

The Mission of Doctoral School of Biological Sciences

The mission of the Doctoral School of Biological Sciences (DSBS) is to conduct, organize, manage and supervise scientific training (teaching and research), as well as the doctoral degree and habilitation process, in the basic and applied research areas of biology from the molecular to the supra-individual level.

The quality of doctoral training at the DSBS is primarily reflected in the scientific performance of its doctoral students and supervisors. Therefore, the publication requirements of DSBS have been established according to the criteria of the internationally recognized standard for doctoral education in biology. Additionally, to ensure the quality of the school's operations, the habilitation process in the disciplinary areas of the Doctoral School of Biological Sciences follows the concept of the requirements of the Hungarian Academy of Sciences in its habilitation procedures.

Doctoral programs of DSBS

The DSBS is currently organized around the following four doctoral programs:

- Fundamentals of Agricultural Biotechnology (head of program: Prof. István Papp DSc)
- Microbiology (head of program: Prof. Katalin Posta DSc)
- Plant Ecology, Ecophysiology (head of program: Prof. Zoltán Nagy DSc)
- Zoology, Animal Ecology (head of program: Prof. Péter István Nagy DSc)

The research topics also indicate the current main training profile of the Doctoral School of Biological Sciences, which we intend to gradually broaden in the future.

Fundamentals of Agricultural Biotechnology:

Relationship between enzyme structure and function, regulation of proteolytic enzyme activity. Molecular genetics of nitrogen fixation. Applied developmental genetics. Gene regulation. Site-specific recombination. Genetic mapping and markers. Transgenic and genetically engineered organisms in agriculture, their environmental and health risks. Bioremediation. Bioenergy production from plant sources. Basics of biotechnological processes based on tissue culture and fermentation. Molecular biology of production and effects of bioactive compounds. Molecular mechanisms of stress responses. Postharvest biotechnology.

Microbiology:

Diversity of soil and gut microorganisms and their involvement in biotic and abiotic stress responses. Isolation and characterization of microorganism with ecological and practical importance. Environmental microbiology regarding climate change and antibiotic resistance. Genomic studies on microbial populations and isolated microorganism. Investigating the effects of organic and inorganic compounds on microorganisms and their communities.

Plant Ecology-Ecophysiology:

Vegetation dynamics, community organization, succession, degradation. Plant taxonomy, floristics, plant geography and botanical conservation. Production ecology of agricultural systems, coupling of carbon, water and N-cycles. Greenhouse-gas emission of agricultural systems. Global climate change and environmental problems, plant stress physiology, plant ecophysiology.

Zoology, Animal Ecology:

Zootaxonomy, systematics basics, faunistics and zoogeography. Taxonomy of invertebrate groups. Population ecology of animals, population dynamics. Population interactions. Synzooology with special emphasis on community organisation and biogeochemical cycles. Zoological-animal ecology of global environmental problems, agriculture, conservation, ecology and ecotoxicology.

Structure of the Doctoral Program

The doctoral school regulates academic obligations as follows:

The PhD program consists of **8 semesters**, during which students must complete **240 credits**. Full-time doctoral students must complete the DSBS-approved courses (C-type) during the first two years of their studies. By the time of the **mid-term exam** (end of 4th semester), each student must have accumulated at least **90 credits**, and by the end of the program, a total of **240 credits** must be obtained, along with passing the required exams. Generally, 1 academic hour per week = 2 credits, except for the Publication course, where the credit value is determined by the publication point table (below). Students can register for courses announced in the **NEPTUN** system for a given semester.

Types of Courses for Doctoral Students

1. Type A (research) courses: These are mandatory for all doctoral students. As the primary goal is to train researchers, most of the required credits must be earned through this course type. DSBS's only Type A course is "Supervised Research", which must be taken every semester. The supervisor is responsible for announcing this course.
2. Type B (compulsory subjects) courses: DSBS does not impose specific requirements due to the broad research spectrum therefore no B-type courses are announced.
3. Type C (elective, teaching and education) courses: These are elective courses, but students must take some to reach the 240-credit requirement. Doctoral students may also enroll in PhD courses from other doctoral schools, subject to approval. BSc and MSc courses can be taken, but no credits are awarded for them. With the supervisor's permission, doctoral students can participate in teaching activities, earning a maximum of 45 credits over 8 semesters.

