Course Specifications
Valid in the academic year 2018-2019

Course
Biochemistry (O000016)

Valid in the academic year 2018-2019

Course offerings and teaching methods in academic year 2018-2019

A (semester 1) English practicum 30.0 h

Lecture 30.0 h

Offered in the following programmes in 2018-2019

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
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
- understand how structures of biological molecules are important for their function
- know the basic formulas to calculate energy values for basic biochemical reactions as
well as the pH for biochemical relevant environments
- be able to discuss the critical biochemical components of various food components
and place this in the context of beneficial or detrimental dietary effects
- understand the basic principles of signal transduction and trans membrane transport
and will be able to discuss the difference between these processes
- be able to assess basic scientific concepts in the field of biochemistry
- be aware of basic biochemical assays used to study metabolisms of various
organisms
- adopt a positive attitude towards independent and life-long learning
- show social and communicative competencies in an international multicultural context
- be able to communicate via an English oral discussion
- be aware of public debates in the context of biochemical compositions of processed
foods
- 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
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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 and continuous assessment

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
Written examination with open questions

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 - 90%
Active participation in practical courses + written examination with open questions
related to the practical course experiments - 10%