

**National Pirogov Memorial Medical University, Vinnytsya**

**"APPROVE"**

Vice-Rector of HEI for Scientific,  
Pedagogical and Academic Affairs

Inna ANDRUSHKO

" 24 " January 2025

**"AGREED"**

Head of Medical and Biological chemistry  
Department

Prof. of HEI Andrii MELNYK

" 22 " January 2025

**SYLLABUS**  
**of academic discipline**  
**"BIOCHEMISTRY OF NUTRITION"**  
(elective course)

Specialty	226 Pharmacy, industrial pharmacy
Educational level	Master
Educational programme	EPP Pharmacy, industrial pharmacy, 2023
Academic year	2024-2025
Department	Medical and biological chemistry
Lecturers	Prof. of HEI Andrii MELNYK Assoc. prof. of HEI Vitaliy NECHIPORUK
Contact information	<a href="mailto:medchemistry@vnmua.edu.ua">medchemistry@vnmua.edu.ua</a> Pirogov street 56, (0432) 57-02-71
Syllabus compilers	Assoc. prof. of HEI Vitaliy NECHIPORUK

## 1. Status and structure of the discipline

Discipline status	Elective Discipline
Discipline code in EPP/ discipline place in EPP	ELC 19 // elective discipline of professional training
Course / semester	2nd year (IV semesters)
The amount of discipline (the total number of hours / number of credits ECTS)	90 hours / 3,0 credits ECTS
Number of Thematic modules	3
The structure of the discipline	Lectures – 10 hours Practical classes - 30 hours Independent work - 50 hours
Language of study	English
Form of study	Full - time

## 2. Description of the discipline

**Short annotation of the course relevance.** The program of the study discipline "Nutrition Biochemistry" is intended for higher education institutions of the Ministry of Health of Ukraine in accordance with the requirements of the ECTS credit-transfer system for the organization of the educational process, based on a combination of learning technologies by sections and credit assessment credits - units of measurement of the student's educational load necessary for mastering the discipline. **The subject** of study of the discipline is the biochemical basis of healthy nutrition; processes of entry and digestion of nutrients in the body to provide it with energy and structural components; biochemical bases of regulation of human eating behavior and biochemical aspects of dietetics.

**Prerequisites.** Interdisciplinary connections is based, in accordance with the curriculum of the discipline "Nutrition Biochemistry", on students' knowledge of the main natural science disciplines: biological and bioorganic chemistry, physiology, biology and is integrated with them.

**The purpose of the course and its significance for professional activities.** The purpose of teaching the educational discipline "Nutrition Biochemistry": formation of students of higher education with a system of knowledge and practical skills regarding the principles of nutritional biochemistry, components of human nutrition and biochemical processes related to the intake and digestion of nutrients in the body to provide energy and structural components for implementation any physiological function.

**Postrequisites.** "Nutrition Biochemistry" forms the basis for the student's in-depth study of disciplines from the cycle of professional training - pathophysiology, pharmacology, and others.

## 3. Learning outcomes. After successful study of the discipline the applicant will be able to:

### **Know:**

- modern principles of nutritional biochemistry, food components and the human body's needs for nutritional compounds;
- essential nutrients, phytonutrients, antinutrients;
- nutritional and biological value of micronutrients (trace elements, vitamins, bioflavonoids);
- the effect of food additives on the human body;
- biochemical basis of digesting nutrients in the body to provide it with energy and structural components in order to implement any physiological function.

### **Be able:**

- explain the biochemical features of nutrition of people of different ages, the relationship between nutritional status and aging;
- explain the biochemical foundations of dietetics, types of diets and their impact on biochemical processes in the human body;

- explain the biochemical basis of sports nutrition and its influence on the implementation of the physiological functions of the human body.

#### 4. Content and logistics of the discipline

<b>Biochemistry of nutrition</b> Module 1. Thematic modules - 3.	IV semester 90 hours / 3 credits	Lectures № 1-5 Practical classes №№ 1-15 Topics for self- study №1-3
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The course includes 15 topics, which are divided into 3 thematic modules.

#### Module 1. "Biochemistry of food"

##### Thematic module 1. Nutritional biochemistry. Food components

Topic 1. Nutritional biochemistry as a science. Components of normal human nutrition. The needs of the human body in nutritional compounds. Essential nutrients, phyto- and anti-nutrients.

