



INTERNATIONAL
UNIVERSITY OF SARAJEVO

FENS
Faculty of Engineering
and Natural Sciences
International University of Sarajevo



Bachelor of Science (B.Sc.) in

GENETICS AND BIOENGINEERING

Info Catalogue

Academic Year 2025-2026

ABOUT THE GENETICS AND BIOENGINEERING STUDY PROGRAM

The **Genetics and Bioengineering (GBE)** program at the International University of Sarajevo (IUS) equips students with the knowledge and skills necessary to thrive in the rapidly evolving fields of biotechnology, genetics, and biomedical sciences. The program integrates a **strong foundation in biology, chemistry, and molecular genetics, with advanced topics in bioinformatics, genetic engineering, and medical biotechnology.** Emphasizing research, innovation, and interdisciplinary collaboration, the GBE

program prepares graduates to contribute to scientific and technological advancements in healthcare, agriculture, environmental protection, and the biotechnology industry on a global scale.

The GBE curriculum incorporates essential elements of chemistry, molecular biology, and core courses from engineering programs, preparing graduates to function effectively in **multidisciplinary research and development teams spanning academia, industry, and healthcare.**



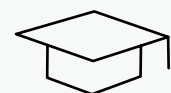
4 years, 8 semesters



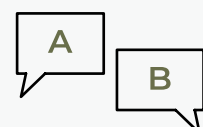
Full-time, in person



240 ETCS



Bachelor of Science (B.Sc.)
in Genetics and
Bioengineering



Language: English

Practical experience is at the heart of the program. Students engage in laboratory work, project-based learning, and compulsory industry internships to bridge theory with real-world applications.

The Research and Development Center (RDC) provides access to basic and applied research, including genetic analysis, molecular cell biology, and genetic engineering, for students.



Conducted entirely in English and embedded in a multicultural campus community, the program fosters an international outlook. Students have the opportunity to participate in **Erasmus+ and bilateral mobility programs**, as well as in **dual degree programs in cooperation with Istanbul Technical University (ITÜ) and Marmara University (MU)**.



Graduates from IUS are not only skilled engineers but also adaptable problem solvers, ethical professionals, and lifelong learners, prepared to contribute to sustainable technological and societal development.

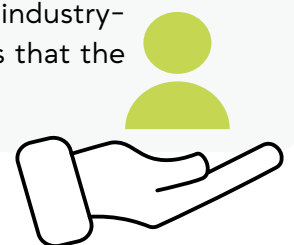
VISION AND PEDAGOGICAL APPROACH

The program aims to educate engineers who can:

- Apply principles of genetics, molecular biology, and engineering to diverse fields such as biotechnology, healthcare, agriculture, and environmental protection.
- Integrate experimental and computational approaches to solve complex biological and biomedical problems.
- Adapt to emerging biotechnological innovations and advancements in genomics, bioinformatics, and synthetic biology.
- Recognize and address the ethical, social, and biosafety implications of genetic and biotechnological research and applications.



Teaching is student-centred, emphasizing active learning, critical thinking, and problem-solving. Methods include lectures, tutorials, laboratory work, case studies, simulations, and industry-based projects. Continuous feedback from students, alumni, and industry ensures that the curriculum remains relevant and forward-looking.



Study program

EDUCATIONAL OBJECTIVES (EO)

Objectives of the Genetics and Bioengineering first cycle study program are:

EO1	Provide a strong foundation in engineering and basic sciences.
EO2	Equip students with comprehensive knowledge and hands-on experience in genetics and bioengineering.
EO3	Prepare students to conduct basic and experimental research and apply engineering and physical sciences to address medical and biological problems.
EO4	Equip students with a biological background so that they can apply engineering technologies to living systems safely and effectively.
EO5	Equip students with problem-solving skills and teamwork capabilities essential for a career in genetics and bioengineering.
EO6	Foster effective communication skills and the ability to collaborate in interdisciplinary teams.
EO7	Offer a well-rounded education that prepares students for diverse career opportunities in genetics, bioengineering, and related fields.

Study program

LEARNING OUTCOMES (LO)

Learning outcomes of the Genetics and Bioengineering first cycle study program are:

LO1	Identify, formulate, and solve biological problems by using appropriate theoretical and experimental skills (including bioinformatics and laboratory work).
LO2	Identify, classify, describe, and analyze the performance of biological systems and components through the use of analytical methods and computational techniques.
LO3	Identify constraints of engineering solutions, including environmental, social, and sustainability limitations, health and safety, and risk assessment issues.
LO4	Apply gained management experience in designing and running experiments and analyzing obtained results.
LO5	Apply knowledge and understanding to acquire practical skills for problem solving, for research tasks, and the design of protocols and procedures.
LO6	Develop an awareness of and commitment to the role of engineers in society, including their professional and ethical responsibilities.
LO7	Develop technical and professional skills for individual and team work, including coordinating the team if necessary.
LO8	Develop an area for creativity excellence through interactivity and participate in scientific events.
LO9	Recognize a need to engage in a life-long learning and the use of contemporary technological advances.

