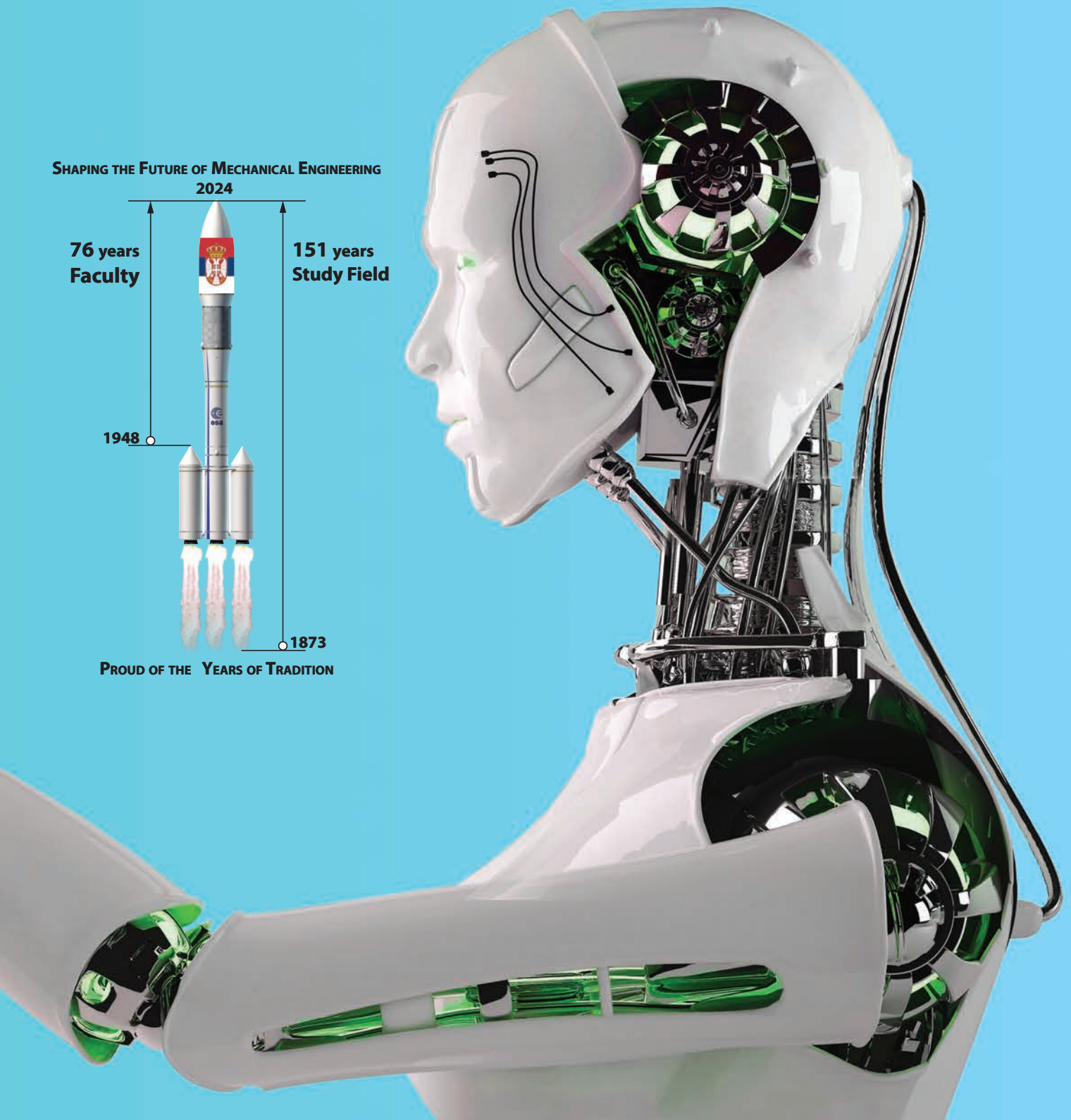
151 years
Study Field

1948



1873

PROUD OF THE YEARS OF TRADITION



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“How do we **educate** our very talented **undergraduate students** for an increasingly **global** and technological society?”

1

HALLMARK 1:
Educate students to be innovative engineers.

2

HALLMARK 2:
Educate students so they are prepared for graduate study.

3

HALLMARK 3:
Educate students for leadership roles.

4

HALLMARK 4:
Educate students for citizenship in a global society.

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DEANS THROUGH 76 YEARS OF THE FACULTY HISTORY

MESSAGE FROM THE DEAN

What you have before you is the expanded and greatly supplemented edition of the brochure "Mechanical Engineering @ University of Belgrade" published in 2018. It contains the description of the most important activities undertaken by the Faculty in recent years for the purposes of its transformation, modernization of educational, scientific and research capacities and modernization of the teaching process. In recent years, Faculty of Mechanical Engineering (FME) of the University of Belgrade (UB) has improved the quality and attractiveness of its study programmes and adapted them to global technical and technological trends. In this way, we have paved the way for students to a successful professional career of mechanical engineers, who are in demand both in the country and the world.

For decades, FME has provided supreme theoretical and practical knowledge to engineers. Practical competences and soft skills have been added to this in the recent period since users of our services, first and foremost the business sector, greatly insist upon these. Following our motto **"One step ahead"**, we turned, above all, to our best students, those who will contribute to the economic development of the country and a much higher growth rate of the national product by developing new products and technologies. It is for this reason that we founded the Student Excellence Centre. The centre currently brings together five student teams working on various innovative projects in the field of automotive engineering, aeronautical engineering, naval architecture, robotics and biomedical engineering.

They honourably represent the UB and the FME at various international competitions. We have introduced a new Master level study programme "Industry 4.0", which is carried out together with the Faculty of Mathematics (UB), and the leading domestic and international companies operating in Serbia. At the level of Bachelor academic studies, which used to be uniform, a few years ago, we introduced a new study programme of Information Technologies in Mechanical Engineering.

We are very proud of the cooperation with the business sector, not only in the field of education and scientific research, but also through joint work on various projects. A significant number of professors and associates are involved in a highly developed cooperation with the business sector, through which we generate more than 40% of total revenues. High quality of studies at the FME has been confirmed by the ASIIN and RINA international accreditations.

Furthermore, many companies have recognized the FME as a place where supreme engineers are educated, e.g. leading international and domestic companies. Cooperation with these companies entails tailoring the curricula to their needs, while they actively participate in the educational process through awarding scholarships, providing professional training and work on specific projects, with the possibility of getting employment mostly before the very completion of Master studies.

The quality of education, scientific and research work, international cooperation and cooperation with the business sector remains our main development priority. Continuation of thorough reforms of the FME and its further affirmation at the national and international level remains one of the basic priorities of the new/old leadership, as well.

In 2023, FME celebrated two important anniversaries - 75 years of its existence and successful work and 150 years since the introduction of higher education in the field of mechanical engineering in Serbia. On the occasion of the jubilee, we published an impressive monograph. We received the Sretenje Order, the most prominent state award. Also, we were honoured by the prestigious Sveti Sava award, for an outstanding contribution to education.

We established the Innovation Incubator and the digital repository of the FME, named Machinery. It provides open access to publications and other research outputs resulting from the projects implemented in this institution. The reading room was completely renovated. Activities of the Alumni Foundation were upgraded. We formed a unique basis of the PhD students and their mentors, named "Doktoroslov".

Most importantly, we enrolled 700 freshmen, which guarantees that the 25,000 mechanical engineers and 1,000 PhDs will successfully continue carrying the torch.



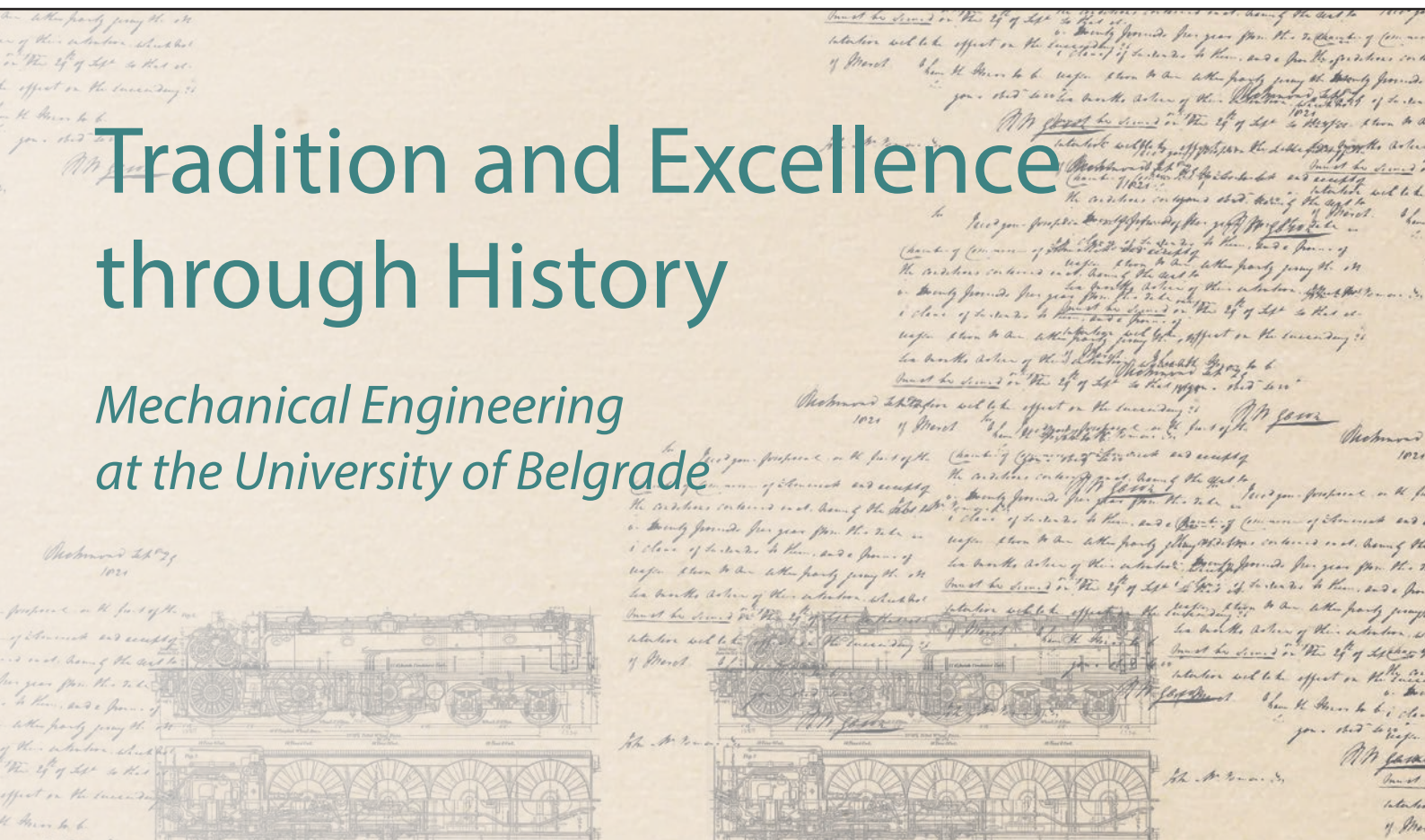
V. Popović

Prof. Dr. Vladimir Popović,
Dean the 25th

History

Tradition and Excellence through History

Mechanical Engineering at the University of Belgrade



1808

1863

1873

1897

1808

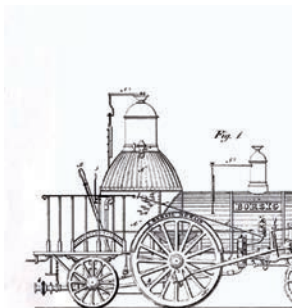
Grand School



215 years
UNIVERSITY OF BELGRADE
1808-2023



Technical Faculty on
the Grand School

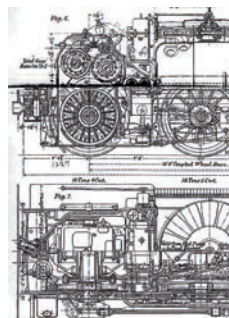


1863

1873

The first course titled:
Mechanics and the
Science of Machines

145 years



Mechanical-
Technical department

1,075,772

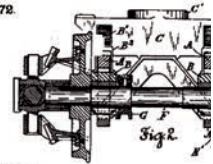
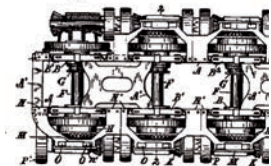
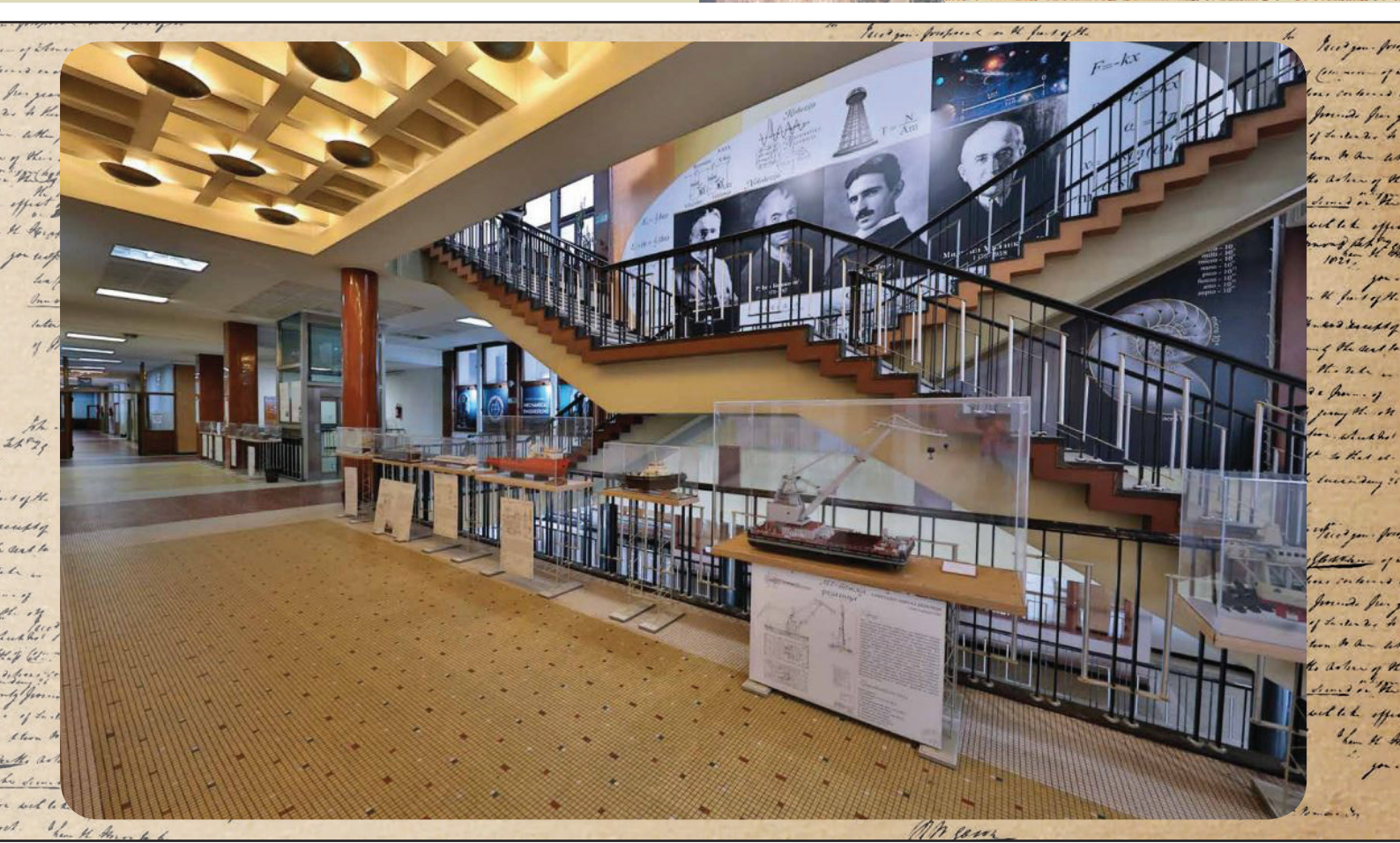


Fig 1

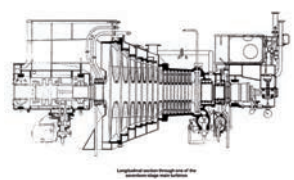


1897



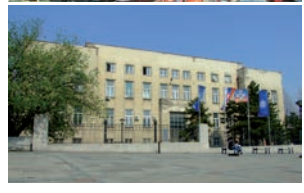
1905

Grand School became the University



Proclamation of the Faculty of Mechanical Engineering

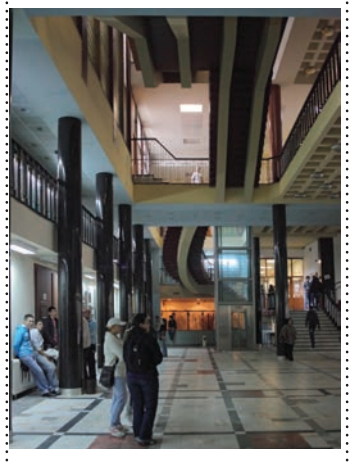
70 years



1948

1960

Start in the new building



today

The City of Belgrade



Belgrade is the capital of the **Republic of Serbia**, well known for its abundant **vitality**, sense of **humour** and **curiosity**. The city which has **much to offer** to its **student population**.



Belgrade is situated in South-Eastern Europe, on the Balkan Peninsula. It lies at the point where the river Sava merges into the Danube, on the slope between two alluvial planes. The river waters surround it from three sides, and that is why, since ancient times it has been the guardian of river passages. Because of its position, it was properly called "the gate" of the Balkans, and "the door" to Central Europe. Along the ridge of the slope, from the Belgrade Fortress, along the Knez Mihailova street, across Terazije to Slavija, stretches the main city traffic artery.

In Knez Mihailova street, in front of the building of the Serbian Academy of Sciences and Arts, the coordinates of Belgrade are marked: 44°49'14" of northern latitude, 20°27'44" of eastern longitude and an altitude of 116.75 m.

Belgrade, a city of very turbulent history, is one of the oldest cities in Europe. Its history encompasses full 7,000 years. The area around two great rivers, the Sava and the Danube, was inhabited as early as in the paleolithic period.

The Vinča culture flourished from 5,500 to 3,500 BC. Archeological site Belo Brdo is close to the present-day village of Vinča, suburban part of Belgrade on the Danube river, where over 150 settlements have been excavated. There is no evidence of war or defences in the townships, and it appears that Vinča was a peaceful society combin-

ing low-level agriculture with foraging (mostly fishing) and goods trade. They produced the first known European examples of a 'proto'-script and were the first people in the world known to melt copper, thus being the first European Metallurgists.

Various styles of zoomorphic and anthropomorphic figurines are



Fishlike human head sculpture from the archeological site Lepenski Vir, on the Danube bank 130 km downstream of Belgrade confluence.

The first European writing - Vinča script.

hallmarks of the culture of Lepenski Vir, which is of the same historic period as Vinča.

In its long and tumultuous history, Belgrade has often changed both its names and its rulers. As of the third century, when the Celtic tribe Scordisci set up a stronghold Singidunum at the confluence of the Sava river into the Danube, the city at the "crossroads of the worlds" was conquered by the Byzantines, the Gepidae, the Sarmatians, the Eastern Goths, the Slavs, the Avars, the Franks, the Bulgarians, the Hungarians, the Ottomans, the Austrians, the Germans... Each of the conquerors used to give the city their respective names: Singedon, Nandor, Fehervar, Nandor Alba, Alba Graeca, Grieschisch Weisenburg, Alba Bulgarica, Taurunum, etc. However, its Slavic name – Belgrade has lasted longest. The British Encyclopedia of Cities mentions that it is the city about which the greatest number of battles were waged, but also the city with the greatest number of symbolic names: The Hill of Battle and Glory, the Hill for Meditation, the House of Wars, the Egypt of Rumelia, the House of Freedom, the Gateway of the East – the Gate of the West...

In recent history, Belgrade suffered two heavy bombings during WWII, one by Germans in April 1941 and the other by "allies" for the Easter in April 1944, as well as 78 days of heavy NATO bombing in 1999.

"The sky above Belgrade is wide and high, unstable but always beautiful; even during the winter serenities with their icy splendour; even during the summer storms when the whole of it turns into a single gloomy cloud which, driven by the mad wind, carries the rain mixed with the dust of the Panonian plain; even in spring when it seems that it also blooms, along with the ground; even in autumn when it grows heavy with the autumn stars in swarms. Always beautiful and rich, as a compensation to this strange town for everything that isn't there, and a consolation because of everything that shouldn't be there.

But the greatest splendour of that sky above Belgrade, that

are the sunsets. In autumn and in summer, they are broad and bright like desert mirages, and in winter they are smothered by murky clouds and dark red hazes.

And in every time of the year frequently come the days when the flame of that sun setting in the plain, between the rivers beneath Belgrade, gets reflected way up in the high celestial dome, and it breaks there and pours down over the scattered town. Then, for a moment, the reddish tint of the sun paints even the remotest corners of Belgrade and reflects into the windows, even of those houses it otherwise poorly illuminates."



Written about Belgrade by: Ivo Andrić, Serbian Nobel prize laureate





University of Belgrade around 300th place in the world (ARWU Shanghai list)



“Knowledge is the golden ladder over which we climb to heaven; knowledge is the light which illuminates our path through this life and leads to a future life of everlasting glory”

“From Immigrant to Inventor” (1925), Pulitzer winning book by Mihajlo Pupin

PhD, Serbian born physicist and inventor of Pupin's coils in electrical engineering, Professor emeritus at the Columbia University



University Association and was also included into various forms of inter-academic cooperation (such as TEMPUS projects and UNIADRON initiative). Nowadays, University of Belgrade is a state university and is ready to maintain and improve its role of the leading higher education institution in the area, preserving the traditional values which make it recognized as a prime national brand, but also constantly adapting to new challenges.

Endowments and Funds

There is a long tradition of endowing properties and funds in Serbia. Many distinguished and affluent Serbs endowed their properties to the University of Belgrade.

History

The origin of the University of Belgrade can be down to the beginning of the 19th century, when Dositej Obradović founded the College in 1808.

On September 24, 1863, the Law on the Advanced School Founding was adopted. It was by power of this Law that the Lyceum was transformed into the The Higher School. This institution was situated in the edifice that one of the wealthiest Serbs of the time, Captain Miša Anastasijević, had bequeathed to his fatherland. The Higher School was well recognized not only in Serbia, but also throughout Europe. The most prominent teachers of this School had been educated at the leading foreign universities and they continued to cooperate with their former tutors and colleagues as the representatives of their respective departments.

Early in 1905, the Act on Universities was enacted, and King Peter I signed the decree of its coming into force. It granted the University autonomy, stating that “the teachers were free to present their knowledge”. The University of Belgrade was the most important academic institution of the Kingdom of Yugoslavia. Not only was it the heart of scientific, educational and cultural life, but also the centre of resistance to totalitarianism. The University gained its reputation through the work of Milutin Milanković, Vladimir Ćorović, Đorđe Tasić, and others.

Modern Days

In the academic year 2023/24, University had around 90,000 active students. Only the students who pass entrance exams and have an adequate high school score can matriculate the University. Graduate studies were organized in the 1950s so that students could advance towards the Master of Sciences degree which, from 1966 on, became a precondition for defending the Doctoral thesis. After a decade of international isolation during the 1990s, the University of Belgrade swiftly came back into the international academic community. It became a member of The European and International

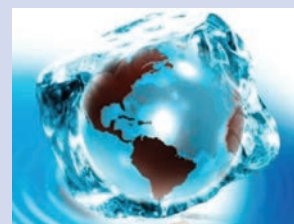
Famous Serbian Scientists and Innovators



Milutin Milanković, Serbian civil engineer, Doctor of technical sciences and university professor, best known for his theory of ice ages, relating variations of the Earth's orbit and long-term climate change, now known as Milankovitch cycles.

Born in 1879 in Dalj, in a Serbian merchant family in former Austro-Hungary. Died in 1958 in Belgrade.

At the age of 25, defended his doctoral thesis at TU Vienna and proudly became the first Serbian Doctor of Technical Sciences.



Worked for an engineering company in Vienna, using his knowledge to design structures. Obtained several patents relating to the methods of building with reinforced concrete.

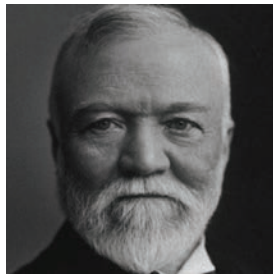
In 1909, became university professor heading the ‘Chair of Applied Mathematics’ at the University of Belgrade. Lectured on rational mechanics, celestial mechanics and theoretical physics, conducting in parallel his scientific research.

Worked for an engineering company in Vienna, using his knowledge to design structures. Obtained several patents relating to the methods of building with reinforced concrete.

http://en.wikipedia.org/wiki/Milutin_Milankovi%C4%87

University Library "Svetozar Marković"

University Library "Svetozar Marković" is the oldest and largest university library in the country and the central library of the University of Belgrade. The building is the **endowment of** Andrew Carnegie world famous philanthropist. It is one of his only three public libraries in continental Europe (the other two are in Leuven, Belgium and Rheims, France). http://en.wikipedia.org/wiki/List_of_Carnegie_libraries_in_Europe



Andrew Carnegie

The design project for the building was created by the University of Belgrade professors Nikola Đorđević and Dragutin Nestorović.

The library was officially opened on St. Cyril and Methodius Day, 24 May 1926.

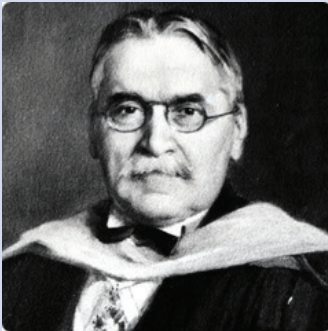


Andrew Carnegie, 1835-1919, was the richest man in the world of his time. Having arrived as a poor kid from Scotland to the United States, by the 1880s he had built an empire in steel (Carnegie Steel Co. today's U.S. Steel Co.), sold it to J.P. Morgan for \$480 million and then donated \$60 million to fund a system of 2,500 public libraries across the world (he also had investments in founding of the Carnegie universities, famous Carnegie Hall in NYC, other thrusts and endowments). To build and equip the library in Belgrade he donated \$100,000. In turn, Belgrade city assigned the land for the library and named a street next to the library after Carnegie.

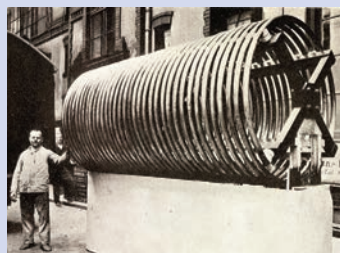


The library is intended primarily for students, teachers and researchers, but is open to all citizens. Its collection consists of scientific and special publications, mostly in foreign languages, as well as electronic publications which can be accessed via the Academic Network and National Library, through the specialized service *kobson.nb.rs* financed by the Ministry of Science.

Mihajlo Pupin, Serbian-American physicist and inventor, was born in village Idvor in former Austria-Hungary empire (today part of Serbia) in 1858. Michael Pupin immigrated to the United States in 1874, graduated from the Columbia University in physics in 1883, and obtained his PhD. at the University of Berlin in 1889. Pupin taught at the Columbia University for more than 40 years, 30 of them as a professor of electromechanics. He Died in New York in 1935.



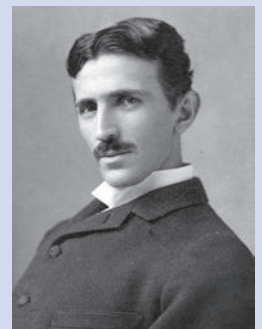
Michael Idvorski (after his birthplace) Pupin improved the quality of long-distance telephone and telegraph transmission by inserting coils in the long lines at intervals; he discovered that matter struck by X-rays is stimulated to radiate other X-rays (secondary radiation) and invented an electrical resonator. Michael Pupin received 34 patents for his inventions, and he won the Pulitzer Prize in 1924 for his autobiography, "From Immigrant to Inventor".



Pupin was a founding member of the National Advisory Committee for Aeronautics (NACA) on March 3, 1915, which later became NASA.

http://en.wikipedia.org/wiki/Mihajlo_Pupin

Nikola Tesla, Serbian-American inventor, was born in village Smiljan in former Austria-Hungary empire in 1856. He was the son of a Serbian Orthodox clergyman. Tesla studied engineering at the Austrian Polytechnic School, then worked as an electrical engineer in Budapest and later emigrated to the United States in 1884 to work at the Edison Machine Works. He died in New York City on Christmas Day January 7, 1943.



During his lifetime, Tesla invented fluorescent lighting, the Tesla induction motor, the Tesla coil, and developed the alternating current (AC) electrical supply system that included a motor and transformer, and 3-phase electricity.



Tesla is now credited with inventing the modern radio as well; since the Supreme Court overturned Guglielmo Marconi's patent in 1943 in favour of Nikola Tesla's earlier patents. The Tesla coil, invented in 1891, is still used in radio and television sets and other electronic equipment.

In 1960, in honour of Tesla, the General Conference on Weights and Measures for the International System of Units dedicated the name "Tesla" to the SI unit measure for magnetic field strength.

http://en.wikipedia.org/wiki/Nikola_tesla



“Ad augusta per angusta”

Through trial to triumph

How our programmes work

Programmes are modular, consisting of self-contained units taught and assessed on a semester basis. As student progresses through each semester and passes the examinations, he/she will earn credit for the courses that he/she has successfully completed. Therefore, throughout the programme the student will have a clear indication of his/her academic progress. All programmes are composed of core and optional units, giving to the student a lot of flexibility and opportunities to shape his/her studies and to develop his/her own interests. Each academic year is worth 60 ECTS.

Assessment

ECTS credits are assessed individually, with the methods of assessment varying according to the nature of the subject. Most subjects combine continuous assessment, such as projects, lab work, orals and written examinations.

Semesters

The academic year is divided into two semesters. Each semester consists of a teaching period followed by exams. The year begins in October and ends in June, with the usual Christmas, Easter and Summer vacations. There is an additional examination period in September.

Teaching

There is a variety of teaching methods, combining the traditional lectures with seminar teaching, team-based group projects and laboratory-based practicals. The Faculty is proud of its relatively

small group teaching methods which help to develop analytical, presentation and communication skills. All of these are highly valued by employers throughout the world.

In addition to classical teaching methods, more and more courses on UB-FME are introducing computer and electronically assisted teaching methods through Moodle, video conferencing and other contemporary learning tools.

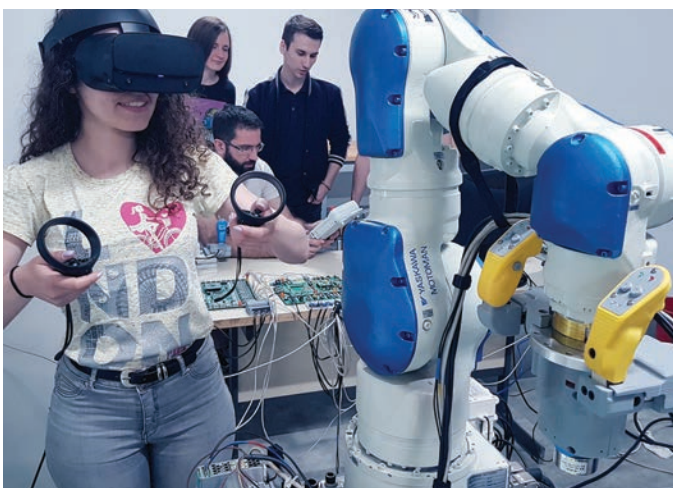


Study Mobility

Opportunities to live, study and work in another culture expand students' horizons and increase their opportunities of employment in various companies. European exchanges take place under the well-established Erasmus+ Programme of the European Commission. As the Faculty fully implements the European Credit Transfer System (ECTS), qualifications gained at the Faculty of Mechanical Engineering are easily recognized and understood in other European countries, and vice versa. Naturally, there are plenty demands for many of these places, so whilst we do our best, we cannot guarantee places in specific countries or at specific universities. If you have any questions, contact the department to which you are applying for further information.

Enterprise and Industry Links

The Faculty has strong links with business and industry and it is keen to build on this and encourage an entrepreneurship culture among students and staff.



Admission Procedures and Standards

International students follow essentially the same procedures as all domestic students in applying for admission. The admissions procedure ensures that applicants fulfil the necessary requirements to study at the highest level at the Faculty of Mechanical Engineering of the University of Belgrade.

A candidate's cultural background and international experiences are highlighted positively in the selection process, as Faculty continues its historic commitment to cultural diversity.

Undergraduate and post-graduate international students are strongly advised to have a minimum of €9,300 per annum in addition to tuition fees. Possession of these financial resources is essential for each full calendar year a student spends in Belgrade. The Faculty will not be able to finance students if for any reason their funds from overseas are restricted before the end of their course.

General Entry Requirements

for a Bachelor's degree:*

- » a secondary school-leaving certificate (also known as High School Diploma, Matura, A-Levels, Bachillerato, Atestat, baccalauréat)
- » proof that student has passed the Faculty of Mechanical Engineering entrance examination

- » * Serbian: Bachelor's degree courses are only taught in Serbian, and students are required to prove that they have an adequate knowledge of Serbian. Students can do this by taking the Serbian language proficiency tests (please contact our admission department for additional information on the Serbian language preparatory courses).

for a Master of Science degree and PhD programmes:

Applications to MSc. and PhD. tracks are accepted from the persons who have completed a BSc. degree for entrance into the Master's programme or a MSc. degree for entry into the PhD. programme. Most incoming students have a degree in mechanical engineering or a related branch of engineering. However, the Faculty's admission criteria are not specific and capable students with backgrounds in various branches of engineering or in science may gain entry.

Necessary documents:

- » Official copies of transcripts
- » English fluency - Common European Framework of Reference for Languages (CEFR) level B2 for students who are not native English speakers. Minimum acceptable score on Cambridge English Scale is 160 or IELTS = 5.5.

When to Apply

The opening date for applications for admission in October is: 21st June.

Experience with international students

Since its start as an independent faculty, in the past period 1948-2005, at UB-FME the system of studies was: integrated 5 years for Dipl.-Ing., additional two years of study for Mgr (old MSc) and just research and thesis defense for PhD. Studies were in Serbian, while for PhD - English was also preformed. In such a system, 260 international students from 26 foreign countries received the Dipl.-Ing. degree (Iraq-129, Jordan-31, Greece-17, Syria-15, Algeria-10, Libya-8, Cyprus-6, Poland-5, Lebanon, Indonesia and Sudan - 4 each, Hungary, India and Ethiopia - 3 each, Austria, Palestine, Ghana, Kuwait, Zaire and Nepal - 2 each, and Germany, Tanzania, Egypt, Sri Lanka, Bolivia and Rwanda - 1 each, republics from former Yugoslavia not counted), 46 got the Mgr degree and 26 defended PhD theses.



In post-Bologna period, since 2005 up to date, the system of studies on UB-FME has been the following: 3 years for BSc, 2 years for MSc and 3 years of studies for PhD. In such a system, besides studies in Serbian, the UB-FME organizes studies in English on all levels. At studies in English, there are currently 9 international students on MSc and 19 on PhD level. Until now, 44 international students have defended their PhD theses at the level of PhD studies in English and 70 at the level of the MSc degree. These students mostly come from Libya, Pakistan, Sudan, Iraq and UAE).

Visas

Serbian Visas are issued on producing the following official documents: Valid passport (passport must be valid at least 90 days after the intended date of departure from the Republic of Serbia, with at least two consecutive blank pages, and issued within the past 10 years); Visa application form obtained at the Embassies or Consular Missions of the Republic of Serbia; Letter of acceptance from the University of Belgrade; Passport size photo; Medical Examination Report; Proof of Sufficiency of funds and Travel health insurance. Visa processing takes about three weeks. All regulations pertaining to consular fees or services are subject to change without any prior notice.

Students at partner universities can study for one or two semesters at the Faculty of Mechanical Engineering of the University of Belgrade as part of an ERASMUS or direct exchange programme.



Study as a GUEST STUDENT !

International students are not invited just for studying the whole programme in English at the Faculty, but also for the part of it. After getting international accreditation and EUR-ACE label, UB-FME is strongly offering to European students the possibility of studying for one semester in Belgrade, through fully recognizable ECTS system and internationally accredited programmes. In accordance with the Bologna principles, students from European countries have the opportunity to spend one or more semesters at the UB-FME, attend lectures and take exams, get familiar with the local culture and habits. The international cooperation is accomplished through the ERASMUS+ and CEPUS programmes, which imply the exchange of students and academic staff. There were several such students in the past (mostly due to financial restrictions and prejudices), but this activity is now expected to be much broader. Students studying at the UB-FME also have the possibility to study abroad through the same exchange programs, as well as to finish the internship through well-established IAESTE programme. Also, some departments organize national and international excursions for students, thus making them acquainted with industry colleagues and facilities. Skill praxis (internship), as a part of the study programme, may also be performed in such manner.

Guest Student Requirements

International guest students can also apply to study for one semester at the Faculty of Mechanical Engineering without being part of a specific exchange programme. After consultation with the department in question, guest students can attend courses and lectures and acquire ECTS points. To apply as a guest student, a student has to be enrolled in a programme at his home university and has to possess an appropriate document which indicates that the home university sends him/her to complete a part of their study programme at the University of Belgrade. He/she also has to make the Agreement on the Regulation of Mutual Rights and Obligations regarding the provision of conditions for the studies and stay in Serbia with the University of Belgrade. Guest students cannot attain a degree from the Faculty of Mechanical Engineering of the University of Belgrade.

Financial Information

Learning Centre

Tuition Fees

The costs of students' academic education at the Faculty are covered by tuition fees. They include core teaching costs and registration. Books, supplementary examinations and re-examination fees, and field trips are not included. If we offer the student a place, we will decide whether they qualify as a Serbian (citizens of some countries do qualify) or international student for fees purposes. We will then be in a position to give them more detailed information on the costs of the study programme. The following provides the basic information you need.

