
Diplomirani mikrobiolog (un)/diplomirana mikrobiologinja (un)

Selected qualifications

Name of qualification	Diplomirani mikrobiolog (un)/diplomirana mikrobiologinja (un)
Translated title (no legal status)	Bachelor of Science in microbiology
Type of qualification	Diploma prve stopnje (UN)
Category of qualification	Izobrazba
Type of education	Academic bachelor's education
Duration	3 years
Credits	180 credits

Admission requirements

- Matura or
- vocational matura in any secondary school programme and an examination in the matura subject of Biology; if the candidate has already passed this subject in the vocational matura, an examination in any other matura subject; the selected subject may not be a subject which the candidate has already taken in the vocational matura; or
- school-leaving examination (prior to 1 June 1995) under any four-year secondary school programme.

ISCED field

Field
Naravoslovje, matematika in statistika

ISCED subfield

subfield biologija

Qualification level

SQF 7
EQF 6
First level

Learning outcomes

The qualification holder will be able to:

(general competences)

- demonstrate insight into the basics of natural science,
- demonstrate mastery of the field of microbiology and understanding of the importance and role of microorganisms in the natural environment, medicine and biotechnology,
- postulate, understand and creatively address problems, principles and theories,
- think critically, analytically and synthetically,
- work in an interdisciplinary manner and apply scientific methods,
- accept new developments,
- develop professional and ethical responsibility,
- demonstrate functional literacy within their field of expertise and numerical literacy,
- use technical language,
- use information and communication technologies,
- pursue own learning in the professional field,
- demonstrate mastery of technical and manual skills for laboratory work,
- demonstrate familiarity with good laboratory practice – work safely in a microbiology laboratory,
- show professional ethical responsibility,

(subject-specific competences)

- demonstrate knowledge of the characteristic structures of microbial cells, identify them by name and demonstrate understanding of their function,
- demonstrate knowledge of the basic structure and functioning of multicellular organisms,
- demonstrate understanding of the key molecules and macromolecules of living organisms, and of their role and functioning,

- demonstrate understanding of the principles of energy metabolism and biosynthesis in microbial cells, the principles of regulation at the level of gene transcription and translation, and the activities of proteins/enzymes,
- demonstrate understanding of the principles of cell division and knowledge of the basic principles of microbial population growth and death,
- demonstrate knowledge of the basic structure of viruses and key groups of viruses and understanding of their functioning,
- demonstrate knowledge of the basic principles of the taxonomy and basic characteristics of microbial groups,
- demonstrate knowledge of the basic characteristics of key pathogenic bacteria, fungi and parasites and the diseases they cause,
- demonstrate knowledge of the basic mechanisms of the pathogenesis of microorganisms and the operation of important toxins produced by them,
- demonstrate knowledge of the functioning of key microbial groups in the environment and understanding of their importance for the circulation of matter in the natural environment,
- demonstrate knowledge of the interactions of microorganisms with other microorganisms, plants and animals,
- demonstrate knowledge of the role of biofilms,
- demonstrate knowledge of the basic laws of microbial ecological organisation,
- demonstrate knowledge of the physical and chemical principles of limitation of growth of microorganisms,
- demonstrate knowledge of the role of microbes in the decomposition and synthesis of compounds in the natural environment,
- demonstrate knowledge of the basic mechanisms of elimination of xenobiotics from the environment, the principles of operation of treatment plants, some key industrial microorganisms in biotechnology and the main bioprocesses in biotechnology,
- demonstrate understanding of the functioning of the human immune system,
- demonstrate knowledge of basic mathematical tools,
- demonstrate knowledge of the biophysical laws of life and of the key principles of thermodynamics,
- demonstrate knowledge of the basics of metrology,
- demonstrate knowledge of legal principles regarding safe lab work,
- use aseptic techniques in microbiology,
- prepare culture mediums and cultivate well-studied aerobic and anaerobic microbes in standard and selective culture mediums,
- store and conserve microorganisms and microbiological samples,
- use an optical microscope and some contrasting colourings,
- quantitatively evaluate the growth of a pure culture in closed and open systems,
- isolate microorganisms from samples,
- demonstrate knowledge of the principles of taxonomic classification of pure microbial cultures and define them phylogenetically,
- carry out the enzyme tests covered by the programme,
- demonstrate mastery of the basic principles of operation and the use of analytical methods in microbiology (e.g. chromatography, biosensors),
- use gel electrophoresis, isolate nucleic acids from a microbial culture, introduce certain vectors to standard working organisms,
- carry out mutagenesis using UV irradiation and chemical agents,
- use a polymerase chain reaction,
- use basic molecular cloning technique and analyse the genome of microorganisms,
- apply basic immunological techniques,
- carry out certain basic diagnostic tests with applications in medical microbiology,
- carry out basic physical and chemical analysis of the environment (pH, temperature, ionic strength, salinity, determination of concentrations of ions such as ammonium, nitrate, phosphate),
- identify the products of microbial metabolism,

- use various techniques to monitor microbial processes in environmental samples,
- determine the potential for microbially significant environmental processes such as nitrification, denitrification, nitrogen fixation, sulphate reduction,
- control the speed of growth of microorganisms,
- prepare an antibiogram and use antimicrobial agents in an experiment,
- estimate the quantity of microbial biomass in samples,
- prepare chemically defined solutions,
- use chemical arithmetic,
- use basic statistical tools,
- work safely in a microbiology laboratory,
- find important information in technical literature available online,
- use basic bioinformatic tools and databases in microbiology.

Assessment and completion

Students' knowledge is assessed by means of practical exercises and seminar papers, and also via products, projects, performances, services, etc. and by examinations. Examination performance is graded as follows: 10 (excellent); 9 (very good: above-average knowledge but with some mistakes); 8 (very good: solid results); 7 (good); 6 (adequate: knowledge satisfies minimum criteria); 5–1 (inadequate). In order to pass an examination, a candidate must achieve a grade between adequate (6) and excellent (10).

Progression

Students may enrol in the next year if by the end of the academic year they have completed all course units prescribed by syllabuses and accumulated at least 60 credits in the previous year.

Transitions

Second-cycle master's study programmes (SQF level 8)

Condition for obtaining certificate

In order to complete the programme, students must complete all prescribed course units, for a total of 180 credits.

Awarding body

University of Ljubljana, Faculty of Bioengineering

URL

<http://www.bf.uni-lj.si/en/>