PROGRAM STRUCTURE

The structure of the regular Genetics and Bioengineering study program in the first cycle is organized as follows:

- 1. University-level courses (8 courses /39 ECTS)**
Introductory courses designed to familiarize students with the academic environment and the fundamentals of engineering.
- 2. Math and engineering-related courses (6 courses / 36 ECTS)**
Provide fundamental knowledge in key mathematical areas, serving as the basis for analytical thinking and engineering problem-solving.
- 3. Program level courses (26 courses / 153 ECTS)**
Focused on specific competencies in the field of genetic engineering.
- 4. Free elective courses (2 courses / 12 ECTS)**
Enable specialization within the program or exploration of topics from other fields.



A detailed overview of the **curricula for the GBE Study Program**, are available at gbe.ius.edu.ba

CURRICULUM HIGHLIGHTS

The Genetics and Bioengineering program provides a solid interdisciplinary foundation combining **biological sciences, chemistry, and engineering principles**. Core courses cover molecular biology, genetics, biochemistry, microbiology, bioinformatics, and cell biology, complemented by essential mathematics, physics, and computer programming courses that prepare students for **data-driven and quantitative approaches in biotechnology**. Students gain hands-on experience through laboratory courses in molecular biology, genetics, biochemistry, microbiology, and genetic engineering, where they learn essential

experimental and analytical techniques.

A wide range of elective courses in the third and fourth years allows students to specialize in areas such as bioinformatics, biomedical engineering, pharmaceutical biotechnology, and environmental biotechnology.

The program emphasizes **research and practical learning through project-based assignments, seminars, and a mandatory internship** (minimum 30 working days), ensuring students are well-prepared for careers in biotechnology, healthcare, academia, and industry, or for pursuing graduate studies in related fields.

Special Opportunities:

Dual degree programs in the natural science department

In addition, IUS offers two separate dual degree programs in Bioengineering, in the department of Natural Sciences, with Marmara University (MU) and Istanbul Technical University (ITÜ).

**For the ITÜ-IUS dual degree Bioengineering program, the first and fourth academic years of the double diploma program will be conducted at IUS and the second and third at ITÜ, based on the GBE-ITU curriculum. Preparatory English language classes are held at IUS. Graduates are awarded two separate diplomas; one issued by IUS and the other issued by Istanbul Technical University.*

**For the MU-IUS dual degree Bioengineering program, the first and second academic year of the double diploma program will be conducted at IUS, and the third and fourth years at MU, based on the GBE-MU curriculum. Preparatory English language classes are held at IUS. Graduates are awarded two separate diplomas; one issued by IUS and the other issued by Marmara University.*



Exchange Abroad

Up to two semesters worldwide through Erasmus+ mobility with funded costs.



Industry Links

Internships, real-life projects, and collaboration with partner companies.



Research Opportunities

Participation in faculty research projects and access to modern laboratories.

LABORATORY & RESEARCH FACILITIES

The Genetics and Bioengineering department belongs to the scientific area of Biology, and as such, it requires certain resources and facilities for conducting education.

The GBE program research laboratory facilities are part of the Research and Development Center (RDC), which covers an area of 1,300 square meters. Apart from GBE laboratories, the Center provides laboratories specialized in scientific fields of physics, mechatronics, electronics, telecommunications, and computer sciences. Genetics and bioengineering laboratories (GBE labs) consist of four parts, covering approximately 500 square meters. These laboratories provide state-of-the-art technical support for basic and applied research in different areas of Genetics and Bioengineering.



GBE labs consist of separate rooms, designed, furnished, and equipped with the latest instrumentation to pave the way for high-quality research at the graduate level and laboratory exercises for undergraduate students. For teaching purposes, there are classrooms and 6 laboratories, located in the Research and Development center at IUS, these laboratories are:

Student Tutorial Lab

Equipped with microscopes. Students have the opportunity to learn about microscopy and to observe numerous microscopic samples of plants, animals, and human tissues. Also, during the Lab tutorials,

Microbiology lab

A specialized lab where students are equipped to study and grow microorganisms like bacteria, fungi, and protozoa. It is equipped with tools and equipment necessary for cultivating, isolating, and identifying these microorganisms.