Serbian and Bi-Lateral Students

Serbian students who do not qualify as budget-financed students pay tuition. Tuition fee will be approx. €1,000 per year. A similar fee is payable in each subsequent year of full-time study. The Government will determine the percentage increase which will apply. If students live in Serbia or they are Bi-Lateral students, they do not have to pay this fee up-front at registration; it is possible to pay it in several installments.

International Students

The fee for undergraduate students is approx €3,000. It is likely that this fee will increase each year. We want to make sure that students' studies are not unnecessarily disrupted, and may therefore ask them for advance written evidence that they, their family or sponsor can pay the tuition fees. Students must ensure that they have sufficient resources to cover tuition, as well as living expenses before they accept any offer we make to them.

Living Expenses

How much students will spend is, to some extent, up to them and will also be affected by what they study and for how long. For a 38-week (approx 10 months) period, an undergraduate should think in terms of the following rough guide based on 2023/24 costs:

Rent accomodation €3,000

Food at (€350 per month) €3,500

Personal Toiletries €300

Laundry & Housekeeping €200

Clothes €300

Travel (local and outside Belgrade e.g. home) €800

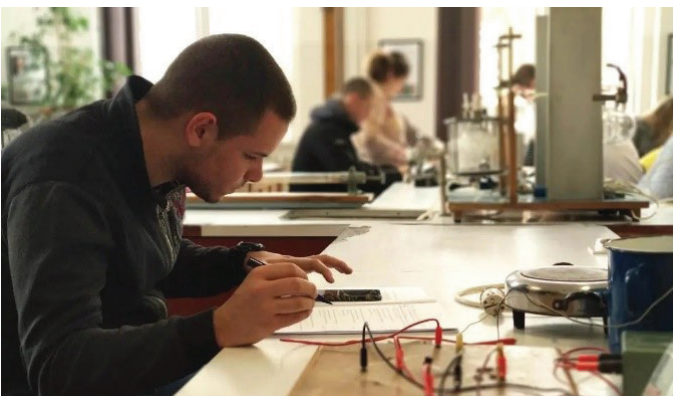
Leisure/Social/Sport at (€50 per month) €500

Telephone (landline & mobile) €200

Contingencies (unexpected bills) €200

Books, materials, photocopying & equipment €300

TOTAL €9,300



The Learning Centre and Library

We have a vital role to play during your time at the Faculty of Mechanical Engineering. Situated at the Faculty building, we are open from 9am to 5pm weekday, during semesters, and our aim is to provide you with all the information you need when you need it. The surroundings are modern, comfortable and ideal for study and there are over 40 reading spaces available for both group-work and individual study.

Library has over 100,000 books and periodicals and we invest heavily in electronic journals and databases and have 500+ networked PCs plus lap-top docking points and wireless access.

The University Library's web-catalogue guides you to high-quality resources, and also provides detailed information on all University Library services. Its electronic resources are accessible over the Internet using KoBSON.

Library staff is always willing to help you with enquiries. More specific queries will be handled by the subject specialist for your area of study or interests.



Computing Services

The UB-FME network is built in the "star" topology, type "fast ethernet". Main router is Cisco Catalyst 3550 with 24 100Mb-ports and 1Gb-port (Faculties connection to European academic network).

All students are issued with an email address, computer username and password when they join the Faculty; this allows them to use one of 180 PCs in computer rooms (1 room with 43 PCs, 2 rooms with 40 PCs, 6 rooms with 20 PCs, 2 rooms with 12 PCs and AutoDesk branded room with 10 PCs).

The latest versions of subject-specific software are provided, including Matlab and engineering drawing and modelling packages (AutoCAD, CATIA, SolidWorks, ProEngineer, etc). PhD. students can use 8 powerful computers for parallel programming at SimLAB (donation of German universities, HRK).

Visiting professors and students can access the European academic network over "eduroam" service at 24 access points.

In addition, the Faculty is extensively equipped with WiFi technology, to enable internet access from virtually all public areas on the campus.

Situated in the Learning Centre there is a friendly 'Help-Desk' to which you can bring your queries. IT training courses are provided for students.

Our facilities include a fully-equipped video conferencing suite on the fifth floor.



Accommodation and Hospitality Services



Living in Belgrade

Where to stay?

If you decide to rent an apartment in Belgrade, it will cost you the same as about anywhere else in Europe, if you choose an apartment in the suburbs. However, it might take you between 40 minutes and one hour to reach the Faculty premises. If you choose to rent an apartment in the centre, prices are a little higher, but you will enjoy the vibrant life Belgrade has to offer.

There are 11 student residencies in Belgrade, including Studentski Grad, which, in addition to dormitories and a restaurant, has two libraries, a cinema and a theater building, conference halls and an open stage for summer concerts. Student residencies are vibrant places, where you can live, eat, study and meet new friends and colleagues.

Accommodation in student dormitories is possible, the price ranges from 90 to 110 Euros per month. Please note that there is a selection process involved. Application forms will be available in November. If you want to feel the true spirit of student life in Belgrade, come and live in one of the many student dormitories!

List of dormitories:

- "Studentski grad" - Address: 143 Tošin Bunar, 11070 New Belgrade; Phone: +381 11 2699 302
- "Slobodan Penčić" - Address: Ban Ivaniš bb, 11000 Belgrade; Phone: +381 11 412 638
- "Kralj Aleksandar I" - Address: 75 Kralja Aleksandra Boulevard, 11000 Belgrade; Phone: +381 11 401 800
- "Patris Lumumba" - Address: 1 Dragice Pravice Street, 11000 Belgrade; Phone: +381 11 751 977
- "4. April" - Address: 320 Vojvode Stepe, 11000 Belgrade; Phone number 1: +381 11 3976 307
- "Karaburma" - Address: 7b Mije Kovačevića, 11000 Belgrade; Phone number: +381 11 750 962
- "Košutnjak" - Address: 156 Blagoja Parovića Street, 11000 Belgrade; Phone number: +381 11 3559 747
- "Rifat Burdžević" - Address: 77 Milana Rakića, 11000 Belgrade; Phone number 1: +381 11 2413 435
- "Vera Blagojević I and II" - Address (Vera Blagojević I): 48 27. marta Street, 11000 Belgrade; Phone number: +381 11 324 6663
Address (Vera Blagojević II): 37 Dalmatinska, 11000 Belgrade; Phone number: +381 11 759 943
- "Žarko Marinović" - Address: 254 Cara Dušana, 11080 Zemun; Phone number 1: +381 11 618 003
- "Mika Mitrović" - Address: 33 Kralja Vladimira, 11000 Belgrade; Phone number: +381 11 3970 283

When do students apply for dormitory accommodation?

Please refer to our students counsellor for all details, from September 1st your year of entry:

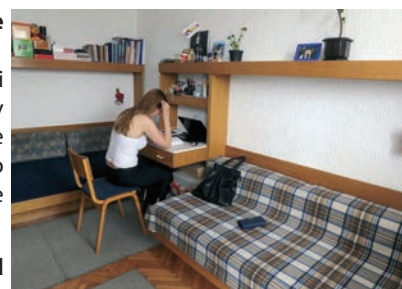
Tel: +381.11. (33-70-350; 33-70-339; 33-02-251; 33-02-254)

Web: <http://www.mas.bg.ac.rs/>

Email: mf@mas.bg.ac.rs

Does student room have internet connection?

There are LAN and WiFi connections in many residencies, but in some of them you will have to use 3g to connect to the Internet.



What about welfare and security?

Resident managers work in each complex and are available to give advice and guidance to all residents. They help foster a good living environment with special regard to student welfare, discipline and safety, as well as organising lots of social activities! The Security Office is also open 24 hours for the benefit of all students.

Can Faculty offer students family accommodation?

Family accommodation in Belgrade can be expensive and it is strongly recommended that students with families do not bring their spouses and/or children to Belgrade until they have found suitable accommodation. The Student Accommodation Office will always do its best to provide new students with temporary single accommodation while they seek family housing.

How do students seek private accommodation if they do not want to live in University residence?

Detailed information and advice service is provided for students who may prefer to live in private accommodation. Please contact us for self-catering lodgings, bed-sits, flats and houses, which are available to rent in the private sector and we can help and advise on tenancy agreements and housing contracts. You can expect to pay a minimum of approximately 100 euros per month for a room in a shared flat; heating, electricity, gas and telephone bills will be in addition.



Medical Assistance for Foreign Students

The medical care system in Serbia is public, but there are also private clinics offering medical care. European Social Security Card is not accepted in Serbia, however,

Serbia signed agreements that regulate urgent medical care with the following countries: Belgium, Netherlands, Italy, France, Montenegro, Bosnia and Herzegovina, Macedonia, Romania, Tunisia, Turkey, Austria, Bulgaria, Croatia, Hungary, Germany, Luxembourg, Slovakia, Slovenia, the Czech Republic, Poland and Great Britain (<https://www.eng.rfzo.rs/>). Students from other countries can receive medical assistance primarily at the students' health clinic, STUDENTSKA POLIKLINIKA – STUDENT POLYCLINIC (near Nikola Tesla museum), Krunska 57, tel. 2430-814, www.studpol.rs, as well as in other public and private institutions.

How to find out more

Our programmes

To find out more about our programmes, please contact the head of the department of your interest listed in the departmental entries in this brochure. Alternatively, take a look at the relevant web pages, which contain the details of programme changes and new developments.

Your qualifications

If you have any questions on suitability of your qualifications for a particular programme, please contact our admissions officer listed in the relevant fact-file.

How to apply

If you have general questions about the application process, fee status, or how we will reach a decision, please contact the Faculty:

Tel: +381.11. (33-70-350; 33-70-339; 33-02-251; 33-02-254)

Web: <http://www.mas.bg.ac.rs/>

Email: mf@mas.bg.ac.rs



Semester & Exam Dates

Winter (Autumn)

Semester: October 1 - January 13

Exams: January 13 - February 17

Summer (Spring)

Semester: February 18 - May 26

Exams: June 3 - July 7, August 20 - Sept. 28

For full details please visit the website:

<http://www.mas.bg.ac.rs/>



www.mas.bg.ac.rs

Visiting the Faculty



Before you apply

You, your family and friends are welcome to visit the Faculty. Our international admissions officer will provide the ideal opportunity not only to go round the building but also to meet the academic staff.

You will have the opportunity to:

1. Take a tour round our buildings;
2. Visit academic departments;
3. Talk to students, lecturers and admissions staff;
4. View accommodation;
5. Try out our catering and enjoy the students' bar;
6. Find out how to apply;
7. Engage in conversation on academic subjects, money matters and all aspects of student life.

If you would like to come, please contact us by phone (+381-11-33-70-350) or email (mf@mas.bg.ac.rs) and we will arrange the visit.

After you apply

If the department you have applied to offers you a place or an interview (for postgraduate students only), they may invite you to a departmental open day where you will have the opportunity to meet their students and staff and attend specific talks and tours.

For further information, please contact us.



Info journal
of the Faculty



Modern Classrooms and Teaching Aids

In addition to new study programmes, the process of transformation of the Faculty of Mechanical Engineering has included the introduction of new teaching aids and teaching methods. Most classrooms are

equipped with modern computers and licensed software for design, modelling, simulation etc.

3DEXPERIENCE laboratory

The first 3DEXPERIENCE laboratory at the University of Belgrade opened on October 17, 2019 at the Faculty of Mechanical Engineering. The laboratory is the result of cooperation with the company CAD/CAM Data from Belgrade, which donated licensed software for the laboratory for product development. Students of all levels of studies, researchers and professors have the opportunity to use this laboratory. The existing computer infrastructure was provided by the Faculty of Mechanical Engineering from its own funds.

The 3DEXPERIENCE laboratory enables students and teachers to test their ideas and concepts for industrial products in virtual reality, i.e. to view the entire product life cycle via one platform – from idea and design, through simulation and testing, production, market launch, to recycling. The platform is one of the latest software solutions and connects designers, engineers, managers, marketing experts, salespeople etc. into an integrated environment; additionally, it is possible to include experts of different profiles from around the world at the same time.

The Renovated Library Reading Room

The renovated Library reading room, projected with upgraded amenities, was opened in mid-2024 for use by students and employees. Once a single-space unit, it is now divided into three connected, but still distinct entities.

The first part is a general-purpose space with 75 seats and video equipment. It is suitable for lectures, presentations, seminars and conferences.

In the area intended for study and student work, there are 30 desks with the same number of seats. The third part of the reading room is used for coffee breaks, short relaxation and informal meetings. Entire space of the library reading room is air-conditioned and: air-conditioned and equipped with remote-controlled window blinds, so as to provide optimal natural light, and it also has access to the surrounding terrace.



Modern Teaching Aids for Students of the Module of Railway Mechanical Engineering

Thanks to a donation from Siemens Mobility d.o.o. Cеровac, starting from October 2020, master students of Module of Railway Mechanical Engineering of the Faculty of Mechanical Engineering in Belgrade have been learning in a completely new environment – a modern classroom equipped with the necessary teaching aids and computers with licensed CREO software. The **donation** was worth 20,000 euros, and all the funds were invested in refurbishing and equipping the classroom.

The **Siemens Mobility** delegation, led by Udo Eichlinger, General Manager of the German company Siemens in Serbia, visited the Faculty of Mechanical Engineering, where it officially handed over the classroom to teachers and students of the Department of Rail Vehicles.





New Atmosphere in FME Amphitheatres

In order to provide students with the best possible conditions for learning and work, during the academic year 2020/21, Faculty of Mechanical Engineering equipped the large **Amphitheatre A** with the most modern presentation equipment. Since the Amphitheatre is used for lectures during which drawings of mechanical constructions are shown, and these require perfect visibility, the equipment had to meet the highest standards when it came to image quality.

As part of the video presentation system, a Sony VPL-FHZ131 laser projector was installed, as well as a motorised screen. This device has a WUXGA resolution, brightness of 13,000 lm, while it uses 3LCD technology for projection.



The Ceremonial Hall 211, which usually hosts various professional gatherings, conferences, presentations and lectures, was also equipped with professional equipment that enables uninterrupted use throughout the day.

These are two independent video presentation systems with two speakers, through which the same image measuring 292x183 cm can be displayed on a motorised screen with remote control. The system has a Sony VPL-PHZ12 video projector intended for use during different types of presentations. The system can function in any position, i.e. 360° orientation, and uses 3LCD technology for projection.

During the academic year 2019/20, **amphitheatres 216 and 208** on the second floor were also adapted. Previous non-functional lighting in these amphitheatres was replaced by LED lighting, and remotely controlled curtains were placed on the windows, which has greatly facilitated the conditions for listening to lectures and the presentation of teaching contents.



Introductory lectures

In order to analyse and evaluate the achievements of their faculties, most European countries assess student achievement expressed via grades and exams. In other words, student successfulness and exam pass rates serve as one of the main indicators of the quality of the teaching process.

Three years ago, following the good practice of universities throughout the world, Faculty of Mechanical Engineering included introductory lectures in mathematics and physics in the teaching process in the first year of studies. The goal was to make it easier for first-year students to follow classes in those subjects, and, consequently, in-

crease exam pass rate. This novelty soon proved to be beneficial. This is evident not only in the results achieved in exam periods, but also in the number of students who enrol in the second and third year of Bachelor academic studies, i.e. the first year of Master studies.

The main goal of introductory lectures is to provide first-year students with better prior knowledge, i.e. to compensate for the shortcomings from the previous, secondary school level of education. In that way, it is possible to achieve continuity in teaching, which leads to better results.



Student Mentor

Faculty of Mechanical Engineering in Belgrade devotes full attention to each student in order to make their studies better and easier. In addition to free introductory lectures in mathematics and physics, at the beginning of their studies, every first-year student also receives a student mentor who helps them to adapt to the academic way of learning as soon as possible.

Student Mentor, the project of the Student Parliament of the Faculty of Mechanical Engineering, was introduced in 2019. Faculty Management supported this initiative, in the same way that it maximally supports all other forms of student activities that contribute to raising the quality of teaching, such as: group exam preparation, knowledge and sports competitions, international competitions, student congresses and the like.

“Student services” application

The “Student Services” application enables direct communication of students with the student services of the Faculty of Mechanical Engineering. Using this application, students can check and control the accuracy of their basic data provided to the faculty when enrolling, select elective courses and have access to the records of those courses.

Further, students can see the records of their pre-exam obligations and passed exams and gain an insight into the course of studies and

overview of financial cards for payments related to tuition or exam application, i.e. they have insight into the total indebtedness and records of all payments.

Starting from the academic year 2018/19, there is also an option in the application to apply for the exam electronically. This application enables students to solve all the questions related to enrolment, tuition, exam application etc. electronically, i.e. to appear in person at the Student Services offices only when they have to.



Internet Corner

Students of the Faculty of Mechanical Engineering also received their "Internet Corner" – a modern space with an Internet network, where they can learn, exchange opinions and solve tasks together in breaks between classes.

The new student corner is located in two spacious galleries on the second floor of the faculty. It is an ideal place not only for learning but also for socialising and chatting about all other interests of future mechanical engineers.



Energy Efficiency Centre

Energy Efficiency Centre at the UB-FME was established in 2016. Its foundation was enabled by the national Law on Efficient Usage of Energy from 2013, which defines the conditions for the establishment of the Energy Efficiency System Management in the Republic of Serbia.

The Law also imposed criteria on the institutions which can realise courses for training of energy efficiency managers. In 2015 the Ministry of Mining and Energy announced the Call for institutions capable in staff and technical support to do the job, and UB-FME was among the best. Based on the submitted documentation on its excellent technical and staff resources, the UB-FME was recognised as an authorised institution for energy efficiency managers training.

Founding of the Centre and purchasing of necessary equipment have were **strongly supported by the Government of Japan through JICA** (Japan International Cooperation Agency, <https://www.jica.go.jp/serbia/english/index.html>). The Centre is equipped with one compressor and one pump installation, as well as with one steam boiler. Centre services are not of interest only to engineers from Serbia, but also from the whole region. When there is no training for engineers from industry, the students from energy study modules actively use installations for experimental laboratory exercises.





Sports

Students' life is about much more than academic work. The students' system provides an excellent opportunity for you to get involved in all kinds of sports, and a whole host of other activities alongside your studies.

Faculty of Mechanical Engineering is a big community with a passionate spirit - we encourage involvement and participation at every level, whatever your ability.



Our teams are enthusiastically supported by the students who attend all Faculty matches armed with megaphones, banners and loud voices!

Faculty boasts a wide range of sports teams and societies. From the Mechanical Engineering Students' Association to the Chess Club, the Rugby Club to the Aero Club (BeoAvia), whatever your interests, there is likely to be something to suit you.



Each spring, UB-FME students participate at the regional, mechanical engineering students' gathering, the famous "Mašinijada".



Since the first "Mašinijada", our students have won the most gold medals!

The Faculty has a great sporting heritage. We are represented in a number of different sports, including football, basketball, handball, volleyball, and table tennis, all of which have weekly practices and regular inter-faculty matches.

TRANS-ATLANTIC RIVALRY

Since 2006, Faculty has been the host to an online distance chess match between the students of the University of Belgrade and University of Texas at Dallas. From 2012, the championship has held a name - Transatlantic Cup Svetozar Gligoric. Several of our students are on the University team. Current status of this battle for the Trans-Atlantic Cup is that the University of Texas in Dallas is leading by 7.5:5.5.





Student Excellence Centre: Reaching World Heights through Teamwork

In the times of increasing competition at the international academic scene, it is very important for Serbia to keep pace with the world and take its place at the top of higher education. One of the ways to achieve this is to support talented students to apply the knowledge acquired during their studies, develop the necessary skills and successfully realise their ideas on the market through work on specific projects.

In keeping with the good practice of the world universities, Faculty of Mechanical Engineering has established the Student Excellence Centre (SEC). The idea is for students to upgrade their theoretical knowledge through practical work. The emphasis is placed on the development of skills that are not an integral part of the curriculum, but complement it. For example, these include: project management, communication, presentation and negotiation skills, finance management, leadership, entrepreneurship and the like.

The Student Excellence Centre is located in the so-called "old building" of the Faculty of Mechanical Engineering at Ruzveltova Street 1 and currently brings together five student teams. These talented young people are engaged in various innovative projects with which they represent the Faculty of Mechanical Engineering and the University of Belgrade at prestigious international competitions.

One of the teams is the **"Road Arrow" Formula Student team**, which deals with the design and building of racing vehicles based on Formula 1. These vehicles are used for participation at international Formula Student competitions throughout Europe. **Confluence Belgrade** is a team of students of the Department of Naval Architecture which is involved in the design and manufacturing of energy efficient vessels for the Hydrocontest and other international competitions for naval architecture students. **The Beoavia team** designs, develops and manufactures unmanned aerial vehicles and rockets for the New Flying Competition, Airbus Sloshing Rocket and Teknofest. **The BMI/ZeptoHyperTech team** works on the development of innovative products in the field of biomedical engineering, while students gathered in the **Robotoid team** develop small autonomous robots for the international EUROBOT competition.

Academician Professor Vladan Đorđević: A Big Step Forward in the Education of Mechanical Engineers

"In founding the Student Excellence Centre, Faculty of Mechanical Engineering has made a big step forward in the education of future mechanical engineers. It has been made possible for the best students to accomplish their ambitions through practical work, to broaden the knowledge acquired during their studies and to apply it to solving specific engineering problems", said the Academician Professor Vladan Đorđević at the SEC opening ceremony, which was held in October 2020.

Student Teams at the SEC

The "Road Arrow" Formula Student Team (fsra.stt.org.rs)

Ever since 2010, side by side with their colleagues from all over the world, "Road Arrow", the first and most successful Formula Student team in Serbia, has participated in the prestigious international Formula Student competitions.

They developed 10 internal combustion engine racing cars and one electric powered vehicle, and took part in more than 25 competitions, in which they accomplished noteworthy results and received awards and praise from experts of the world's leading automotive industries.

This season, the "Road Arrow" team is set to premiere its second electric-powered Formula Student vehicle, featuring a unique powertrain system and other original solutions. The main innovation is the monocoque chassis, which significantly improves the dynamic and aerodynamic performance of the electric vehicle. Additionally, a Drag Reduction System will be implemented for the first time in the team's history.

The rear-wheel drive additionally enhances the dynamics of the electric formula. The torque vectoring system allows for individual control of each powered wheel. The vehicle is powered by lithium-ion batteries, which theoretically enable the electric formula to reach a speed of 100 kilometers per hour in 4.4 seconds.

The fact that, in the current season, the "Road Arrow" team includes more than 50 students from as many as seven faculties of the University of Belgrade additionally demonstrates what a great challenge this is. Besides students from the Faculty of Mechanical Engineering, team members come from the Faculty of Technology and Metallurgy, The School of Electrical Engineering, Faculty of Economics, Faculty



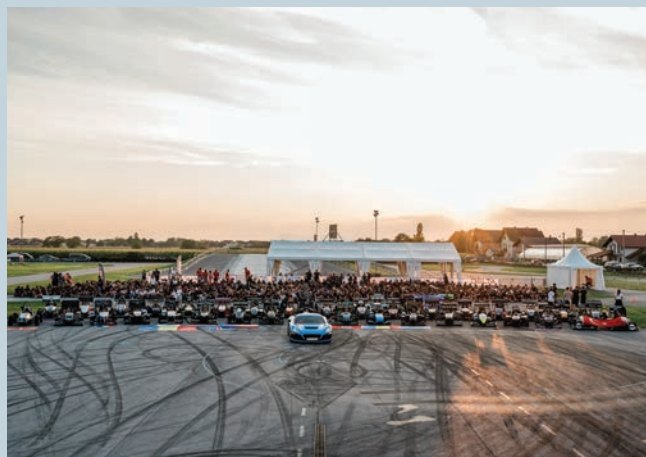
of Architecture, as well as the Faculty of Organizational Sciences and the Military Academy.

As of this season, the biggest support comes from the platinum sponsors: Mercedes Benz - Emil Frey, Brose, Rivian and Synchrotek. Besides them, the great support comes from Bosch, InMold, CIAH, PRDC, SKF and many others.

The Formula Student Competition

Formula Student is a competition in designing, constructing and building race cars. Its aim is to encourage innovation and the development of students' practical skills and it consists of two parts – the static and dynamic events.

The static events include the team's presentation of the design, explanation of the vehicle construction, elaboration of the cost of the vehicle by individual parts and manufacturing technologies, and the project business plan. One of the most important parts of the project that the team must pay special attention to includes finances and this is where team members need to show marketing and management skills. The dynamic events include real driving doing skid pads, testing of vehicle acceleration and efficiency, and it also includes the endurance race.



The Confluence Belgrade Team

Founded in 2017 by a group of ambitious and idea-driven students of the Department of Naval Architecture at the Faculty of Mechanical Engineering in Belgrade, the Confluence Belgrade team welcomes every year a number of new future naval architects, engineers and creative minds in order to conquer the challenges of demanding projects together and widen their horizons.

The team's newest project is "Sava Eko", a solar-powered garbage-collecting catamaran that was launched in Montenegro in November 2024, where team members presented their latest work at the Kotor International Maritime Conference. Design, production and assembling of the vessel required of the students to "think outside the box", work together as a team and come up with new ideas to overcome numerous challenges they were facing while working on the project.

Nevertheless, the first "steps" of the Confluence Belgrade team should not be forgotten, when the students participated at the prestigious international competition of naval architecture students, Hydrocontest, in 2017 and 2018, winning the first place and a gold medal in the category of heavy weight boats, along with other awards and medals. With great enthusiasm, in 2019 the team began to work on a project of a solar ship, whose hull would be optimised for the use of hydrofoils. Although the project has been stopped due to the lack of financial resources, a future generation of team members may overcome the challenges and finally make a debut at the Monaco Energy Boat Challenge.





The Beoavia Student Team

Beoavia, a student team founded in April 2018 by a group of students from the Department of Aeronautical Engineering at the Faculty of Mechanical Engineering in Belgrade, focuses on the design, development, and construction of unmanned aerial vehicles. As the sole representatives of Serbia and the University of Belgrade at prestigious international student competitions in aviation, they have been very successful.

In the New Flying Competition 2022, their VTOL aircraft, named the Wasp, stood out as one of their most complex projects to date. Wasp was designed not only to perform vertical takeoffs and landings but also to carry a payload of 2 kg. During flight, the aircraft was required to identify QR codes on the ground and communicate their exact locations in real-time to the operator. To tackle this challenging task, Beoavia implemented advanced neural networks for object recognition, demonstrating their ability to integrate cutting-edge technology into designs. The Wasp secured an impressive 4th place among 50 competing teams, showcasing Beoavia's technical expertise and innovative approach.

Earlier that year, Beoavia had celebrated a significant victory in Teresa, Spain, where their rocket-glider Aurora 3 won the 1st place. This triumph not only brought recognition to the team, but also provided them with the honor of hosting the finals of this competition in Belgrade in August 2023, organised in collaboration with Airbus — a testament to their growing influence in the field.

In 2023, the concept of the unmanned aerial vehicle with a variable configuration, named "Modular X," achieved huge success by win-

ning the 1st place at the International Exhibition of Innovations and New Technologies "Novo Vreme," held in Sevastopol. This innovative project was also recognised as the best innovative solution at the Sixth Cup of Nations for Young Innovators, a part of the 37th International Invention Exhibition "Inventions Belgrade 2023."

Looking ahead to 2024, Beoavia embarked on another ambitious project: the Putnik, an unmanned aerial vehicle designed to transport billiard balls as cargo for Air Cargo Challenge 2024. The challenge is to build the aircraft to operate with the limited current of 30A while maximising distance and enhancing energy efficiency. This project reflects Beoavia's commitment to sustainability and advancing technology in practical applications.

In addition to technical projects, Beoavia had taken the initiative to collaborate with the long-term sponsor, APS Aviation Parts Service, to organise the Southeast Europe General Aviation Conference 2024. The aim of the conference was to connect the the companies from North America and Western Europe with those from Southeast Europe, fostering valuable partnerships and knowledge exchange. The event was successfully held in September 2024.

Through their dedication, creativity, and teamwork, Beoavia strives not only to represent our University and country but also to inspire future generations of engineers and innovators in the field of aviation.





Robotoid – Student Team that Makes Autonomous Robots

Students gathered in the Robotoid team work on the development and construction of a small autonomous mobile robot for Eurobot – an international competition for students and young people involved in robotics. Their ambition is to be one of a total of three teams that will represent Serbia at this competition in France.

The Robotoid team was founded in October 2017. It has eight members and consists of Bachelor and Master students of the Faculty of Mechanical Engineering in Belgrade. Although it has existed for several years only, the team has made visible progress and has been achieving increasingly better results from year to year.

The Eurobot competition is a good opportunity for students to implement their knowledge, learn something new and gain experience in solving certain problems as a team. The competition is held once a year and every year a new task is set that the robot needs to solve in a certain time frame.

Designing and building an autonomous mobile robot is a very serious and demanding task for students, who invest a lot of effort into developing the device so that it can reach the level necessary for competing. In order to be able to participate in the competition, robots must pass a detailed check of the fulfilment of technical requirements and proving their performances, the so-called homologation. This means that they are completely autonomous in terms of energy and guidance, they perform tasks independently and solve new situations.



The BMI/ZeptoHyperTech Team: Light as a Cure

We all know that, besides air and water, light is one of three sources of life on planet Earth. But only a young, talented student team, composed of Master and PhD students of biomedical engineering at the Faculty of Mechanical Engineering in Belgrade, knows the fact that light can heal and the way in which it can do so.

They are the BMI/ZeptoHyperTech team and they work on the development of innovative products in the field of biomedical engineering, intended to improve health and quality of life. The team is supported by the Department of Biomedical Engineering of the Faculty of Mechanical Engineering and ZeptoHyperTech, an innovative company of Zepter International.

The focus of their research is the quality of air, water, food, dynamic human activities and the like. They are currently working on early detection of cancer and melanoma using light, therapeutic effects of light, the impact of negative UV and blue rays, improving existing air and water purifiers, improving the process of food preparation, construction of various types of beds for patients, as well as various orthopaedic aids.

The main starting point in their research is the premise that humans are electromagnetic beings, i.e. beings of light. However, the Sun has two faces: it is our best friend, but often a very dangerous enemy as well, especially because of UV and high energy blue light. This is where fullerene, a molecule composed of 60 carbon atoms, enters the scene. It gives light photons a new arrangement and redistribution of energy. This is how light of a new quality is created – the hyper-harmonised light. It has the power to recognise biomolecules, biostructures and bioprocesses similar to itself and harmonise processes in the body.

Applying this knowledge, these young talented people have, in just a few months, developed a number of innovative products.



Activities

Our students excel in music as well as sports, and the Faculty has a students' club which is regularly used for parties and promotions of various things. We have several student bands and one professors' band which perform to a high standard and hold regular concerts.



Our students are also highly represented in many major University of Belgrade orchestras and choirs.



With several clubs and societies to choose from, students' time at the Faculty should never be dull. The range of interests is wide – sports, music, drama, student bulletin, to mention but a few: the students' main problem will be choosing which societies to join.

Students at the Faculty enjoy a wealth of opportunities to involve themselves in music, as listeners and performers, and at all levels. The University's Orchestra offers a great range of opportunities, including performances, recitals, masterclasses and coaching. Other organisations within the Faculty cater for almost every other conceivable interest, from soul to jazz, from classical to contemporary.

Regardless of the students' level of expertise, she/he can become involved in any club or society in which she/he is interested. If a society or team is not available, there is support for those wishing to establish one.



When students enrol in the Faculty, a good way of following a current interest or taking up a new one is to join one of the many clubs and societies run by the Mechanical Engineering students unions, clubs and societies. The Faculty has more than ten affiliated societies based on the campus, which encompass a wide range of



student interests at the Faculty and include national (e.g. Arabic), subject (e.g. Aeromodelling), arts (e.g. music), religious (e.g. Orthodox Christian), sports (e.g. basketball, football, rugby) and general interest societies. The list is ever-changing. Alternatively, if students cannot find anything that reflects their interests in, they can start their own society – Faculty of Mechanical Engineering offers help and institutional support with this respect.





Hours weekly	1 st year		2 nd year		3 rd year	
	1 st	2 nd	3 rd	4 th	5 th	6 th
1						
2						
3	1.1.5 Mathematics 1 6 ECTS	2.1.5 Mathematics 2 6 ECTS	3.1.5 Mathematics 3 6 ECTS	4.1.5 Thermodynamics B 6 ECTS	5.1.5 Fluid mechanics B 6 ECTS	6.1.5 Electrical engineering 6 ECTS
4						
5						
6						
7	1.2.5 Mechanics 1 6 ECTS	2.2.5 Elective course 6 ECTS	3.2.5 Mechanics 2 6 ECTS	4.2.5 Mechanics 3 6 ECTS	5.2.5 Numerical methods 6 ECTS	6.2.5 Fundamentals of control engineering 6 ECTS
8						
9						
10						
11	1.3.2 Constructive geometry and graphics 2 ECTS	2.3.5 Engineering graphics 6 ECTS	3.3.5 Machine elements 1 6 ECTS	4.3.5 Machine elements 2 6 ECTS	5.3.5 Manufacturing technology 6 ECTS	6.3.5 Elective course 6 ECTS
12	1.3.3 Engineering management and economy 4 ECTS					
13						
14						
15						
16	1.4.5 Physics and measurements 6 ECTS	2.4.2 Engineering materials 1 2 ECTS	3.4.5 Engineering materials 2 6 ECTS	4.4.5 Elective course 6 ECTS	5.4.5 Elective course 6 ECTS	6.4.5 Elective course 6 ECTS
17		2.4.3 Strength of materials 4 ECTS				
18						
19						
20						
21	1.5.2 English 1, 2 ECTS	2.5.2 English 2, 2 ECTS	3.5.5 Fundamentals of strength of structures 6 ECTS	4.5.4 Mechanical engineering and sustainable development 3 ECTS	5.5.5 Elective course 6 ECTS	6.5.5 BSc work 6 ECTS
22						
23	1.5.3 Programming in C 4 ECTS	2.5.3 Computational tools 4 ECTS				
24						
25				4.5 Skill praxis B 3 ECTS		

Bachelor Studies - ECTS-180

In Diploma certificate of BSc studies, the **title: Bachelor of Science (BSc from the Latin Baccalaureus Scientiæ) in Mechanical Engineering – three year studies** will be stated.

A Diploma Supplement will contain a list of courses the student has attended and passed exams in.

Abbreviations: B.Sc.ME or BSc ME.

Skill praxis B, M = Internship, training, practice



Master Studies - ECTS-120

In Diploma certificate of MSc studies, the **title: Master of Science (MSc from the Latin Magister Scientiæ) in Mechanical Engineering** will be stated.

A Diploma Supplement will contain a list of courses the student has attended and passed exams in, as well as the name of the obligatory study specialisation from a certain department he/she has taken and completed. Abbreviations: M.Sc.ME or MSc ME.

Courses of elective study specialisation are given in the section on **Study Specializations (Study Modules)**.

Hours weekly	1 st year		2 nd year	
	1 st	2 nd	3 rd	4 th
1				
2	1.1.5 COURSE OF ELECTIVE MODULE	2.1.5 COURSE OF ELECTIVE MODULE	3.1.5 COURSE OF ELECTIVE MODULE	4.1 Skill praxis M
3				4.2.2 Optional: Foreign language
4				
5				
6				
7	1.2.5 COURSE OF ELECTIVE MODULE	2.2.5 COURSE OF ELECTIVE MODULE	3.2.5 COURSE OF ELECTIVE MODULE	4.3.11 Course of MSc thesis
8				
9				
10				
11				
12	1.3.5 Mechanics M or Fluid mechanics M	2.3.5 COURSE OF ELECTIVE MODULE	3.3.5 COURSE OF ELECTIVE MODULE	
13				
14				
15				
16				
17	1.4.5 Mechatronics or Thermodynamics M	2.4.5 Elective course	3.4.5 Elective course	4.4.11 MSc thesis
18				
19				
20				
21				
22	1.5.5 Elective course	2.5.5 Elective course	3.5.5 Elective course	
23				
24				
25				

Doctoral Studies - ECTS-180

In Diploma certificate of PhD studies, the **title: Doctor of Philosophy (Science) (Ph.D. from the Latin Philosophiæ Doctor) in the field of Mechanical Engineering** will be stated.

A Diploma Supplement will contain the date of enrollment, specialisation area, a list of courses the student has attended and passed exams in, the data on student's teaching experience, papers published and project participation, and finally, the date of PhD thesis defence, the Thesis title, name of the Mentor (Supervisor), and the names of PhD committee members. Abbreviations: Ph.D.ME or PhD ME.

ECTS	1 st year		2 nd year		3 rd year	
	1 st	2 nd	3 rd	4 th	5 th	6 th
5	Advanced course in mathematics 1.1.5	Selected topics in mechanics or Selected topics in fluid mechanics 2.1.5	Elective course 3.1.5	Elaboration of the project of the idea of Ph.D. thesis 4.1.30	Ph.D. thesis 5.60	
5	Numerical methods 1.2.5	Elective course 2.2.5	Elective course 3.2.5			
5	OMSR and communication 1.3.5	Elective course 2.3.5	Research & publication - III 3.3.20			
5	Elective course 1.4.5	Research & publication - II 2.4.15				
10	Research & publication - I 1.5.10					

More pieces of information about the system of studies may be found in the Academic Studies Guide (the printed printed booklet or pdf e-version on the site).



Accreditation Approval and Recognition of UB-FME Quality

Accreditation system of institutions and study programmes in Serbia was introduced back in 2005 by the new Law on Higher Education, which also introduced the Bologna process. The National Entity for Accreditation and Quality Assurance in Higher Education (NEAQA) - www.nat.rs is appointed as the responsible independent institution for executing the process. For accreditation of the university faculties, the process effectively started in 2007 and UB-FME was the first one to apply and get accreditation from the CAQA. Certificates for the institution (faculty) and all study programmes (BSc, MSc, PhD, all in Serbian) were issued on May 19, 2008.

