

## **MSc GBE**

### Master in Genetics and Bioengineering

*The Initial Stage of Your Aspiring Scientific Career*





## Welcome to Burch

**The best private University in BiH 4 years in a row**

The field of genetics and bioengineering is one of the fastest growing fields in science and technology. Our multidisciplinary MSc program at International Burch University is unique as it encompasses two of the confronting aspects of science and technology. Namely, within the program our students are taught theoretical principles of fundamental life sciences and at the same time real time application within the laboratory and in their fields of interest. Furthermore, our students learn how to use this data that was before just stacked in piles, as information needed to design intelligent systems based on machine learning techniques that are the foundation of the technological future.

This multidisciplinary and multiaspect approach within our MSc program enables students to develop a unique perspective and continue work and education in different fields not only in Bosnia and Herzegovina but worldwide.

## Who is right for Burch MSc GBE

The Burch GBE MSc Program is designed for individuals from different backgrounds including fundamental sciences (biology, genetics, botany), applied sciences (medicine, diagnostics, pharmacy, industry) as well as engineering/sciences who are willing to broaden their horizons, gain fundamental and practical knowledge in the field and compete with the current global trends.

This MSc program is designed for the individuals who are already part of different laboratories or industrial teams, and want to gain additional education that will aid them in their line of work. It is also for students who want to strive in their academic career and engage in scientific projects and studies.





“ Dear students, dear professors, scientists, geneticists, engineers, leaders, successful people, we are happy that you are considering spending the most exciting years of your life gathering knowledge from the field of Genetics and Bioengineering at GBE Department at the International Burch University.

Within that time, through the lectures, exams, projects and, most importantly, through the open persistent communications with your assistants (friends) and professors (mentors), you will have a chance to meet and accumulate all their knowledge and life experience which they will truthfully share with you each day, semester and year of your study. In return, all we are expecting from you is a very simple and tiny task: just give the best you can as a student! We are not asking too much, are we? Quality education...for today, for tomorrow, for all of us.

”

Dear students, on behalf of all teaching staff, I would like to wish you a warm welcome to our Master in Genetics and Bioengineering program at the Department of Genetic and Bioengineering at International Burch University.

This is an exciting place to be! We are scientists, who are actively engaged in innovative research, as well as in teaching and training of the next generation of researchers through our MSc and PhD graduate programs. We are offering our students not only education, but a scientifically stimulating and collegial environment, where students together with their Professors and Assistants carry out scientific projects in an intellectually encouraging environment and have a chance to show their accomplishments to the scientific community.

Within our department we possess high quality laboratories that support education and a wide range of research projects. The staff at our Department is involved in studies that range from molecular biology, population genetics, cancer biology, genetic disorders, microbial genetics, microbiology, to nanotechnology and other. Our department also offers a unique program from the bioengineering field where students learn how to interconnect knowledge from different sciences and apply it in real time.

Please join us on our journey of scientific discovery in the Department of Genetic and Bioengineering at International Burch University.

I wish you all the best for the coming year.

Sincerely,

Assist. Prof. Dr. Monia Avdić  
Head of GBE Department





## What makes us distinctive

Our learning and teaching methods provide high quality learning opportunities so that candidates can effectively demonstrate achievement in their courses and modules, which will be applicable later on in their field of work.

Also, mastering the art of scientific project design and following a project through - from the creation of a project idea, project design, carrying out the experiment, result interpretation to communicating the results with the scientific community.

We aim to foster the development of independent study skills, intellectual autonomy and a sense of curiosity, whilst encouraging commitment to lifelong learning and continuous professional development.

Practical sessions and mastering of new techniques within uniquely designed workshops and gaining certificates after their successful completion.

Access to world class laboratories and their usage.



## The outcomes of Burch - Master in Genetics and Bioengineering

- Skilled in advanced concepts of genetics and bioengineering necessary for success in various professional or academic endeavors.
- Prepared to pursue career choices in genetics and bioengineering, forensics, bioinformatics, biomedical fields, microbiology, or related interdisciplinary fields that require a strong background in applied sciences, engineering and laboratory experience, all of which are gained through the work on their experiments and thesis.
- Equipped with advanced problem solving skills, laboratory skills, and design skills for technical careers.
- In possession of communication and teamwork skills as well as ethical behavior necessary to thrive in their careers.
- Show an advanced level of knowledge in the field of genetics and bioengineering.
- Demonstrate an advanced level of knowledge through the merger of genetics and bioengineering with fundamental sciences as well as computer programs necessary for the bioengineering profession.
- Interpret and discuss current topics related to the field.