Topic 2. Micronutrients: basic concepts, classification. Nutritional value of trace elements. Dysmicroelementoses

Topic 3. Vitamins as components of human nutrition. Peculiarities of exchange of water-soluble vitamins. Vitamin therapy

Topic 4. Nutritional value of fat-soluble vitamins. Features of metabolism of fat-soluble vitamins. Laboratory indicators of availability of vitamins A, D, E, K

Topic 5. Bioflavonoids: nutritional and biomedical significance, application in pharmacy

Topic 6. Biochemistry of food additives. Dietary supplements in pharmacist practice

##### Thematic module 2. Biochemical aspects of the regulation of eating behavior and digestive processes

Topic 7. Biochemical bases of digestion and absorption of simple and complex proteins

Topic 8. Biochemical bases of digestion and absorption of carbohydrates

Topic 9. Biochemical bases of digestion and absorption of lipids and their derivatives

Topic 10. Biochemical bases of regulation of human eating behavior

Topic 11. Fundamentals of nutritional genomics

##### Thematic module 3. Biochemical aspects of dietetics

Topic 12. Biochemical bases of nutrition of children and adolescents

Topic 13. Biochemical bases of nutrition of adults of different age categories

Topic 14. Biochemical bases of sports nutrition. Biochemical aspects of nutrition of military personnel

Topic 15. Biochemical bases of dietetics. Types of diets. Basics of diet therapy for disorders of carbohydrate and lipid metabolism. Final control (credit).

The topics of the lecture course reveal the problematic issues of the relevant sections of the discipline.

Practical classes involve detailed consideration by students of individual theoretical provisions of the academic discipline with the teacher and the formation of skills and abilities in their practical application through individual performance of formulated tasks and solving situational problems.

The student's independent work involves preparation for practical classes, studying topics for independent extracurricular work, writing abstracts, preparing presentations, tables. Control of mastering the topics of independent extracurricular work is carried out during practical classes and the final control of the discipline.

Individual work includes the study of scientific literature, preparation of reviews on given topics for presentation at meetings of the student scientific circle, performance of scientific and practical research, participation in specialized Olympiads, scientific and practical conferences, competitions of student scientific works.

Thematic plans of lectures, calendar plans of practical classes, thematic plan of independent work outside the classroom, scope and directions of individual work are published on the website of the department.

The route for obtaining materials: department of medical and biological chemistry / for students / Full-time education / (medicine) / 2course / Educational materials / or through the link

<https://www.vnmdu.edu.ua/> department of medical and biological chemistry. Access to the materials is carried out through the student's corporate account [s000XXX@vnmdu.edu.ua](mailto:s000XXX@vnmdu.edu.ua).

## 5. Forms and methods of monitoring learning success

Current control in practical studies	Methods: oral or written survey, testing, electronic survey, solving situational problems, conducting laboratory studies, interpreting them and evaluating their results (drawing up a protocol in a workbook)
Final control of the discipline - credit	Methods: oral questioning (according to the Regulation of the Academic process in National Pirogov Memorial Medical University, Vinnytsya (link <a href="https://www.vnmdu.edu.ua/Generalinformation">https://www.vnmdu.edu.ua/Generalinformation</a> )).
Learning success diagnostic tools	Theoretical questions, tests, clinically-oriented situational tasks, practical tasks, practical skills, demonstration.

## 6. Assessment criteria

Knowledge assessment is carried out in accordance with the Regulations of the Academic process in National Pirogov Memorial Medical University, Vinnytsya (link <https://www.vnmdu.edu.ua/en/general-regulations> )

Continuous assessment	On a four point system of traditional assessments: 5 «excellent», 4 «good», 3 «satisfactory», 2 «unsatisfactory»
Control of practical skills	According to the four-point system of traditional assessments
Credit (final control)	On a 200-point scale (the arithmetic average grade for the semester is converted into points) Credited: 122 to 200 points Not credited: less than 122 points (See Grading Scale)

## Discipline Score Scale: National and ECTS

The sum of grades for all types of educational activities	Score ECTS	Score on a national scale	
		For exam, course project (work), practice	for credit test
180-200	<b>A</b>	excellent	credited
170-179,9	<b>B</b>	good	
160-169,9	<b>C</b>		
141-159,9	<b>D</b>	satisfactory	
122-140,99	<b>E</b>	satisfactory	
0-121,99	<b>FX</b>	unsatisfactory with the possibility of reassembly	is not credited with the possibility of reassembling
0-121,99	<b>F</b>	unsatisfactory with a mandatory reexamination of discipline	is not credited with mandatory reexamination of discipline

## 7. Policy of discipline/course

The student has the right to receive high-quality educational services, access to modern scientific and educational information, qualified advisory assistance during the study of the discipline and mastery of practical skills. The policy of the department during the provision of educational services is student-centered, based on the regulatory documents of the Ministry of Education and the Ministry of Health of Ukraine, the university charter and the procedure for providing educational services, regulated by the basic provisions of the organization of the educational process at National Pirogov Memorial Medical University, Vinnytsya and the principles of academic integrity.

### **Adherence to the rules of National Pirogov Memorial Medical University, safety techniques in practical classes and rules of behavior during the signal «Air alarm» and other warning signals.**

Observance of the rules of the VNMU regulations, safety precautions at practical classes. Instruction on biosafety, safety of handling chemical reagents and burners is conducted at the first practical lesson by the teacher. The instructed students are registered in the Safety Instruction Journal. A student who has not been instructed is not allowed to perform practical work.