In addition to national accreditation, UB-FME applied for the TEMPUS project on International Accreditation of Engineering Studies, got it granted and successfully finished it by getting its BSc and MSc programmes in English accredited with ASIIN (Akkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik e.V., Germany, <http://www.asiin.de/>), and also gaining the EUR-ACE (European Accredited Engineering Programme, <http://www.enaee.eu/eur-ace-system>) label. Participation and help of foreign partner institutions in TEM-

PUS project (TU München, KIT - Karlsruhe Institute of Technology, ICL - Imperial College London, UPC - Polytechnic University Catalonia Barcelona, GUC - German University in Cairo) is gratefully acknowledged.

In the meantime, the study programme in Naval Architecture also obtained its international verification by being accredited by RINA (The Royal Institution of Naval Architects, <http://www.rina.org.uk/>).

In the second, third and fourth rounds of National accreditation, UB-FME was also the first institution to apply and obtain renewed accreditation for all study programmes (BSc, MSc, PhD), but this time both in Serbian and English, it gained reaccreditation by RINA and it is now in the process of reaccreditation by ASIIN.



**INTERNATIONAL
ACCREDITATION
OF ENGINEERING
STUDIES**

144856-TEMPUS-2008-RS-JPGR (15.1.2009–14.1.2013)
This project was funded with support from the European Commission.

Study Specializations (Study Modules)

CUM LAUDE STUDENTS AWARDS



Todor Pantelić

Every year, the Faculty awards students who achieved excellence in studies and research. At each year of studies, there is the prize for the magna cum laude student and the award for all students who have the grade point average above 9 (on the scale from 6 to 10). Also, there are special prizes for the student who graduated with the highest grade point average and for the student who graduated as the first in his class (generation).

In addition to the Faculty awards, there are the prizes: "Dušan Tomić" (a former Professor at the Faculty /b.1875-d.1947/ and one of the founders of the Department, prize funded by his family), for the magna cum laude student who graduated in courses given by the Department of Thermal Science, and "Todor Pantelić" (a former Professor at the Faculty /b.1923-d.1999/, prize is given by the Fund for development in Theory of Mechanisms and Machines), for cum laude student who graduated in courses given by the Department of Theory of Mechanisms and Machines.



Dušan Tomić



AEROSPACE ENGINEERING

The Department of Aerospace Engineering has played an integral role in educating aeronautical engineering students, conducting innovative and exciting scientific research and improving the economic development of Serbia.

Throughout its illustrious history, the programme has continued to be an important training ground for future engineers across the country, region, and even the world. It continues to be popular with students for its novelty, creativity and permanent progress. Furthermore, the department is constantly making an effort to remain on par with other similar departments worldwide.

The mission of the Aerospace Engineering Department is to provide quality undergraduate and graduate aerospace engineering education and to advance the engineering and science knowledge base through research. The educational programme is constantly updated to meet contemporary aerospace engineering demands and needs. The department offers coursework that fully prepares students to become members of advanced design teams prepared for the challenges of modern aerospace engineering worldwide.

OBLIGATORY COURSES for MSc

- Applied aerodynamics
- Computational aerodynamics
- Structural analysis
- Flight dynamics
- Composite structures
- Aircraft control and systems
- Aircraft propulsion
- Aircraft design
- Skill praxis M - VAZ
- Course of MSc thesis
- MSc thesis

The goals of this programme are:

- to provide comprehensive aeronautical engineering education that develops in students fundamental skills necessary for the design, analysis, synthesis and research of the aircraft, spacecraft and other high technology flight systems, and
- to prepare students for various professions in aeronautical engineering and related fields by developing in them the attributes needed to make significant contributions to the society and to the engineering community both now and in the future.

The educational objectives of the Aerospace Engineering programme are to produce graduates (after three or five years of studying) whose expected accomplishments will be either successful careers in industry, private practice, government or research institutes or continuation to advanced postgraduate studies. After the faculty, the students will be skilled practitioners able to apply their knowledge and expertise when solving relevant engineering problems both in the aeronautical or related professions.



Aerospace Engineering

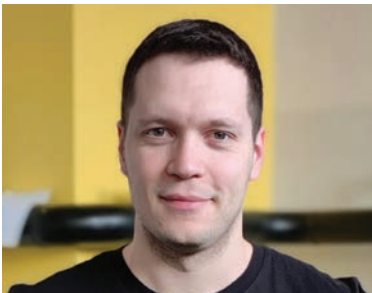
“Aerospace Engineering is by its very nature a creative profession. When practicing engineers develop solutions to open-ended, real-world problems, they must employ conscious and subconscious mental processing, as well as divergent and convergent thinking. If you like to question, explore, invent, discover, and create, then Aerospace Engineering could be the ideal profession for you!”



Miloš Petrašinović
Graduate student in
Aerospace Engineering

Biomedical Engineering

"A true multidisciplinary programme is designed to put your engineering skills and thinking skills to a critical test by exploring and contributing to the most valuable research area – improvement of human health. Here, it is possible to put your understanding of the essence of physical laws into entirely different context of living, biological systems. How well do we know the connection of ourselves and underlying mechanisms that enable us to do everyday's work?"



Nikola Stojiljković
PhD student in
Biomedical Engineering

BIOMEDICAL ENGINEERING

Biomedical Engineering (BME) is one of the latest study specializations at the Faculty of Mechanical Engineering, which provides to students multidisciplinary education and qualifies them for a variety of biomedical engineering jobs worldwide. The study programmes of BME offer analytical tools to understand how biological systems operate and in which manner engineering principles should be applied to resolve medical and biological problems. During mandatory and optional MSc courses, students have opportunities to gain knowledge in different fields, such as tissue mechanics, signal processing, biomedical devices, nanotechnology, and get practical experience in organization and functioning of the environment in which they will apply their knowledge in the future professional career. Through combination of theoretical and practical work, students learn to use and maintain modern equipment and perform applied research in biomedical engineering. There is an intensive collaboration between teaching staff of Biomedical Engineering study specialization and medical doctors, biologists, chemists and engineers working in medical facilities and companies, which allows our students to conduct studies, improve existing and develop novel devices, materials and diagnostic methods through their Master thesis. Our approaches in biomedical engineering include the invention of new methods, device improvement, equipment maintaining and applying information technologies in clinics.

OUR MAIN RESEARCH AREAS ARE:

1. Early skin cancer and melanoma detection
2. Nanomedical engineering
3. Biomedical software engineering
4. Clinical engineering

BME study specialization has two laboratories equipped with modern instruments, which are available for students of MSc and PhD studies. The first laboratory, Nanolab, provides opportunities for research in the area of Nanotechnology and Nanoscience, while the second one gives students the possibility to design and develop their own medical devices and aids.

OBLIGATORY COURSES for MSc

- Spectroscopy methods and techniques
- Biomedical instrumentation and equipment
- Clinical engineering
- Biomechanics of tissue and organs
- Introduction to nanotechnology
- Signal processing
- Nanotechnology
- Early diagnostics
- Nanomedical engineering
- Skill praxis M - BMI
- Course of MSc thesis
- MSc thesis

PROJECTS:

1. Project III 41006 - Development of new methods and techniques for early diagnosis of cancer, financed by the Ministry of Science and Technology of the Republic of Serbia
2. Project III 45009 - Functionalization of nanomaterials for a new type of contact lenses and early diagnosis of diabetes, financed by the Ministry of Science and Technology of Republic of the Serbia
3. TEMPUS: Studies in Bioengineering and Medical Informatics (BioEMIS)

COLLABORATION WITH:

- Kobe University, Japan
- Tokyo Institute of Technology, Japan
- Massachusetts Institute of Technology, Boston, USA
- University of Washington, Seattle, USA
- Faculty of Medicine, University of Belgrade, Serbia
- Faculty of Dental Medicine, University of Belgrade, Serbia
- Military Medical Academy, Belgrade, Serbia



Biomedical Engineering - a truly MULTIDISCIPLINARY challenge

CONTROL ENGINEERING

This study specialization involves teaching activities focused on the development of methodologies, algorithms and software for modelling, simulation, control and automation of complex apparatus and systems, plus their applications in many different areas.

The theoretical and applied research carried out at the department has a significant impact on the teaching process.

Research is concentrated on the systems for identification, prediction and control of complex systems, along with their applications in the automotive and aerospace sectors, on new technologies for multi-company logistics, as well as on software for simulation and robot control.

Within computer engineering, our research spans a wide range of areas from computer networks to computer graphics, from voice recognition systems to the architecture for arithmetic

OBLIGATORY COURSES for MSc

- Computer control
- Automatic control
- Dynamic systems modelling, identification and simulation
- Nonlinear systems 1
- Synthesis of linear systems
- Fuzzy control systems
- Industrial process control
- Nonlinear systems 2
- Skill praxis M - SAU
- Course of MSc thesis
- MSc thesis

calculation, from databases to software engineering, from electronic circuit design to CAD instruments which assist in planning.

The Department is committed to the development of teaching at all levels of university education, as well as to the continuing education of research and teaching staff.



Control Engineering

“As in every new chapter in life, I have a lot of expectations and fears. I expect a lot of challenges and new knowledge in the field of automatic control.”



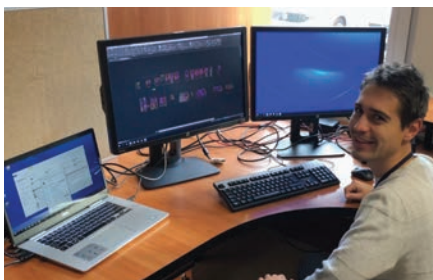
Ksenija Joksimović
Graduate student in Control Engineering

Naval Architecture



Ship BELUGA SKYSAILS
Hull made at the VAHALI shipyard in Belgrade

“ This degree studying programme offers an opportunity for study at an advanced level of naval architecture theory, analysis and design procedures for various kinds of ships, unusual vessels and floating bodies in general. An important part of the studies is individual, as well as team work on comprehensive projects that should be presented and elaborated to course staff. ”



Matija Vasilev, PhD student and Junior Researcher at the Department of Naval Architecture

NAVAL ARCHITECTURE

The main goal of this study specialization is to provide advanced education and graduate engineers qualified to work successfully in the field related to various aspects of ships.

COURSES for BSc

- Ship geometry
- Ship buoyancy and stability 1
- Ship structures 1
- Shipbuilding technology
- Ship systems
- Ship equipment

The courses taught include ship buoyancy and stability, ship strength, ship structures, ship production, ship engines and equipment, sea-keeping, maneuvering, (computer aided) ship design, but also advanced courses, for instance, ship waves, aero-hydrodynamics of sailing vessels, high speed craft, numerical methods in ship structural design, computational fluid dynamics (CFD) applied to ship hydrodynamics, wave induced loads etc.

The department graduates are engineers who are responsible for the design, construction, and/or repair of ships and boats, including: merchant ships (oil/gas tankers, cargo ships, bulk carriers, container ships), passenger/vehicle ferries, high speed craft, yachts (power boats, and other recreational craft), various kinds of floating structures etc.

Our graduates typically work for shipyards, shipping companies, design firms and consultancies, equipment manufacturers, regulatory bodies

and governments. Many of the department's graduates now hold prominent positions in the shipbuilding industry in Serbia, Montenegro and other countries all across the globe (Canada, Australia, the Netherlands, etc.).

OBLIGATORY COURSES for MSc

- Ship resistance
- Ship strength 1
- Ship propulsion
- Ship buoyancy and stability 2
- Ship structures 2
- Ship design
- Seakeeping
- Marine engines
- Application of methods and techniques of industrial engineering in shipbuilding
- Skill praxis M - BRO
- Ship turbines and boilers
- Course of MSc thesis
- MSc thesis

ALSO ACCREDITED BY



Welding and Welded Structures

WELDING AND WELDED STRUCTURES

Following the new world trends in the field of welding, necessary for fulfilling the requirements for trained specialists, starting from the academic year 2005/6, the Department for Engineering Materials and Welding, Tribology, Fuels and Combustion together with the Department for General Machine Design, and with the support from "Messer Tehnogas", a.d. Belgrade, have jointly implemented the elective module (profile) of academic studies within the Master of Science degree, called Welding and Welded Structures (WWS). In the past years, the Department for Process and Environment Protection engineering are also included in the teaching process on this module.

OBLIGATORY COURSES for MSc

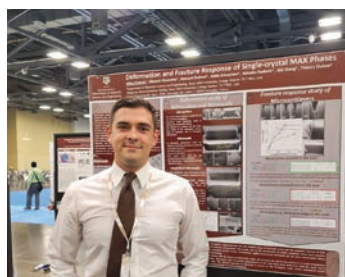
- Engineering materials 3
- Fuel, lubricants and industrial water 2
- Design of welded structures
- Welding metallurgy
- Machine design and construction M
- Fracture mechanics and structural integrity
- Design, construction and operation of processing systems
- Optimization and reliability of constructions
- Welding technology
- Skill praxis M - ZZK
- Course of MSc thesis
- MSc thesis

The WWS module is designed to cover four major fields in the science of welding, compiled both in obligatory (compulsory) and elective courses of the MSc academic studies:

1. Welding processes and equipment, including both the conventional and unconventional processes, as well as the related processes.
2. Engineering materials and their behaviour during exploitation and welding.
3. Design of welded structures, including strength and strain analysis and the structural integrity of welded joints; their reliability, remaining life assessment and quality assurance and quality control.
4. Fabrication, application and welded joint engineering, with a special accent on non-destructive testing methods and in-service behaviour. Failure analysis and welding procedure specifications with practical examples complete this topic dealing with the behaviour of welded joints in the conditions of creep, fatigue, friction, wear, and corrosion.



"This programme truly brings together various disciplines of mechanical engineering and materials science, offering students comprehensive understanding that allows future welding engineers to apply their skills across industry and academia. Professors' dedication is evident in how they connect students with the leading companies in the industry, providing invaluable networking opportunities that give students a head start in their careers."



Miloš Dujović
Graduate Assistant Researcher
at Texas A&M University

DESIGN IN MECHANICAL ENGINEERING

Study module Design in Mechanical Engineering provides knowledge about innovative methods of designing mechanical systems, as well as the possibility of acquiring application skills of the software packages used in the modern mechanical industry



Andrijana Savić
Graduate student in
Design in Mechanical Engineering

The elective study specialization, Design in Mechanical Engineering, trains mechanical engineers of general orientation in the skills of innovative development of new technical (mechanical) systems for the new functions (Function-based Design), innovative increase in the level of technical systems for the existing functions (Property-based Design) and innovative linking of electronic-software and mental control (Behaviour-based Design). In these innovative designs, students are trained to recognize the five levels of technical innovation (rationalization, modernization, new variant solution, new principle and invention); further, students are encouraged to develop the highest levels that yield new principles and inventions. The mechanical engineer with the listed skills has the main role in every expert team for product development in all branches of engineering.

Students are prepared to develop the TS function and user needs, harmonized to human features, environmental and ecological needs. TS functions are not supposed to disturb the natural environment, but rather to ennoble it. Students have the opportunity to perform numerous design activities, such as Conceptual design (generating ideas – brainstorming), Embodiment design (designing, the parameters definition, decision making, axiomatic and genetic methods, CAD shape modeling, FE methods application, simulations, etc.). Additional activities comprise the transformation of biological principles to technical systems (bionics), harmonization with the human features (ergonomics) and with the environment (ecology). Aesthetic design is one of the main objectives which students can achieve using the CATIA software, 3D printing (rapid prototyping), etc. The laboratory

OBLIGATORY COURSES for MSc

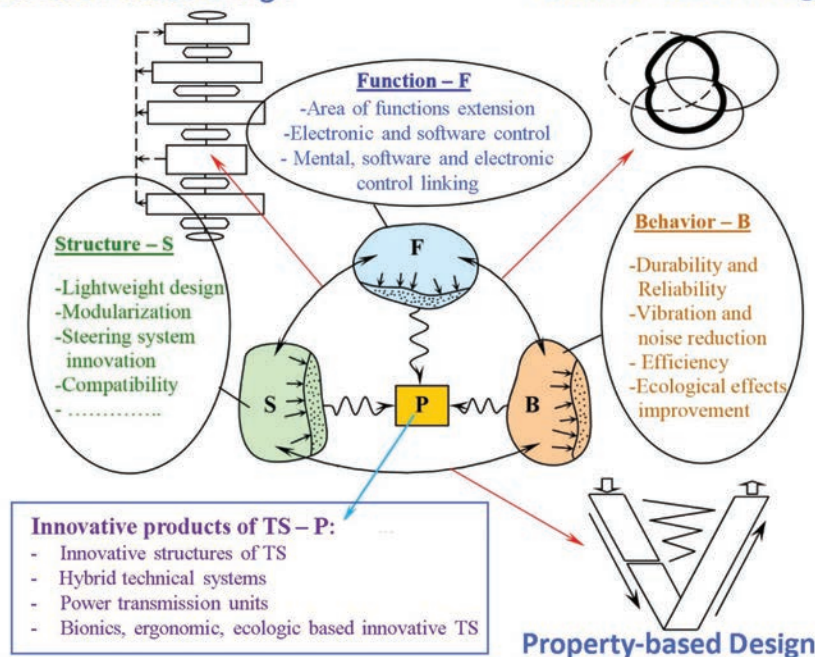
- Structure modelling with calculation
- Innovative design of technical systems
- Ergonomic design
- Bionics in design
- Machine design and construction M
- Decision-making methods
- Software tools in design in mechanical engineering
- Optimization methods
- Eco design
- Skill praxis M - DUM
- Course of MSc thesis
- MSc thesis

for Design in Mechanical Engineering is also available to students for their training.

The curriculum of the study specialization comprises three groups of courses. The first includes the courses related to the creation of ideas, development of the principle solutions, development of the structure of the system, development of the desired properties, and the like. In this sense, the most important are the courses in Innovative Design of Technical Systems, Methods in Engineering Design, Methods of Optimization and Decision Making Methods, Modelling and Structure Calculation. The second group comprises the courses which provide skills in the design tools applications (Software Tools in Design) and necessary knowledge in bionics, ergonomics, ecology etc. The third group includes elective courses which broaden the area of knowledge and practical application of specific TS development, such as Hybrid Technical Systems or Gear Power Transmission Units.

Function-based Design

Behavior-based Design



Design in Mechanical Engineering

INFORMATION TECHNOLOGIES

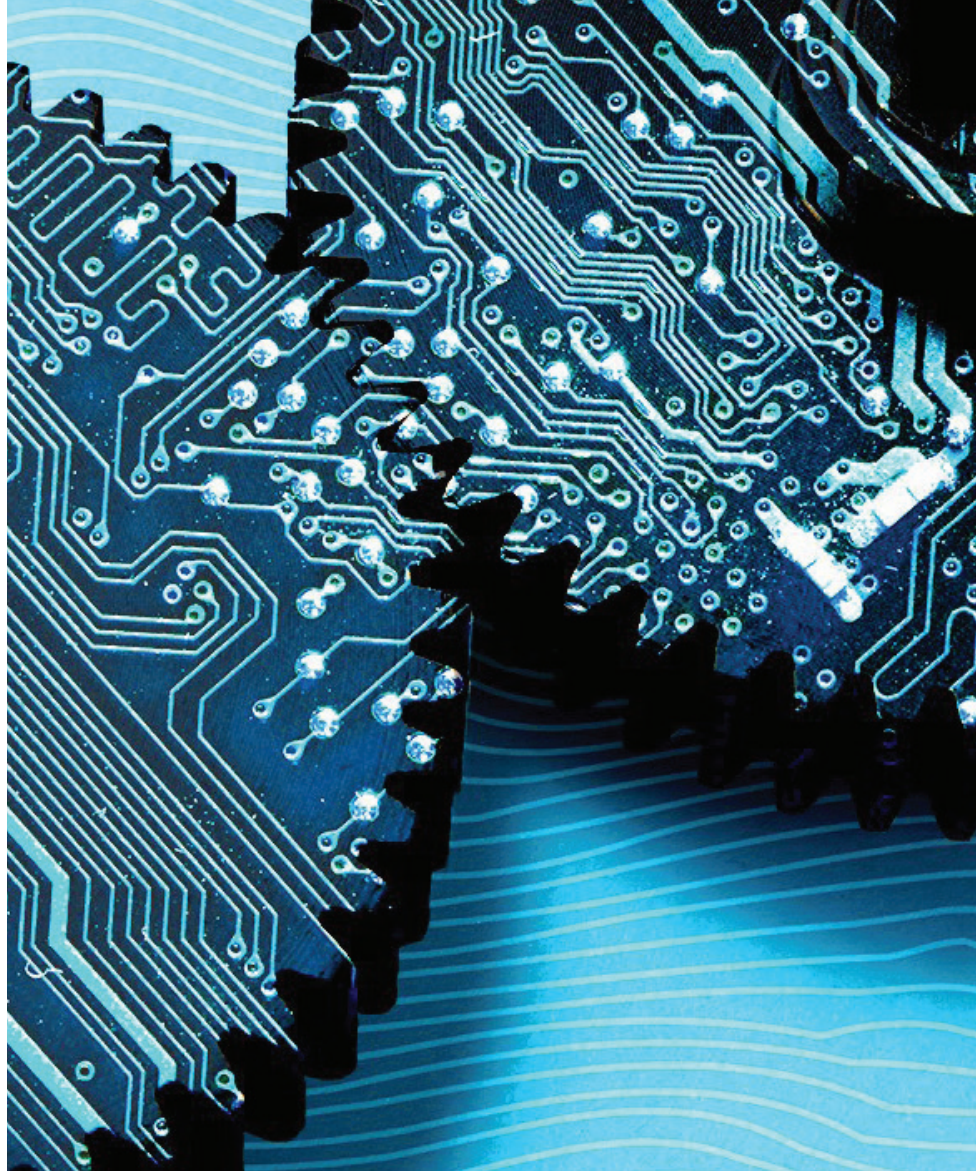
Rapid dissemination of digital technologies has been accompanied by the development of high-performance intelligent machines, such as the next-generation mobile devices, hybrid cars and robots. These products and services have been made possible by the integration of various technologies through digital technology. In response to current trends, the study specialization of Information Technologies (MIT) produces engineers who can utilize advanced equipment and information technology in a broad range of fields, from product development to the construction of intelligent information services.

OBLIGATORY COURSES for MSc

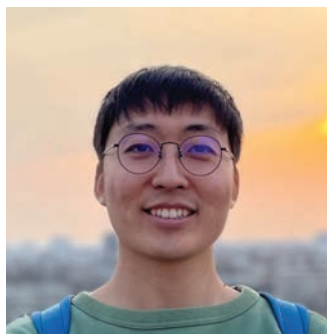
- C/C++
- Object oriented paradigm
- Algorithms and data structures
- Programmable control systems
- Data exquisite in mechanical engineering
- Engineering software design
- Optimization methods
- Numerical methods in continuum mechanics
- Skill praxis M - MIT
- Course of MSc thesis
- MSc thesis

MIT produces human resources and technology that will integrate mechanical engineering, the foundation of design and manufacturing, with information engineering. This, in turn, is supposed to have a major impact on the society. MIT offers educational programmes that impart the basic knowledge and practical application ability in those areas of dynamics essential to equipment design, cartography and processing technology. We teach the courses required for manufacturing products, control theory and computer control for machine and equipment control, as well as information-related courses, such as knowledge processing, and the Internet, all of which are essential for the creation of viable computer models, as well as for the application of these technologies. In addition, students are given opportunities to conduct actual research through participation in joint projects with business enterprises in such areas as high-performance intelligent equipment, design and manufacturing technology and computer network technology.

Our students master the latest technology and research methods required for careers as researchers or engineers. The study specialization programme provides training in mechanical, digital and software technology to produce engineers with strengths in both information and mechanical engineering, and, consequently, regardless of the surrounding economic conditions, graduates are sought after by businesses in a broad range of fields, including not only the manufacturing industry, but also the semiconductor and information system related businesses.



Mechanical Engineering & Information Technology



Feng Jiang
Graduate student in
Information
Technologies

“ My first experience of studying abroad was both challenging and rewarding. However, with the determination and support from my professors and colleagues, I gradually adapted. Their guidance, both academically and personally, was invaluable and comforting.

The Mechanical Engineering and Information Technologies module is a "place" where engineering and IT meet, making it a challenging yet rewarding study. Daily lab and classroom work with teachers' support helps us explore how IT is applied in modern engineering. Even as a foreign student, I faced no barriers in mastering databases, data acquisition and exquisite, programming languages and various web and graphics software tools. ”

“Life in big cities is unimaginable without efficient public transportation. Rail systems make the backbone of a well-organized public transportation system. Imagine an automatic driverless metro system in Belgrade! We would like to participate in the realization of one such great idea.”



Pavle Savičević, Mila Đurković and Pavle Simović
Graduate students in Railway Mechanical Engineering

RAILWAY MECHANICAL ENGINEERING

To be able to successfully work in the field of Railway Mechanical Engineering, you should learn several things. First, the wheels on rail movement and the guidance principles. Then we need to know different components of moving resistance.

The power needed for train movement and resistance overcoming make a difference in the types of locomotives which move the power transforming plants. Diesel-engine or electric power from the catenary needs to be transformed into mechanical energy. Pure mechanical gears can do this for low power locomotives only. In most other cases, electric or hydrodynamic gear is needed. But, there are plenty of variations, and each of them needs an appropriate control system. Unfortunately, technical systems are not ideal, and some energy dissipation is always present. The cooling system of the locomotive has the task to bring out excessive heat generated by this cause. For the train, we need auxiliary power sources, like compressed air for the brake system and other devices. The compressor system on the locomotive should master that. And, when we put the train in movement, the dynamical forces and accelerations arise. What the possible consequences are, what the acceptable limits are, and what an engineer can do to keep all dynamical phenomena in acceptable

limits, should be learned, too. Another problem with the train in motion is how to stop the moving mass of several thousands tons. The brake system must be reliable, well coordinated, within maybe a hundred of vehicles in the train, and safely controlled by the locomotive. We make the vehicles for people transportation and for freight traffic. They must be put in an appropriate, strong enough structure. We need to learn how to design, calculate and afterwards test the strength of structure.

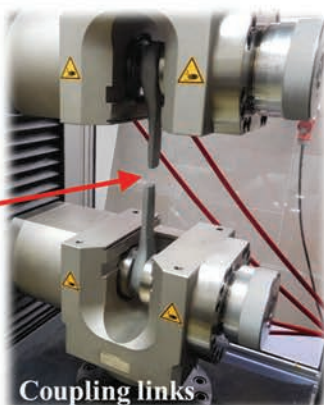
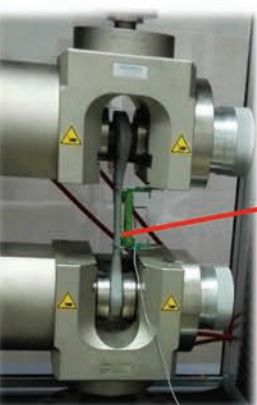
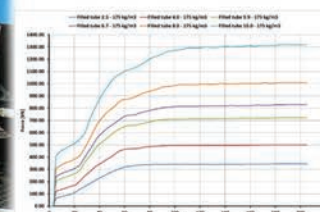
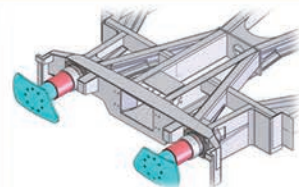
We learn how to design passive safety elements and install them in the bearing structure. Using forensic engineering, we learn to analyze the failure causes of parts of rail vehicles.

Lots of interesting things! Aren't they?

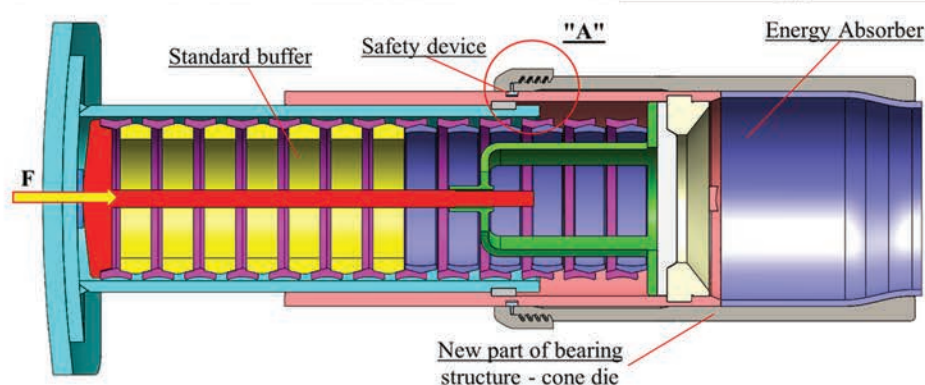
OBLIGATORY COURSES for MSc

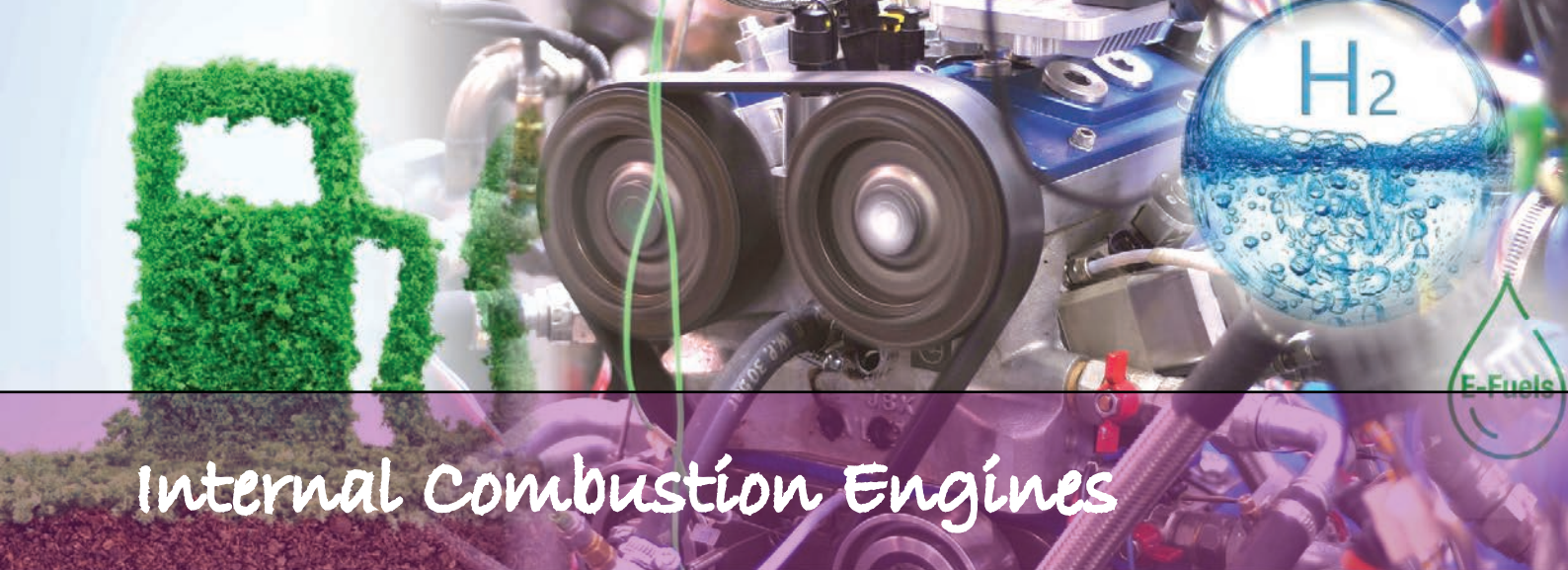
- Rail vehicles 1
- Theory of traction
- Locomotive 1
- Rail vehicles 2
- Brakes of rail vehicles
- Locomotive 2
- Railway vehicles maintenance
- Fundamentals of rail vehicle dynamics
- Skill praxis M - ZEM
- Course of MSc thesis
- MSc thesis

Railway Mechanical Engineering



Coupling links





Internal Combustion Engines

“ ICE-based powertrain is mechanical engineering as a whole. Mastering the design of systems of tremendous dynamics, the processes from the aspect of the synergy of fluid mechanics and thermodynamics, advanced mechatronics and the complex world of state-of-the-art testing environments and methods on a single object is a fascinating journey which made me an engineer of such versatility I could have never imagined. ”



Nemanja Bukušić
PhD Student in Internal Combustion Engines and Powertrain Systems

INTERNAL COMBUSTION ENGINES

Since internal combustion engines are one of the most complex and dynamic machines, studies demand a multidisciplinary approach. Therefore, we at the Department of Internal Combustion Engines, we dedicate ourselves to providing BSc, MSc and PhD education for the students interested in entering the engineering field, which continually grows and develops faster than ever in its almost 130-year history.

The study programmes at the ICEPS rely on the fundamentals in mathematics and fluid and thermal sciences, with particular emphasis on issues such as combustion, heat transfer, and gas flow. We further provide students with in-detail knowledge and advanced approaches in the fields of engine process, its modelling and simulation, mixture formation, turbocharging and engine mechatronics. Acting with a sense of social and ecological responsibility, we pay special attention to lectures concerning pollutant formation and control and evaluating alternative power sources.

The study of ICE-based powertrains is hardly possible without extensive laboratory practice. For this reason, we apply special attention to practical training in instrumentation and measurement techniques in general, highlighting fascinating topics, particularly the techniques of

OBLIGATORY COURSES for MSc

- Engine working processes
- Mixture formation and combustion in IC engines
- IC engine design 1
- Internal combustion engine mechatronics
- Supercharging of IC engines
- IC engine design 2
- IC engine testing
- Engine design project
- Ecology of mobile power sources
- Skill praxis M - MOT
- Course of MSc thesis
- MSc thesis

stationary and dynamic measurements on engines. The ICEPS, widely recognized for developing its own high-tech measuring and acquisition equipment and applying advanced, high-quality instrumentation, encourages the involvement of students in experimentation as a fundamental tool in ICE-based powertrain development.

The worldwide recognized practice of involving students in research projects during their thesis work, state-of-the-art laboratory facilities, modern equipment, problem-solution-oriented lectures, and the individual approach to each student are some of the main benefits of studying at the ICEPS.



Agricultural Food Engineering



“From the outset of my studies, the Agricultural Department has made me realize the immense value of the knowledge I have gained in this field. This knowledge has the potential to enhance the quality of people’s lives through the application of innovative techniques in agricultural engineering.”



Nemanja Jovanović
PhD student in
Agricultural Food Engineering

AGRICULTURAL FOOD ENGINEERING

The Agricultural Food Engineering study specialization educates highly skilled engineers capable of designing, constructing, and researching agricultural machinery, facilities, and food processing equipment, as well as maintaining them. This is offered through bachelor's, master's, and PhD programmes.

Graduating projects tackle real-world problems related to agricultural machinery and food engineering, with a particular emphasis on the projects critical for manufacturers and users of agricultural and food processing equipment.

Graduates have a wide range of career opportunities, depending on their area of specialization. Employers include government agencies, civil engineering firms, food companies, machinery manufacturers, and many others. Many students secure employment immediately upon graduation. In the past, people could only till about half a hectare of land in a day, but with the aid of modern machinery, it is now possible to cultivate over 321 hectares in 24 hours.

The importance of educating students in Agricultural Food Engineering cannot be overstated, as they are crucial to meeting future global challenges in food production, sustainability, and technological innovation. This field equips them with the knowledge and skills to drive progress and ensure the efficient and sustainable use of resources in agriculture and food systems.

COURSES for BSc

- Renewable and secondary resources
- Agricultural machinery and equipment
- Machines and equipment for food processing and production
- Drying and hygrothermal processes

OBLIGATORY COURSES for MSc

- Tractors and self-propelled agricultural machines
- Refrigeration in food technologies
- Design of agricultural machines and equipment
- Design of mechanisms and manipulators in the food industry
- Drying process techniques and technologies
- Software tools in design in mechanical engineering
- Geoinformation and remote control of biotechnic systems
- Design of plants and process and energy systems
- Skill praxis M - PPM
- Course of MSc thesis
- MSc thesis

MOTOR VEHICLES

The Motor Vehicle Department prepares students for a wide range of careers in a fast growing, rapidly changing automotive industry through BSc, MSc, and PhD educational levels.

The demand for skilled, educated, and honest professionals continues to intensify as the complexity of the modern automobiles increases. Students will be provided with the tools and techniques necessary to achieve their potential. They will be shown how to produce an idea for product development or how to make decisions

OBLIGATORY COURSES for MSc

- Vehicle design
- System effectiveness
- Vehicle propulsion and suspension systems
- Automotive friction systems
- Vehicle mechatronics
- Vehicle body structure
- Vehicle testing
- Vehicle maintenance
- Skill praxis M - MOV
- Course of MSc thesis
- MSc thesis

related to possible ways for product improvement. Students will learn to use sophisticated methods to design and develop new or improved vehicles and/or components. To achieve this, students will be encouraged to develop the skills and attitudes needed to work effectively in a multidisciplinary design team.

As the automotive industry deals with the complex products, processes and constraints, an engineer's approach to motor vehicle development cannot be based on the simple strategy of specifying "good quality" components. Designing and assembling of motor vehicles with confidence involves quantifying the function and performance of systems and subsystems. Working in the modern automotive industry cannot afford to ignore system approach in the process of vehicle and/or its components development. Accordingly, the motor vehicle courses are designed to provide students with the knowledge and skills that links the bottom level component design to the top level objectives, such as customer satisfaction and cost effectiveness.

The courses at the Motor Vehicle Department are selected and designed to reflect:

- a top-down approach to the vehicle engineering topics,
- a "system thinking" framework, referring to motor vehicles lifecycle,
- a significant level of core technical engineering content,
- clear links between design, development, testing, and manufacturing of motor vehicles.



“Automotive engineering fascinates me as it offers the opportunity to explore the entire vehicle development process, from design and manufacturing to testing and optimization. It also allows me to contribute to innovative solutions that shape the future of sustainable and intelligent mobility.”



Zdravka Gajić
Graduate student in
Motor Vehicles

INDUSTRIJSKO INŽENJERSTVO



Industrial Engineering

During my studies in Industrial Engineering, I gained incredible experience that allowed me to develop various skills and knowledge crucial for solving complex problems in different industrial fields. This has made me very successful at work from the very first day. The dedication of the professors and assistants, as well as their support, significantly contributed to my preparation for the changing environment, as well as to the development of my confidence. Today, all of this positively impacts my work and my ability to handle various career challenges, for which I am very grateful.