## Program Structure

### One program, two options

The Burch MSc Genetics and Bioengineering Program is designed for those students that want to enhance their knowledge from different courses in the field of their interest as well as develop strategic thinking in experimental design and pursue them in world class laboratories within our facilities.

In addition to the formal teaching sessions, the students will be motivated to develop their independent thinking and apply theoretical knowledge to practical work place situations.

## Compulsory Courses

### SCIENTIFIC RESEARCH METHODS IN GENETICS AND BIOENGINEERING:

This course introduces students to the art of research in natural sciences, most prominently in genetics and bioengineering. All phases of designing and performing the research, converting obtained data into meaningful results, and result presentation through scientific articles are covered during this course. At the end of semester, students are supposed to analyze original scientific articles and case studies in order to understand the difference. Active student participation and preparation of high quality presentations are of the highest importance.

### SEMINAR I and II.

This course is designed to guide students through the process of initiating a graduate project. Starting from the selection of topics and fields of interest, throughout the development of the research proposal and methodologies, this course covers all the initial stages of project development. The graduate project is the capstone requirement of a student's program, and, therefore, is normally conducted upon completion of core and specialization coursework.

Through these courses students will work within different workshops that will aid them in gaining practical knowledge in the field and gain certificates for mastering those methods.



## LIST OF COURSES: Genetics and Bioengineering

3 + 2 Program

First Semester	Second Semester	Third Semester	Four Semester
Scientific Research Methods in Genetics and Bioengineering	Elective IV	Master Thesis I	Master Thesis II
Elective I	Elective V		
Elective II	Elective VI		
Elective III	Elective VII		
Seminar I	Seminar II		

Elective Courses for <u>Field of Genetics</u>	Elective Courses <u>Field of Bioengineering</u>
Molecular Cell Biology	Cellular and Molecular Engineering
Bioterrorism	Purification Techniques of Biomolecules
Genetic Testing and Counseling	Integration of Computational and Experimental Biology
Molecular Principles of Virology	Biomedical Telemetry
Purification Techniques Of Biomolecules	GMO (Genetically Modified Organisms)
Integration Of Computational and Experimental Biology	Advanced Topics in Bioengineering
Nucleic Acid and Protein Chemistry	Advanced Topics in Bioinformatics
Genetic Markers	Systems Neurogenetics
Genetic Diversity	Pharmacogenomics and Gene Therapy
GMO (Genetically Modified Organisms)	Omics Technology
Microbial Genetics	Ethics and Public Policy in Bioengineering
Advanced Topics in Bioinformatics	Nanotechnology and Nanosensors
Cancer Biology	Laboratory Quality Management Systems
Systems Neurogenetics	Biomedical Data and Analysis
Developmental Biology	Biomedical Instrumentation and Measurement
Pharmacogenomics and Gene Therapy	Medical Imaging and Image Processing
Molecular Anthropology	Biomaterials and Artificial Organs
Stem Cells	Systems Anatomy and Physiology
Techniques in Molecular Biology	Scientific Research Methods in Biomedical Engineering
Laboratory Quality Management Systems	

# 4 + 1 Program

First Semester	Second Semester
Scientific Research Methods in Genetics and Bioengineering	Elective IV
Elective I	Elective V
Elective II	Master's Thesis
Elective III	
Seminar I	

Elective Courses for <u>Field of Genetics</u>	Elective Courses <u>Field of Bioengineering</u>
Molecular Cell Biology	Cellular and Molecular Engineering
Bioterrorism	Purification Techniques of Biomolecules
Genetic Testing and Counseling	Integration of Computational and Experimental Biology
Molecular Principles of Virology	Biomedical Telemetry
Purification Techniques Of Biomolecules	GMO (Genetically Modified Organisms)
Integration Of Computational and Experimental Biology	Advanced Topics in Bioengineering
Nucleic Acid and Protein Chemistry	Advanced Topics in Bioinformatics
Genetic Markers	Systems Neurogenetics
Genetic Diversity	Pharmacogenomics and Gene Therapy
GMO (Genetically Modified Organisms)	Omics Technology
Microbial Genetics	Ethics and Public Policy in Bioengineering
Advanced Topics in Bioinformatics	Nanotechnology and Nanosensors
Cancer Biology	Laboratory Quality Management Systems
Systems Neurogenetics	Biomedical Data and Analysis
Developmental Biology	Biomedical Instrumentation and Measurement
Pharmacogenomics and Gene Therapy	Medical Imaging and Image Processing
Molecular Anthropology	Biomaterials and Artificial Organs
Stem Cells	Systems Anatomy and Physiology
Techniques in Molecular Biology	Scientific Research Methods in Biomedical Engineering
Laboratory Quality Management Systems	