The teacher conducting the class in the event of an alarm (air alarm signal) must stop the class and go to the shelter together with the group. All personnel (including students and teachers) must remain in shelter until the air warning signal is cancelled. The teacher must inform the students about further actions after canceling the signal: to continue classes in the classroom or to study the material independently (in this case, the testing will take place in the next scheduled class).

**Requirements for preparation for practical classes.** The student must come to the practical session on time, theoretically prepared according to the topic. Tardiness is not allowed (according to the Rules of Internal Procedure for persons studying at National Pirogov Memorial Medical University, Vinnytsya). The student must follow the rules of dress code and look appropriate for the situation. In communication with teachers, employees, comrades and other persons studying and working at National Pirogov Memorial Medical University, be polite, friendly, friendly. While working in the laboratory, students must follow the safety rules (published on the website of the department <https://www.vnmue.edu.ua/> department of medical and biological chemistry).

**Academic integrity.** While studying the discipline, the student must be guided by the Code of Academic Integrity of National Pirogov Memorial Medical University, Vinnytsya ([https://www.vnmue.edu.ua/general information/ Main documents/ Code of academic integrity](https://www.vnmue.edu.ua/general%20information/Main%20documents/Code%20of%20academic%20integrity)). If the norms of academic integrity are violated during the current and final examinations, the student receives a grade of "2" and must work it out to his teacher in the prescribed manner within two weeks after receiving an unsatisfactory grade.

**Missed classes.** Missed classes are made up in accordance with the procedure established in the Regulations on the Organization of the Educational Process at National Pirogov Memorial Medical University, Vinnytsya (link [https://www.vnmue.edu.ua/ General information/Main documents](https://www.vnmue.edu.ua/General%20information/Main%20documents)) at the time determined by the practice schedule (published on the website of the department [https://www.vnmue.edu.ua/ department of medical and biological chemistry](https://www.vnmue.edu.ua/department%20of%20medical%20and%20biological%20chemistry)) the next teacher. To make up for a missed class, a student must provide a completed workbook protocol on the relevant topic, pass a test, and answer questions on the topic of the class in writing or orally.

**The procedure for admission to the discipline final control** is given in the Regulations of the Academic process in National Pirogov Memorial Medical University, Vinnytsya (link <https://www.vnmue.edu.ua/en/general-regulations> ). To the final control allowed students who do not have missed practical classes and received an average traditional grade of at least "3".

**Additional individual points.** Individual points in the discipline (from 6 to 12) a student can receive for individual work, the scope of which is published on the department's website in the teaching and methodical materials of the discipline, the number of points is determined by the results IRS according to the Regulation on the organization of the educational process at National Pirogov Memorial Medical University, Vinnytsya (link [https://www.vnmue.edu.ua/ General information/Basic documents](https://www.vnmue.edu.ua/General%20information/Basic%20documents)).

**Conflict resolution.** In the event of misunderstandings and claims against the teacher due to the quality of educational services, assessment of knowledge and other conflict situations, the student must first inform the teacher about his claims. If the conflict issue has not been resolved, the student has the right to appeal to the head of the department in accordance with the Regulation on consideration of



appeals by applicants for higher education at National Pirogov Memorial Medical University, Vinnytsya (<https://www.vnmua.edu.ua/> General information/Main documents).

**Politics in terms of remote learning.** The distance learning procedure is regulated by the Regulation on the introduction of elements of distance learning at National Pirogov Memorial Medical University, Vinnytsya (<https://www.vnmua.edu.ua/> General information/Main documents). The main training platforms for conducting training sessions are Microsoft Team, Google Meets. The procedure for conducting practical classes, exercises and consultations during distance learning is published on the website of the department (<https://www.vnmua.edu.ua/> department of medical and biological chemistry / to the Student).

Feedback with the teacher is carried out through messengers (Viber, Telegram, Whats App) or e-mail (at the choice of the teacher) during working hours.

**1. Educational resources**

Educational and methodological support of the discipline is published on the website of the department (<https://www.vnmua.edu.ua/> department of medical and biological chemistry to the Student). Consultations are held twice a week according to the consultation schedule.

**2. The schedule and distribution of groups** by teachers is published on the website of the department (<https://www.vnmua.edu.ua/> department of medical and biological chemistry / To the student).

**3. Questions for the final control** of the discipline are published on the website of the department (<https://www.vnmua.edu.ua/> department of medical and biological chemistry to the Student).

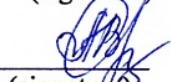
The syllabus of the discipline "**Biochemistry of nutrition**" was discussed and approved at the meeting of the department of medical and biological chemistry (record № 7, dated "22" January 2025)

Responsible for the academic  
discipline

  
(signature)

Assoc. prof. of HEI Vitaliy NECHIPORUK

Acting head of the department

  
(signature)

Prof. of HEI Andrii MELNYK