Aleksandar Kalaver,
Graduate student in
Industrial Engineering

INDUSTRIAL ENGINEERING

While most engineering disciplines apply knowledge and skills in individual areas, Industrial Engineering is applicable in every industry. The Department of Industrial Engineering is firmly convinced that the future is tailored to the young! We know that learners are changing, as well as the social context. Therefore, we carefully listen to the needs of our students and

the labour market and improve processes every day; thus, our students are systems, lean, and sustainability thinkers, who have the technological, digital, and transversal skills to face the current and future challenges of the successive industrial revolutions.

Our department was established in 1990 as the first one in the Balkan region with the aim of meeting the growing demand for qualified industrial engineers. The department curriculum was developed in such a way as to provide students with the skills required by modern industrial engineers, including the analysis of product design to determine the optimum manufacturing process, the selection of equipment and design of layout, the design and installation of systems for controlling production, inventory, job

OBLIGATORY COURSES for MSc

- Operations research
- Engineering statistics
- Industrial logistic
- Ergonomic designing
- Database systems
- Production and operations management 2
- Organization design
- Industrial management
- Skill praxis M - IIE
- Course of MSc thesis
- MSc thesis

design and method improvement, the design of material handling systems, project appraisal, ergonomics, applied computer science in industrial engineering, quality and risk management, and operations research. The department cooperates with various national and international institutions and is engaged in basic and applied research projects, with a strong connection to the industrial world.

Our programmes were designed with the aim of providing the engineers with the knowledge and skills necessary to function in the working environments where cost effectiveness, high

productivity, continuous quality and reliability improvements, waste reduction, and efficient resource utilization are critical success factors for organizations. In addition to the disciplinary content, the department also encourages students to gain expertise in the use of modern information technologies and take part in professional and extracurricular activities. As a result, our students are able to stand out in many international contests and activities, so it is quite common for them to end up having job offers during their internships. Altogether, the goal of this department is to produce efficient industrial engineers with a high rate of technical ability, including practical, as well as theoretical knowledge, in order to attain secure and responsible positions in the competitive arena of industrial and service enterprises.

The Industrial Engineering Department is known for:

- Experienced, dynamic, and research-oriented IE department members;
- Modern classrooms, equipment, and laboratory facilities;
- Courses that are designed in line with the future trends;
- Opportunities to participate in the academic and social activities organized within the department;
- Undergraduate diploma and Graduate programmes leading to MSc and PhD degrees in Industrial Engineering.

The value of our graduates is well understood in every field of the manufacturing and service industries. During their studies, our graduates usually find jobs in both global and local corporations all over the world. They have proven that they can add value to companies in almost every field due to their strong knowledge in engineering, application skills, and an ability to work in multi-disciplinary and multi-cultural teams. We are proud of our students who hold leading positions in Bombardier, Bosch, ZF, Siemens, Philips, Signify, SAP, ISO, Danube Commission, Egzakta, Millennium Team, and many other companies!

ENGINEERING GRAPHICS AND MECHANICS

In 2023, the Department for the Theory of Mechanism and Machines founded the new master academy study module Engineering Graphics and Mechatronics, which represents the combination of three areas of mechanical engineering: Engineering graphics, Theories of mechanisms and Mechatronics.

Engineering graphics in this module's courses comprises advanced methods and techniques of shaping, constructive processing, presentation - rendering and rapid prototyping of complex three-dimensional space objects in mechanical engineering and other branches of science and technology. It includes the theory of constructive projective geometry and aesthetics, as well as modern computer methods of practical modelling and display of positional and metric invariants of space, using both classical technical documentation and virtual and augmented reality.

Theory of mechanisms in this master module provides knowledge about the structural, kinematic and dynamic characteristics of different types of classical mechanisms. Knowledge and

OBLIGATORY COURSES for MSc

- Constructive processing of curves and surfaces
- Constructive geometry and graphics
- Engineering condition monitoring
- Fundamentals of mechanism analysis and synthesis
- Applied mechatronics
- Engineering graphics and simulations
- Application of virtual and augmented reality in mechanical engineering
- The aesthetics of 3d modelling
- Skill praxis M - IGM
- Course of MSc thesis
- MSc thesis

skills of design, simulation and motion analysis of classic mechanisms are acquired, primarily using modern software tools.

Mechatronics is a multidisciplinary scientific and technical field as synergy of mechanical engineering, electronics and modern information technologies. A combination of the most modern fields of engineering, in this study specialization, provides engineers with an insight and understanding of the whole functioning and design of modern, highly sophisticated devices and systems. Along with engineering graphics and the theory of mechanisms, mechatronics gets the necessary theoretical and practical basis both in the design phases, as well as in the phases of visual presentation and prototyping. Students who complete this module will be educated and trained to: model complex machine parts and assemblies using advanced "CAD" methods, improve the aesthetic characteristics of modelled forms, present machine parts and assemblies with appropriate assembly and workshop drawings, design and analyze the movements of various types of mechanisms, perform simulation and analysis of the movement of the projected mechanisms, present complex three-dimensional forms using methods and techniques of virtual and augmented reality, as well as mechatronic systems.



Engineering Graphics and Mechatronics

“The department has many excellent teachers, who collectively have huge teaching and research experience. Professors are always ready to cooperate with students and provide help in mastering the material. At this department students learn through practice and real projects, which is very important for every student.”



Aleksandra Joksimović
Graduate student

“The study specialization in Production Engineering offers a wide range of contemporary knowledge in the fields of manufacturing technologies, techniques and cybernetics. I am sure that, after graduating, I will have many opportunities for employment and further career development. I would recommend this study field to all prospective students.”



Marija Stojanović
Graduate student in
Production Engineering

PRODUCTION ENGINEERING

Production Engineering Department has created a contemporary school of production engineering at all three levels (BSc, MSc and PhD) of studies. The curriculum covers three basic areas of production engineering with scientific content in the domains of techniques, technologies and cybernetics.

Production techniques relate to a wide spectrum of machine tools, robots and robotic systems, automatic assembly systems, measurement and control machines, flexible manufacturing systems, tools, fixtures and other components and elements.

Production technologies are based on a wide range of different technologies, including machining and assembly processes design and planning.

Production cybernetics includes manufacturing processes control systems, cyber-physical manufacturing systems, artificial intelligence in manufacturing, CAD, CAM, CAE systems in products and production design, as well as informational integration of production enterprises.

The programmes of study are well conceived and balanced units, embracing methods of study and knowledge tests, study results and student competencies.

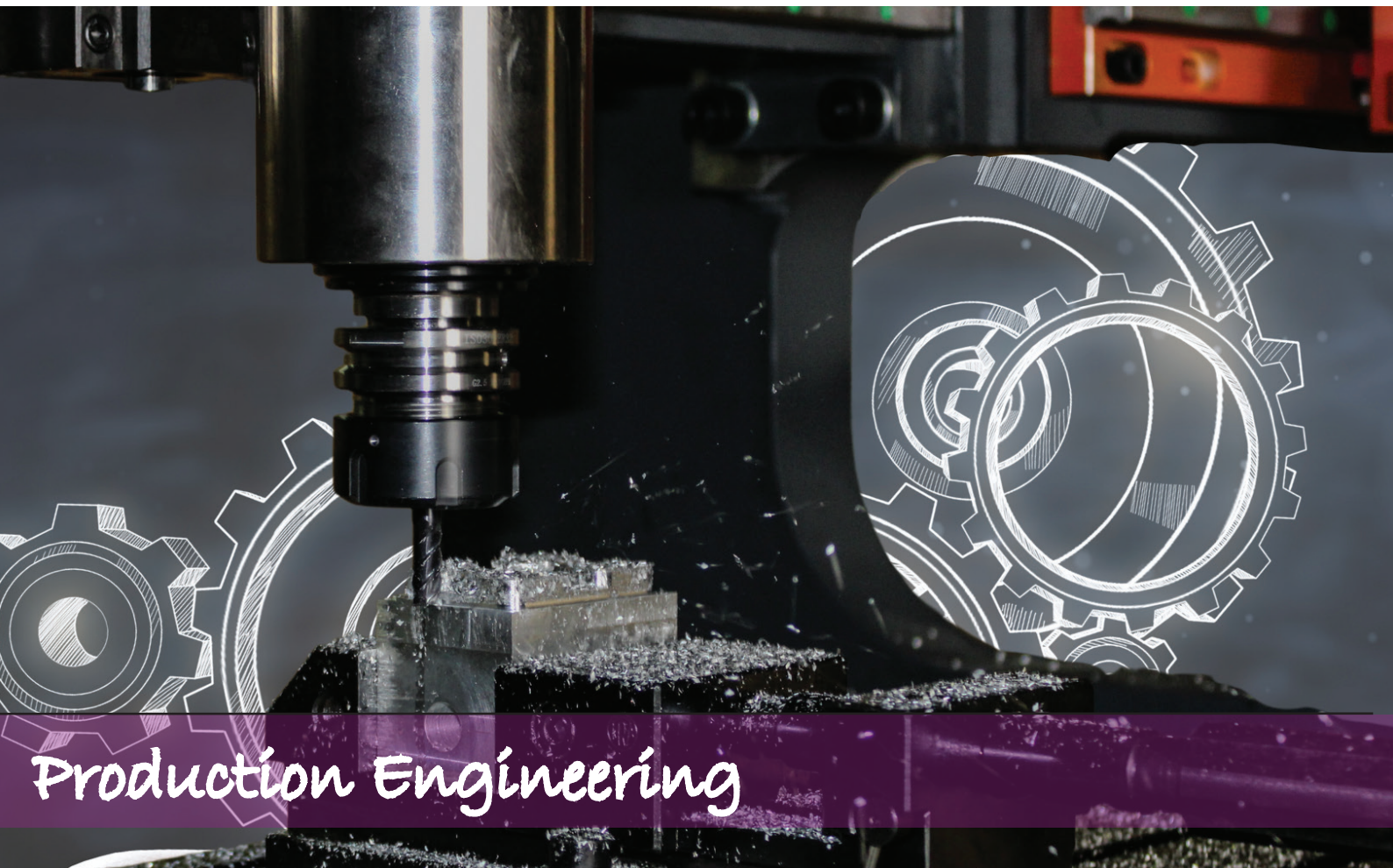
The Department has at its disposal the facilities and equipment necessary for conducting all forms of education at very high-quality levels: 10 laboratories, amphitheatre and classrooms.

OBLIGATORY COURSES for MSc

- Manufacturing automation
- Industrial robots
- Manufacturing systems design
- Computer integrated manufacturing systems and technology
- Production information systems
- New technologies
- Quality management
- Intelligent manufacturing systems
- Skill praxis M - PRO
- Course of MSc thesis
- MSc thesis

ELECTIVE COURSES for MSc

- Sheet-metal processing tools
- Coordinate measuring machines
- New generation of machine tools and robots
- Computer simulation in manufacturing automation
- Mechatronics systems
- Additive manufacturing technologies
- Assembly technology
- Machine tools M
- Computer control and monitoring in manufacturing automation
- Micro manufacturing and characterization



Production Engineering

MECHANICS

The study specialization in Mechanics is a multidisciplinary specialization which provides theoretical and practical knowledge in following fields:

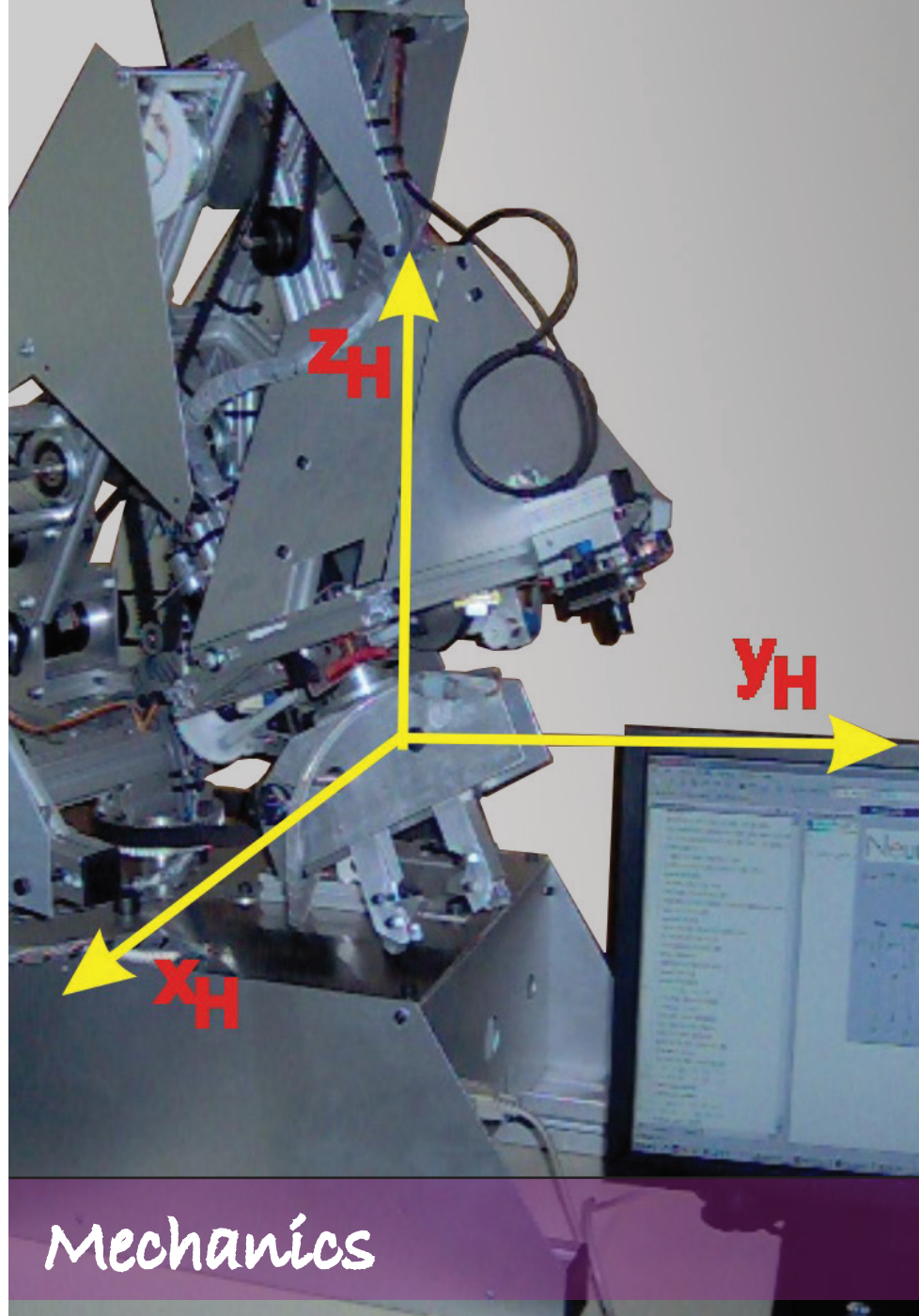
1. Rigid body mechanics
2. Solid body mechanics
3. Fluid mechanics

OBLIGATORY COURSES for MSc

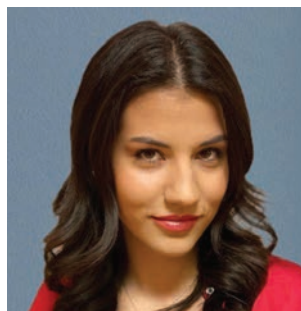
- Analytical mechanics
- Continuum mechanics
- Theory of elasticity
- Fluid mechanics 1
- Computational fluid mechanics
- Mechatronic robotics
- Multiphase flow M
- Theory of finite element method
- Skill praxis M - MEH
- Course of MSc thesis
- MSc thesis

After a successful completion of courses, students will be able to apply the acquired knowledge for:

- the design, production and maintenance of rigid mechanical systems, such as ideal mechanisms, robotic systems, mechanical control systems, mechatronics systems;
- the design, production and maintenance of deformable mechanical systems and structural analysis of deformable structures; finite element and vibration analysis of structures;
- the design, production and maintenance of equipment which involve flow processes: pipelines, flow machines, tube transport of fluids and solid materials, multiphase flow; analysis by using computational fluid dynamics (CFD).



“Mechanics is one of the oldest sciences and as such represents basis of mechanical engineering and other technical sciences. Doing an MSc in mechanics therefore means studying the foundations of mechanical engineering and contribution to the progress of science.”



Milica Novičić
Graduate student in Mechanics

Process Engineering and Environmental Protection



“The Process Engineering programme offers a unique opportunity to gain practical skills through laboratory work and projects. I aspire to be part of an innovative environment where I can contribute to the creation of new products and systems, thereby aiding the development of sustainable solutions for the challenges the society faces. The selfless support of dedicated professors and assistants has empowered me to confidently step into the field of engineering and, alongside my colleagues, push the boundaries in this area.”



Katarina Telebak
Graduate student in
Process Engineering

PROCESS ENGINEERING AND ENVIRONMENT PROTECTION

In its simplest form, process engineering is the design, development and management of a wide spectrum of industrial processes.

The following list of industries in which chemical

OBLIGATORY COURSES for MSc

- Transport phenomena in process industry
- Mechanical and hydromechanical operations and equipment
- Heat transfer operations and equipment
- Biotechnology
- Chemical and biochemical operations and reactors
- Design, construction and operation of processing systems
- Mass transfer and equipment
- Air pollution control
- Waste and wastewater management
- Skill praxis M - PTH
- Course of MSc thesis
- MSc thesis

engineers are employed provides a good indication of the diversity of the profession and the sort of work undertaken: oil refineries, chemical and petrochemical plants, energy production, food and drink processing, biotechnology, environmental health and safety industries, pulp and paper, pharmaceuticals, equipment manufacturing and plant construction, etc.

The Department holds the majority of courses dedicated to teaching and research in the field of process and environmental engineering. These courses cover process design, unit operations

and equipment, energy efficiency, pollution and waste management/control, etc.

Students can study process engineering and environment protection at all three levels of study - Bachelor of Science (BSc) - Master of Science (MSc) - Doctor of Philosophy (PhD).

After completing the bachelor level, an engineer should:

- have knowledge of relevant basic sciences (mathematics, physical chemistry, etc.),
- understand the basic principles underlying process engineering,
- have a basic understanding of health, safety, and environmental issues,
- have knowledge of some practical applications of process and product engineering.

After completing the Master of Science study programme, an engineer should:

- use deeper knowledge of the underlying phenomena to build more advanced models,
- be able to perform experiments and to give interpretations of the results,
- be able to analyse, evaluate and compare relevant alternatives in the chosen orientation,
- be able to synthesize and optimize novel solutions,
- be able to self-study a topic in-depth.

During their studies, students extensively use experimental facilities in our laboratory:

- basic process variable measurements, such as pressure, temperature, flow rate, fluid and solid properties, etc,
- unit operations and equipment, such as packed mass transfer column, heat exchanger, rotary furnace, hot wire reactor, fluidization, and venturi scrubber.

In order to achieve a significant level of practical training, students are often taken to visit various process plants.

WEAPON SYSTEMS

The Weapon Systems specialization offers a robust educational and research environment for both undergraduate and graduate students. This programme plays a pivotal role in training the next generation of experts in defence technology.

Our department has a distinguished track record, with nearly 600 engineers and over 60 doctoral graduates who have significantly contributed to the field through innovative research and comprehensive theses. A significant number of our students come from abroad, bringing a global perspective to their studies.

COURSES for BSc

- Introduction to weapon systems
- Fundamentals of weapon system design
- Fundamentals of projectile propulsion
- Projectiles flight mechanics
- Classical armament design
- Missile weapon design
- BSc thesis

OBLIGATORY COURSES for MSc

- Physics of explosive processes
- Flight dynamics and aerodynamic of projectiles
- Missile propulsion
- Fire control systems
- Interior ballistics
- Automatic weapons
- Missile guidance and control
- Projectile design
- Artillery weapons design
- Missile design and launchers
- Terminal ballistics
- Optical devices and optoelectronics
- Skill praxis M - SIN
- Course of MSc thesis
- MSc thesis

Students in this programme gain in-depth knowledge across various domains, including classical weaponry, rocket systems, flight mechanics, projectile propulsion, explosive materials, and the design of ammunition and missile systems. The curriculum is designed to provide both theoretical foundations and practical insights essential for tackling complex, multi-disciplinary challenges in defence technology.

The Weapon Systems Department benefits from strong collaborations with other departments within the Faculty of Mechanical Engineering, as well as numerous military and civilian research institutions. This synergy ensures a high-quality educational experience and enhances research opportunities.

Our specialization is one of the few of its kind offered at a public, non-military university, providing a unique opportunity to engage with advanced technologies and acquire multi-disciplinary expertise in weapon design. With a focus on personalized learning and excellent career prospects, our programme prepares students to excel in the evolving field of defence technology.



Weapon Systems

“Students of the Weapon Systems programme are dynamic, engaged, and forward-thinking. They embrace the rich tradition and history of the department while championing openness and creativity. We benefit from access to cutting-edge equipment and resources, enabling us to conduct pioneering research and tackle complex challenges in the field of defense technologies.”



Radmilo Jovanović
Graduate student in
Weapon Systems



Thermal Power Engineering

“You will have the opportunity to learn and grow through both theory studying and internships. Often, the Faculty will closely mentor you and help you tackle progressively more challenging tasks. You will learn from experienced engineers and will be offered seminars, short courses and internships to increase your knowledge.”



Miroslav Trivunović
Graduate student in
Thermal Power Engineering

Thermal Power Engineering

The study programme provides quality education for students entering the power engineering profession or seeking careers in this field, to advance to scientific knowledge through basic and applied research, to disseminate technical information through scholarly publications and conferences, to advance to the profession through service within the associated societies and to promote activities which serve global development.

The programme focuses on the processes and equipment of thermal and nuclear power plants, solutions to problems in design, manufacturing and operation of steam turbines, gas turbines, steam boilers, nuclear reactors, and energy efficiency solutions, as well as on all other aspects of thermal power engineering.

The educational objectives of the programme are to produce graduates who can apply the principles of science and engineering, and are knowledgeable in thermal and mechanical systems. The students are educated to understand and investigate the relationships between thermal processes and thermal power equipment, to apply integrated designs, to communicate effectively and to demonstrate ability to function in multidisciplinary teams. Their skills include usage of modern engineering tools in design, investigation and analyses of processes, equipment and integral plants.

The Department encourages students to participate in research projects.

The courses in steam and gas turbines provide students with knowledge of thermodynamic cycles of steam and gas power plants, processes of heat conversion into mechanical energy, subsonic and supersonic gas and steam flows in turbomachinery, basic information on the design and construction of turbomachinery, etc.

In the courses in Thermal power plants students are given information about energy plants, heat schemes, thermal power plant equipment, design and optimization of thermal power plants, and their operation and maintenance.

Within the Energy steam boilers course students are taught of processes, design and construction of steam boilers.

Courses in nuclear engineering give students

basic information on nuclear fuels, processes and equipment. Modern fission reactors and nuclear systems for steam production are examined. Special attention is paid to the thermal-hydraulic processes, modelling and numerical simulation of heat transport and two-phase flow.

Energy balances, planning and rational use of energy, as well as increase of energy efficiency are the topics covered in Planning of energy systems.

OBLIGATORY COURSES for MSc

- Steam turbines 1
- Power steam boiler 1
- Steam turbines 2
- Thermal power plants 1
- Gas turbines
- Energy planning
- Thermal power plants 2
- Steam generators
- Skill praxis M - TEN
- Course of MSc thesis
- MSc thesis

Besides the above mentioned obligatory courses, students can broaden their knowledge through elective courses, such as: Environmental protection in thermal power engineering, Steam turbines 3, Nuclear reactors, Two-phase flows with phase transitions, Computer simulations of thermal-hydraulic processes and CFD, Turbo-compressors, Pumps and ventilators, Pipelines, etc.

Research facilities include the Laboratory for thermal turbomachinery and thermal power plants, and the Laboratory for steam generators and nuclear reactors

MATERIAL HANDLING, CONSTRUCTIONS AND LOGISTICS

Material handling, the primary field of study at the Department, is present in every field of industry. Proper handling and transportation of the material is one of the key aspects of an efficient industrial system. As such, the curriculum has been designed to familiarize the students with the engineering challenges in these fields by allowing them to explore the methods of calculation and design of civil, mining and material handling machines and industrial and warehouse systems.

COURSES for BSc

- Fundamentals of steel structures
- Elements of construction and mining machines
- Material handling equipment

During the BSc and MSc study programmes, the students will gradually acquire proficiency and tools for dealing with the challenges of designing an efficient civil, mining or material handling and transportation system. These include various calculation methods and theories, as well as the use of modern CAD software for creating 3D models, technical documentation or Finite Element Analyses (FEA).

By the time the study course is finished, the students will have some practical and theoretical background in the calculation and design of various types of civil and mining machines and systems: earthmoving machines, various kinds of cranes and excavators, conveyors, factories and warehouses, lifts and elevators, cable cars, and others.

OBLIGATORY COURSES for MSc

- Facility layout and industrial logistics
- Computer aided design in material handling practice
- Structural and stress analysis
- Transport and logistic systems design
- Conveying and material handling machines
- Mining and construction machines
- Cranes design
- Eco design
- Skill praxis M - TKL
- Course of MSc thesis
- MSc thesis

The study programme is completed with the Master's thesis, in which the student applies the acquired skills and knowledge to solve a real-world challenge in one of the fields covered by the study programme.

Material Handling, Constructions and Logistics



"I chose the Master's programme in Material Handling, Constructions and Logistics because I have always been attracted by the complexity and importance of conveying systems. The programme provided me with excellent competence in conveying, planning, and logistics principles, as well as the skills needed for designing complex mechanical structures. I have gained the knowledge and skills that will help me become a valuable and committed mechanical engineer."



Marko Đorđević
Graduate student in
Material Handling,
Constructions and Logistics

“Modern humanity cannot be imagined without fresh drinking water, electricity and clear air. The branch which connects all of the above is hydropower. This is why I think it was the topic of yesterday, it is the topic of today, and is especially going to be the topic of tomorrow. This has made me choose this as my engineering major.”



*Milan Bulajić, PhD student
The best student in the
academic year 2023/2024 in
Hydropower Engineering and
a former member of the erbian
national water polo team*

HYDROPOWER ENGINEERING

Hydropower plants, machines and equipment, have various applications in many industrial areas such as: electro power industry, turbomachines production industry, hydropower plants, water supply factories, oil industry, chemical industry, turbomachines management, water treatment plants, ventilation systems and many others where applied fluid mechanics is important.

This implies that there is a great need for hydropower engineers.

As an addition to comprehensive learning of subject matter, students acquire knowledge

OBLIGATORY COURSES for MSc

- Theory of turbomachinery
- Pumps
- Hydraulic turbines
- Design of Pumps, fans and turbocompressors
- Fans and turbocompressors
- Hydropower plants and equipment
- Hydraulic power transmitters
- Hydropower measurements
- Skill praxis M - HEN
- Course of MSc thesis
- MSc thesis

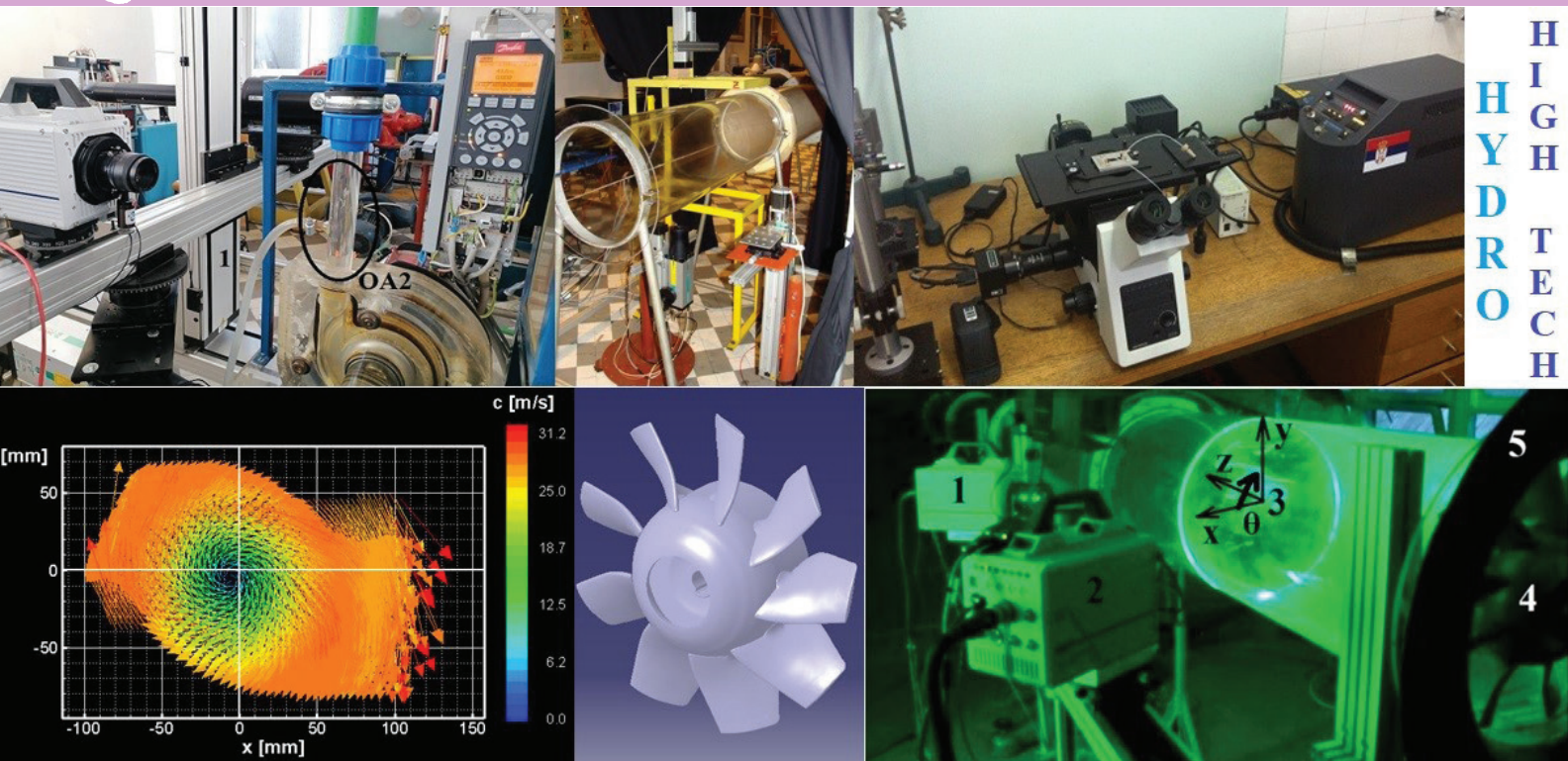
in other mechanical engineering departments, so that they can become involved in other domains of mechanical engineering techniques, if necessary.

It could be said that the hydropower engineering department belongs to the group of departments with a long tradition. It has great teaching programmes in undergraduate and post-graduate it possesses; the required laboratories and equipment for research and teaching; it has cooperation with industry, other faculties and institutes; finally, it has a significant number of scientific results and actualized products.

The Department prepares students to become practicing engineers who can participate fully in the engineering activities of design, building, operation, production, maintenance, safety, marketing, research, and administration.

Particular strengths of the Department include: national and international recognition, complex experimental techniques and test rigs, commissioning tests, water turbines, pumps, fans and compressors testing in accordance with the international standards, hydraulic and ventilation systems and components testing, as well as calibration of the flowmetres and anemometres.

Hydropower Engineering



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Thermal Science Engineering

THERMAL SCIENCE ENGINEERING

The Thermal Science Engineering study curriculum provides the students with skills required for Heating Ventilating Air Conditioning and Refrigeration (HVAC&R) systems design and construction, for work in companies within the field of HVAC&R installations production, assembling, maintenance, and/or exploitation sectors, as well as for research and scientific work.

The master's thesis BSc has to be taken from the list of courses passed by the students during the studies. Through the written report and the defence in front of the commission, the student proves his/her capability to solve practical problems by applying the knowledge acquired during the studies.

COURSES for BSc

- Pipelines
- Steam boilers basics
- Heating technique fundamentals
- Basics of refrigeration

In the last couple of decades, our study programme has been the most popular among mechanical engineering students, since a great number of enrolled students and graduates at-

OBLIGATORY COURSES for MSc

- Steam boilers elements and equipment
- Refrigeration equipment
- Steam boiler processing
- Refrigeration systems
- Air-conditioning fundamentals
- Thermal power plants and heat plants
- Heat pumps
- Air conditioning systems
- Skill praxis M - TTA
- Course of MSc thesis
- MSc thesis

tend our courses. The reason is very simple – the ease of finding jobs.

Students can benefit from our fruitful cooperation with the Norwegian University of Science and Technology (NTNU) – Trondheim, where they can enrol to joint postgraduate studies, financially assisted by the Norwegian government.

Both the work with students and the research work take place in the Laboratory for cooling devices and heat pumps and the Laboratory for heating and air-conditioning.

Laboratories were formed so as to enable energy and exergetic measurements and analyses of HVAC and Refrigerating Devices and Plants. Within the scope of the District Heating Rehabilitation Programme, the new HVAC installations at the Mechanical Engineering Faculty are constructed also as the demonstrating ones for the purpose of providing conditions for students' training.



“Most people know that engineering requires hard work and strong technical skills. As a member of such a respected profession, you will receive a high amount of prestige. Understanding of technology will provide you with better understanding of many issues facing our society.”



Filip Karadžić
Graduate student in
Thermal Science Engineering



Awards



By the Decree of the President of the Republic of Serbia, on the occasion of the Statehood Day of the Republic of Serbia in 2023, the Faculty of Mechanical Engineering was awarded the Sretenje Order of the Second Class, for special merits for the Republic of Serbia and its citizens in education, scientific research and overall contribution to the development of mechanical engineering in the country and the region. The order was awarded in the year in which the Faculty of Mechanical Engineering celebrated its 75th anniversary.



In 2022, the Ministry of Education of the Government of the Republic of Serbia awarded the Saint Sava Award to the Faculty of Mechanical Engineering for the participation of the institution and its employees in the programmes and projects with significant results achieved.



In 2019, the Ministry of Education, Science and Technological Development of the Government of the Republic of Serbia awarded the Saint Sava Award to the Faculty of Mechanical Engineering for the achieved reputation in the international scientific and research community and strategic investment in the development of high-quality higher education.

Departments

University of Belgrade
FACULTY OF MECHANICAL ENGINEERING



Production Engineering

Since its inception in 1948, the Production Engineering Department has endeavoured to impart quality education to students and train them to meet the demands of the manufacturing industry. The department has established links with the industry, R&D organizations, and academic institutes worldwide. The department sees itself as a pathfinder of emerging technologies and techniques in the area of production engineering and develops students to be technologically and managerially ready to meet the challenges of the open market in the present era of globalization.

The Production Engineering Department is committed to fostering sustainable development in

STAFF: 13 professors, 4 teaching and research assistants, 2 associates

DATE FOUNDED: 1948

DISTINGUISHED ALUMNI

- A.I. Kosicki, writer of the first textbook in Serbian for Production Engineering
- Prof. Dr. Pavle Stanković, famous lecturer
- Prof. Dr. Vladimir Šolaja
- Prof. Dr. Vladimir Milačić
- Prof. Dr. Milisav Kalajdžić
- Prof. Dr. Ljubodrag Tanović
- Prof. Dr. Bojan Babić

COOPERATION WITH FOREIGN UNIVERSITIES

- Duke University, Durham, North Carolina, USA
- Anhui University of Technology, Ma'anshan, China
- Tsinghua University, Beijing, China
- Białystok University of Technology, Białystok, Poland
- University of Liverpool, Department of Physics
- Faculty of Mechanical Engineering, Cracow University of Technology
- Mechanic and Mechatronic Engineering Department, University of Brasília, Brazil
- Universidade do Minho, Portugal
- Nicolaus Copernicus University in Torun, Poland

production from manufacturing processes to manufacturing control and management.

The Department's educational mission is to provide a broad base for students preparing for technological and leadership careers within the manufacturing area.

The Department's research mission is not only to educate PhD students in core manufacturing areas with special focus on development of methods for modelling and simulation of manufacturing processes and systems, designing machine tools, robots, and tools, developing intelligent manufacturing systems, and implementing quality management systems, but also to prepare them for future professional development through providing soft and transferable skills.

The Production Engineering Department has created the educational and scientific activities with the following goals:

- to provide industry and other fields with highly qualified and skilled engineers, capable of solving complex problems in the area of production engineering – from design and planning to control on all levels, from plant to complex industrial systems;
- to develop highly creative engineers capable of development and internationalization of all the activities in technological fields;
- to ensure active student involvement in the learning process, especially in the research labs, while maintaining the appropriate level of study efficiency;
- to continually improve the study programme.

The research within the Department and the Centre for Advanced Technologies consists of long-term programmes defined through research projects supported by industry and the

Ministry of Science, Technological Development and Innovation and it is conducted within the existing laboratories for:

- Structural analysis (CAE),
- Manufacturing automation (Automation),
- Computer integrated manufacturing and technologies (CIM),
- CAD/CAM systems,
- Flexible manufacturing systems, machining processes and tools (FMS),
- Industrial robotics and artificial intelligence (Robotics and AI),
- Production metrology and quality (CAQ),
- Cybernetics and mechatronic systems (CM-SysLab)
- Manufacturing System Design Laboratory
- Laboratory for Micro-Nano Mechanical Engineering (MINA)

Projects (reference list):

- MISSION 4.0: Deep machine learning and swarm intelligence-based optimization algorithms for control and scheduling of cyber-physical systems in industry 4.0
- Human-Robot Co-Working as a Key Enabling Technology for the Factories of Future
- Next Generation Technology for Ubiquitous Collaborative Robotics (UbiCbot)
- AVATAR – Advanced Virtual and Augmented Reality Toolkit for Learning
- Multifunctional rapid prototyping machine – MULTIPRODESK
- ToF (Time-of-Flight) detector, CERN.

