# COURSE DESCRIPTION CARD - SYLLABUS

Course name
Biochemistry [S1Bioinf1>BIOCHEM]

## Course

Field of study
Bioinformatics

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

## Number of hours

Lecture
30

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

## Number of credit points

4,00

## Coordinators

dr hab. inż. Anna Parus
anna.parus@put.poznan.pl

## Lecturers

dr hab. inż. Anna Parus
anna.parus@put.poznan.pl

dr inż. Katarzyna Adamska
katarzyna.adamska@put.poznan.pl

## Prerequisites

The student should have basic knowledge of physics, chemistry and biology concerning thermodynamics, electrochemistry, structure, properties of chemical compounds and ha ve the ability to work in a chemical laboratory.

## Course objective

The course aims to obtain knowledge about the structure and function of basic biological macromolecules (proteins, nucleic acids, lipids, carbohydrates). To get to know the basic metabolic pathways and the mechanisms of their regulation. To lay the foundations for a better understanding of the major subjects, and to learn basic laboratory techniques used in biochemical research.

## Course-related learning outcomes

Knowledge:
- The students has a basic biological phenomena and processes, and their interpretation is based on

empirical grounds, using mathematical methods, including statistical and machine learning (K_W01)
- The student has a basic knowledge enabling the description of chemical and biochemical processes - (K_W04)
- The students knows the cell structure and functions of cell structures, biochemical basis of metabolic pathways (K_W06)
- The student knows the chemical structure, properties of bioactive compounds (K_W08)

Skills:
- acquire information from literature, databases and other properly selected sources, also in English (K_U01)
- use basic laboratory techniques in synthesis, isolation and purification of chemical compounds, including bio-molecules and biologically active compounds (K_U03)
- apply analytical, simulation and experimental methods to formulating and solving research tasks under the supervision of a tutor (K_U07)

Social competences:
- lifelong learning and improving one"s competences (K_K01)
- cooperate and work in a group, taking various roles in it (K_K02)
- take responsibility for own and others work safety; take appropriate actions in case of emergency (K_K06)

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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The knowledge acquired in the lecture is verified during the exam at the end of the semester. The exam is conducted in written form containing open and closed questions. Pass mark: 50% of the points. The pass mark:
50% of the points.
Knowledge acquired during the laboratory classes is verified on the basis of the student"s oral responses, student activity during the classes as well as written partial tests. At the end of each laboratory session the student is obliged to make a written report on the performed exercise. The pass mark: 50% of the points.

## Programme content

Lectures:
Discussion of topics related to:
1. Structure and properties of proteins and amino acids, lipids, carbohydrates, nucleic acids, enzymes and coenzymes, steroids and carotenoids and vitamins.
2. Major catabolic pathways - glycolysis, Krebs cycle, respiratory chain.
3. Examples of anabolic pathways.
4. Stages of biological oxidation of carbohydrates, lipids and fatty acids.
5. Integration and regulation of metabolism.
6. Biochemistry of selected physiological processes.

Topics of laboratory exercises:
1. Properties of amino acids.
2. Analysis of proteins.
3. Isolation and qualitative and identification of saccharides and polysaccharides.
4. Examination of nucleic acids components.
5. Determination of the properties of lipids.

## Course topics

Covers the characterisation and analysis of chemical compounds found in organisms and the basic biochemical processes these compounds undergo during their life cycle.

## Teaching methods

1. Lecture with a multimedia presentation, discussion with students, laboratory classes.

2. Lcaboratory exercises: completion of practical exercises in accordance with the course plan and a written report including the recording of relevant chemical reactions together with mathematical calculations and observations.

## Bibliography

Basic
1. Murray R.K., Granner D.K., Mayes P.A., Rodwell V.W.: Biochemia Harpera PZWL.
2. Berg J.M., Tymoczko J.L., Stryer L.: Biochemia, PWN, Warszawa.
3. Cichocki M. Biochemiczne i molekularne podstawy biotransformacji ksenobiotyków. WN UMP 2015
Additional
1. Kączkowski J.: Podstawy biochemii, PWN, Warszawa.
2. Hames B.D., Hooper N.M., Houghton J.D.: Biochemia - krótkie wykłady, PWN, Warszawa.

## Breakdown of average student's workload

| | Hours | ECTS |
|---|---|---|
| Total workload | 100 | 4,00 |
| Classes requiring direct contact with the teacher | 45 | 2,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 55 | 2,00 |