## GBE Laboratories

The Department of Genetics and Bioengineering at International Burch University established six laboratories for conducting experiments at all three study cycles:

1. Research Laboratory
2. Microbiology Research Laboratory
3. Chemistry & Bioengineering Laboratory
4. Molecular Biology and Genetics
5. Plant Growth Laboratory
6. Cell Culture Laboratory

Within our MSc program, through seminar 1 and seminar 2, students will attend different workshops led by specialists in their field including: Quorum quenching and sensing, biofilm research, DNA fingerprinting, cell culture techniques etc. After successful completion of the workshops students will get certificates for mastering the conducted techniques. Through these sessions, professors and assistants are preparing the students to be able to design and conduct experiments on their own in the future (for gaining degrees or publishing papers), as well as to acquaint them with the methodologies used in laboratories of different facilities (medical diagnostics, bioengineering etc.) and in the industry. It is important to point out that our master students use the laboratories of Genetics and Bioengineering Department to carry out their master projects guided by their mentors. Through our international collaborations it became evident that the experimental results acquired in our laboratories are of high quality and can compete with world class laboratories. Crucially, GBE Laboratories are the place where our students can witness the realization of their experimental ideas, carry out their experiments, publish their findings and show the world their capabilities.



## Enrollment and Graduation Requirements and Tuition Fees

Candidates that have completed the first cycle of study in English do not have to take any additional English examination tests. Candidates who are for the first time taking classes in English will take an English proficiency exam followed by an interview with the Head of the GBE Department.

In order to graduate, students must meet the following criteria:

- Complete all courses subject to the program
- Complete Master Project (for non-thesis program) or Master Thesis (for thesis programs)
- Complete the publication requirement for thesis programs

Tuition fee for Master in Genetics and Bioengineering is 6,000 KM per academic year for 3+2 and 4+1 programs.

## Admission

Candidates seeking admission to the BURCH MSc Program of Genetics and Bioengineering should present a bachelor's degree or equivalent from a recognized educational institution. All candidates must have a proficiency in use of English language, spoken and written. The final decision concerning the acceptance into the program rests with BURCH faculty management.



## How to Apply?

Applicants must provide the following documentation:

- 4 x Photos
- Bachelor / Master Diploma
- Bachelor / Master Transcript
- Medical Report (must be obtained in BiH)
- Citizenship Certificate
- Birth Certificate

For more information regarding the application please check our website at [mgbe.ibu.edu.ba](http://mgbe.ibu.edu.ba) or send the email to [almir.badnjevic@ibu.edu.ba](mailto:almir.badnjevic@ibu.edu.ba)

## Contact Us

We can help you with your decision

Head of Department of Genetics and Bioengineering  
Assist. Prof. Dr. Monia Avdić  
e-mail: [monia.avdic@ibu.edu.ba](mailto:monia.avdic@ibu.edu.ba)  
Office phone: +387 (0)33 944 482

Faculty Secretary  
Anesa Jabučar  
e-mail: [anesa.jabucar@ibu.edu.ba](mailto:anesa.jabucar@ibu.edu.ba)  
Office phone: +387 (0)33 944 502





## Department of Genetics and Bioengineering

Head of Department of Genetics and Bioengineering

Assist. Prof. Dr. Monia Avdić

e-mail: [monia.avdic@ibu.edu.ba](mailto:monia.avdic@ibu.edu.ba)

Office phone: +387 (0)33 944 482

Faculty Secretary

Anesa Jabučar

e-mail: [anesa.jabucar@ibu.edu.ba](mailto:anesa.jabucar@ibu.edu.ba)

Office phone: +387 (0)33 944 502