

Course Specifications

Valid as from the academic year 2019-2020

Course size (nominal values; actual values may depend on programme)

Credits 5.0 Study time 150 h Contact hrs 60.0 h

Course offerings and teaching methods in academic year 2019-2020

A (semester 1)	English	lecture	30.0 h
		practicum	30.0 h

Lecturers in academic year 2019-2020

Magez, Stefan	KR01	lecturer-in-charge
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Offered in the following programmes in 2019-2020

	crdts	offering
Bachelor of Science in Environmental Technology	5	A
Bachelor of Science in Food Technology	5	A
Bachelor of Science in Molecular Biotechnology	5	A
Joint Section Bachelor of Science in Environmental Technology, Food Technology and Molecular Biotechnology	5	A

Teaching languages

English

Keywords

Biochemistry, Metabolism, Enzyme, Protein, Lipid, Carbohydrate

Position of the course

The basic concepts of the metabolic processes in the cell are studied. The most important biochemical cycles and enzymatic processes are described, as well as the regulation of the different pathways. This course is meant to provide the student with a sufficient insight in bio-energetics and intermediary metabolism.

Contents

1. General concepts of biochemical reactions and energy flows
2. Building blocks and structure of proteins, carbohydrates lipids
3. Signaling over lipid membranes
4. Function of enzymes
5. Introduction to metabolism
6. Glycolysis, gluconeogenesis and glycogen metabolism
7. Citric acid cycle, pentose phosphate pathway and oxidative phosphorylation
8. Basics of amino acid and nucleotide metabolism.
9. Biochemistry of signal transduction

Initial competences

The content of the courses General Biology and Microbiology are considered initial competences for this course. Competences acquired in Organic Chemistry 1 are crucial as well.

Final competences

- 1 The student understands the basic principles in metabolism and the links between different metabolic pathways. The student can use the gained knowledge to solve problems related to the course contents.
The student will:
 - be aware of the basics of structures of amino acids, nucleic acids, DNA, RNA, proteins, lipids, carbohydrates and more complex biological molecules such as enzymes
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- 2 - understand how structures of biological molecules are important for their function

- 3 - know the basic formulas to calculate energy values for basic biochemical reactions as well as the pH for biochemical relevant environments
- 4 - be able to discuss the critical biochemical components of various food components and place this in the context of beneficial or detrimental dietary effects
- 5 - understand the basic principles of signal transduction and trans membrane transport and will be able to discuss the difference between these processes
- 6 - be able to assess basic scientific concepts in the field of biochemistry
- 7 - be aware of basic biochemical assays used to study metabolisms of various organisms
- 8 - adopt a positive attitude towards independent and life-long learning
- 9 - show social and communicative competencies in an international multicultural context
- 10 - be able to communicate via an English oral discussion
- 11 - be aware of public debates in the context of biochemical compositions of processed foods
- 12 - be aware of the complementarity of biochemistry, genetics and other biological sciences in the study of human evolution and biological evolution in general

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, practicum

Learning materials and price

Learning material is provided as PowerPoint presentation and movies explaining basic principles that are both available on Minerva. An education Biochemistry textbook is strictly followed with respect to content. It is being advised to purchase the reference book, as it is a work that covers the basic principles that supporting various other courses throughout the curriculum.

References

Berg, Tymoczko, Stryer. Biochemistry (7th or 8th Edition) W.H. Freeman and Company - NY

Course content-related study coaching

Practical courses are designed to directly support the biochemical principles outlined in the course (participation in the latter is obligatory).

Evaluation methods

end-of-term evaluation

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Extra information on the examination methods

Participation in the practical courses is obligatory. The final exam will have open questions that directly relate to the experiments performed during the practical course

Calculation of the examination mark

Written examination with open questions related to the lecture course material – 85%
Active participation in practical courses + written examination with open questions related to the practical course experiments – 15%