Cell culture lab

This lab allows the growth of diverse cell types under controlled conditions, generally outside their natural environment. It is one of the major tools used in cellular and molecular biology, which provides excellent model systems for studying the normal physiology and biochemistry of cells, cell metabolism, cell homeostasis, the effects of drugs and toxic compounds on the cells, and mutagenesis and carcinogenesis.

PCR lab

A Polymerase Chain Reaction lab is a specialized laboratory designed for performing diverse PCR methods, techniques used to amplify specific segments of DNA. PCR is a crucial method in molecular biology for replicating small amounts of DNA into larger quantities that can be analyzed or used in various applications, such as diagnostics, research, and forensic investigations.

Genetics and Molecular Biology Lab

This lab is used for Molecular Biology, Molecular Diagnostics, Genetic Engineering, Plant Proteomics, Forensics, and Biochemistry. This laboratory aims to introduce DNA, RNA, and protein extraction, quantification, and analysis.

Preparation Lab

This lab is the biggest lab, equipped with a chemical hood for the purposes of General Chemistry and Organic Chemistry lab tutorials. Also, students use the hood for RNA and DNA extraction. The lab also has a Growth Chamber, used for plant growth under controlled conditions (temperature and light).

INDUSTRY & CAREER LINKS

Our alumni are employed in diverse sectors, including the health sector, molecular diagnostic sector, pharmaceutical sector, biotech companies, bioinformatics sector, academia, and research institutions.

Partner companies and organizations provide internship placements, guest lectures, and collaborative projects.

Selected employers of IUS GBE graduates:

- **Bosnalijek pharma company** (Bosnia and Herzegovina)
- **Farmavita pharma company** (Bosnia and Herzegovina)
- **AlphaChrom biotech company** (Bosnia and Herzegovina)
- **Institute for Genetic Engineering and Biotechnology (INGEB)** (Bosnia and Herzegovina)
- **Pharmamed d.o.o.** (Bosnia and Herzegovina)
- **Maarif Schools of Sarajevo** (Bosnia and Herzegovina)
- **Royal Key Pharma** (Turkey)
- **Anatolia Geneworks** (Turkey)
- **Bahçeci Sağlık Grubu** (Turkey)
- **ARILAB** (Turkey)
- **MED-EL** (Austria)
- **Acrivon Therapeutics, Inc.** (USA)
- **Boston Genetics** (USA)

ADMISSION REQUIREMENTS:

Applicants must hold a recognized high school diploma, and admission is subject to entrance evaluation as per IUS regulations. For more information, please visit ius.edu.ba.

TEACHING AND ASSESSMENT:

- Lectures and mandatory tutorials (Hands-on Labs)
- Project-based assignments and design challenges
- Continuous assessment (quizzes, projects, presentations)
- Written examinations
- Assessment criteria are transparent and available via e-Campus. Students may appeal grades according to IUS regulations.



STUDENT SUPPORT

Each student is **assigned an advisor/mentor** who provides academic guidance and support throughout the entire study program. Additional tutoring, remedial courses, and regular office hours with faculty members are offered to help students achieve the intended learning outcomes.



STUDENTS WITH DISABILITIES

IUS supports students with disabilities through its **Support Office**, whose aim is to foster an inclusive environment. The office provides guidance and assistance to students with disabilities and works closely with staff to ensure their full participation in university life. To further support inclusion, the university has adopted guidelines for inclusion and improved campus facilities, including Braille markings for visually impaired.

STUDENT VOICE MATTERS

QUALITY ASSURANCE

At IUS, we are committed to continuously improving student academic experience. That's why we've built a strong **Internal Quality Assurance System**—and students play a key role in it! Our quality assurance system ensures that everything we do—from teaching and research to administration and community engagement—is constantly evolving for the better.

Every semester, we invite students to participate in the **Student Survey**. This is students' chance to share honest feedback about:

- Learning and Teaching effectiveness
- Course content
- Learning resources
- Overall satisfaction



Students' input is carefully analyzed and used to:

- Improve course design and delivery
- Support and develop our academic staff
- Shape strategic decisions for the future

By participating, students help us build a more **student-centered learning environment**—where their needs, ideas, and experiences truly shape the University's growth.

CAREER OPPORTUNITIES AND FURTHER STUDIES

Graduates are well-prepared for positions such as:

- Molecular biologist
- Systems engineer
- Genetic engineer
- Laboratory research scientist
- Biomedical scientist
- Bioinformatician
- Biostatistician
- Medical laboratory technologist
- Clinical research associate

They are also qualified to pursue a Master's program in Genetics and Bioengineering, Health Sciences, Biotechnology, and Computational Biology.

APPLY TODAY!

International University of Sarajevo
Faculty of Engineering and Natural Sciences

Visit apply.ius.edu.ba or
call 00 387 957 110

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