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Full Professors:

Dr. Zoran Miljković, Dr. Radovan Puzović, Dr. Saša Živanović, Dr. Živana Jakovljević

Associate Professors:

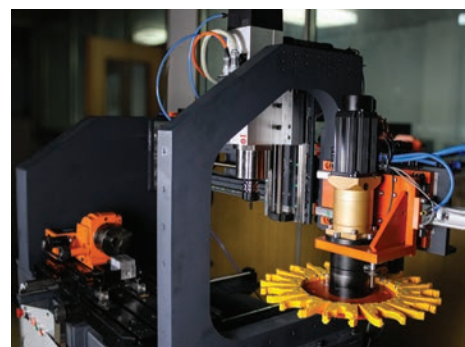
Dr. Božica Bojović, Dr. Nikola Slavković, Dr. Goran Mladenović, Dr. Mihajlo Popović, Dr. Slavenko Stojadinović, Dr. Milica Petrović, Dr. Branko Kokotović

Assistant Professors:

Dr. Miloš Pjević, Dr. Dušan Nedeljković

Teaching and Research Assistants:

Nikola Vorkapić, Lazar Matijašević, Aleksandar Jokić, Bogdan Momčilović





Material Handling, Constructions and Logistics

HISTORY AND TRADITION

The Department of Material Handling, Constructions and Logistics is one of the first departments established at the Faculty of Mechanical Engineering at the University of Belgrade. Its history starts even further in the past (1897), with the course of Machines for Civil Engineering. Nowadays, the Department is committed to scientific research and applicative development in the areas of: structural analysis and CAD, logistics and intralogistics,

STAFF: 4 professors, 2 teaching and research assistants

DATE FOUNDED: 1946

HEAD OF THE DEPARTMENT

• Prof. Nenad Zrnić

COOPERATION WITH FOREIGN UNIVERSITIES

- Vienna University of Technology, Austria
- Graz University of Technology, Austria
- Montan University Leoben, Austria
- Wrocław University of Science and Technology, Poland
- AGH University of Science and Technology, Cracow, Poland
- Leibniz University Hannover, Germany
- Karlsruhe University of Technology, Germany
- Dresden University of Technology, Germany
- TU Munich, Germany
- TU Dortmund, Germany
- University of Stuttgart, Germany
- TU Delft, Netherlands

AWARDS

12 for best technical innovations

2 for theses

1 for a PhD dissertation

material handling and conveying machines, mining and construction machines and ecode-sign.

EDUCATION

One of the fundamental activities of the Department is teaching, through which we try to help our students on their way to becoming successful engineers. Following the contemporary educational trends, we offer them modern working environment with theoretical assistance, along with strong computer aided backup. We consider them as partners in constant improvement of design and research processes in the field of material handling machines. We commit ourselves to turn our courses into a strong foundation for their future engineering practice. Our goal is to give every student the ability to, after completing the courses, work on the graduate thesis related to the practical industrial needs. Additionally, we make significant contributions to shape them into the future leaders in the area of production of material handling machines.

Since 1976, the Department has been the organizer of the International Conference on Material Handling and Logistics - MHCL. The aim of the Conference is to be a forum to exchange views, opinions and experience on MHCL from technical viewpoints in order to track the current achievements, but also to look for future developments. Also, one of the main goals of the Conference is to make scientific/research exchange between similar academic Departments and Institutes from different countries.

Furthermore, our commitment is full cooperation with industry with more than 700 realized projects.

REPRESENTATIVE PROJECTS (REFERENCE LIST)

- Superstructure stability of the Bucket Wheel Excavator SchRs 1600, Kolubara
- Design of the temporary support structure for gas oil tank, Port of Benghazi
- Stress state analysis of the roof construction during the lifting process, RTB Bor
- Reconstruction of the production line, BFC, LaFarge
- Erection of a bucket wheel excavator, ThyssenKrupp
- Design of a shipyard portal crane, Kostolac
- Design of a gantry crane for Shipyard Begej
- Rescue and Reconstruction of the Bucket Wheel Excavator SRs 1200, Kolubara
- Design of a bridge crane, Le Belier Kikinda

OUR RESEARCH FACILITIES INCLUDE:

- Laboratory for testing and certification of material handling machines
- Computer laboratory used in lectures and student training
- Section for extracurricular student activities (CAD/CAE and FEA computer laboratory)
- Laboratory for the Design and Testing of Mining, Transport and Civil Machines
- Laboratory for Strength and Dynamics of the Load Carrying Structures of Civil and Mining Machines
- Laboratory for the Logistics, Eco Design and Terotechnology of Machines.

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Full Professors

Dr. Nenad Zrnić

Associate Professors

Dr. Nenad Kosanić, Dr. Vlada Gašić

Assistant Professor

Dr. Nebojša Gnjatović

Teaching and Research Assistants

Aleksandra Arsić, Aleksandar Stefanović

Agricultural Engineering

If you want to produce feed, then machinery, plants and equipment are absolutely necessary, but you can control them only if you have knowledge about them. The way from a furrow to food is very long, through fields and factories, and it is achievable only through machines. We lead our students through areas of knowledge, practice and science about agricultural machinery.

EDUCATION

The 60-year-long development in teaching in the field of agricultural engineering is characterized by the introduction of new disciplines, the modernization aspects of teaching in the laboratory using electronic measurement techniques and with the indispensable assistance of a computer. The Department of Agricultural Engineering holds courses in specific areas of 17 subjects, 6 of the the Bachelor level and 11 at the Master level of studies. Doctoral studies in specific areas of agricultural engineering include the four subjects. Intensive research work is based

STAFF: 2 professors

DATE FOUNDED: 1948

DISTINGUISHED ALUMNI

- Prof. Dr. Dragan Marković
- Prof. Vlastimir Novaković
- Prof. Stevan Marković, the first lecturer

COOPERATION WITH FOREIGN UNIVERSITIES

- Institute Wageningen, Holland
- Northwestern University, USA
- Angel Kanchev University, Rousse, Bulgaria
- Technische Universität Dresden, Germany
- Institute IMAS, MGAU, VISHOM, MTILP, Moscow, Russia
- European Federation of Chemical Engineering, Working Part of Drying (EFCE-WPD)

Full Professor:

Dr. Ivan Zlatanović

Associate Professor:

Dr. Vojislav Simonović

on developing new technological solutions in the field of Agricultural Food Engineering.

The Department is engaged in a wide range of research, scientific and technical research related to the machines, devices and equipment of self-propelled agricultural machines, tractors and agricultural machinery for soil, as well as the equipment for drying and storage of agricultural products and machinery and equipment for food processing.

LABORATORIES & RESEARCH

APS LAB (Agriculture Precision Solutions Laboratory) is a laboratory for precision engineering of biotechnical systems established in at the Department in February 2014, used for educational and scientific research purposes. The basic field of teaching, scientific research and commercial activities within the laboratory and the equipment that the laboratory contains comprises satellite guidance of agricultural machines and engineering of sitespecific management and precise agricultural production.

The commercial application of systems, devices and equipment for precision agriculture has experienced steady growth over the last two decades. The APS LAB with its equipment and operation contributes to the introduction of potential users to new technologies, implements saving economies projects for large agricultural corporations, develops more advanced technologies for more precise applications of location-specific production and consulting, and thus affects all potential customers of advanced technology devices for navigation and management of agricultural machinery. The APS LAB is ready to temporarily allocate part of the equipment to interested parties in order to combine

commercial profits in real agricultural production and scientific research efforts to improve technologies and technical systems for application in precision agriculture.

The Laboratory for Agricultural Machines and Equipment conducts research on the machines, devices, and equipment used in various stages of agricultural production, the control of microclimate in agricultural and industrial facilities, techniques and technologies for drying processes, and the hot and cold processing of food materials. It also focuses on the storage and preservation of agricultural products, as well as food processing facilities. We offer services for monitoring and optimising production processes, energy consumption in industrial facilities, and designing production lines and equipment. Performances of the department in the domain of education and research in industry are the following:

- high level student education (mentor work);
- the development of software, new technologies and solutions for pursuing more operations in one pass;
- the development of service machines, units and equipment;
- participations in the projects at domestic and foreign conferences, in journals, published books, etc;
- active cooperation with reputable international institutions and attendances at foreign and domestic fairs.

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Web site: <https://ppm.mas.bg.ac.rs/>





Industrial Engineering

HISTORY AND TRADITION

The activities of the Industrial Engineering department are related to the development, improvement, implementation, evaluation, and optimization of integrated systems consisting of machines, men, information, energy, money, and material. Over 72 years ago, the department started with the development of the pertaining scientific areas. The first lectures in the field of scientific organization work were given by Prof. Dr. Vukan Dešić, Dean of the Faculty of

STAFF: 7 professors, 4 teaching and research assistants.

DATE FOUNDED: 1952

DISTINGUISHED ALUMNI

- Prof. Vukan Dešić, Founder of the department
 - Prof. Vuksan Bulat, long-term Dpt. Head
 - Prof. Milivoj Klarin, long-term Dpt. Head
- COOPERATION WITH FOREIGN UNIVERSITIES**

- Universidade Nova de Lisboa, Portugal
- University of Southern California, USA
- Purdue University, USA
- RWTH Aachen University of Technology, Germany
- Fraunhofer – IPA, Germany, Fraunhofer Austria
- Hochschule fuer Technik & Architektur, Switzerland

- Universidade do Minho, Portugal
- Università degli Studi di Messina, Italy
- University of Genova, Italy
- TU Graz, Austria etc.

COOPERATION WITH INDUSTRY

- SAP South Eastern Europe
- Tigar tyres d.o.o.
- West pharmaceutical services Beograd d.o.o.
- Gecko Solutions d.o.o.
- TRANSNAFTA AD,
- GSP "Beograd", etc.

Mechanical Engineering, whose original complex analytical method is well-known in the world.

The name of Industrial Engineering for the Department has been in use since 1990. Teaching contents are analogous to the industrial engineering programmes in the United States. Since 1990, hundreds of mechanical engineers have graduated from our Department, whereby a certain number of students also obtained their Doctoral degrees.

EDUCATION

The Industrial Engineering Department follows state-of-the-art in the industrial engineering area worldwide. We use a more "problem solving" oriented approach with less theoretical effort. Our Department cherishes the mechanical engineering profile that, besides the knowledge from the engineering domain, possesses other specific disciplines necessary to engineers in their daily work, practice, and smart environments. The managing personnel in companies, without an exception, engage knowledge gained in industrial engineering. As a result of such a multidisciplinary approach, industrial engineers very successfully work both in production and service industries.

LABORATORIES

Four laboratories are at students' disposal - for ergonomics, business information systems, terotechnology and equipment maintenance.

RESEARCH

Intensive research activities of the Industrial Engineering Department and numerous projects are related to the work organization, analysis, improvement, digitalization and optimization of production processes, maintenance of

production equipment, analysis of economy indicators, designing of information and decision support system, quality, risk and ecology management, logistics, ergonomic design of products and services, in different fields including transport facilities, power systems, production processes, communication and traffic systems etc. The Department organizes an international conference of Industrial Engineering and founded the Industrial Engineering Association.

PROJECTS

We managed numerous projects financed by the Science Fund of the RS, the Innovation Fund of the RS, the Eureka Network, the Safera Initiative, Bilateral Cooperation Programmes and with industry and participated in HORIZON and Visegrad projects, such as:

- ERGOCAB: Prototyping New Generation of Ergonomically Adapted Crane Cabins' Chairs
- HAMRISK: Hoisting and Mining Machinery Context Specific Adaptive Risk Prevention Expert System
- SPRINCE: Smart Process Industry Cranes
- RESMOD: Resilience Enhancement Model
- HORIZON - ERIA Circle U (Empowering Research and Innovation Actions)
- VISEGRAD: Possibilities and barriers for Industry 4.0 implementation in SMEs in V4 countries and Serbia, and
- SMARTMINER: Support Systems for Smart, Ergonomic and Sustainable Workplaces.

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Web site: <http://ie.mas.bg.ac.rs/>

Instagram: [industrijsko.inzenjerstvo](#)

Full Professors:

Dr. Vesna Spasojević Brkić, Dr. Dragan D. Milanović, Dr. Mirjana Misita, Dr. Aleksandar Žunjić, Dr. Uglješa Bugarić, Dr. Ivan Mihajlović

Associate Professors:

Dr. Tijana Vesić Pavlović

Teaching and Research Assistants:

Martina Perišić, Neda Papić, Nemanja Janev, Nikola Petrović

Visiting Professor:

Prof. Dr. Stanislav Karapetrović, Faculty of Engineering, University of Alberta, Edmonton, Alberta, Canada



**CHOOSE TO
BE A LEADER!**



Mechanics

The Department of Mechanics promotes, coordinates, and runs teaching services and research and plays a role as a consultant in the field. The Department covers the functional and structural planning of all types of mechanical systems and devices, the fundamental inherent phenomena involved, their applications in various areas, their development and their integration in complex systems.

The progress of technology confronts the engineer with a wide variety of problems connected with structural design (buildings, bridges, canals, dams, etc.), the design, manufacture and operation of various machines, motors and means of locomotion, such as automobiles, steam engines, ships, aircraft, rockets, and spaceships. In spite of the diversity of problems that arise, their solution, at least in part, is based on certain general principles common to all of them, namely, the laws governing the motion and equilibrium of material bodies. The science

which treats the general laws of motion and equilibrium of material bodies and the resulting mutual interactions is called theoretical or general mechanics. Theoretical mechanics constitutes one of the scientific bedrocks of modern engineering. Mechanics, in a broad sense of the term, may be defined as the science that deals with the solution of all problems connected with the motion of equilibrium of material bodies and the resulting interactions between them. Theoretical mechanics treats the general laws of motion of material bodies. i.e., laws which apply equally, for example, the Earth's motion around the Sun or the flight of a rocket or an artillery projectile. Other branches of mechanics cover a variety of general and specialized engineering disciplines treating the design and calculation of specific structures, motors and mechanisms as their parts. All these disciplines are based on the laws and methods of theoretical mechanics.

RESEARCH

The principal areas of research include: statics, kinematics, dynamics, vibration analysis, dynamics analysis of mechanical systems, functional analysis of machinery and its components, experimental mechanics, mechatronics, theory of optimal control, continuum mechanics and micromechanics. The research staff at the Department is constantly involved in research programmes of national importance funded by the Serbian Ministry of Science. There are also international research programmes in collaboration with several respected universities all around the globe. The Department staff teaches courses held at the Faculty of Mechanical Engineering, and is also involved in the Doctoral studies in the field of Mechanics in collaboration with the

Faculty. Teaching syllabi pay particular attention to work in theoretical mechanics and vibrations. Doctoral theses in mechanics are offered by the Department.

“If I have been able to see further, it was only because I stood on the shoulders of giants.”



Sir Isaac Newton (1643-1727)

STAFF: 9 professors, 2 teaching and research assistants

DATE FOUNDED: 1905

DISTINGUISHED ALUMNI

- Prof. Danilo Rašković, a famous lecturer
- Prof. Svetopolk Pivko, a famous lecturer
- Prof. Ljubodrag Radosavljević, a famous lecturer

COOPERATION WITH FOREIGN UNIVERSITIES

- Lomonosov Moscow State University, Institute of Mechanics
- Lomonosov Moscow State University, Faculty of Mechanics and Mathematics
- Xidian University, Xian, China
- Polytechnic University of Bari, Bari, Italy

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Full Professors:

Dr. Nemanja Zorić, Dr. Olivera Jeremić, Dr. Mihailo Lazarević, Dr. Zoran Mitrović, Aleksandar Obradović, Dr. Nataša Trišović

Associate Professors:

Dr. Petar Mandić, Dr. Aleksandar Tomović

Assistant Professor:

Dr. Radoslav Radulović

Teaching and Research Assistants:

Marko Veg, Nevena Rosić





Theory of Mechanisms and Machines

The Department of the Theory of Mechanisms and Machines was founded in the seventh decade of the 20th century. The following fifteen years were filled with intensive activities in the field of scientific research and lecturing development. In that period, over 300 students graduated making their final papers working in the scientific and engineering fields the Department dealt with.

In the middle of the eighth decade, the Department started activities for founding the Food Industry Engineering study specialization, in which a great number of projects were successfully implemented.

We patented and accomplished a lot of innovations and improvements in cooperation with domestic industry, a number of production lines for bakery and sweet production, as well as special machines and apparatuses.

Laboratory exercises, engineering and research activities are carried out in the following laboratories:

1. Laboratory for mechanism design
2. Laboratory for machine dynamics

STAFF: 5 full professors, 3 teaching and research assistants

DATE FOUNDED: 1979

DISTINGUISHED ALUMNI

- Prof. Todor Pantelić, a famous lecturer and innovator

COOPERATION WITH FOREIGN UNIVERSITIES

- Technische Universität Darmstadt, Germany
- Concordia University, Montreal, Canada

COOPERATION WITH INDUSTRY

- Banini, Kikinda
- Centropoizvod, Belgrade

3. Laboratory for engineering graphics

4. Laboratory for virtual and augmented reality

5. Mechatronics Laboratory

We are the members of the International Federation for Theory of Machines and Mechanisms (IFTToMM), Serbian Society for Geometry and Graphics (SUGIG) and International Society for Geometry and Graphics (ISGG). Together with the departments of the Universities of Novi Sad and Niš, we biennially organize the international conference "MoNGeometrija" dedicated to geometry, engineering graphics, various fields of visual communications, as well as kinematics and theory of mechanisms.

Geometry should be ranked, not with arithmetic, which is purely aprioristic, but with mechanics.



Carl Friedrich Gauss (1777-1855)

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Full professors:

Dr. Zorana Jeli, Dr. Branislav Popkonstantinović, Dr. Goran Šiniković

Associate professors:

Dr. Emil Veg, Dr. Miša Stojićević

Teaching and Research Assistants:

Aleksandra Dragičević, Boris Kosić, Ivana Cvetković



Thermal Science Engineering

The Department of Thermal Science sees itself as a centre of scientific research and application development in the areas of: Heating, Ventilating, Air-conditioning, Refrigeration, Steam Boilers and Thermal Power Stations.

HISTORY AND TRADITION

The Department of Thermal Science Engineering has a long and rich history, which started with the first subject named Mechanical technology with heating and ventilating introduced at the Lyceum, i.e. the Great School, in 1904. The name of the subject Heating and ventilating appeared for the first time in 1923. The subject Air condi-

STAFF: 7 professors, 2 teaching and research assistants

DATE FOUNDED: 1904

DISTINGUISHED ALUMNI

- Prof. h.c. Mladen Popović
- Prof. Milorad Urošević
- Prof. Sava Vujić
- Prof. Branislav Todorović
- Prof. Ljubiša Brkić
- Prof. Mile Markoski
- Prof. Franc Kosi
- Prof. Titoslav Živanović
- Prof. Branislav Živković

COOPERATION WITH FOREIGN UNIVERSITIES

- Chalmers University, Sweden
- University of Liege, Belgium
- University of Loughboro, United Kingdom
- Aristotel University, Thessaloniki, Greece

COOPERATION WITH INDUSTRY

- Hyatt Regency
- Airport Belgrade,
- Railway station Belgrade,
- EPS, Serbia

tioning was introduced in 1966 and has been taught ever since. The course Steam boilers was introduced at the Technical faculty of the University of Belgrade in 1919. Nowadays, there are several courses dealing with steam boilers and power plants, such as: Fundamentals of Steam boilers, steam boilers elements and equipment, Steam boilers processing, Energy steam boilers and Thermal power plants and heat plants. Refrigeration technique has been taught since 1948. The name of the first subject Refrigeration machines was changed into Cooling devices later on. In 1966 the new subject was introduced, called the. Design of industrial cooling devices, which was later replaced with Refrigerating plants and heat pumps as an obligatory course in 1999. Pipelines were introduced in 1973 as an obligatory course for the students of Thermal Science Engineering and Thermal Power Engineering.

RESEARCH

The Department of Thermal Science Engineering is capable of making significant contributions to the development and modernization of industry in the field of HVAC, aiming at achieving competitiveness of their products at the world market. We can take over and perform complex and responsible design tasks for the Serbian operative units abroad, having the increased export of our products as an indirect outcome. Direct cooperation with R&D experts in industry has proved to be the most effective way of mastering new products, and of achieving technological development and progress.

COOPERATION

The Department's cooperation with different

companies and industry has resulted in numerous general and main designs, expertises, revisions, expert's reports and laboratory measurements. Within the scope of scientific and research work of our Department, all of the members are engaged in working on energy efficiency research projects financed by the Ministry of Science. Given the limited energy resources of our country, the Department of Thermal Science Engineering is fully capable of playing the pivotal role in planning and implementation of the programme for rational energy consumption and brisati increased energy efficiency.

Our cooperation with Universities from the former Yugoslav Republics is carried out in the form of giving lectures at graduate (Banja Luka) and postgraduate studies (Bitolj, East Sarajevo), and membership in the committees for MSc and PhD theses defence (Ljubljana, Skoplje, Bitolj).

We have fruitful cooperation with the Norwegian University of Science and Technology (NTNU) – Trondheim, which We have fruitful joint postgraduate studies, financially assisted by the Norwegian government.

Such a cooperation enables continuity in permanent professional upgrading of our staff, and provides them a possibility of having an insight into and keeping pace with professional developments abroad.

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Full Professors:

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Associate Professors:

Dr. Aleksandra Sretenović Dobrić, Dr. Tamara Bajc, Dr. Goran Stupar, Dr. Uroš Milovančević

Assistant Professor:

Dr. Milena Otović

Teaching and Research Assistants:

Vladimir Černicin, Anton Kerčev





Thermal Power Engineering

The Department of Thermal Power Engineering is devoted to education, research and development of processes and equipment related to

STAFF: 5 professors, 1 teaching and research assistant

DATE FOUNDED: 1959

DISTINGUISHED ALUMNI:

- Prof. Georgije Pio-Uljski
- Prof. Mladen Popović
- Prof. Dragutin Stojanović
- Prof. Vojislav Đurić
- Prof. Dimitrije Savić
- Prof. Milorad Ristić
- Prof. Novica Vasiljević
- Prof. Nikola Čuk
- Prof. Milovan Studović
- Prof. Branislav Savić

COOPERATION WITH FOREIGN UNIVERSITIES:

- Leibniz Universität Hannover, Germany
- University of Oxford, United Kingdom
- University of Pennsylvania, Philadelphia, USA
- Florida International University, USA
- Kyoto University, Japan
- JAERI, Japan
- University of California, Santa Barbara, USA
- University of Kentucky, USA
- University of Illinois at Urbana-Champaign, USA

COOPERATION WITH INDUSTRY:

- Electric Power Industry of Serbia, Belgrade
- Thermal Power Plants "Nikola Tesla", Obrenovac
- Thermal Power Plants "Kostolac", Kostolac
- "Panonske elektrane", Novi Sad
- Siemens, Erlangen, Germany
- MAN Energy Solutions, Oberhausen, Germany
- General Electric, USA/Switzerland/Germany
- RAFAKO S.A., Poland
- Halla Visteon, Germany
- Framatome ANP/AREVA, Germany
- Mitsubishi Heavy Industry, Japan
- Honeywell Aerospace, USA

thermal and nuclear power plants, steam and gas turbines, steam generators, and other thermal power equipment. Nowadays, when the environmental protection and the reduction of greenhouse gases emission are the highest imperatives, the mission of the Department is also to improve the energy efficiency of thermal energy production and conversion, as well as to increase the safety and reliability of thermal and nuclear power plants. Rational use of energy and energy planning and policy are also our research areas.

Thermal Power Engineering is recognized as one of the most important parts of the country's energy system, which influences the overall economy. Serbia, two thirds of all electricity production capacities belong to thermal power plants. The share of thermal power plants in the electrical energy generation reaches 70% in Serbia.

Thermal power engineering is also important for industrial and communal energy supply. The combined production of electrical energy and heat in thermal power plants is the most energy efficient and environmentally friendly solution for district heating in urban areas or for steam supply in industry. In transport sector, thermal turbomachines are applied as a prime mover for airplanes, ships, heavy vehicles, while turbochargers enhance performance of passenger and transport vehicles.

The Department is committed to excellence in education and research. The Department offers a variety of obligatory and elective courses on fundamental and specialized knowledge in fields of thermal power engineering. Many graduated students from this Department have become

leading experts in national and international companies.

Rresearch and development at the Department is performed in a firm connection and as a strong support to the current needs of national and international electric power utilities and energy power industry. Also, research in various fields of the engineering science is conducted with the application in thermal power engineering. The engineering and scientific activities of the Department include: nominal and partial load operation of steam and gas power plants, energy and exergy analyses and optimization of thermal power plants, development of systems for analyses, diagnostic and optimization of thermal power plants operation, combined heat and power production, combined gas and steam power plants, energy efficiency, energy planning and policy, transients in thermal and nuclear power plants, transport phenomena in two-phase flow, design of the thermal turbomachinery and thermal equipment, thermal cycles calculation and optimization, vibrations in steam turbines, revitalization of thermal power plants, thermal tests of steam turbines, subsystems or the whole thermal power plants, expert investigations and analyses of incidents in thermal power plants, environmental protection and engineering related to the design of systems and equipment for environment protection.

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Full Professors:

Dr. Milan Petrović, Dr. Vladimir Stevanović

Associate Professors:

Dr. Sanja Milivojević

Assistant Professors:

Dr. Srđan Milić, Dr. Đorđe Petković

Teaching and Research Assistants:

Teodora Madžar



Process and Environmental Protection Engineering

The Department of Process Engineering (DPE) was established in 1966. The Department of Process Engineering (DPE) is dedicated to teaching and researching in the field of process and environmental technology.

Besides their teaching activities, the staff of

STAFF: 10 professors, 2 teaching and research assistants

DATE FOUNDED: 1966

DISTINGUISHED ALUMNI

- Prof. Dragutin Popović, the founder and famous lecturer
- Prof. Branislav Đaković
- Prof. Milan Antić
- Prof. Miloš Kuburović

COOPERATION WITH FOREIGN UNIVERSITIES

- Norwegian University of Science and Technology, Trondheim, Norway
- University of Maribor, Faculty of Mechanical Engineering, Slovenia
- University of Skopje, FYROM
- University of Ljubljana, Slovenia
- "Politehnica" of Timisoara, Faculty of Mechanical Engineering, Romania
- ATZEVUS, Germany
- Universidad Politécnica de Madrid
- Empress Catherine II Saint Petersburg Mining University, Russia
- Chengdu University of Information Technology, China

COOPERATION WITH INDUSTRY

- Joint stock company "Electric power industry of Serbia
- Petroleum Industry of Serbia Serbia
- Public Utility Company Beogradske Elektrane
- Public Utility Company Belgrade Waterworks and Sewage
- Elixir group
- TETO Pančevo, Pančevo

the DPE is very active in research and development projects concerning process design, unit operations and equipment design, energy production and management, environmental protection, etc.

The DPE realized a great number of projects for more than 300 Serbian and foreign companies concerning various tasks of process engineering, energy and environmental protection. Research projects, funded by the Ministry of Science of the Republic of Serbia, were also realized in cooperation with other research companies.

The important activity of the DPE is industrial and laboratory testing and pollutant emission measurement from stationary sources. This has been performed in power plants, cement factories, metallurgy, ceramic industry, foundries, oil refinery, food, drinks and water industry, etc. in Serbia and abroad.

The DPE also covers the application of computers in industry, software and hardware design for industrial measurements, process control, introduction of expert systems for process and plant control.

Experimental apparatus (heat exchanger, pilot rotary furnace, hot wire reactor, fix bed gasifier, pilot particle precipitation facility, small fluidized bed, venturi scrubber) is used in the DPE laboratories for research work.

In the past forty years, over 1400 students obtained their engineering graduate degree in process engineering (equivalent to MSc - a five-year degree) and over 120 students obtained engineering first level degree (equivalent to BSc - a three-year degree).

Over 80 students completed former postgraduate courses in process engineering and obtained

a magister degree (Mgr. - a two-year year post-graduate degree) and 35 obtained a doctoral degree.

"The main objective of this project is to contribute to the development of sustainable and environmentally friendly energy systems in the Western Balkan. This is realized through a development and establishment of the PhD study programme inside the field of energy and environment."



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Full Professors:

Dr. Srbslav Genić, Dr. Aleksandar Jovović, Dr. Aleksandar Petrović, Dr. Dejan Radić, Dr. Nenad Mitrović, Dr. Mirjana Stamenić

Associate Professors:

Dr. Marko Obradović, Dr. Dušan Todorović, Dr. Nikola Karličić

Assistent professor:

Dr. Miloš Ivošević

Teaching Assistants:

Branislav Gajić, Milan Travica





Thermomechanics

The Department of Thermomechanics is dedicated to teaching and researching in the scientific field of thermodynamics, heat and mass transfer and closely related scientific/engineering disciplines that all form theoretical basis for solving practical engineering problems in thermal science engineering, thermal power engineering, process engineering, etc. It is a theoretical basis for several courses in the curriculum of several study specializations in the plan of the studies conducted in accordance with the Bologna declaration.

The main task of the Department is to offer to the students of Bachelor and Master studies, as well as PhD students, a detailed survey of brisati modern theoretical and professional knowledge

STAFF: 5 professors, 1 teaching and research assistant

DATE FOUNDED: 1896

DISTINGUISHED ALUMNI

- Prof. Stevan K. Marković, the first lecturer and founder of department
- Prof. Aleksandar A. Brandt, famous lecturers and authors of the first original textbook on Thermodynamics in Serbian
- Prof. Georgije N. Pio-Uljski, famous lecturer
- Prof. Fran S. Bošnjaković, world famous lecturer and scientist
- Prof. Dimitrije K. Voronjec, famous lecturer
- Prof. Đorđe G. Kozić, famous lecturer

COOPERATION WITH FOREIGN UNIVERSITIES

- Rheinisch-Westphalisch Technische Hochschule, Aachen, Germany
- Univerza v Mariboru, Maribor, Slovenija
- University of Vienna, Vienna, Austria
- Technische Hochschule, Karlsruhe, Germany
- University of Perugia, Italy

in: Thermodynamics, Applied thermodynamics, Heat and mass transfer, Transport phenomena, Solar energy and solar systems, Sustainable energy, Biomass energy, Thermodynamics of chemical processes, Statistical thermodynamics, Thermodynamics of irreversible processes, Thermodynamics of multicomponent systems, Entropy-exergy analysis of process and equipment efficiency, Lab/in-situ measurements in thermomechanics, Numerical methods in thermomechanics. The Department of Thermomechanics experimental facility includes:

1. A solar thermal system with different types of collectors
2. An experimental system for determination of thermomechanical changes in the aquifer during the ground source heat pump operation
3. Calibrated Hot Box experimental installation
4. Measuring equipment for determination effective thermal conductivity of building structures
5. A geothermal heat pump with a model room for energy efficiency testing

Along with teaching, within the scope of scientific and research work of the Department of Thermomechanics, all of the members are engaged in research projects funded by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia. Research areas include actual problems of the use of renewable energy sources - solar and geothermal energy, efficient use of energy, energy management, drying and evaporating process, as well transport phenomena in porous media and vegetative (green) roofs. Also, members of

the Department currently take part in one UNDP and a several domestic and EU projects.

“The production of motive power is then due in steam engines not to actual consumption of the caloric but to its transportation from a warm body to a cold body.”



Nicolas Léonard Sadi Carnot (1796-1832)
in the dress uniform of a student of the
École Polytechnique.

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Full Professors:

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Associate Professor:

Dr. Nedžad Rudonja

Assistant Professor:

Dr. Ružica Todorović

Teaching and Research Assistant:

Marija Vasilev





Hydropower Engineering

The Hydropower Department, as one of the oldest at the Faculty, has a great and a long tradition, established in 1931. Its contemporary name is the Department for Hydraulic Machinery and Energy Systems and it is unique in this field in Serbia. Bachelor, Master and PhD programmes are constantly innovated. The Department's main goals include education, theoretical and experimental research and industry cooperation. The researchers cultivate all forms of theoretical, numerical and experimental work in the field of fundamental, development and applicable hydraulic research. The Department's Laboratory for experimental research, one of the biggest at the Faculty, consists of: the Laboratory for pumps, hydraulic turbines, hydraulic torque converters and hydro mechanical equipment, the Laboratory for fluid measurement techniques and model testing, the Laboratory for research, development, testing and optimization of the hydropower plants and the Laboratory for turbulence and velocimetry. The laboratories are equipped with corresponding measuring devices. The most significant installations include those: for defining energy and cavitation characteristics of the pump models, for testing turbines, pumps and fans with air, for climatization channels, for investigating model pumps, flowmeters, gates and valves, for defining energy characteristics of the radial and axial fans, for probe calibration, for swirling flow research.

STAFF: 4 professors, 2 teaching and research assistants and 2 support staff.

DATE FOUNDED: 1931

DISTINGUISHED ALUMNI

- Prof. Svetozar Zorić, the first lecturer, 1897
- Academic Vladimir Farmakovski
- Academic Prof. Nikola Obradović

The novel measurement optical techniques are used, such as the three-component laser Doppler velocimetry system and the high-speed stereo particle image velocimetry system.

Some of the most important fundamental research results comprise: swirl flow phenomena in straight ducts, diffusers and jets, flow stability related to the flow geometry, energy losses in the turbomachine impellers, unsteady flow in complex hydraulic systems, turbulent models, the improved method for measuring velocity and pressure flow field with Conrad probe and fast response five-hole probe, etc.

Some of the most important recent results for industry include: developed bulb turbines for Serbian turbine industry, developed flow geometry of the small hydropower plants, developed software for 3D design of turbo machinery, developed jet fan, developed software for calculation of the waterhammer and reverse waterhammer of the double regulated hydraulic turbines, developed software for hydraulic oscillation calculation and facility stability analysis, various data processing software, calibration of flow metres and velocimeters, etc. The Department members are working on the programme of the first national space satellite. They have a good cooperation with industry: Electropower Industry of Serbia, Petroleum Industry of Serbia (NIS Gazprom Neft), Serbian Armed Forces, Drinking-Water treatment plants, Chamber of Commerce and Industry of Serbia, Goša-FOM, Grundfos, VATECH, DEC International, numerous domestic private companies, etc.

The Department members are leaders or participants in the projects funded by the Ministry of Science, Technological Development and In-

novation R. of Serbia, European Commission, Science Fund of the Republic of Serbia, Innovation Fund, R. of Serbia, etc. The Department members organize international scientific conferences and are editors or coeditors in the scientific journals. The Department has a very rich collaboration with all domestic universities and faculties, as well as with numerous international universities and institutes: Technische Fakultät Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; University of Resita, Engineering Faculty, Romania; Institut für Strömungsmechanik, Karlsruhe Institute of Technology, Germany; École nationale supérieure d'électricité et de mécanique de Nancy (ENSEM), Nancy, France; Tohoku University, Japan; Государственный проектный институт "Сантехпроект" Госстроя СССР, Москва, Russia; Technische Universität Braunschweig, Germany; Faculty of Mechanical Engineering, University of Illinois, USA; EPFLMH, Lausanne, Suisse; LMZ, Petersburg, Russia; ASTRÖ, Graz, Austria; Center for turbulence research, Stanford University, USA; TU Wien, Austria; National Research Center of Pumps, Jiangsu University, China; The Fluid Mechanics Lab at NASA's Ames Research Center, California, USA; TU Clausthal, Germany; Institute of Mechanics, Lomonosov Moscow State University, Russia; Moscow Institute of Physics and Technology, Russia; University Politehnica of Bucharest, Romania; Steinbeis, Berlin, Germany; University Carlos III de Madrid, Spain, etc.

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Full Professors:

Dr. Đorđe Čantrak, Dr. Ivan Božić

Associate Professor:

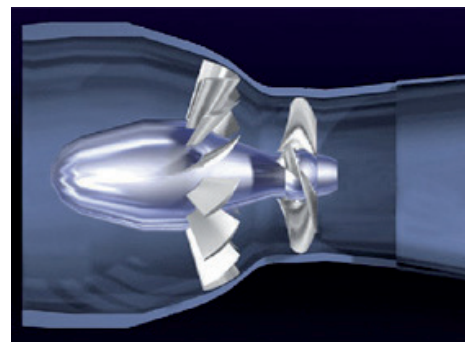
Dr. Dejan Ilić

Assistant Professors:

Dr. Novica Janković

Teaching and Research Assistants:

Bogdan Ristić, Lazar Lečić





Mathematics

Mathematics is the body of knowledge centered on such concepts as quantity, structure, space, and change, but it is also the academic discipline that studies them. Other practitioners of mathematics maintain that mathematics is the science of pattern, and that mathematicians seek out patterns which can be found in numbers, space, science, computers, imaginary abstractions, or elsewhere. Mathematicians explore such concepts, aiming to formulate new conjectures and establish their truth by rigorous deduction from appropriately chosen axioms and definitions.

STAFF: 9 professors, 2 teaching and research assistants.

COOPERATION WITH FOREIGN INSTITUTIONS

- Kent State University, USA
- University of La Laguna, Tenerife, Spain
- Universidad Politecnica de Madrid, Spain
- University of Cagliari, Cagliari, Italy
- Ağrı Ibrahim Çeçen University, Ağrı, Turkey

DISTINGUISHED ALUMNI

- Academician Dimitrije Nešić
- Academician Bogdan Gavrilović
- Academician Radivoj Kašanin
- Academician Mirko Stojaković
- Prof. Zlatko Mamuzić
- Prof. Ljubomir Ćirić
- Prof. Stojan Radenović

IMPORTANT INTERNATIONAL CONFERENCES

- Approximation and Computation – Theory and Applications (ACTA 2017), Belgrade, Serbia, 2017
- Mathematics, Numerics and Applications (MNA 2022), Budva, Montenegro, 2022
- Numerical Methods for Large Scale Problems (NMLSP 2022), Belgrade, Serbia, 2022

Through the use of abstraction and logical reasoning, mathematics has evolved from counting, calculation, measurement to the systematic study of shapes and motion of physical objects. Knowledge and use of basic mathematics have always been an inherent and integral part of individual and group life. Refinements of the basic ideas are visible in mathematical texts originating in the ancient Egyptian, Mesopotamian, Indian, Chinese, Greek and Islamic worlds. Rigorous arguments first appeared in Greek mathematics, most notably in Euclid's Elements.