Mid-term (complex) exam

Doctoral students must take a mid-term exam at the end of the 4th semester, in accordance with the Doctoral Rules of MATE.

Exam Topics by doctoral program

- Fundamentals of Agricultural Biotechnology:
 - Plant Biotechnology,
 - Plant Molecular Biology.
- Microbiology:
 - Soil and gut microbiology,
 - Microbial stress responses,
 - Genomic studies on microorganisms,
 - Environmental microbiology,

- Microorganism with ecological and practical importance,
- Microorganisms regarding biotic and abiotic stress.
- Plant Ecology and Ecophysiology:
 - Plant Science (cell biology, histology, organology, physiology, systematics, phytosociology, phytogeography),
 - Plant Ecology.
- Zoology and Animal Ecology:
 - Zoology,
 - Animal Ecology.

For individual applicants, eligibility for the doctoral degree procedure is decided by the Doctoral School Council, based on the applicant's scientific and educational performance.

Publication Requirements

To obtain the PhD degree, the Biological Sciences Doctoral School sets the following minimum publication requirements:

- **One first-author paper in a Q1-Q3 level journal + one co-authored IF paper,**
OR
- **One first-author paper in a D1 level journal.**

If the doctoral candidate wishes to submit a thesis-based dissertation (short dissertation), one must have **three IF papers as the first or last author**, with at least **one paper published in a Q1 journal and none ranked below Q3**.

In the case of shared first authorship in a D1 or Q1 journal, the Doctoral School Council decides on acceptance. Otherwise, shared first authorship counts as 0.5, meaning two papers are required to meet the minimum.

The Doctoral School Council follows the Hungarian Academy of Sciences' recommendations regarding predatory journals and does not accept papers published in journals classified as "0" on the Norwegian List ([link](#)). The list of questionable journals is available on MTMT ([link](#)).

Courses of the Doctoral School of Biological Sciences
For course announcement please contact the lecturer

Type	Course	Lecturer	lec.	pr.	total credit
A	Supervised Research 1-8	supervisor	0	8	24
C	Oktatás 1-8	supervisor	max. 45/8 félév.		
C	Scientific Activity 1-8	supervisor	See table below		
C	Actual problems of molecular biology and physiology in Horticulture	István Papp Papp.Istvan@uni-mate.hu	2	2	8
C	Agro-Arachnology	Ferenc Tóth ferenc.toth@biokutatas.hu	2	2	8
C	An introduction to data analysis using R	Fóti Szilvia Foti.Szilvia@uni-mate.hu	2	2	8
C	Applied lichenology	Farkas Edit farkas.edit@okologia.mta.hu	2	2	8
C	Archeobotany and basics of tree-ring research	Dénes Saláta, Ákos Pető Salata.Denes@uni-mate.hu	1	3	8
C	Bash Scripting for Bioinformatics:	Endre Barta barta.endre@uni-mate.hu	1	2	6
C	Bioinformatics and Functional Genomics:	Endre Barta barta.endre@uni-mate.hu	2	2	8
C	Chapters in Plant Biology	Marianna Marschall marschall.marianna@uni-eszterhazy.hu	2	2	8
C	Conservation biology of lichens	Farkas Edit farkas.edit@okologia.mta.hu	1	1	4
C	Crop ecology	Zoltán Nagy nagy.zoltan@uni-mate.hu	2	2	8
C	Earth observation and geoinformatics in water and environmental management	Zoltán Vekerdy Vekerdy.Zoltan@uni-mate.hu	2	2	8
C	Earth observation models in the monitoring of environmental processes	Zoltán Vekerdy Vekerdy.Zoltan@uni-mate.hu	2	2	8
C	Ecology and Conservation of Bees	Miklós Sárospataki sarospataki.miklos@uni-mate.hu	2	2	8
C	Electrically sensed plant characteristics and responses to soil and environmental effects	Kálmán Rajkai rajkai.kalman@atk.hu	1	1	4
C	Establishment and function of symbiotic nitrogen fixation (SNF) between legumes and rhizobia	Péter Kaló kalopeter@uni-mate.hu	2	2	8
C	Food webs in agroecosystems	Ferenc Tóth ferenc.toth@biokutatas.hu	2	2	8

