

## SYLLABUS

Name: **Elective subject - Basics of vital processes (BioAIS-BF>SMs1BVp3F)**

Name in Polish:

Name in English: **Elective subject - Basics of vital processes**

### Information on course:

Course offered by department: Faculty of Energy and Environmental Engineering

Course for department: Silesian University of Technology

Term: Summer semester 2021/2022

Cordinator of course edition: Dr inż. Marcelina Jureczko

### Default type of course examination report:

ZAL

### Language:

English

### Short description:

The subject presents the basics of the life processes of plant organisms, animals and microorganisms and aims to supplement and align knowledge level from biology.

### Description:

The aim of the subject is to present the basics of the life processes of plant, animal organisms and microorganisms at the molecular, cellular, tissue and physiological levels. Biochemical and molecular foundations of life processes, necessary for the work of a biotechnology engineer, are presented. Classes are aimed at supplementing and aligning knowledge level with biological objects.

### Bibliography:

Idra Pearl Solomon, Diana W. Martin, Berg, Claude Alvin Vilee Jr., Biology, 1994 i nowsze

actual scientific articles

### Learning outcomes:

Student has the enhanced knowledge necessary to understand the social, economic, legal and other non-technical conditions of engineering activities, including environmental problems related to the implementation of industrial biochemical processes; has extended knowledge of the safe handling of chemicals and the selection and disposal of chemical and hazardous waste (m.in. pathogenic microorganisms, infectious material) -has well-established knowledge in the field of health and safety at work;

has the ability to obtain and critically evaluate information from literature, databases and other sources and to formulate reports and opinions on this basis, which fully justifies;

can prepare and present in Polish and English a well-documented study of own research issues in the field of biotechnology

### Assessment methods and assessment criteria:

test

presentation

essay and experiment report

### Practical placement:

-

### Information on course edition:

### Default type of course examination report:

ZAL

### Homepage of course edition:

<https://platforma.polsl.pl/rie/course/view.php?id=1147>

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### Notes:

brak

### Details of classes and study groups

lecture (30 hours)

### Bibliography:

Idra Pearl Solomon, Diana W. Martin, Berg, Claude Alvin Vilee Jr., Biology, 1994 and newer

actual articles

### Learning outcomes:

Student has the enhanced knowledge necessary to understand the social, economic, legal and other non-technical conditions of engineering activities, including environmental problems related to the implementation of industrial biochemical processes; has extended

knowledge of the safe handling of chemicals and the selection and disposal of microorganisms, -has well-established knowledge in the field of health and safety at work - K2A\_W14

has the ability to obtain and critically evaluate information from literature, databases and other sources and to formulate reports and opinions on this basis, which fully justifies - K2A\_U01

can prepare and present in Polish and English a well-documented study of own research issues in the field of biotechnology - K2A\_U04

**Assessment methods and assessment criteria:**

test on-line, student's literature based presentation

**Classes topics:**

1. Molecular basics of life; DNA, RNA, molecular biology dogma – gene expression (replication, transcription, translation), genetic code, genes and their inheritance
2. Cell as a molecular factory – bacterial, plant and animal cell characteristics and comparison; tissue definition and types in animals and plants
3. Metabolism – biochemical basics: katabolism and anabolism, key biochemicals, enzymes and their characteristics
4. Gaining energy for life: ATP structure, role and production during biochemical reactions
5. Biochemical basics of the respiration: glycolysis, Krebs cycle, fermentation vs. respiration
6. Photosynthesis and photosynthetic dyes
7. Plants, animals and bacterial nutrition; micro and macronutrients, fertilizers, hydroponics, types of substances transport in cell and tissue
8. How organisms move? Movement of Prokaryota and Eukaryota organisms
9. Reproduction in plants, animals and microbial cells; mitosis, meiosis and amitotic division

**Teaching methods:**

lecture, discussion, educational videos

**Study groups details**

Group number 1

**Class instructors:**

Dr inż. Marcelina Jureczko

classes (15 hours)

**Bibliography:**

Idra Pearl Solomon, Diana W. Martin, Berg, Claude Alvin Vilee Jr., Biology, 1994 and newer

actual articles

**Learning outcomes:**

Student has the enhanced knowledge necessary to understand the social, economic, legal and other non-technical conditions of engineering activities, including environmental problems related to the implementation of industrial biochemical processes; has extended knowledge of the safe handling of chemicals and the selection and disposal of microorganisms, -has well-established knowledge in the field of health and safety at work - K2A\_W14

has the ability to obtain and critically evaluate information from literature, databases and other sources and to formulate reports and opinions on this basis, which fully - K2A\_U01

can prepare and present in English a well-documented study of own research issues in the field of biotechnology - K2A\_U04

**Assessment methods and assessment criteria:**

document with content condensation, presentation of the selected issue in the form of a 3-minute presentation, preparation and presentation of a poster, report - film, active participation in discussion - Oxford debate,

**Classes topics:**

Condensation of the content presented in student's engineering / bachelor theses - issues related to biotechnology/environmental protection and engineering

experiments explaining biological phenomena

discussion on the vital processes in the form of short presentations and on poster

Oxford-style discussion on the usefulness and dangers of microorganisms

**Teaching methods:**

discussion - Oxford debate, presentation, poster, student's work - home experiments, learning to condense content

**Study groups details**

Group number 1

**Class instructors:**

Dr inż. Marcelina Jureczko

**Element of course groups in various terms:**

Course group description	First term	Last term
missing group description in English (BioAIS-BF>1(1))	2020/2021-L	

**Course credits in various terms:**

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	3	2020/2021-L	