MODULE / SYLLABUS
EDUCATION CYCLE 2023-2026

Module/subject name:	**BIOCHEMISTRY AND BIOPHYSICS**
Direction:	**NURSING**
Level of study*:	**I degree (bachelor's)** II degree (master's degree)
Profile of education:	**practical**
Type of studies*:	**stationary**
Type of classes*:	obligatory **X** supplementary □ to choose from □
Year and semester of studies*:	Year of study*: I **X** II□ III □ Semester*: 1 **X** 2 □ 3□ 4□ 5 □ 6□
Number of ECTS credits assigned	**2**
Language of instruction:	**English**
Name of the PSW Department:	**Faculty of Health Sciences**
Contact (tel./email):	**Tel.** 55 279 17 68 **e-mail:** dziekanat@psw.kwidzyn.edu.pl
Type of module/subject relating to apprenticeships*:	• basic sciences **X** • social sciences and humanities □ • science in the basics of nursing care □ • specialist care □
Presenter(s):	according to the studies plan

Forms of student workload	**Student charge (number of teaching hours)**
Contact hours with an academic teacher (according to the study plan)	
Lectures (W)	**30**
Seminar (S)	
E-learning (e-L)	
Coversatories	
Exercises (C)	
Practical classes (ZP)	
BUNA - independent student work* (*according to the study plan)	**21**
Student's workload related to work placements (***according to the study plan)***	
Total student workload – total number	**51**
Number of ECTS credits per subject/module	**2, including 1 BUNA**

Didactic methods	• giving (lecture, talk), • programmatic (using audiovisual tools, boards), • activating (case method, situational method, • staging method, didactic discussion, project method), • analysis of clinical cases.
Assumptions and aim of the subject	Familiarizing students with the biochemical foundations of the integrity of the human body, the structure and function of macromolecules occurring in the human body and the biophysical foundations of the functioning of the human body.
Teaching tools	Board and multimedia projector, boards.
Prerequisites:	Basic knowledge of biology, chemistry and physics at the secondary school level.

Matrix of learning outcomes for the module / subject in relation to the methods of verifying the achievement of the intended learning outcomes and the form of implementation of didactic classes

Symbol learning outcome	The graduate: knows and understands / is able to / is ready to	Methods for verifying the achievement of the intended learning outcomes	Form of implementation of didactic classes * enter the symbol
A.W3.	the role of organs and systems in maintaining homeostasis of the body;	*Written and/or oral examination*	W
A.W5.	functioning of the regulation systems (homeostasis) and the role of positive and negative feedback;	*Written and/or oral examination*	W
A.W13.	physicochemical basis of the functioning of the senses employing physical channels of information (sound and electromagnetic waves);	*Written and/or oral examination*	W

A.W14.	vitamins, amino acids, nucleosides, monosaccharides, carboxylic acids and their derivatives, comprising macromolecules present in cells, extracellular matrix and systemic fluids;	*Written and/or oral examination*	W
A.W15.	regulation mechanisms and biophysical basis of metabolism in the human body;	*Written and/or oral examination, draft or oral answer*	W/BUNA
A.W16.	influence of external factors such as temperature, gravity, pressure, electromagnetic field and ionising radiation on the human organism;	*Written and/or oral examination, draft or oral answer*	W/BUNA
A.U5.	participate in the selection of diagnostic methods in various clinical conditions using knowledge in biophysics and biochemistry;	*draft or oral reply*	BUNA
O.K7.	perceive and recognise their own limitations in terms of knowledge, skills and social competences and carry out a self-assessment of their educational deficits and needs.	*Observation, self-assessment*	W/BUNA

*****W-lecture; S-seminar; EL- e-learning; K -conversations; Ć-exercises; ZP-practical classes; PZ-professional internships; BUNA-independent student work

EXAMPLES OF METHODS FOR THE VERIFICATION OF LEARNING OUTCOMES

in the field of knowledge (lectures/seminars): spoken exam (*non-standardized, standardized, traditional, problem*); written exam – the student generates / recognizes the answer (*essay, report; short structured questions /SSQ/; multiple-choice test /MCQ/; multiple-answer test /MRQ/; match test; T/N test; answer completion test*),

in terms of skills (exercises/seminars): Practical examination; Objective Structured Clinical Examination (OSCE); Mini-CEX (mini – clinical examination); Implementation of the commissioned task; Design, presentation

in the field of social competences: reflective essay; prolonged observation by the tutor / teacher of the teacher; 360° assessment (opinions of teachers, colleagues, patients, other colleagues); Self-assessment (including portfolio)

BUNA – the student's own work is verified by assessing the degree of implementation of the assumed learning outcomes: a test checking the student's knowledge of the subject specified in the syllabus, but also through final papers, projects, presentations and any other mid-term work.