C	Freshwater fishes and their conservation	Péter Sály saly.peter@ecolres.hu	2	1	6
C	Introduction to the biology of spiders	Róbert Gallé galle.robert@ecolres.hu	3	1	8
C	Lichen chemistry I	Farkas Edit farkas.edit@okologia.mta.hu	4	2	12
C	Lichen chemistry II	Farkas Edit farkas.edit@okologia.mta.hu	4	2	12
C	Lichen ecology	Farkas Edit farkas.edit@okologia.mta.hu	2	2	8
C	Lichenology I.	Edit Farkas farkas.edit@okologia.mta.hu	2	2	8
C	Lichenology II.	Edit Farkas farkas.edit@okologia.mta.hu	2	2	8
C	Mobile Genetic Elements	Ferenc Olasz Olasz.Ferenc@uni-mate.hu	2	2	8
C	Modern Bioinformatics	Endre Barta barta.endre@uni-mate.hu	1	2	6
C	Molecular genetic methods in lichenology	Farkas Edit farkas.edit@okologia.mta.hu	3	2	10
C	Morphology and Ecology of Mycorrhizae	Zoltán Bratek bratek@caesar.elte.hu	2	2	8
C	Mycorrhizal fungi	Katalin Andrea Posta Posta.Katalin@uni-mate.hu	2	2	8
C	Plant ecophysiology	Zoltán Nagy nagy.zoltan@uni-mate.hu	2	2	8
C	Plant Regulatory Small RNAs	Éva Várallyay varallyay.eva@abc.naik.hu	2	2	8
C	Progress in the systematics of parmelioid lichens	Farkas Edit farkas.edit@okologia.mta.hu	4	2	12
C	Research Methodology	Miklós Mézes Mezes.Miklos@uni-mate.hu	2	2	8
C	Quantitative methods in plant population biology	Anna Mária Csergő Csergo.Anna.Maria@uni-mate.hu	2	2	8
C	Simulation modeling in ecology	Péter Sály saly.peter@ecolres.hu	2	1	6
C	Simulation of ecological processes	Zoltán Nagy nagy.zoltan@uni-mate.hu	2	2	8
C	Tropical botany	Andrea Sass-Gyarmati sass.gyarmati.andrea@uni-eszterhazy.hu	2	2	8
C	Viral Genetics and Virus Diagnostics	Éva Várallyay varallyay.eva@abc.naik.hu	2	2	8

Scientific activity	credit
1. Publications and citations	
Autorship in scientific papers:	
D1 paper	25
Q1 paper	24
Q2 paper	22
Q3, Q4 paper	20
SCI registered paper, no IF	10
peer-reviewed, not SCI registered	5
Conference proceeding:	
International	5
Hungarian	2
Conference participation (oral, poster):	
International	2
Hungarian	1
Scientific book, chapter, editing:	
Book, international publisher	20
Book, Hungarian	10
Book chapter, international	5
Book chapter, Hungarian	2
Book editing, international	10
Book editing, Hungarian	5
Patent:	
in Hungary	10
abroad	20
Citations (independent):	
Hungarian	1
international	2
2. Other works:	
Know-how	10
3. Research projects:	
PI of international research project	5
PI of Hungarian research project	2
international research assignment	3
Hungarian research assignment	2
4. Supervising:	
Thesis supervisor	4
TDK (student research) supervisor	5
5. Other activities	
Editor of Hungarian paper	5
Editor of international paper	10
Official of Hungarian scientific association	2
Official of international scientific association	5