The development continued in fitful bursts until the Renaissance period of the 16th century, when mathematical innovations interacted with new scientific discoveries, leading to an acceleration in research that has continued to the present day. Today, mathematics is used throughout the world in many fields, including natural science, engineering, medicine, and social sciences, such as economics. Applied mathematics, the application of mathematics to such fields, inspires and makes use of new mathematical discoveries and sometimes leads to the development of entirely new disciplines.

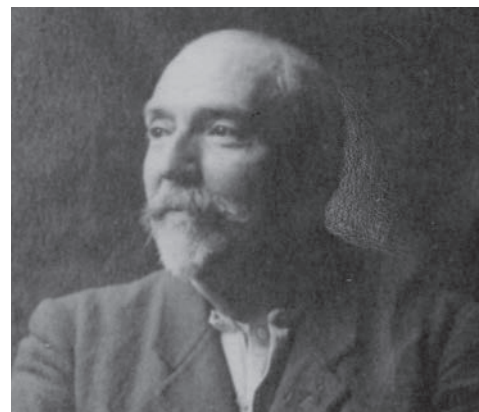
Mathematicians also engage in pure mathematics, or mathematics for its own sake, without having any application in mind, although applications for what began as pure mathematics are often discovered later.

The Department of Mathematics offers undergraduate, graduate and postgraduate educational programmes in mathematics and computer science.

The main research areas of our Department are:

Numerical Analysis, Nonlinear functional analysis, Scientific computing, Relational and XML database systems, Data mining, Machine learning and Bioinformatics.

“It is better to study without mathematics than studying without it.”



Henri Bouasse (1866 - 1953)

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Full Professors:

Dr. Miodrag Spalević, Dr. Ivan Arandjelović, Dr. Aleksandar Pejčev, Dr. Goran Lazović, Dr. Slobodan Radojević

Associate Professors:

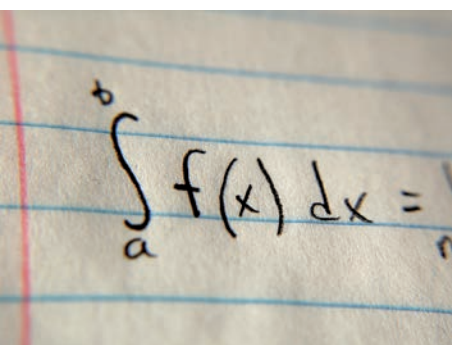
Dr. Davorka Jandrić, Dr. Dušan Đukić

Assistant Professors:

Dr. Jelena Tomanović, Dr. Rada Mutavdžić - Đukić

Teaching and Research Assistants:

Stefan Spalević, Andrijana Marjanović



Control Engineering

Over many years, ever since the Department was established, the members of the Department of Automatic Control have taken part in the rich and diverse development of almost every field of automatic control, from scientific fundamentals to the application of solutions in the industry, which led to many significant published papers and many technical solutions, which consequently granted wide recognition in academic and industrial structures. Research projects were financed by the state and through the direct cooperation with the domestic and foreign companies, located not only in Serbia, but worldwide.

PROJECTS:

- Accompanying control systems in electrical-hydraulic and electrical-pneumatic systems
- Building management systems

STAFF: 4 professors, 3 teaching and research assistants

DATE FOUNDED: 1970

DISTINGUISHED ALUMNI

- Prof. Borislav Milojković, the first lecturer
- Prof. Ljubomir Grujić, long term Head of the Department
- Prof. Milivoje Sekulić, Innovations in Exploitation of Circuits

COOPERATION WITH FOREIGN UNIVERSITIES

- University of Southern California, Los Angeles
- Norwegian University of Science and Technology, Trondheim
- University of Banja Luka

COOPERATION WITH INDUSTRY

- Elektroprivreda Srbije
- Siemens d.o.o. Beograd
- Tetra Pak Production d.o.o. Beograd

• Electromechanical actuation systems

The Development of new control concepts and control algorithms for securing better closed-loop system performance, whether in general or in specific cases, for specific plants, is still the main objective for every Department employee. Students at the Department of Automatic Control are offered a variety of courses, starting from the first year of Bachelor studies, through elective courses and one mandatory subject, where rich curricula encompass control theory, working principles of sensors, actuators and computer controlled systems. Also, students can become acquainted with mathematical modelling of the systems and programming in MATLAB and Simulink.

At the level of Master studies, rich basic knowledge is further broadened through additional mandatory and elective courses organized by the Department of Automatic Control. Starting with deeper understanding of control theory and computer controlled systems working principles, students also gain knowledge from the field of fuzzy control systems, at the same time learning to simulate work of all those systems, using a computer. Besides the analysis of the linear system performance, students are taught control system design for linear systems. Also, mandatory courses cover the study of nonlinear effects, unavoidable in every physical system. Specific class of controllers, programmable logic controllers (PLCs), programming is one of the main course outcomes of industrial automation course. Bioautomation, robot mechanics, and mechatronics in general, intelligent buildings, neural networks, used for identification and control, are also some of the topics covered through

the courses available. Low price of microcontrollers nowadays makes this technology available to everyone and, since they are widely used in the control practice, this makes it possible that every student has an opportunity to implement and test their own control algorithms through laboratory exercises.

Our department runs the study specialization in Control engineering.

“All the effects of Nature are only the mathematical consequences of a small number of immutable laws.”



Pierre-Simon, marquis de Laplace
(1749 - 1827)

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Full Professors:

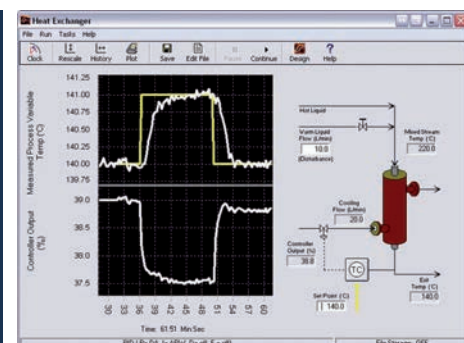
Dr. Dragan Lazić, Dr. Milan Ristanović, Dr. Radiša Jovanović

Assistant Professor:

Dr. Vladimir Zarić

Teaching and Research Assistants:

Mitra Vesović, Luka Filipović, Natalija Perišić





Physics and Electrical Engineering

The Department of Physics and Electrical Engineering has successfully conducted educational and research activities at the Faculty of Mechanical Engineering for many years.

Joint research activities with various institutions are focused on:

- Analysis and modeling of modern microelectronic devices;
- Investigation of heterostructural transistors, organic based transistors, TFT (thin film transistors);
- Electronic devices research and designing;
- Real time processing;
- Physics of ionized gases; low temperature plasma; momentum transfer theory;
- Laser application in metrology;

STAFF: 8 professors and 1 teaching assistant

DATE FOUNDED: 1948.

DISTINGUISHED ALUMNI

- Academician Petar Miljanić (1927-2015), long term Head of the Department

- Prof. Dragan Kandić, retired

COOPERATION WITH FOREIGN UNIVERSITIES

- Rutgers University, New Brunswick, USA
- University of California, Berkeley, USA
- North Carolina Central University, Durham, USA

COOPERATION WITH INSTITUTES & INDUSTRY

- Institute of Technical Sciences of the Serbian Academy of Sciences and Arts; University of Belgrade: Vinča Institute of Nuclear Sciences, Institute of Physics, Faculty of Physics, Faculty of Electrical Engineering, Faculty of Technology and Metallurgy, Institute for Multidisciplinary Research, Belgrade
- EPS Corporation

- Photo-voltage conversion of sun light and solar panels and modules;
- Synthesis-structure-properties correlation of micro- and nanomaterials, including powders, films, composites and ceramic materials; development of polymer-ceramic nanocomposites, multiferroic nanomaterials, hybrid films and nanostructures based on functionalized biopolymers, as well as the development of other advanced functional materials;
- NTC thermistor based constant temperature anemometry;
- Electric and control system design for power and industrial plants;
- Multifractal analysis of digital images;
- Software for the detection of microcalcifications in the breast using the methods of mathematical morphology and multifractal analysis;
- Efficient and economical method for assessing the condition of the insulation of the stator windings of an HV asynchronous electric machine based on the law of increasing probability without disassembling the machine;
- Investigation of gas breakdown in gas surge arresters.

For the research and development of advanced electroceramic materials based on barium titanate, the work team was awarded a gold medal in 2000 and a special plaque with a gold medal in 2002 by the Belgrade Association of Inventors. Other activities:

- Research in Microelectronics
- Applied Physics
- Control Systems
- Digital Signal Processing

“Ere many generations pass, our machinery will be driven by a power obtainable at any point in the universe. Throughout space there is energy. Is this energy static or kinetic? If static our hopes are in vain; if kinetic — and this we know it is, for certain — then it is a mere question of time when men will succeed in attaching their machinery to the very wheelwork of nature.”



Nikola Tesla (1856-1943)

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Full Professors:

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Associate Professor:

Dr. Tomislav Stojić

Teaching and Research Assistant:

Aleksandra Jerotić



Fluid Mechanics

EDUCATION

The Department of Fluid Mechanics has had a significant contribution in the development of science and education in the field of theoretical and applied fluid mechanics in Serbia and former Yugoslavia. The Department is in charge of BSc, MSc and PhD courses at the Faculty of Mechanical Engineering in Belgrade. It covers a wide domain of research

activities in theoretical, experimental and computational fluid mechanics, such as

- Problems in hydrodynamic stability
- Laminar and turbulent boundary layer flow
- Internal and external flow of compressible fluids
- Convective flow
- Wave motion in fluids
- Turbulent swirling flow in pipes and diffusers
- Magneto-hydrodynamic and magneto-gasdynamic laws
- Multiphase flow and cavitations problems
- MEMS flow

STAFF: 6 professors and 4 research assistants

DATE FOUNDED: 1961

DISTINGUISHED ALUMNI

- Prof. Konstantin Voronjec, member of the Serbian Academy of Sciences and Arts
- Prof. Viktor Saljnikov
- Prof. Mane Šašić
- Prof. Vladan D. Đorđević, member of the Serbian Academy of Sciences and Arts
- Prof. Radomir Ašković, University of Valenciennes, France
- Prof. Tomislav Ašković
- Prof. Svetislav Čantrak
- Prof. Miloš Pavlović
- Prof. Predrag Marjanović
- Prof. Cvetko Crnojević

COOPERATION WITH FOREIGN UNIVERSITIES

- University of Southern California, Los Angeles, USA
- University of Algiers, Algier
- University of Karlsruhe, Karlsruhe
- University of Freiburg, Freiburg, Germany
- University of Poitiers, ENSMA, France
- University of Valenciennes, France

COOPERATION WITH INDUSTRY

- Etamic, Paris, France
- SILEC, Paris, France

RESEARCH

The scientific work at the Department is acknowledged by numerous papers published in leading international scientific journals in the field of Fluid mechanics, such as J. of Fluid Mechanics, Physics of Fluids, AIAA J., ASME J. of Fluid engineering, Advances in Physics: X, Izvestiya AN SSSR Meh. zhidkosti i gasa, Acta Mechanica, ZAMM, C.R. de l'Academie des Sciences, Paris, and many others.

The Laboratory for Fluid Mechanics, as a part of the Department, is accredited for the calibration of gas flow meters, gas meters and reflectometers.

“There is no philosophy which is not founded upon knowledge of the phenomena, but to get any profit from this knowledge it is absolutely necessary to be a mathematician.”



Daniel Bernoulli (1700-1782)

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Full Professors:

Dr. Milan Lečić, Dr. Nevena Stevanović, Dr. Aleksandar Čović

Associate Professor:

Dr. Darko Radenković

Assistant Professor:

Dr. Milan Raković



Aerospace Engineering

HISTORY AND TRADITION

The Department of Aerospace Engineering is a truly multidisciplinary, regional centre of aeronautical engineering with educational, research and development activities focused on flight vehicles problems, including methods and means of their design, computation, manufacturing and maintenance. Since the beginning of aerospace engineering in Serbia and the foundation of this department, the main goal - to make a significant contribution to the development of aerospace industry - has been achieved through the implementation of new, innovative solutions and with the full dedication of the staff.

EDUCATION

A constant tendency of the Department of Aerospace Engineering is to develop and improve the teaching process, to keep up with the leading uni-

versities worldwide and to meet the always new and exciting challenges and demands in the field of aerospace engineering.

The complexity of modern aircraft, the level of technological development and continuous endeavours of the Department towards improvements in order to make the educational process as efficient as possible led to certain changes in the syllabi and the curricula. The courses are organized and performed in a way similar to other relevant European universities and the students are treated as our future partners and associates.

LABORATORIES

The Department has many laboratories and pieces of equipment for providing experiments for both teaching and research and development purposes. Our research facilities include:

- Laboratory for subsonic aerodynamics – Wind tunnel „Miroslav Nenadović“
- Laboratory for supersonic aerodynamics
- Laboratory for avionics
- Laboratory for jet propulsion
- Laboratory for structural analysis
- Laboratory for aeroelasticity
- Laboratory for CFD
- Laboratory for numerical analysis of structures
- Laboratory for composite structures
- Laboratory for computer and information technologies

The Department has recently obtained new, complex equipment that made both educational and research work even more useful and effective.

RESEARCH & DEVELOPMENT

Research and development activities are focused on advanced fields of aerospace engineering, in particular:

- Aerodynamics,
- Design and Structural Analysis,
- Avionics,

- Propulsion,
- Wind turbines.

The research and development achievements realized through innovative approaches resulted in various projects and products and successful cooperation with numerous industrial partners.

PROJECTS (FROM THE REFERENCE LIST)

- airplane GALEB,
- airplane JASTREB,
- airplane ORAO,
- airplane SUPER GALEB,
- airplane KRAGUJ,
- airplane LASTA,
- airplane UTVA 75,
- airplane Moma 86,
- BS3 Light Airplane (Safat 03),
- Mi-8 helicopter main rotor composite blade,
- Gazelle helicopter main rotor composite blade,
- Trisonic wind tunnel T-38,
- Hypersonic wind tunnel VTI,
- Composite Vuk-T Glider,
- Very light rotorcraft H135,
- Wind turbine SAZ-15,
- AH M08 KNIGHT military helicopter – conceptual design,
- AH M10 RAIDER military helicopter – conceptual design,
- FFROG light sports amphibian aircraft – conceptual design,
- Design and manufacturing of moulds for composite blades.

STAFF: 14 professors, 2 teaching and research assistants

DATE FOUNDED: 1931

DISTINGUISHED ALUMNI:

- Prof. Miroslav Nenadović, a member of the Serbian Academy of Sciences and Arts
- Prof. Dušan Stankov, CTO of the Aeroplane factory Zmaj, Zemun
- Prof. Sima Milutinović, CTO of the First Serbian Aeroplane factory Rogozarski, Belgrade

COOPERATION WITH FOREIGN UNIVERSITIES:

- University Al-Fatah, Libya
- University of Illinois, Urbana-Champaign, USA
- Technical University, Prague, Czech Republic

COOPERATION WITH INDUSTRY:

- AIR Serbia, Belgrade
- Boeing, Seattle, USA
- VTI Žarkovo, Belgrade
- VZ Moma Stanojlović, Belgrade

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Associate Professors:

Dr. Olivera Kostić, Dr. Goran Vorotović, Dr. Ognjen Peković, Dr. Toni Ivanov

Assistant Professors:

Dr. Nikola Davidović, Dr. Maja Rosić Vitas

Teaching Assistants:

Miloš Petrašinović, Nikola Raičević



Weapon Systems

HISTORY AND TRADITION

Founded in 1948 as the Department of Military Mechanical Engineering, and rebranded in 2006 as the Department of Weapon Systems, we are a cornerstone of the Faculty of Mechanical Engineering at the University of Belgrade. Our department has a distinguished history and a pivotal role in advancing defence technology and military engineering. Our alumni include almost 600 graduate engineers and over 60 PhD

STAFF: 4 professors, 2 teaching and research assistants

DATE FOUNDED: 1948

DISTINGUISHED ALUMNI

- Prof. Obrad Vučurović
- Prof. Aleksandar Stamatović

Innovations in Weapons

- Prof. Boško Stanisavljević
- Anastas Paligorić, Dipl. Ing.

COOPERATION WITH FOREIGN UNIVERSITIES

- Beijing Institute of Technology, Beijing, China
- Cranfield University, UK
- University of Defense, Czechia

COOPERATION WITH INDUSTRY

- Military Technical Institute, Belgrade
- Technical Test Centre, Belgrade
- Yugoimport SDPR, Belgrade
- EDePro, Belgrade
- Vlatacom Institute, Belgrade
- Sloboda, Čačak
- DLS Special Systems, Belgrade
- Prvi partizan, Užice
- Krušik, Valjevo
- Zastava Arms, Kragujevac
- Milan Blagojević, Lučani
- Senzor Infiz, Belgrade
- PPT Petoletka, Trstenik

graduates. We have played a significant role in training personnel for the military industry and scientific research institutions, preparing experts who have made substantial contributions to the field.

EDUCATIONAL FOCUS

Our department offers comprehensive education in classical and missile weapon systems. We emphasize multidisciplinary approaches in the design of weapon systems, providing diverse teaching courses and research areas. Our close collaboration with other departments within the Faculty of Mechanical Engineering, as well as various scientific research and development institutions, ensures a robust academic foundation in defence technologies.

UNIQUE FEATURES

Specialized Guidance: Tailored training for future weapon system designers.

Multidisciplinary: Diverse teaching subjects and research areas stemming from the complexity of weapon system design.

Personalized Learning: Instruction in smaller groups to foster closer student engagement.

Scholarships: Opportunities for students to receive scholarships based on merit.

LABORATORIES

Ballistics Laboratory: Equipped with a ballistic tunnel for advanced research.

Control Systems Laboratory: Focused on control systems in weapon systems.

Numerical Simulations Laboratory: Dedicated to computational modeling and simulations in weapon systems.

RESEARCH AND COOPERATION WITH INDUSTRY

The department actively contributes to scien-

tific advancement in weapon systems applications. We maintain long-term collaboration with domestic and international companies and research organizations. Developing proprietary software tools and applying commercial simulation software are the key areas of focus, reinforcing our commitment to innovation and practical impact.

Main research fields: Interior ballistics, Rocket propulsion, Combustion, Physics of explosion, Aerodynamics, Flight dynamics, Projectiles and warheads design, Artillery systems design, Launchers. Fire control systems, Rocket design, Rocket system integration, Missile guidance and control, Weapon efficiency and terminal ballistics, Ballistic protection, Measurement and testing of weapon systems.



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Dr. Ivana Todić, Dr. Miloš Marković

Assistant Professor:

Dr. Dejan Jevtić

Teaching and Research Assistants:

Radovan Đurović, Luka Miličić





Naval Architecture

STAFF: 4 professors, 1 teaching and research assistant

DATE FOUNDED: 1948

DISTINGUISHED ALUMNI

- Academician Jakov Hlitičijev, the first Head and founder of the Department

DISTINGUISHED PROFESSORS

- Prof. Stevan Stevović, founder of the Department
- Prof. Nenad Zrnić, member of the Serbian Academy of Science and Arts
- Prof. Borivoje Ribar
- Prof. Borislav Džodžo
- Prof. Branislav Bilen
- Prof. Milan Hofman
- Prof. Dejan Radojčić
- Prof. Milorad Motok

Assoc. Prof. Igor Bačkalov

COOPERATION WITH FOREIGN UNIVERSITIES

- University of Southampton, United Kingdom
- Delft University of Technology, The Netherlands
- University of Trieste, Italy
- Budapest University of Technology and Economics, Hungary
- National Technical University of Athens, Greece

COOPERATION WITH INDUSTRY

- Development Centre for Ship Technology and Transport Systems (DST), Duisburg, Germany
- Maritime Research Institute (MARIN), Wageningen, The Netherlands
- Bureau Veritas Inland Navigation Management (DNI), Antwerp, Belgium
- Via Donau, Vienna, Austria
- Shipyard Vahali, Sremska Mitrovica, Serbia

HISTORY AND TRADITION

The Department of Naval Architecture was founded in 1948 and it is the only such department in Serbia today. The founder of the Department was the Academician Jakov Hlitičijev. He was followed by a number of distinguished professors and experts in different fields of naval architecture.

Over the past decades, the growth of Serbian shipbuilding industry was significant, resulting in the completion of more than 2300 seagoing ships and inland vessels that operate worldwide today. This would have not been possible without more than 500 naval architects, who graduated from the Department of Naval Architecture in Belgrade. In addition, numerous naval architects educated at our Department, made a career at foreign universities, research facilities, institutes, classification societies and shipyards all over the world. Some of them have successfully continued their postgraduate and doctoral studies in the Netherlands, Great Britain, Italy, Denmark, Canada, USA and other countries.

EDUCATION AND RESEARCH

Naval architecture is a profession based on the centuries of experience in shipbuilding. Therefore, our Department aims to offer an educational approach based on a balanced combination of traditional craftsmanship and application of the modern engineering methods and advanced software. Students are taught to design ship lines plans, to perform calculations of ship structure, ship resistance and propulsion, and to solve various problems of ship stability, ship strength, seakeeping, manoeuvring, etc. Knowledge obtained through undergraduate courses enables naval architects to design both seagoing and inland vessels. Postgraduate

courses make naval architects capable of working in research facilities and various institutes.

The Department possesses equipment/instruments for measurement of various kinds of ship vibrations, for instance, ship structure vibrations, engine and equipment vibrations, torsion vibrations of shaft lines, power absorption, noise etc. In addition to the measurements performed on the vessels on the Danube and Sava, this equipment was also used for diverse measurements worldwide: the vessels on the Irawadi River in Burma, in the Bay of Bengal, etc.

Notable research areas and projects include: the development of risk-based ship stability regulations (for which members of the Department were awarded with the RINA-Lloyd's Register Ship Safety Award); seakeeping and dynamic stability of ships; development of mathematical models for the evaluation of resistance and propulsion characteristics of high-speed crafts (for which members of the Department were awarded with the SNAME's "Vice Admiral E.L. Cochrane Award"); numerical simulations of ship hydrodynamic performances using the computational fluid dynamics (CFD); numerical methods in ship structural design; development in the classification of ship hull structures; wave-induced loads on ships; innovative design of shallow draught inland vessels; safety of autonomous ships, etc.

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Members of the Department of Naval Architecture receiving the Royal Institution of Naval Architects and Lloyd's Register Education Trust Ship Safety Award for 2007

Associate Professors:

Dr. Milan Kalajdžić, Dr. Nikola Momčilović, Dr. Aleksandar Simić

Assistant Professors

Dr. Stefan Rudaković

Teaching and Research Assistants:

Ines Ivković



Internal Combustion Engines

HISTORY AND TRADITION

The first lectures in Internal Combustion Engines at the University of Belgrade date back to 1919, just after World War I. It was only 22 years after Rudolf Diesel had managed to operate his engine successfully for the first time. Education and research were then enriched and supported widely with a dedicated lab facility built in early 1931. Rooted in its long history and tradition, the Internal Combustion Engines and Powertrain Systems Department (ICEPS) focuses today on well-founded teaching and innovative and recognized research for practical applications in ICE engines, hybrid powertrains and E-fuels.

EDUCATION

STAFF: 5 professors

DATE FOUNDED: 1948 (lectures from 1897)

DISTINGUISHED ALUMNI

- Prof. Dr. Rade Jankov, ICED, a famous lecturer and innovator
- Prof. Dr. Radivoje Trifunović, ICED, a famous lecturer and innovator
- Prof. Dr. Dušan Gruden, PORSCHE AG, a well-known expert
- Prof. Dr. Zoran Filipi, Clemson University, South Carolina, well-known Professor
- Prof. Slobodan Dobrosavljević, the first Head of ICED (1948)
- Prof. A.I. Kosicki, the writer of the first textbook in Serbian for ICE (1935)

COOPERATION WITH FOREIGN UNIVERSITIES

- University of Manchester, University of Loughborough, Imperial College, King's College, Queen Mary College, London, United Kingdom
- TH Aachen, TU München, TU Darmstadt, Germany
- TU Graz, Austria
- BIT, Beijing, PR China

The field of ICE grows continually and develops faster than ever in every aspect of engine design, process understanding and control, efficiency, manufacturing and maintenance. Today, defining the primary educational goals for an engine specialist is a highly challenging, demanding and, most of all, responsible task. Considering that the IC engine is a thermal machine, we at the ICEPS believe in a soundly founded theoretical and practical background in thermal and fluid sciences as a base for further special training in ICE. Modern facilities, vivid presentations, individual approach to each student and problem-solution-oriented lectures on fascinating topics in engine design, combustion control, mixture formation, mechatronics, and charging provide our students with in-detail, up-to-date theoretical knowledge and understanding of the most fascinating and fastest dynamical object on Earth. State-of-the-art Laboratory facilities, one of the largest at the Faculty, designed, equipped, and regularly used for research activities, give our students unique and real opportunities to learn, feel, and experience many aspects of ICE testing and participate in our research projects. Based on the current requirements and global technical knowledge and achievements, the lectures, both in the classroom and laboratory, are continually updated every year and are particularly suited to an engineer seeking up-and-coming positions not only in the automotive industry, but also in a wide range of industry and R&D institutions requiring engineering versatility and skills needed for solving complex multiple domain problems.

LABORATORY

The ICEPS encompasses 13 engine test cells

with eddy current and AC asynchronous dynos, a state-of-the-art single-cylinder research engine test cells for advanced combustion systems, emission and mixture formation R&D and ICE & Hybrid Powertrain computation and numerical simulation lab. The recent upgrade (2023) with the gaseous Hydrogen supply facility enables research and development of hydrogen-fueled ICE combustion systems.

RESEARCH

The ICEPS focuses on research mainly in the fields of:

- IC engine numerical simulation techniques
- Turbocharging
- Mechatronic systems and techniques applied to engine control and diagnostics.
- Development of IC engine testing methods and advanced measurement techniques
- Hybrid powertrain systems
- Engine fuels

PROJECTS (FROM THE REFERENCE LIST)

- Development of Turbocharged SI engine
- R&D of High-pressure diesel injection system
- R&D of a range of Turbochargers for CI engines
- Hybrid powertrain systems for heavy public transportation and communal vehicles
- Engine fuels testing
- Development and Testing of engine test bed instrumentation and systems (in coop. with AVL GmbH)
- R&D of innovative combustion systems in Gasoline and Hydrogen engines (in coop. with AVL GmbH)

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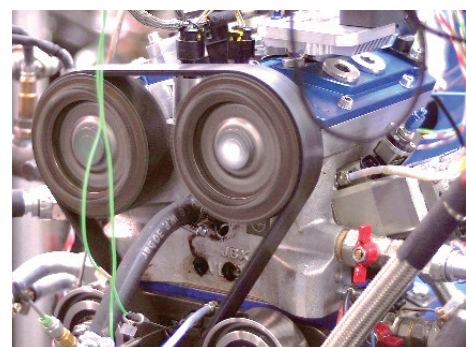
Web site: motori.mas.bg.ac.rs

Associate Professors:

Dr. Slobodan Popović, Dr. Nenad Miljić, Dr. Dragan Knežević

Assistant Professors:

Dr. Predrag Mrđa, Dr. Marko Kitanović





Motor Vehicles

The development of advanced intelligent vehicles, their systems and components continues to offer exciting and challenging work for highly motivated and well educated young people.

Research, design and development in the area of automotive engineering has become a wide-ranging branch of engineering, encompassing electronics, computing, materials science and ergonomics, as well as the traditional core sub-

STAFF: 7 professors, 2 teaching and research assistants

DATE FOUNDED: 1946

DISTINGUISHED ALUMNI

- Prof. Aleksej Lebedev, the first motor vehicle lecturer
- Prof. Milan Cvetnić
- Prof. Miroslav Nenadović
- Prof. Mihailo Borisavljević
- Prof. Jovan Todorović
- Prof. Dimitrije Janković
- Prof. Nenad Janičijević
- Prof. Čedomir Duboka
- Prof. Gradimir Ivanović
- Prof. Živan Arsenić

COOPERATION WITH FOREIGN UNIVERSITIES

- Cranfield University
- University of Montenegro
- University of East Sarajevo
- University of Skopje

COOPERATION WITH INDUSTRY

- Tractors and Farm Equipment Limited, India
- RDW, The Netherlands
- TBV, Germany
- Uniplast Serbia
- and many more...

jects of mechanical engineering science.

The objective of the Department is advanced education of students who would be able to create products which in the near and distant future will meet and satisfy the needs of the user. New technologies, such as integrated active and passive vehicle safety systems, application of new materials and electronic components in addition to new vehicle drive systems (electric, hybrid, etc.) impose challenging engineering problems for the future, requiring a broadly based multidisciplinary education.

The Motor Vehicle Department is concerned with all aspects of R&D of motor vehicles and their trailers, both in the education at BSc, MSc, and PhD levels, as well as in offering R&D services to evaluate new technologies and to improve automotive product engineering processes. The Department provides services to the industry in form of R&D, certification and approval testing, application of CAD/CIMM/ICT technologies, mechanical design assessment and consultancy. Our curriculum is internationally recognized for continually educating the most qualified and well-rounded experts in the field of automotive engineering.

The Department has over 60 years of experience in teaching, advising and placing graduates in the automotive industry and related positions. So far, 1400 students have graduated from the Motor Vehicle Department. Students at our Department can attend the following courses:

- Fundamentals of Motor Vehicles,
- Vehicle Systems,
- Vehicle Dynamics,
- Vehicle Performances,

- Vehicle Design 1,
- Vehicle Design,
- Skill Praxis B,
- System Effectiveness,
- Vehicle Propulsion Systems,
- Automotive Frictional Systems,
- Vehicle Mechatronics,
- Vehicle Testing,
- Vehicle Safety,
- Intelligent Vehicle Systems,
- Vehicles and Environment,
- Vehicle Maintenance,
- System Engineering,
- Forensic Engineering,
- Skill Praxis M, etc.

Automotive employment opportunities exist in every country and in all parts of the world. The employment and career opportunities that our Department degrees offer are very broad and without limits. The Motor Vehicle Centre is an organizational unit for science-research activities within the Department, comprised of the following units:

- CIAH Laboratory,
- CESiL - Center for System Effectiveness and Logistics,
- LaBMV – Laboratory for Motor Vehicles Safety.

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Full Professors:

Dr. Branko Vasić, Dr. Branislav Rakićević, Dr. Vladimir Popović, Dr. Dragan Aleksendrić, Dr. Ivan Blagojević

Associate Professor:

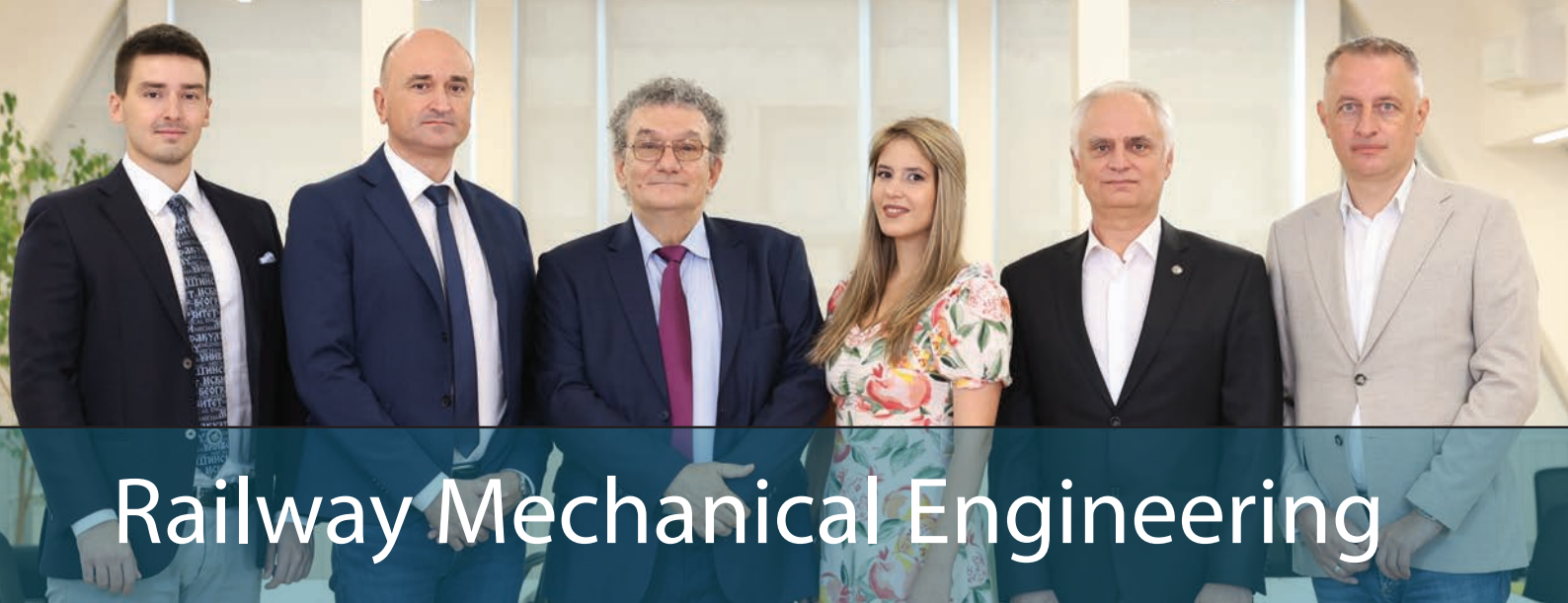
Dr. Saša Mitić

Assistant Professor:

Dr. Dragan Stamenković

Teaching and Research Assistants:

Miloš Maljković, Branko Miličić



Railway Mechanical Engineering

RESEARCH AND EDUCATION

In research and teaching, the Railway Mechanical Engineering Department is mainly focused on rail vehicles. Its development is tightly connected with the development of the domestic railway industry. From the early beginnings of the Department to date, Department members have successfully contributed to dozens of realized projects of rail vehicles. Cooperation with the industry, especially in coach manufacturing, shows that the high technical level and quality have been achieved, which enabled significant export business of domestic companies in the last decades to:

- Hungary,
- Poland,
- Russian Federation,
- Greece,
- Croatia,

STAFF: 2 professors and 2 teaching and research assistants.

DATE FOUNDED: 1946

DISTINGUISHED ALUMNI

- Prof. Svetozar Zorić, the first lecturer 1897
- Prof. Vladimir Farmakovski, the first Chief of the Department

COOPERATION WITH FOREIGN UNIVERSITIES

- Vienna University of Technology, Austria
- University of Sheffield, United Kingdom
- Newcastle University, UK

COOPERATION WITH INDUSTRY

- AMM Manufacturing, Kragujevac
- SIEMENS MOBILITY, Kragujevac
- Srbija voz, Beograd
- GOŠA, Smederevska Palanka
- Srbija kargo, Beograd
- ŠINVOZ, Zrenjanin

- Slovenia,
- Iran.

This experience shows that the collaboration with industry has always given the best results and stimulation both for further research and teaching activities. A large number of graduation theses dealt with specific problems of design, testing and maintenance of railway vehicles. Topics of several master and doctoral theses were initiated by developing the problems within various projects. As an example of recently finished research projects, we can mention the development of elements for energy absorption in the case of railway vehicles accidents. Design, calculation methodologies and technology of hydrodynamic couplers for railway traction vehicles were researched as well. Many analyses and research projects were performed using specialized software partially developed at the Faculty, such as: gauge calculation, strength FEM calculations in elastic and plastic area, calculations of suspension, calculation of forces in buffers and draw gear in curves, calculation of eigenvalues and calculation of ride stability, derailment safety, guiding forces in curves, wheel wear index etc.

TESTING

Considering the size of a rail vehicle, most of the Department tests are performed in real service conditions - on track, as well as in railway factories. For these tests, the Department is equipped with the majority of required measuring equipment.

Recently, the following tests have been performed:

- determination of the coefficient of flexibility, inclination pole position, centre of gravity;
- eigenvalue tests, including eigenvalues of the

car body as elastic body, tests of the structure sections buckling, static strength of carbody structure, impact test, test of dynamical behavior according to EN and UIC standards, air tightness test of the coaches for 200 km/h, etc.

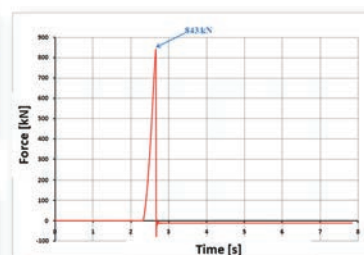
In the laboratory conditions, several assemblies were also tested: fatigue test of the bogie frame and bolster beam, tests of different rubber elements, axle box water tightness, crashworthiness of elements for passive safety etc.



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Dr. Dragan Milković, Dr. Jovan Tanasković

Teaching and Research Assistants:
Aleksandra Kostić Miličić, Jagoš Stojanović



Designed load – $F_p = 800 \text{ kN}$.
Break of shearing ring – $F_i = 843 \text{ kN}$.



General Machine Design

The Department of General Machine Design deals with machine system components of great importance to all fields of mechanical engineering, as well as the design of machines, their assemblies, subassemblies, and elements.

Some of the research fields covered by the Machine Design Department include machine elements

STAFF: 7 professors and 3 teaching and research assistants.