TABLE OF PROGRAMME CONTENTS

Program content	**Number of hours**	**Reference of learning** outcomes **to CLASSES**
LECTURES, semester I		
1. Definition of biochemistry, molecular biology and biophysics and their importance in medicine. Biophysical and biochemical foundations of the functioning of the human body.	1	A.W5. O.K7.
2. Biophysical basis of homeostasis.	1	A.W3. A.W5. O.K7.
3. Feedback control systems.	1	A.W3. A.W5. O.K7.
4. Transfer of information between cells and tissues.	1	A.W3. O.K7.
5. The association of disorders in molecules, reactions and biochemical processes with the occurrence of pathology in humans.	2	A.W3. O.K7.
6. The main causes of diseases affecting a variety of biochemical mechanisms in the cell and body.	2	A.W16. O.K7.
7. Macromolecules as structural components, catalysts, hormones, receptors or stores of genetic information.	2	A.W3. O.K7.
8. Properties of amino acids. Peptides – structure.	1	A.W14. O.K7.
9. Physicochemical basis of the operation of the senses.	1	A.W13. O.K7.
10. Three-dimensional structure, levels of order and biological properties of proteins.	2	A.W13. O.K7.
11. Protein classifications based on different criteria. Role and properties of enzymes; enzymatic defects and their effects.	2	A.W14. O.K7.
12. The influence of physical factors on the body – temperature, pressure, ionizing radiation,	2	A.W16. O.K7.
13. Identifying the basic processes occurring in a living organism. Diagnostic value of enzymatic studies.	2	A.W14. A.W16. O.K7.
14. Congenital defects of metabolism caused by genetically conditioned abnormalities in enzyme synthesis.	2	A.W15. O.K7.
15. Anabolic processes.	1	A.W16. O.K7.
16. Nucleosidotriphosphates – a source of energy in anabolic processes.	2	A.W15. O.K7.
17. Gluconeogenesis.	2	A.W15. O.K7.
18. Glycogen synthesis.	1	A.W15. O.K7.

19. Synthesis of fatty acids and cholesterol.	1	A.W15. O.K7.
20. Synthesis of phospholipids and urea.	1	A.W15. O.K7.
BUNA – independent student work, semester I		
1. Exothermic reactions.	5	A.W15. A.U5. O.K7.
2. Endothermic reactions.	5	A.W15. A.U5. O.K7.
3. Biochemical processes and the mechanism of action of drugs.	5	A.W15. A.U5. O.K7.
4. The influence of environmental factors on the course of biochemical processes.	5	A.W16. A.U5. O.K7.

LIST OF LITERATURE

Basic literature:

1. Davidovits P., *Physics in Biology and Medicine*, Academic Press 2018.
2. Michael A., PhD LiebermanAlisa, MD Peet, *Marks' Basic Medical Biochemistry*, Wolters Kluwer Health, cop. 2022.

Suplementary literature:

1. Emine E., AbaliSusan D. Cline, David S. Franklin, Dr. Susan M., Ph.D. Viselli, *Lippincott Illustrated Reviews: Biochemistry*, Wolters Kluwer Health, cop. 2021.

Method of passing and forms and basic assessment criteria/examination requirements

Method of credit

- Exam – lectures
- Passing without a grade – BUNA

Forms and criteria for passing

PASSING THE SUBJECT - THE SUBJECT ENDS WITH AN EXAM

Lecture:

The basis for obtaining credit/zal is:

- presence of 100%; confirmed by an entry on the attendance list,
- possible 10% absence balanced in a manner individually agreed with the lecturer,
- active participation in lectures (joining the discussion initiated by the lecturer, showing interest in the issues discussed during the lecture),
- BUNY pass

BUNA – spoken pass

Evaluation criteria — spoken answer

Assessment	Criterion
Very good	Correct, full, independent answer to 3 questions asked to the student by the lecturer
Endorsement	Correct, requiring little orientation by the teacher, answer to the 3 questions asked to the student
Sufficient	Correct, incomplete, requiring significant orientation by the teacher answer to the 3 questions asked to the student
Insufficient	No answer or incorrect answer to each of the 3 questions asked to the student

or project

BUNA evaluation criteria - independent student work

Evaluation criteria	Assessment: zal/nzal
Compliance of the content of the work with the subject of education	
Substantive assessment of work	
Evaluation of the selection and use of sources	
Assessment of the formal side of the work (footnotes, language)	
**(recommendations for work)*	
(rating)	*(signature)*

* if any of the criteria are not met, the work should be corrected according to the lecturer's recommendations

FINAL EXAM IN THE SUBJECT

- The condition for admission to the exam is to obtain credit from lectures and exercises / seminars and pass BUNY (project)

— The exam takes the form of a written test, a multiple-choice test /MCQ/ with one correct answer (each correct answer is 1 point, no answer or incorrect answer 0 points, a minimum of 60% of the answers qualifies for a positive assessment.

Test evaluation criteria

Assessment	Very good (5.0)	Good plus (4.5)	Good (4.0)	Sufficient plus (3.5)	Sufficient (3.0)	Insufficient (2.0)
% of correct answers	93-100%	85-92%	77-84%	69-76%	60-68%	59% and less

and/or reply orally

Evaluation criteria – spoken answer

Assessment	**Criterion**
Very good	Correct, full, independent answer to 3 questions asked to the student by the lecturer
Endorsement	Correct, requiring little orientation by the teacher, answer to the 3 questions asked to the student
Sufficient	Correct, incomplete, requiring significant orientation by the teacher answer to the 3 questions asked to the student
Insufficient	No answer or incorrect answer to each of the 3 questions asked to the student

FINAL GRADE IN THE SUBJECT:

- exam grade

Conditions for making up classes abandoned for justified reasons:

Making up for abandoned classes is possible only in the case of a student's illness documented by sick leave or other random reasons. Justification of classes and passing of the material being the subject of exercises during the period of absence is made by the lecturer conducting the classes.

Both a student returning from dean's leave and a student repeating the year is obliged to attend all classes and take the exam. Only if the exam in a given year has been obtained with at least a sufficient grade (3.0), a student repeating the year due to another subject may be exempted from the need to attend classes and pass and pass the subject.

Acceptance: Vice-Rector for Teaching and Student Affairs