DATE FOUNDED: 1948

DISTINGUISHED ALUMNI

- Dušan Vitas, Milan Trbojević, Slobodan Veriga, Zoran Savić, Vera Kršmanović, Momčilo Janković, Vojislav Latinović, Nedeljko Plavšić, Pauna Obradović, Miodrag Janković, Mileta Ristivojević, Božidar Rosić

- Emeritus Prof. Milosav Ognjanović

- Emeritus Prof. Radivoje Mitrović

MEMBER OF THE SERBIAN ACADEMY OF SCIENCES AND ARTS

- Prof. Vladimir Farmakovski

COOPERATION WITH FOREIGN UNIVERSITIES

- Aston University, Birmingham, UK
- University of Erlangen-Nurnberg, Germany
- Technical University Karlsruhe, Germany
- Vienna University of Technology, Austria
- Slovak University of Technology in Bratislava, Slovakia

- Technical University Sofia, Bulgaria

COOPERATION WITH INDUSTRY

- Goša, Smederevska palanka
- TENT, Obrenovac
- TEKO, Kostolac
- FKL, Temerin
- Messer-Tehnogas AD, Beograd
- EDePro, Beograd

(gears, bearings, shafts, mechanical joints, etc.), failure analysis (fatigue, endurance, and strength), vibration and noise generation, and the design of machine systems (product development, prototyping and 3D printing, design parameter optimization, such as multi-criteria optimization methods, including genetic algorithm optimization), etc.

The Department has been a vital part of the Faculty of Mechanical Engineering since its foundation. The courses offered by the Department provide a broad foundation of knowledge, along with the practical and analytical skills needed to become a successful mechanical engineer.

The Department possesses laboratory equipment intended for education at all study levels, as well as for scientific research and investigation. Experimental research is conducted in the laboratories focused on testing different engineering materials, and machine parts and elements (such as standardized test samples, models, and real machine components). Currently, the Department has the following laboratories:

1. Accredited (certified) Laboratory for bearings (LiMES) SRPS ISO 1132-1:2016, SRPS ISO 1132-2:2017, SRPS ISO 15242-1,2,3:2018, SRPS EN ISO 6508-1:2024;
2. Laboratory for gears and gear drives;
3. Laboratory for machine elements;
4. Laboratory for machine design;
5. Laboratory for fatigue and strength (LiMES, out of accreditation scope);
6. Laboratory for vibration and noise;
7. Laboratory for hybrid technical systems.

Research in the area of machine elements is primarily focused on gears and gear drives, which include bearings, shafts, couplings, fasteners,

springs, belt and chain drives, as well as friction drives. Gear research includes gear teeth geometry, durability, endurance, strength, operational loads (stress spectra), vibrations, and noise emissions. Research in the area of structural integrity focuses on the failure probability of gears, screws, bolts, connecting rods, and other machine parts. For this purpose, in addition to back-to-back gear test rigs, a servo-hydraulic machine for static and dynamic testing is utilized. Research in the field of failure theory includes the analysis of crack initiation and propagation processes, the hypothesis of damage accumulation, and the application of modern numerical methods, such as modeling and Finite Element Method (FEM) analysis.

Students are regularly introduced to research activities, particularly experimental research conducted by department members. As a result, students become familiar with the machine component testing methods and gain the capability to design and perform experimental investigations on their own.

International projects in which members of the department were/are engaged: ERASMUS+, INTERREG Europe, COST Actions, CEEPUS, bilateral projects.

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Associate Professors:

Dr. Žarko Mišković, Dr. Nenad Kolarević

Assistant Professors:

Dr. Miloš Sedak, Dr. Aleksandar Dimić

Teaching and Research Assistants:

Ivan Simonović, Pavle Ljubojević, Jovana Antić



Engineering Materials and Welding, Tribology, Fuels and Combustion

Education and research activities of the Department (since 1973) include three engineering areas: Engineering Materials and Welding, Tribology and Fuel and Combustion.

ENGINEERING MATERIALS AND WELDING

The historical significance of materials science in Serbia has been recognized since 1895, when the course of Mechanical Technology and Department was introduced at the Technical Faculty of the Great School. Since WWI, this course has been advanced up to the present day. Over the last 100 years, material scientists have made unprecedented advances in developing revolutionary materials that shape everyday life. Advanced materials (polymers, ceramics, composites, biomaterials and nanomaterials) are but

STAFF: 12 professors, 2 associates

DATE FOUNDED: 1966

DISTINGUISHED ALUMNI

- Danilo Dančević, Borivoj Manojlović, Svetislav Janać, Avram Majstorović, Vitomir Đorđević
- Prof. Anđelka Milosavljević
- Prof. Vera Šijački-Žeravčić
- Prof. Aleksandar Rac
- Prof. Milan Radovanović
- Academician Dušan Veličković
- Prof. Emeritus Miroslav Adžić
- Prof. Emeritus Aleksandar Sedmak

COOPERATION WITH FOREIGN UNIVERSITIES

- Institute Karpenko, Ukraine
- Institute for Welding, Timisoara, Romania
- Drexel University, Philadelphia, USA
- IST Lisbon, Portugal
- Universidad Politécnica de Madrid
- University of Maribor, Slovenia
- Aristotle University of Thessaloniki, Greece
- Technical University of Sofia, Bulgaria

COOPERATION WITH INDUSTRY

- Electric Power Industry of Serbia, Serbia
- US Steel Serbia
- Petroleum Industry of Serbia

a few examples of the materials that have a fundamental impact on life in the 21st century. In designing a structure or a device, it is quite a challenge to the engineer to select from the vast number of materials those that suit best the intended purpose. Mistakes can cause disasters. Material properties have to be considered when selecting a material. It is not only a matter of design properties, but often service behaviour of materials plays a dominant role (creep, fatigue and corrosion etc.), causing rupture. Therefore, the microstructure, material properties and n-service behavior are the keywords in understanding engineering materials. Management of material microstructure enables the modification of different properties and service behaviour by applying different treatments and processing. The science of welding is also an important aspect of our activities. Research activities at the Laboratory of Engineering Materials and Welding include: service behaviour and testing of all kinds of engineering materials, remaining life, structural integrity and reliability and failure of components, as well as welding and deposition procedures. Our activities include a large number of completed projects, mostly for industrial applications and research. We have accomplished a total of over 150 projects, which include five international and five completed EUREKA projects.

TRIBOLOGY

Tribology Laboratory (TriboLab) is dedicated to education and research in all aspects of tribology. The interdisciplinary character of tribology and the presence of tribological processes in most mechanical systems demand research in all fields of industry, where tribological activities can achieve significant technical and economic effects. The main research activities of TriboLab are: Friction and wear characteristics of materials (metals, polymers, ceramics and composites), Surface modifications and coatings, Lubricants – application, recycling and monitoring, Lubrication systems, Failure diagnostic of tribologi-

cal systems, and Nanotribology. TriboLab realized a great number of projects financed by the Serbian Government or Serbian industry, and 12 international projects (1 EUREKA, 1 EIT RawMaterials, 6 bilateral projects, 1 Erasmus+ and 3 COST actions). We are also a part of three CEEPUS networks. The members of the staff have cooperation with universities abroad mainly through the Balkan Tribological Association. TriboLab is one of the founders of the Serbian Tribology Society. Web: <http://tribolab.mas.bg.ac.rs/>

FUEL AND COMBUSTION/THERMAL ANALYSIS

Fuel and Combustion Laboratory (FCL) is unique in Serbia due to extensive education and wide research activities comprising: characterization of fossil and alternative fuels (biomass and biofuels), experimental and computational research in combustion, energy production and utilization, prediction of emissions, environmental engineering (deSOx and deNOx systems), chemical kinetics, burners and combustors. The FCL has realized numerous research and development projects supported by the Serbian Government, Serbian industry, the US DOE and the EU (EUREKA, FP6, FP7 and H2020) programmes. The Laboratory for Thermal Analysis (LTA) investigates the thermal properties and behavior of a variety of energy materials. The primary goals include the investigation of stability, reactivity, and degradation processes under controlled conditions to perform comprehensive and fundamental kinetic modeling. That allows optimizing the properties and increasing the safety and environmental footprint of utilization for various materials and their mixtures in energy or industrial applications in line with sustainable development goals and circular economy principles.

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E-mail: nmilosevic@mas.bg.ac.rs

Web site: <http://www.mas.bg.ac.rs/organizacija/katedre/23>

Full Professors:

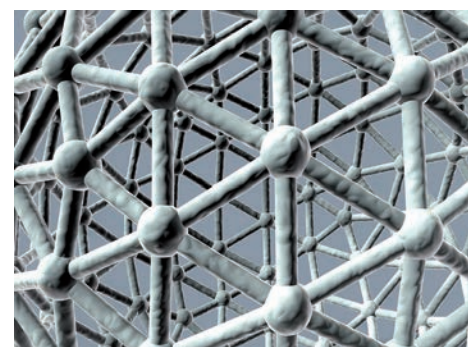
Dr. Radica Prokić-Cvetković, Dr. Dragoslava Stojiljković, Dr. Zoran Radaković, Dr. Olivera Popović, Dr. Aleksandar Vencel, Dr. Gordana Bakić, Dr. Miloš Đukić, Dr. Nebojša Manić, Dr. Aleksandar Milivojević

Associate Professor:

Dr. Vladimir Jovanović

Assistant Professors:

Dr. Bratislav Rajičić, Dr. Nenad Milošević



Strength of Structures

The evaluation of internal stresses within a structure to assess the margins of safety regarding permanent deformation or collapse, as well as the analysis displacements under service loads, are one of the most crucial fields in engineering. This task requires expertise from several disciplines, particularly those related to calculating stresses and strains in structural members, as well as those focused on the mechanical characterization of materials. Such disciplines are within the focus of research and teaching at the Department of Strength of Materials.

The expertise of the Department members and the innovative research activities primarily focus on the application and development of numerical simulations based on the finite element method (FEM). The emphasis is placed on the development of structural diagnosis techniques and the integration of numerical and experimen-

tal methods for the mechanical characterization of modern, complex composite materials. In contemporary engineering, there is an increasing trend to incorporate smart and modern, complex materials into innovative designs. To support this advancement, it is essential to have reliable simulation tools, which often necessitate the development and numerical implementation of constitutive models within finite element codes, accompanied by robust experimental protocols for mechanical characterization.

Our department approaches these tasks at various levels. We aim at imparting this knowledge to undergraduate students, collaborating with PhD candidates to develop novel techniques, participating in prestigious national and international research initiatives, and providing consultancy services to industrial partners, among other activities.

In the last few decades, the Department established collaboration with different industrial partners, both national and international. Several examples are listed below:

- Ski lifts Serbia
- Excavators (Elektroprivreda Serbia)
- Automotive industry (AQOS Technologies)
- Continental GmbH, Germany
- Vesuvius Group, Belgium
- Osram, Italy
- SACMI, Italy

The Department also took part in prestigious EU projects, such as Horizon 2020, FP7, Eureka! COST, and many others.

Collaboration with foreign universities:

- Moscow State University MGU, Russia
- Georgia Tech University, Atlanta, USA

- Technical University of Budapest, Hungary
- Politecnico di Milano, Milano, Italy
- University of Trento, Trento, Italy
- University of Bergamo, Bergamo, Italy

Department foundation year: 1962

“Calculating replaces, while geometry stimulates thinking.”



Jacob Steiner (1796-1863)

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E-mail: ibalac@mas.bg.ac.rs
Website: <https://www.mas.bg.ac.rs/organizacija/katedre/24>

STAFF: 5 professors, 1 teaching and research assistant

DATE FOUNDED: 1962

DISTINGUISHED ALUMNI

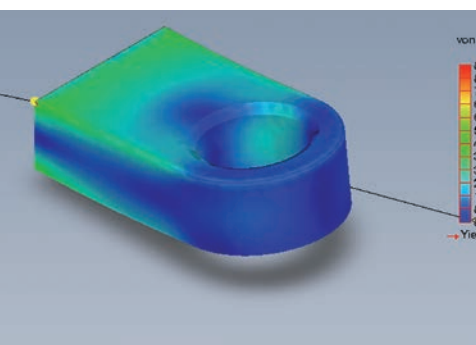
- Prof. Jakov Hlitičijev
- Prof. Dušan Stankov

COOPERATION WITH FOREIGN UNIVERSITIES

- Moscow State University MGU, Russia
- Georgia Tech University, Atlanta, USA
- Technical University of Budapest, Hungary

COOPERATION WITH INDUSTRY

- Lola, HIP Bukulja, Serbian Railways, Termoelektro, TIPO, Belgrade
- Želvoz, Smederevo
- Lafarge cementary, Beočin
- Holcim cementary, Novi Popovac
- Azotara, NISP, HIP, Pančevo



Full professors:

Dr. Nina Anđelić, Dr. Vesna Milošević-Mitić, Dr. Igor Balać, Dr. Vladimir Buljak

Assistant professors:

Dr. Ana Petrović

Teaching and Research Assistant:

Milan Janković

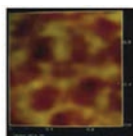
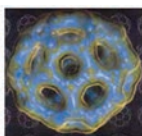
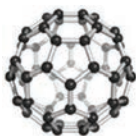
Biomedical Engineering

This is a recently founded Department, established after twelve years of existence of the study specialization of Biomedical Engineering (BME). The members of the BME Department have, for many years, successfully carried out interdisciplinary education (mechanical and electrical engineering, human anatomy and physiology for engineers and design of biomedical instrumentation, devices and clinical equipment). The programme of BME is in line with the BME programmes at other European Universities and was verified during the TEMPUS project.

Since 2006, the members of BME have realized joint research and development with various institutions in the following fields:

- Early detection of melanoma, skin cancer, cervical cancer, bowel cancer and oral cavity cancer;
- Medical equipment for clinical use: rotating sick bed and locomotor rehabilitation devices,
- Nanophotonic devices for eye protection of UV and high energy blue light, which also regulate secretion of serotonin and melatonin,
- Device for vertically transformation of polarized light into hyperpolarized light,
- Software and algorithms for Opto-Magnetic Imaging Spectroscopy (OMIS) applied to different types of materials: liquids (solutions),

biological tissues and solid state materials. The Department of BME has three teaching and research laboratories: (1) NanoLab - with very sophisticated equipment which can measure the properties of samples on the nanoscale level using scanning tunnelling microscopy (STM), atomic force microscopy (AFM), magnetic force microscopy (MFM) under different temperature and pressure conditions, (2) SpectraLab - UV/VIS/NIR from 320-3300 nm, FTIR from 2400-14000 nm, and (3) Manufacturing Lab - it has different types of tool machines, the chemical vapour deposition system, the coating system, the system for production high pure water (18.2 MΩ) and 3D printers. In NanoLab, the first image



Left: Stick model of molecule C_{60} (size 1 nm, composed of 60 carbon atoms, rotate $1.8 \times 10^{10} \text{ s}^{-1}$), **middle:** quantum mechanical model of C_{60} published on the cover page of Science, December 1991, **right:** STM image of C_{60} captured in April 1992 at the NanoLab



with atomic resolution of molecule C_{60} was made by STM in April 1992.

Active project: Project no. 451-03-65/2024-03/200105), financed by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia

“Engineering without medicine is blind, medicine without engineering is feeble.”



Richard Feynman (1918 -1988), the father of the idea of Nanoscience and Nanotechnology

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Web site: bmi.mas.bg.ac.rs

STAFF: 3 professors, 1 teaching and research assistant, 1 research associate

DATE FOUNDED: Study specialization 2006 and the Department 2018

DISTINGUISHED ALUMNI

- Prof. Đuro Koruga, the founder of the study specialization and the first lecturer
- Prof. Zoran Krivokapić MD, FRCS, member of SASA

Full Professor:

Dr. Lidija Matija

Associate Professor:

Dr. Branislava Jeftić

Assistant Professor:

Dr. Ivana Stanković

Teaching Assistant:

Aleksandra Dinić

Tim Hunt (Richard Timothy Hunt), the British scientist who, with Leland H. Hartwell and Sir Paul M. Nurse, won the Nobel Prize for Physiology or Medicine in 2001 for the discovery of the key regulators of the cell cycle, is the only Nobel Prize laureate who visited the UB-FME and had a discussion with our professors on Sept. 11, 2014





New Study Programme – IT in ME (at BSc Level)

In keeping with the European principles of academic excellence for jobs of the future, much has been done in recent years to transform the Faculty of Mechanical Engineering, modernise the teaching process, improve the quality and attractiveness of study programmes and adapt them to the global trends and needs of economy.

At the level of Bachelor academic studies, in addition to the study

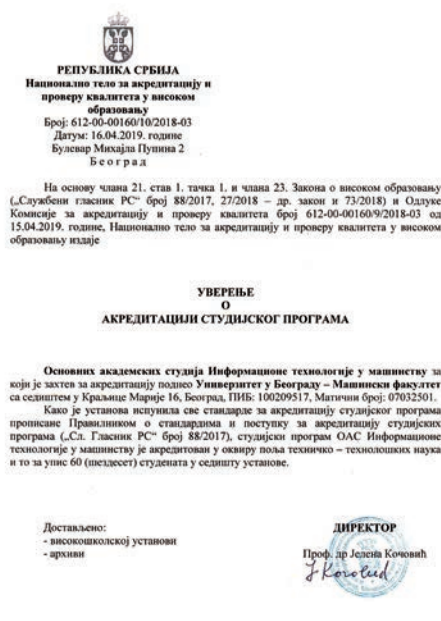
programme of Mechanical Engineering, the study programme Information Technologies in Mechanical Engineering was introduced. The latest result of the modernization of teaching at Master academic studies is the Industry 4.0 study programme. Both programmes are accredited by the National Entity for Accreditation and Quality Assurance in Higher Education (NEAQA).

INFORMATION TECHNOLOGIES IN MECHANICAL ENGINEERING

The study programme Information Technologies in Mechanical Engineering is a continuation of the decade-long keeping up with the trends of contemporary and own research of the Faculty of Mechanical Engineering and its implementation in the teaching process in response to the needs of high-tech companies that do business in Serbia. The study programme IT in Mechanical Engineering lasts for three years and carries 180 ECTS points. It started from the school year 2019/2020.

One of the basic goals of this programme is to provide students with high-quality general and vocational education in the field of information technologies, as well as to enable them to acquire the knowledge in the field of computer technologies necessary for mechanical engineering in the context of Industry 4.0.

The idea is to use a qualitatively different approach to improve the entire teaching process at the level of Bachelor studies in order for future engineers to acquire all the necessary competences required by the fast development of technology in the world. The new study programme should enable future mechanical engineers to understand modern trends in the field of information technologies and develop their awareness of the need for permanent education and continuous upgrading of acquired knowledge.



Hours weekly	1 st year		2 nd year		3 rd year	
	1 st semester	2 nd semester	3 rd semester	4 th semester	5 th semester	6 th semester
1	1.1 Programming (10 ECTS)	2.1 Data structures (10 ECTS)	3.1 Fundamentals of algorithms (5 ECTS)	4.1 Introduction to operating systems (6 ECTS)	5.1 Object-oriented paradigm (5 ECTS)	6.1 Database systems (5 ECTS)
2			3.2 Discrete mathematics (5 ECTS)			
3				3.3 Elective course 3 (5 ECTS)	4.3 Basics of mechanics 3 (6 ECTS)	5.3 Fundamentals of thermodynamics and heat transfer (5 ECTS)
4			3.4 Basics of mechanics 2 (5 ECTS)			
5				3.5 Basics of mechanic of materials (5 ECTS)	4.5 Praxis (6 ECTS)	5.5 Elective course of section 6 (5 ECTS)
6			3.6 Mechanical materials (5 ECTS)			
7				1.2 Algebra and linear algebra (8 ECTS)	2.2 Calculus (8 ECTS)	4.6 Elective course 6 (5 ECTS)
8	1.3 Elective course 1 (4 ECTS)	2.3 Basics of mechanics 1 (3 ECTS)	4.7 Elective course 7 (5 ECTS)			
9				1.4 Basics of computing systems (4 ECTS)	2.4 Intro into the electrical engineering fundamentals (4 ECTS)	4.8 Elective course 8 (5 ECTS)
10	1.5 English 1 (2 ECTS)	2.5 Software application in elementary physics (3 ECTS)	4.9 Elective course 9 (5 ECTS)			
11				1.6 Elective course 2 (2 ECTS)	2.6 Engineering economics (2 ECTS)	4.10 Elective course 10 (5 ECTS)
12	1.7 Elective course 3 (4 ECTS)	2.7 Basics of mechanics 2 (3 ECTS)	4.11 Elective course 11 (5 ECTS)			
13				1.8 Elective course 4 (4 ECTS)	2.8 Basics of mechanics 3 (3 ECTS)	4.12 Elective course 12 (5 ECTS)
14	1.9 Elective course 5 (4 ECTS)	2.9 Basics of mechanics 4 (3 ECTS)	4.13 Elective course 13 (5 ECTS)			
15				1.10 Elective course 6 (4 ECTS)	2.10 Basics of mechanics 5 (3 ECTS)	4.14 Elective course 14 (5 ECTS)
16	1.11 Elective course 7 (4 ECTS)	2.11 Basics of mechanics 6 (3 ECTS)	4.15 Elective course 15 (5 ECTS)			
17				1.12 Elective course 8 (4 ECTS)	2.12 Basics of mechanics 7 (3 ECTS)	4.16 Elective course 16 (5 ECTS)
18	1.13 Elective course 9 (4 ECTS)	2.13 Basics of mechanics 8 (3 ECTS)	4.17 Elective course 17 (5 ECTS)			
19				1.14 Elective course 10 (4 ECTS)	2.14 Basics of mechanics 9 (3 ECTS)	4.18 Elective course 18 (5 ECTS)
20	1.15 Elective course 11 (4 ECTS)	2.15 Basics of mechanics 10 (3 ECTS)	4.19 Elective course 19 (5 ECTS)			
21				1.16 Elective course 12 (4 ECTS)	2.16 Basics of mechanics 11 (3 ECTS)	4.20 Elective course 20 (5 ECTS)
22	1.17 Elective course 13 (4 ECTS)	2.17 Basics of mechanics 12 (3 ECTS)	4.21 Elective course 21 (5 ECTS)			
23				1.18 Elective course 14 (4 ECTS)	2.18 Basics of mechanics 13 (3 ECTS)	4.22 Elective course 22 (5 ECTS)
24	1.19 Elective course 15 (4 ECTS)	2.19 Basics of mechanics 14 (3 ECTS)	4.23 Elective course 23 (5 ECTS)			
25				1.20 Elective course 16 (4 ECTS)	2.20 Basics of mechanics 15 (3 ECTS)	4.24 Elective course 24 (5 ECTS)
26	1.21 Elective course 17 (4 ECTS)	2.21 Basics of mechanics 16 (3 ECTS)	4.25 Elective course 25 (5 ECTS)			
27				1.22 Elective course 18 (4 ECTS)	2.22 Basics of mechanics 17 (3 ECTS)	4.26 Elective course 26 (5 ECTS)
28	1.23 Elective course 19 (4 ECTS)	2.23 Basics of mechanics 18 (3 ECTS)	4.27 Elective course 27 (5 ECTS)			
29				1.24 Elective course 20 (4 ECTS)	2.24 Basics of mechanics 19 (3 ECTS)	4.28 Elective course 28 (5 ECTS)
30	1.25 Elective course 21 (4 ECTS)	2.25 Basics of mechanics 20 (3 ECTS)	4.29 Elective course 29 (5 ECTS)			
31				1.26 Elective course 22 (4 ECTS)	2.26 Basics of mechanics 21 (3 ECTS)	4.30 Elective course 30 (5 ECTS)
32	1.27 Elective course 23 (4 ECTS)	2.27 Basics of mechanics 22 (3 ECTS)	4.31 Elective course 31 (5 ECTS)			
33				1.28 Elective course 24 (4 ECTS)	2.28 Basics of mechanics 23 (3 ECTS)	4.32 Elective course 32 (5 ECTS)
34	1.29 Elective course 25 (4 ECTS)	2.29 Basics of mechanics 24 (3 ECTS)	4.33 Elective course 33 (5 ECTS)			
35				1.30 Elective course 26 (4 ECTS)	2.30 Basics of mechanics 25 (3 ECTS)	4.34 Elective course 34 (5 ECTS)
36	1.31 Elective course 27 (4 ECTS)	2.31 Basics of mechanics 26 (3 ECTS)	4.35 Elective course 35 (5 ECTS)			
37				1.32 Elective course 28 (4 ECTS)	2.32 Basics of mechanics 27 (3 ECTS)	4.36 Elective course 36 (5 ECTS)
38	1.33 Elective course 29 (4 ECTS)	2.33 Basics of mechanics 28 (3 ECTS)	4.37 Elective course 37 (5 ECTS)			
39				1.34 Elective course 30 (4 ECTS)	2.34 Basics of mechanics 29 (3 ECTS)	4.38 Elective course 38 (5 ECTS)
40	1.35 Elective course 31 (4 ECTS)	2.35 Basics of mechanics 30 (3 ECTS)	4.39 Elective course 39 (5 ECTS)			
41				1.36 Elective course 32 (4 ECTS)	2.36 Basics of mechanics 31 (3 ECTS)	4.40 Elective course 40 (5 ECTS)
42	1.37 Elective course 33 (4 ECTS)	2.37 Basics of mechanics 32 (3 ECTS)	4.41 Elective course 41 (5 ECTS)			
43				1.38 Elective course 34 (4 ECTS)	2.38 Basics of mechanics 33 (3 ECTS)	4.42 Elective course 42 (5 ECTS)
44	1.39 Elective course 35 (4 ECTS)	2.39 Basics of mechanics 34 (3 ECTS)	4.43 Elective course 43 (5 ECTS)			
45				1.40 Elective course 36 (4 ECTS)	2.40 Basics of mechanics 35 (3 ECTS)	4.44 Elective course 44 (5 ECTS)
46	1.41 Elective course 37 (4 ECTS)	2.41 Basics of mechanics 36 (3 ECTS)	4.45 Elective course 45 (5 ECTS)			
47				1.42 Elective course 38 (4 ECTS)	2.42 Basics of mechanics 37 (3 ECTS)	4.46 Elective course 46 (5 ECTS)
48	1.43 Elective course 39 (4 ECTS)	2.43 Basics of mechanics 38 (3 ECTS)	4.47 Elective course 47 (5 ECTS)			
49				1.44 Elective course 40 (4 ECTS)	2.44 Basics of mechanics 39 (3 ECTS)	4.48 Elective course 48 (5 ECTS)
50	1.45 Elective course 41 (4 ECTS)	2.45 Basics of mechanics 40 (3 ECTS)	4.49 Elective course 49 (5 ECTS)			
51				1.46 Elective course 42 (4 ECTS)	2.46 Basics of mechanics 41 (3 ECTS)	4.50 Elective course 50 (5 ECTS)
52	1.47 Elective course 43 (4 ECTS)	2.47 Basics of mechanics 42 (3 ECTS)	4.51 Elective course 51 (5 ECTS)			
53				1.48 Elective course 44 (4 ECTS)	2.48 Basics of mechanics 43 (3 ECTS)	4.52 Elective course 52 (5 ECTS)
54	1.49 Elective course 45 (4 ECTS)	2.49 Basics of mechanics 44 (3 ECTS)	4.53 Elective course 53 (5 ECTS)			
55				1.50 Elective course 46 (4 ECTS)	2.50 Basics of mechanics 45 (3 ECTS)	4.54 Elective course 54 (5 ECTS)
56	1.51 Elective course 47 (4 ECTS)	2.51 Basics of mechanics 46 (3 ECTS)	4.55 Elective course 55 (5 ECTS)			
57				1.52 Elective course 48 (4 ECTS)	2.52 Basics of mechanics 47 (3 ECTS)	4.56 Elective course 56 (5 ECTS)
58	1.53 Elective course 49 (4 ECTS)	2.53 Basics of mechanics 48 (3 ECTS)	4.57 Elective course 57 (5 ECTS)			
59				1.54 Elective course 50 (4 ECTS)	2.54 Basics of mechanics 49 (3 ECTS)	4.58 Elective course 58 (5 ECTS)
60	1.55 Elective course 51 (4 ECTS)	2.55 Basics of mechanics 50 (3 ECTS)	4.59 Elective course 59 (5 ECTS)			
61				1.56 Elective course 52 (4 ECTS)	2.56 Basics of mechanics 51 (3 ECTS)	4.60 Elective course 60 (5 ECTS)
62	1.57 Elective course 53 (4 ECTS)	2.57 Basics of mechanics 52 (3 ECTS)	4.61 Elective course 61 (5 ECTS)			
63				1.58 Elective course 54 (4 ECTS)	2.58 Basics of mechanics 53 (3 ECTS)	4.62 Elective course 62 (5 ECTS)
64	1.59 Elective course 55 (4 ECTS)	2.59 Basics of mechanics 54 (3 ECTS)	4.63 Elective course 63 (5 ECTS)			
65				1.60 Elective course 56 (4 ECTS)	2.60 Basics of mechanics 55 (3 ECTS)	4.64 Elective course 64 (5 ECTS)
66	1.61 Elective course 57 (4 ECTS)	2.61 Basics of mechanics 56 (3 ECTS)	4.65 Elective course 65 (5 ECTS)			
67				1.62 Elective course 58 (4 ECTS)	2.62 Basics of mechanics 57 (3 ECTS)	4.66 Elective course 66 (5 ECTS)
68	1.63 Elective course 59 (4 ECTS)	2.63 Basics of mechanics 58 (3 ECTS)	4.67 Elective course 67 (5 ECTS)			
69				1.64 Elective course 60 (4 ECTS)	2.64 Basics of mechanics 59 (3 ECTS)	4.68 Elective course 68 (5 ECTS)
70	1.65 Elective course 61 (4 ECTS)	2.65 Basics of mechanics 60 (3 ECTS)	4.69 Elective course 69 (5 ECTS)			
71				1.66 Elective course 62 (4 ECTS)	2.66 Basics of mechanics 61 (3 ECTS)	4.70 Elective course 70 (5 ECTS)
72	1.67 Elective course 63 (4 ECTS)	2.67 Basics of mechanics 62 (3 ECTS)	4.71 Elective course 71 (5 ECTS)			
73				1.68 Elective course 64 (4 ECTS)	2.68 Basics of mechanics 63 (3 ECTS)	4.72 Elective course 72 (5 ECTS)
74	1.69 Elective course 65 (4 ECTS)	2.69 Basics of mechanics 64 (3 ECTS)	4.73 Elective course 73 (5 ECTS)			
75				1.70 Elective course 66 (4 ECTS)	2.70 Basics of mechanics 65 (3 ECTS)	4.74 Elective course 74 (5 ECTS)
76	1.71 Elective course 67 (4 ECTS)	2.71 Basics of mechanics 66 (3 ECTS)	4.75 Elective course 75 (5 ECTS)			
77				1.72 Elective course 68 (4 ECTS)	2.72 Basics of mechanics 67 (3 ECTS)	4.76 Elective course 76 (5 ECTS)
78	1.73 Elective course 69 (4 ECTS)	2.73 Basics of mechanics 68 (3 ECTS)	4.77 Elective course 77 (5 ECTS)			
79				1.74 Elective course 70 (4 ECTS)	2.74 Basics of mechanics 69 (3 ECTS)	4.78 Elective course 78 (5 ECTS)
80	1.75 Elective course 71 (4 ECTS)	2.75 Basics of mechanics 70 (3 ECTS)	4.79 Elective course 79 (5 ECTS)			
81				1.76 Elective course 72 (4 ECTS)	2.76 Basics of mechanics 71 (3 ECTS)	4.80 Elective course 80 (5 ECTS)
82	1.77 Elective course 73 (4 ECTS)	2.77 Basics of mechanics 72 (3 ECTS)	4.81 Elective course 81 (5 ECTS)			
83				1.78 Elective course 74 (4 ECTS)	2.78 Basics of mechanics 73 (3 ECTS)	4.82 Elective course 82 (5 ECTS)
84	1.79 Elective course 75 (4 ECTS)	2.79 Basics of mechanics 74 (3 ECTS)	4.83 Elective course 83 (5 ECTS)			
85				1.80 Elective course 76 (4 ECTS)	2.80 Basics of mechanics 75 (3 ECTS)	4.84 Elective course 84 (5 ECTS)
86	1.81 Elective course 77 (4 ECTS)	2.81 Basics of mechanics 76 (3 ECTS)	4.85 Elective course 85 (5 ECTS)			



New Study Programme – Industry 4.0 (at MSc Level)

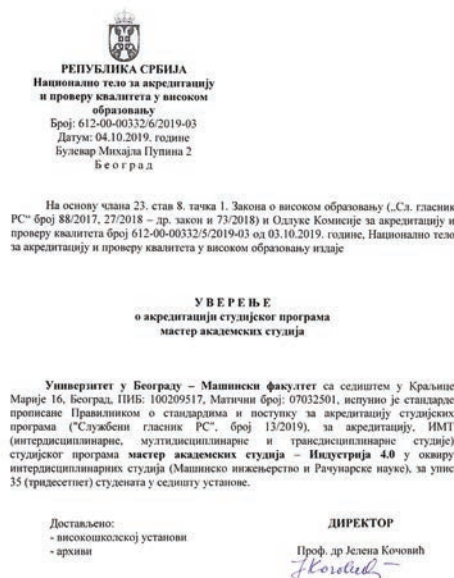
THE INDUSTRY 4.0 MASTER PROGRAMME

The Industry 4.0 Master programme is a multidisciplinary study programme with the main goal of preparing students for the jobs of the future within Industry 4.0. Upon the completion of the programme, the title of a Master of science in mechanical engineering and informatics is obtained. This programme carries 120 ECTS points and started from the school year 2020/2021.

Through the Industry 4.0 study programme, students acquire knowledge and skills in advanced technologies, such as robotics, artificial intelligence, information technologies, company digitalisation, virtual reality, the Internet of Things, reconfigurable manufacturing systems, etc. Furthermore, they acquire appropriate business knowledge and transferable skills.

The programme of Master Academic Studies Industry 4.0 is jointly implemented by the Faculty of Mechanical Engineering and the Faculty of Mathematics of the University of Belgrade. The study programme was created with the encouragement of the Government of the Republic of Serbia, and was chosen at a public competition conducted by the Ministry of Education, Science and Technological Development at the suggestion of the Digital Serbia Initiative.

The Industry 4.0 programme is an amalgam of several study programmes which have existed at the Faculty of Mechanical Engineering for a long time. It is a synthesis of study programmes of production engineering, industrial engineering, automatic control and mechanical engineering and information technologies. This module is focused on state-of-the-art digitised production processes, and such an approach has been recognised by leading European companies and partners in the country and the world as high-tech knowledge necessary for the new knowledge-based economy.



Faculty of Mechanical Engineering
Faculty of Mathematics
Internship and Master thesis

Hours weekly	1 st year		2 nd year	
	1 st semester	2 nd semester	3 rd semester	4 th semester
1	1.1 Introduction to production systems	2.1 Designing business models in industry 4.0	3.1 Interfaces for interoperability in industry 4.0	4.1 Elective courses group M4
2				
3				
4				
5				
6	1.2 Contemporary management and network organizations	2.2 Machine learning of intelligent robotic systems	3.2 Elective courses group R1	4.2 Internship, 2nd part
7				
8				
9				
10				
11	1.3 Statistics for automated data analysis	2.3 Cyber physical systems	3.3 Elective courses group M2	4.3 M.Sc. thesis – research work
12				
13				
14				
15				
16	1.4 Robotics and artificial intelligence	2.4 Elective courses group M1	3.4 Elective courses group M3	4.4 M.Sc. thesis – defense
17				
18				
19				
20				
21	1.5 Algorithms and data structures	2.5 Elective courses group R1	3.5 Internship, 1st part	
22				
23				
24				
25				



Careers

Employability of Mechanical Engineering Graduates

Faculty of Mechanical Engineering is well known for the success of its graduates in labour market market. We believe that employability of our graduates is very important. Faculty will help you develop your employability, identify your preferred career plan and realise it.

Why choose Mechanical Engineering?

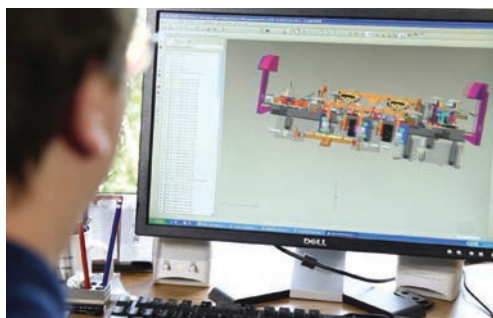


Just look around you. How much of what you see has been manufactured? Engineers are involved in the design and manufacture of everything, from cars to airplanes. Many recent medical advances have been made as a result of work done by engineers: from brain scanners to the drug dispensers used by asthma sufferers.

If you want to be an informed member of society, able to understand modern technology as well as the infrastructure on which our society is built, then there can be no better training than that given to mechanical engineers at the University of

Belgrade. Graduates of the Faculty have benefited from education that enables them to make a real difference to the world outside while, at the same time, pursuing successful and rewarding careers.

Your options should be open



The training that engineers receive is scientifically rigorous. The distinctions between mathematicians, physicists, computer scientists and engineers are getting more and more blurry.

Mechanical engineers are team players and work closely with professional colleagues from other backgrounds. Very few people describe themselves as physicists or mathematicians in their passports. Nearly all 'scientists' have to apply their science at some stage and that is engineering. Studying Mechanical Engineering keeps your options open.

What's so special about studying Mechanical Engineering at the Faculty?

Our graduates are in demand. Our aim is to provide our students with all the mathematical, analytical and computing skills that underpin modern engineering practice, while encouraging the creative skills and problem-solving strategies that are so important to a good mechanical engineer. You will learn the skills needed for team leadership and how to apply new technologies in novel situations: the skills you will need to master technical and managerial demands throughout your professional career.

Graduates from the Faculty of Mechanical Engineering of the Uni-

versity of Belgrade are always in great demand by employers in all the major industrial and commercial sectors, be it manufacturing, energy, oil field, automotive industry, HVAC or many other disciplines of mechanical engineering and, not only those many of our graduates work in information technology or even in finance. Why not join them?



Is there any partnership with industry?

In recent years, the Faculty has forged strong links with industry. Spin-off companies from the Faculty have played a large part in creating the centre for high technology that the city of Belgrade has now become.

Finding that job

We are continually developing relations with graduate recruiters and receive new vacancy information all the time. The website <http://poslovi.infostud.com/> is an online service that matches employer information and job vacancies against your profile and automatically sends you an email alert when your criteria are matched.

Careers talks and workshops

The winter and spring terms provide an opportunity to attend talks and skills workshops. These provide insights into specific careers and help with interview techniques, psychometric testing, business awareness, applications and time management. All of this is done in collaboration with the University of Belgrade Centre for Career Development (<http://www.razvojkarijere.bg.ac.rs/>). The Centre also organises presentations by leading graduate recruiters and holds the Job Fair for final year students and recent graduates, which lists all the recruitment activities for the coming year. The Centre system allows you to book careers events and activities online, including quick query appointments.

Entrepreneurship

Through cooperation with the faculties of Civil, Electrical and Chemical Engineering and with the City of Belgrade, the Faculty founded the Business Technology Incubator. The Incubator is a new venture, designed to empower student entrepreneurs. Also, the Faculty founded the Innovation Centre, which is an economic development tool designed to accelerate the growth and success of students' entrepreneurial companies



through an array of business support resources and services.



The Innovation Incubator of the Faculty of Mechanical Engineering

"We create material solutions"

The Innovation Incubator was founded in 2024 as a project implemented within the Programme of the Founding and Development of Innovation Incubators in Scientific and Research Organizations financed by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia. The establishment of the Innovation Incubator represents an important step in the development of innovative and entrepreneurial ideas among students and researchers of the Faculty of Mechanical Engineering (FME). The partner in the project is the Innovation Centre of the Faculty of Mechanical Engineering in Belgrade (IC-FME).

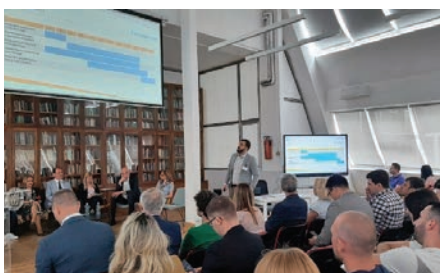
The Incubator aims to connect students, teachers and researchers at the FME with other scientific and research institutions, science technology parks, experts from the economy and interested companies, which enables the creation of a stimulating environment for the development and promotion of entrepreneurship, and, therefore, the space for economic empowerment and development of startups and startup teams within the FME. The Incubator will, in accordance with the internationally and locally recognized approach and confirmed practice, use the Lean startup approach, which is used to reduce risks and waste of resources during the process, by

ensuring that the developed solution has customers or users at an early stage of product/service development.

There are already three startups at the FME planning their further development:

- RotoDyna d.o.o. – founded in 2022 thanks to the Grant from the Innovation Fund of the Republic of Serbia. Their goal is to increase the service life and reliability of high-capacity machines for surface exploitation and bulk material transport.
- FCL Team d.o.o. – founded in 2022. They are the winners of the special award of the jury "Best business idea from the Western Balkans" at the EIT JUMPSTARTER 2022 competition for the project of developing the technology of unconventional biomass gasification. Their goal is the production of high-quality gasification products, which will enable additional valorization of biomass.
- MMAG Design d.o.o. was founded in 2024 with the intention to design various types of flying vehicles using modern software tools.

Student teams and researchers interested in the support for the development of innovative ideas can contact the Incubator at inkubator@mas.bg.ac.rs or via the project's Instagram profile



VISION

Innovative entrepreneurship becomes the reality of every successful mechanical engineering student.

MISSION

We motivate, support and empower innovation within an expert environment of the institution with the tradition in solving complex engineering problems.

Instagram



inkubator.mfb

Follow

Message

5 posts

210 followers

323 following

Иновациони инкубатор Машинског факултета у Београду
Science, Technology & Engineering
Од идеје до реализације
Крајинић Машине 16, Belgrade, Serbia
inkubator.mas.bg.ac.rs

REPOSITORY OF THE FACULTY OF MECHANICAL ENGINEERING – MACHINERY

<https://machinery.mas.bg.ac.rs/>

The Repository of the Faculty of Mechanical Engineering - MACHINERY is a digital repository of all departments within the FME and IC-FME aiming to provide open access to publications and other results of various projects implemented at the FME and IC-FME. It is one of the three largest repositories within the University of Belgrade. The repository stores scientific papers of teachers, associates and other researches, publications issued by the FME, as well as all other contents of importance, such as: publications (including preprint documents); doctoral dissertations; magister's, master's and graduate theses; working documents and technical solutions; white papers and reports; primary data; scientific papers from conferences; posters; teaching and educational materials; pictures/graphic attachments; audio and video recordings.

The MACHINERY repository was launched in January 2023 and, by the end of 2024, a total of 7799 scientific papers and other publications were entered:

- 3884 papers in scientific journals;
- 3167 papers published at conferences;
- 88 books;
- 151 monograph chapters;
- 135 doctoral dissertations; and
- 374 other documents.

Total number of scientific papers and other publications in open access is 4783.

The total number of authors represented in the repository is 5290.

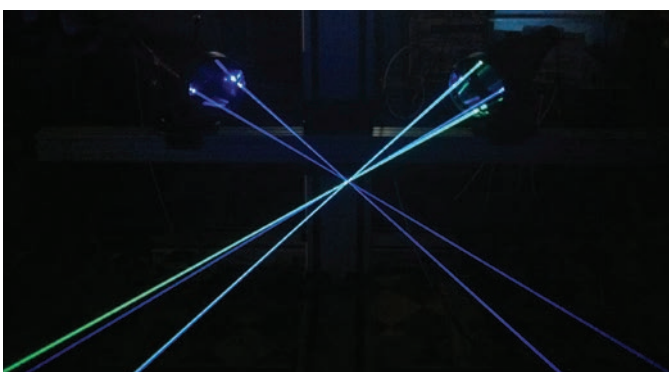
Regarding the number of teachers, associates and researchers using the repository, the data are as follows:

- 225 registered users from the FME;
- 35 registered users from the IC-FME.



Innovation Centre FME

The major focus of the Innovation Centre of the Faculty of Mechanical Engineering (ICFME) is the application of scientific and technological knowledge and inventions and creation of new and improved products, processes and/or services. Experts and specialists at ICFME have top-notch equipment, laboratories and other facilities at their disposal, which helps them in problem solving for various branches of industry, primarily in the following fields: Light and Heavy (Mechanical engineering) industry, Software design, Materials and chemical technologies, IT, Biotechnology, Energy efficiency. ICFME facilities and laboratories for applied and innovative research are located on the premises of the FME, University of Belgrade. The activities of ICFME include various projects, as well as consulting, related to quality control, expertise, certification of products, etc. ICFME was an active participant in seven European Eureka! projects in the past. The Innovation Centre has established bilateral cooperation with research laboratories and similar innovation centres in the

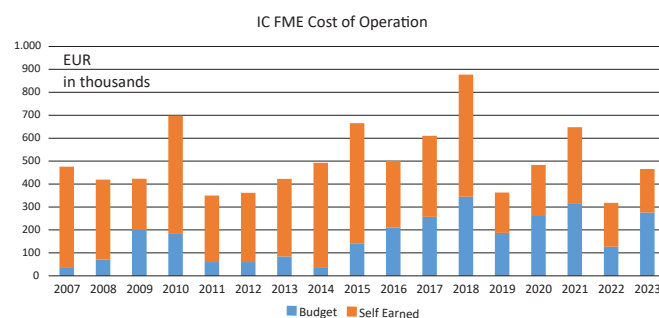
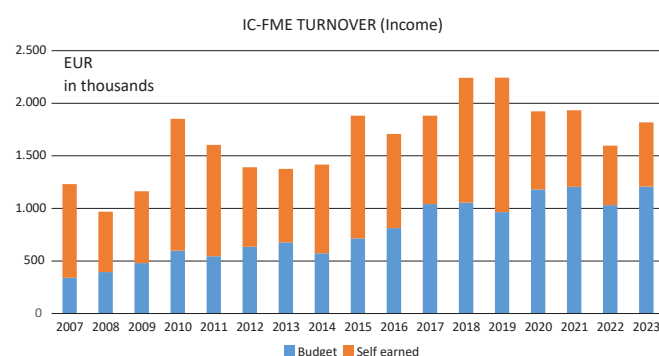


Western Balkan countries. ICFME conducted several innovation projects, and some of them include: "Development of a methodology to apply new materials for coating cables with adjustable preload force", "Development and design of multi-place hyperbaric chambers for medical applications", "Collection bin for remnants from threshing corn", "Lifting stations bypass filter and heat pump", "The development of the programming language for the 2D parametric geometric molding", "Trailer for shipping, packaging and transporting remnants", "Serbian mini winery", "XYZ nano manipulator", "3D styrodur and polystyrene slicer", "Innovation Relay Centre (IRC) Serbia - Support projected market compatibility and self-positioning as means of improving innovation", "Improving the efficiency of the combustion of biomass development of a new type crusher for briquettes", "A digital system for measuring angular velocity in hydraulic turbines in the system of automatic regulation", "Design and development of a prototype four axis numerically controlled machines for surfacing", and "ICT services to optimize resource consumption". The international project SMP-COSME-2021-EEN, Improving competitiveness of Serbian SMEs through implementation of integrated services focused on innovative capacities, digitalisation, sustainability and internationalisation, is being successfully realized by ICFME. ICFME continues with the realisation of the project HORIZON-EIE-2022-CONNECT INNO-MOB (Unlocking the Potential of Mobility Innovation Ecosystems and Networks). Recently, within the INTERREG DRP call, two projects in whose consortia ICFME participates were approved for financing, Plan-C (Moving PLastics and mMachine iNdustry towards Circularity) and CapTTict (Enhancing capacities for technology transfer, company building and innovations in the field of ICT) and their realisation has begun. As a part of

the INTERREG Adrion call, two projects were recently approved for funding: INNOVABLUE (Innovation network for development of solutions and technologies for sustainable blue economy in the Adrion region) and SMARTMOBAIR (Smart Mobility in Adriatic Ionian Region Urban Areas).



The implementation of the DigiMet project (Digitalisation of SMEs in metal processing sector), which was financed by GIZ, was successfully completed. The implementation of the project within the Programme for the Formation and Development of Innovation Incubators in Scientific and Research Organisations in Serbia, in cooperation with FME, has begun. Several accredited laboratories and centres at the ICFME worked successfully: Laboratory for thermal turbo machines - LTT, Laboratory for testing machine elements and systems - LIMES, Control and Certification Centre - accredited Control and Certification Body in the field of pressure equipment etc. Also, the Laboratory for calibration of electricity metre standards - LAB EEBEE was accredited in 2024. The Centre for rapid development of prototypes also operates within the framework of ICFME. ICFME employees are engaged in several COST actions. ICFME participates in the projects supported by the Serbian Innovation Fund and the Science Fund. Within the programmes of the Science Fund (Green and PRIZMA), ICFME currently participates in two projects. ICFME maintains a tight relationship with the industry and implements numerous projects. There are 50 researchers employed at the ICFME.





Alumni and Friends

ALUMNI - ECHO OF THE QUALITY AND IMPACT

After completing their studies, graduate and master mechanical engineers become a part of a large family of alumni gathered and organized by the Alumni Foundation of the Faculty of Mechanical Engineering in Belgrade (AFMF, Foundation).

Since its inception in 2006, the Foundation has nurtured values, promoted success and represented the interests of over 25,000 members, contributing to the development of the academic and professional community in the field of mechanical engineering. By promoting science and education as well as affirming the reputation of the University of Belgrade - Faculty of Mechanical Engineering (FME), the Foundation has achieved wider social, national, and humanitarian significance and it strives to become the most important promoter and supporter of excellence in education, research, innovation, and entrepreneurship regionally. As a non-profit organization, the AFMF focuses on its alumni and their successes. The individual successes of older alumni should inspire the younger generations and future the alumni. Bearing that in mind, the coordinators of 23 alumni clubs communicate successfully with alumni worldwide. They are representatives of the departments and all the modules studied at the FME and are dedicated to the development and functioning of their alumni clubs.

With its activities, the Foundation:

- affirms higher education and research in the field of mechanical engineering;
- improves the development of teaching and scientific human resources and increases the reputation of the profession;
- upgrades the working environment for students and teachers by modernizing the classrooms and laboratories at the Faculty of Mechanical Engineering;
- helps in the organization of professional gatherings and thematic conferences, as well as vocational visits and internships for students;
- supports and rewards young talents, future innovators and experts, but also expresses gratitude to its doyens;
- promotes the future role of the mechanical engineer to younger generations in primary and secondary education,
- fosters endowments and humanitarian aid, and
- funds the functioning and achievement of the alumni community goals.

The AFMF pays special attention to its friends, to all those who helped or contributed in any way to the success of its alumni, and



АЛУМНИ ФОНДАЦИЈА
ПАШИНСКОГ ФАКУЛТЕТА

to those who unreservedly encourage, love and support what the FME, its Foundation and all its members do to promote educational and professional values.

More about the Foundation's work and organization, as well as all its activities, can be found at <http://alumni.mas.bg.ac.rs/>.

THE AFMF MISSION

The Alumni Foundation of the Faculty of Mechanical Engineering in Belgrade fosters values, promotes success and represents the interests of its members, contributing to the development of the academic and professional community in the field of mechanical engineering. By promoting science and education and affirming the reputation of the University of Belgrade - Faculty of Mechanical Engineering, the Foundation has a wider social, national and humanitarian significance.

WE ARE PROUD OF YOUR SUCCESS!

CAREERS SUPPORT

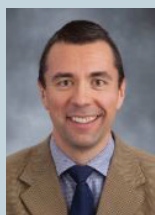
Faculty is renowned for its high graduate employment rates. Students have the opportunity, through the Alumni Network and other focused careers events, to benefit from the experience of more than 20,000 former students.

As a graduate student, you will also have free access to the Faculty's Careers resources for three years after graduation

VISITING PROFESSORS



Prof. Dr. Mihailo Jovanović
University of Southern California, Los Angeles,
USA



Prof. Dr. Stanislav Karapetrović
University of Alberta, Edmonton, Canada





Alumni of the Faculty - Members of the Serbian Academy of Sciences and Arts (SASA)

Professors - members of SASA



Vladimir V. Farmakovski

8-21/10/1880. - 5/6/1954
ffp.1920, died before retirement
Prof. in Railway Eng and Machine Design
cSASA 1947, full 18/3/1948



Slobodan Dobrosavljević

5/9/1903 - 3/4/1980
ffp.1937, ret.30/9/1970
Prof. in IC Engines
cSASA 1950, full 1961



Jakov M. Hlitičijev

1/12/1886 - 14/4/1963
ffp.14/4/1920, ret.30/9/1957/
Prof. in Mechanics and Naval Arch
full SASA 10/6/1955



Konstantin Voronjec

17-30/1/1902. - 19/10/1974.
ffp.1947, ret.30/9/1971
Prof. in Fluid Mechanics.
cSASA 30/1/1958, full 5/12/1963



Miroslav Nenadović

18/3/1904. - 21/2/1989.
ffp.1937, ret.30/9/1974
Prof. in Aeronautical Eng.
cSASA 30/1/1958, full 16/12/1965



Dimitrije Savić

29/9/1898 - 16/4/1981
ffp.1960, ret.1966
Prof. in Thermal Power Eng.
cSASA 17/12/1959, full 7/3/1968



Nikola Obradović

15/5/1900 - 7/12/1982
ffp.1924, ret.30/9/1970
Prof. in Hydro Power Eng.
cSASA 1961, full 1972



Svetopolk Pivko

29/9/1910 - 13/10/1987
ffp.1964, ret.30/9/1978/
Prof. in Mechanics.
cSASA 22/12/1961, full 1976



Dušan Veličković

1/2/1909 - 8/10/1971.
ffp.1946, died before retirement
Prof. in Fuels and Combustion
cSASA 1963



Petar Miljanić

17/8/1927 - 16/2/2015
ffp.1957, ret.30/9/1992
Prof. in Electrical Eng.
cSASA 1968, full 1976

SASA

cSASA - corresponding member
full - full member

UB-FME

ffp. - first faculty position
ret. - retirement



Nenad Zrnić

28/01/1909/ - 20/2/1991
ffp.1949, ret.30/9/1978
Prof. in Naval Arch.
cSASA 1972, full 1985



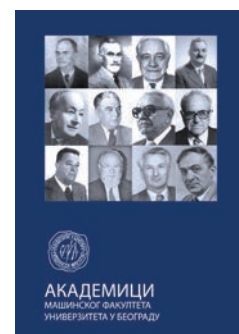
Miomir Vukobratović

26/12/1931 - 11/3/2012
ffp.1984, ret.30/9/1996
Prof. in Robotics.
cSASA 7/5/1981, full 27/10/1994



Vladan Đorđević

7/10/1938 - 15/10/2022
ffp.1962, ret.30/9/2004
Prof. in Fluid Mechanics.
cSASA 12/12/1985, full 23/10/1997



Professor of Grand Technical School

Ljubomir Klerić (Julius Klery)

29.6.1844. - 21.1/3.2.1910.
Prof. in Mechanics since 1875.
Since 24.1.1871. member of the Serbian Learned Society (1864 - 1892)
and since 5.4.1887. member of the Serbian Royal Academy (1886 - 1947)

UB-FME Graduate students - members of SASA

Professors at other universities

Dragutin Zelenović, 19.5.1928 - 27.4.2020, cSASA 29.5.1991, Uni. Novi Sad
Miloš Kojić, 24.12.1941 - , cSASA 2009, full 8.11.2018, Uni. Kragujevac
Milorad Bojić, 4.1.1951 - 22.1.2016, cSASA 2015, Uni. Kragujevac



Research - International Projects and Journal

Horizon 2020

Modelling and Optimal Design of Refractories for High Temperature Industrial Applications for a Low Carbon Society (RE-FRACTURE2)

Flexible Fossil Power Plants for the Future Energy Market through New and Advanced Turbine Technologies (FLEXTURBINE)

Novel IWT and Maritime Transport Concepts (NOVIMAR)

Eastern European twinning on Structural Integrity and Reliability of Advanced Materials Obtained through Additive Manufacturing (SIRAMM)

Demonstration of Innovative Integrated Biomass Logistics Centres for the Agro-Industry Sector in Europe (AGROinLOG)

Service contract for the provision of quantitative data on biomass availability and qualitative information on the state-of-the-art in bioeconomy in Serbia for the needs of the project "Central European leaders on bioeconomy (CELEBIO)" - Cascade funding

7th Framework Programme for Research - FP7

New Ceramic Technologies and Novel Multifunctional Ceramic Devices and Structures (CERMAT2)

Delivery of Sustainable Supply of Non-Food Biomass to Support a "Resource-Efficient" Bioeconomy in Europe (S2Biom)

Public Transportation - Accessibility for All (PubTrans4all)

Support for Realising New Member and Associate States' Potentials in Transport Research (TransNEW)

Modernisation of Vessels for Inland Waterway Freight Transport (Move It!)

Erasmus +

Extended Reality Tools to Support Learning Activities in Engineering (XREN)

Alliance for Community Engagement in European Higher Education (ACE)

Accelerating the Introduction of Decarbonised Heating and Cooling Solution (Repower Regions)

Building an Ecosystem for 21st Century Skills Education in STEM (BE21SKILLED)

Advanced Virtual and Augmented Reality Toolkit for Learning (AVATAR)

Implementation of Dual Education in Higher Education of Serbia (DualEdu)

Ministry of Science, Technological Development and Innovation - Strategic bilateral projects

Multimodal Haptic Interface for Kinesthetic and Remote Human-Robot Collaboration in Robotic Digital Twin Based on Virtual and Augmented Reality (RoboTWIN) - China

Next Generation Technology for Ubiquitous Collaborative Robotics (UbiCbot) - China

Ministry of Science, Technological Development and Innovation - bilateral projects

Application of Novel MXene 2D Materials as Lubricant Additives for Highly Loaded Contacts in Helicopter Gears (LUBE2D) - Austria

Research on New Technologies for Reducing SO₂ Emissions - China

Advanced Technologies for Controlling the Combustion Process and the Emission of Pollutants when Using Biomass and Solid Fuels Obtained from Waste - China

Coal-fired Boilers and Furnaces - Germany

Assessment and Reduction of Risks Related to the 3D Printing Technologies Used in the Automotive Industry - Slovakia

EUREKA - Ministry of Education, Science and Technological Development

Hoisting and Mining Machinery Context Specific Adaptive Risk Prevention Expert System (HAMRISK)

GIZ

Introduction of Work Integrated Learning in University Education in Serbia

European Institute of Innovation & Technology - EIT

Grain Boundaries Engineered Nd-Fe-B Permanent Magnets (RECO2MAG) - Raw Materials

Ministry of Science, Technological Development and Innovation

Innovation Incubator

Ministry of Education, Science and Technological Development

Resilience Enhancement Model (RESMOD) - SAFERA

The Central European Initiative - CEI

Innovation Vouchers scheme for resource efficiency technologies and services in Serbia - Support to the implementation and marketing of the innovation vouchers scheme in the country

Blending Science and Practice against Fuel Quality Deviations and Illegal Trade in the Serbian Energy Sector (Blend4Quality)

Integrated Waste-Oils Management System - Transfer of Best Practices for Safe, Sustainable and Eco-friendly Transport in Serbia (WASTEOLFREE)

Competitiveness and Innovation Framework Programme - CIP

Valuable EneRgY for a smart School (VERYSchool)

Balanced European Conservation Approach - ICT Services for Resource Saving in Social Housing (BECA)

Saving Energy in Europe's Public Buildings Using ICT (SMARTSPACES)

European Cooperation in Science and Technology - COST

Modular Energy Islands for Sustainability and Resilience (MODENERLANDS)

Optimising Design for Inspection (ODIN)

Focused Ion Technology for Nanomaterials (FIT4NANO)

Harnessing the Potential of Underutilized Crops to Promote Sustainable Food Production (DIVERSICROP)

European Materials Acceleration Center for Energy (EU-MACE)

Sustainable Use of Salt-Affected Lands (SUSTAIN)

BEEkeeping products valorization and biomonitoring for the SAFETY of BEEs and HONEY (BeSafeBeeHoney)

CyberPhysical Systems and Digital Twins for the Decarbonisation of Energy-Intensive Industries (CYPHER)

Smart Energy Carriers for Distributed Energy Production (SMARTCATS)

European Bank for Reconstruction and Development - EBRD

Innovation Vouchers Scheme for Resource Efficiency Technologies and Services: Programme Preparation and Definition of Possible Implementation Approaches (TCRS 1654) for Serbia

United Nations Development Programme - UNDP

Improvement of the Energy Management System to Increase Investments in Energy Efficiency of Public Buildings in Serbia

Improving Air Quality by Utilization of Advanced Fuel (Biomass Pellets) in Small-Scale Household Appliances

Climate Change and Air Quality Expert, Report on SLCs for Serbia

The Science Fund of the Republic of Serbia (Research projects)

Active Condensation Hybrid Systems in Biomass Combustion (AC-BC) - PRISMA

Forward-Looking Framework for Accelerating Households' Green Energy Transition (FF GreEN) - PRISMA

Deep Machine Learning and Swarm Intelligence-Based Optimization Algorithms for Control and Scheduling of Cyber-Physical Systems in Industry 4.0 (MISSION 4.0) - Artificial Intelligence

Support Systems for Smart, Ergonomic and Sustainable Mining Machinery Workplaces (SmartMiner) - Green Program

Improving Operational Flexibility of Decarbonized Thermal Power Plants with Energy Storage Towards Increased Renewable Sources Utilization (TPP-RSU) - Green Program

Sustainable Deployment of Biomass Catalytic Gasification Technology to Increase the Utilization of Renewable Energy in the Serbian Industry (STABILISE) - Green Program

The Science Fund of the Republic of Serbia (Knowledge exchange vouchers)

Improvement of Electric Motor Performance for Off-Road Machinery Using Integrated Sensor Systems - Diaspora

Multiphase Flows in Automotive Refrigeration Systems - Diaspora

Artificial Intelligence and Nature Inspired Optimization in the Function of Sustainable Water Management - Diaspora

Ministry of Mining and Energy

Development of Draft Hydrogen Strategy for the Republic of Serbia and Organization of Round Tables and Promotions (DECIDE)

ORGANISATIONAL STRUCTURE

- Faculty Council with its President;
- the Dean;
- Vice-deans for: teaching, finances, science and research, international cooperation;
- Heads of departments - 25;
- Heads of laboratories - 90 laboratories, 5 laboratories accredited by the Accreditation Agency of Serbia;
- Secretary General, Head of Finances, Head of Student Services, Head of Library, etc.;
- Administrative units for students, finances, building maintenance, etc.;
- Library with over 100,000 items;
- Publishing service.

STAFF (AS OF NOV. 2024)

- Full Professors 88
- Associate Professors 46
- Assistant Professors (Dozents) 27
- T&R Assistants 41

- Researchers 40
- Lab and technical personnel 40
- Administrative personnel 49
- Technical and cleaning service 64
- Restaurant 9

NUMBER OF ALUMNI

1. Dipl.Ing. (5 years of study): 20,003 (Oct.1948 - Oct. 2024)
2. Magisters (Mgr.) (2 additional years of study with thesis): 1,485 (Oct.1948 - Oct. 2024)
3. Doctorates (just defense of thesis): 791 (Oct.1948 - Oct. 2024)
-
4. Bachelors of Science: 4,911 (Oct. 2006 - Oct. 2024)
5. Masters of Science (Dipl.Ing.): 3,170 (Oct. 2006 - Oct. 2024)
6. PhDs through studies: 226 (Oct. 2006 - Oct. 2024)

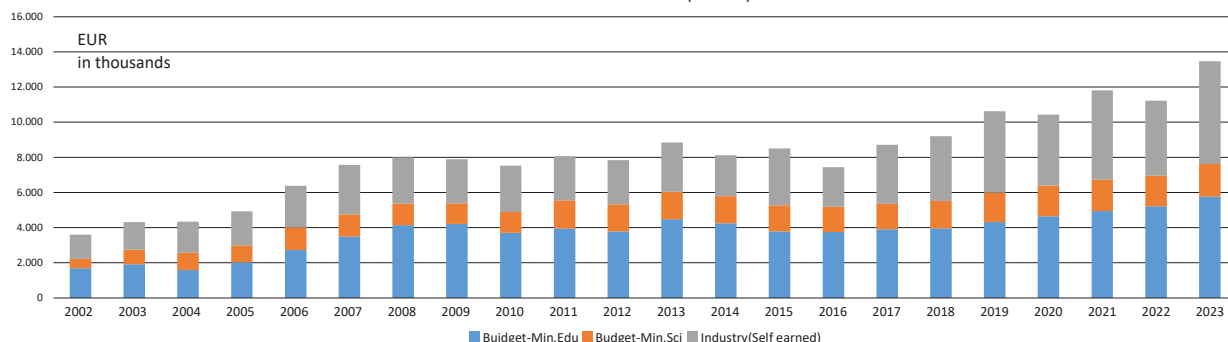
BUILDINGS

- New building 32,239 m²
- Old building 4,116 m²
- Wind tunnel building 515m²
- Building of the former heating plant 2,103 m²

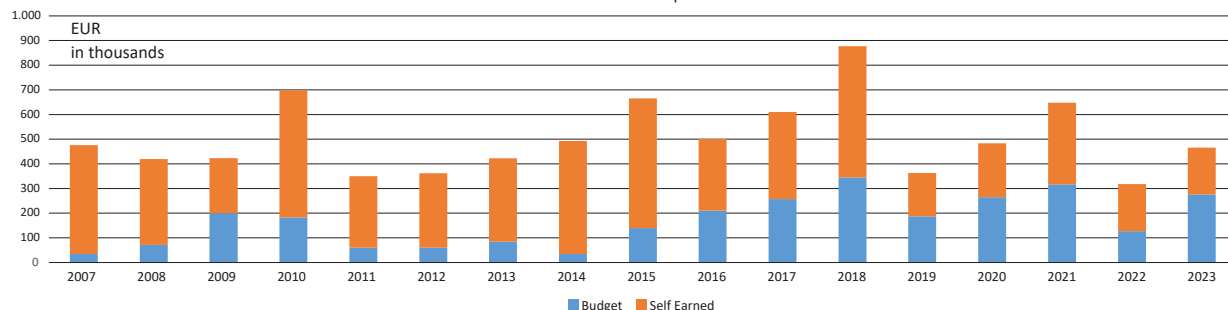
Altogether 38,973 m²

- 4 amphitheatres
- 30 lecture rooms
- 4 rooms for numerical laboratories
- 1 specialised IT room
- 30 laboratories
- 1 ceremonial room
- 4 conference rooms
- 118 offices
- 2 library reading rooms
- 2 internet alleys with free WiFi access
- student caffe, cafeteria with bakery, restaurant

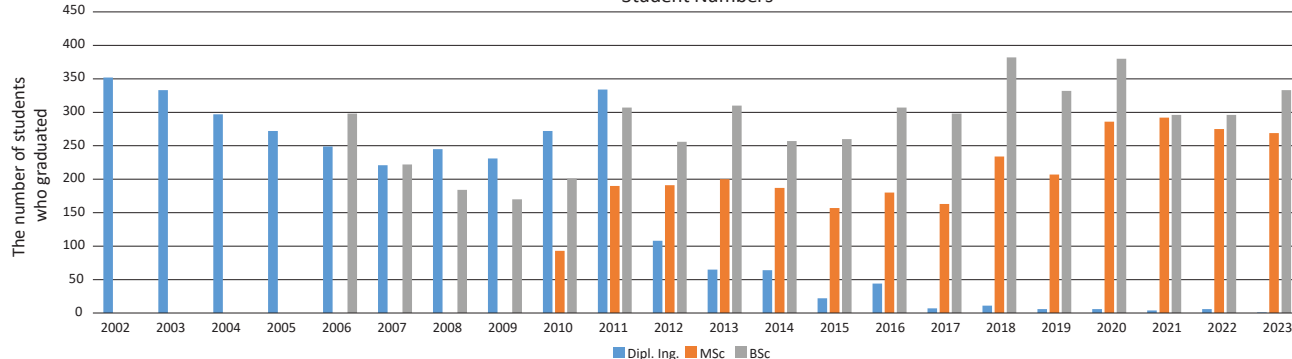
UB FME TURNOVER (Income)



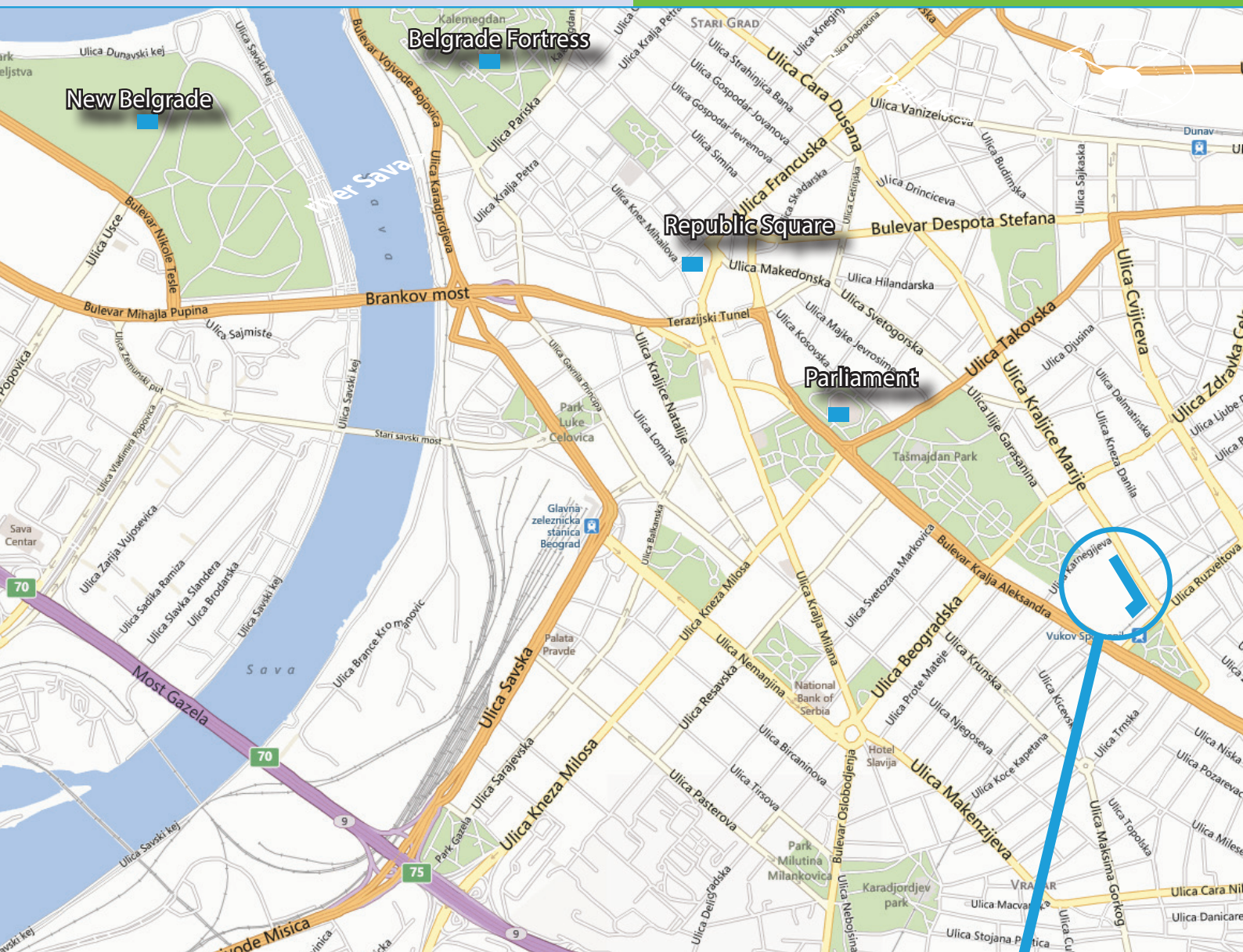
IC FME Cost of Operation



Student Numbers



After the completion of the accreditation procedure of the study programmes, the Faculty was allowed to admit the following maximal enrollment numbers for each year of studies: **720 bachelor, 451 master and 50 doctoral students.** These totals do not include visiting students.



HOW TO GET TO THE FACULTY

You can reach the Faculty building in several ways. It depends on how you will get to Belgrade.

If you arrive by:

BUS

The easiest way to get to the Faculty building from the Belgrade Bus Station is to take tram no. 7, the direction Bulevar Kralja Aleksandra

TRAIN

The easiest way to get to the Faculty building from the Belgrade Train Station is to take the trolleybus no. 40, the direction Zvezdara to the station 27. marta, and to change to the trams no. 2 or no. 5, the direction Vukov spomenik

PLANE

The easiest way is to take a taxi. Other options are:

1. to take a mini bus A1 to Slavija square which goes every 20 minutes, and then take the tram no.2, the direction Bulevar Kralja Aleksandra;
2. to take the public transport bus no.72 to Zeleni venac and after that bus no.65 to the Faculty location.

http://www.beg.aero/passengers/to_and_from_the_airport/bus_transport.326.html

Wind tunnel building

Faculty old building



Faculty building

Mechanical Engineering @ University of Belgrade

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SERBIAN EMBLEM OF ARMISTICE DAY (November 11th)



Natalie's ramonda (Lat. *Ramonda nathaliae*) – a species of flowering plant in the genus *Ramonda* that grows in the Eastern part of Serbia, scientifically described in 1884 by Royal MD Sava Petrović and Academician Jovan Cvijić, who named it after Queen Natalija Obrenović. Besides its beauty of the purple leaves, it has a magical Fenix ability to return to life from hibernation with a few drops of water, thus symbolizing the resurrection of the Serbian army and state during the WW I.



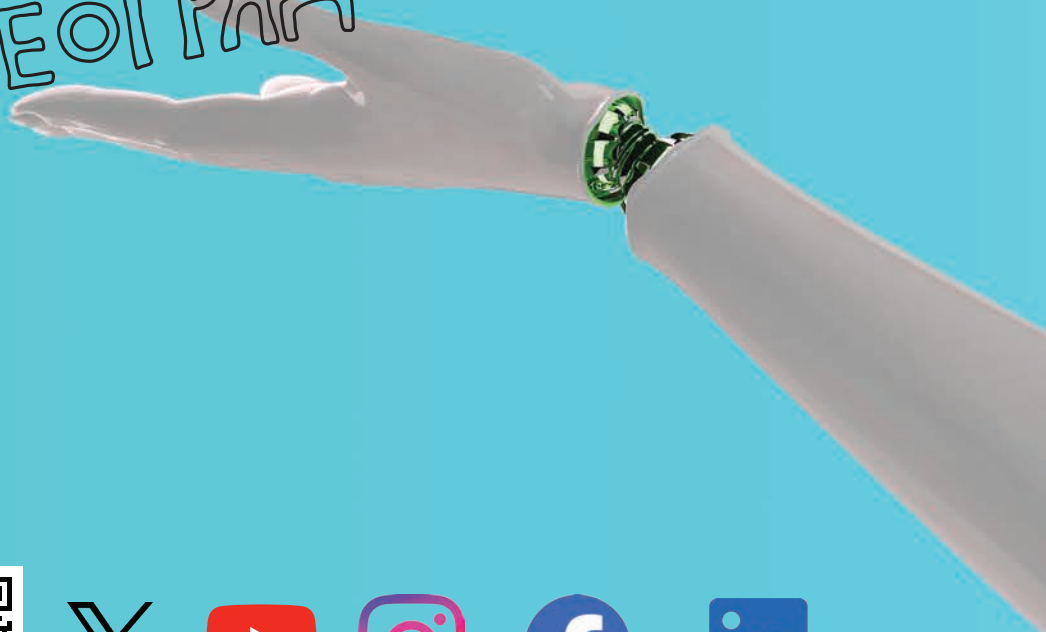
The strip (band) of the Serbian medal awarded to military personnel and civilians who retreated through Albania to the Corfu island in Greece and back to the Salonika frontier, instead the medal the strip holds ramonda in the emblem of Armistice Day.

1873 - the first subject (course) in Mechanical Engineering

1897 - Mechanical Engineering Department

1948 - Faculty of Mechanical Engineering

1873
НАУКА О
МАШИНАМА
1897 МАШИНСКО
ТЕХНИЧКИ ОДСЕК
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