SYLLABUS OF THE EDUCATIONAL COMPONENT

FUNCTIONAL BIOCHEMISTRY

for applicants for higher education of 3 year of study full-time form of education of educational program "Pharmacy", in specialty "226 Pharmacy, industrial pharmacy" field of knowledge "22 Publik Health" training for second (Master`s) level of higher education

TEACHERS

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1. **The name of higher education establishment and department:** National University of Pharmacy, Department of Biological chemistry and Veterinary medicine.

2. **Address of the department: Kharkiv, Kulikivska str., 12, ground floor, т. 057-706-30-99.**

3. **Web site of the department: https://biochem.nuph.edu.ua/en/**

4. **Information about teachers:**

Seniuk Igor

PhD, associated professor of Department of Biological chemistry and Veterinary medicine of National University of Pharmacy. Experience of scientific and pedagogical work – 30 years. He teaches courses "Biological Chemistry", "Functional Biochemistry". Research interests: study of mechanisms of pathogenesis and ways of correction of hepatobiliary system.

5. **Consultations:** Every day you can send your questions to the forum. The given day for discipline.

6. **Brief summary of the educational component:** the educational component "Functional biochemistry " is an elective discipline for the Master's Level of Higher Education in the specialty 226 Pharmacy of educational program Pharmacy for foreign students (Language of instruction – English for applicants for higher education 3 rd year of study). **The subject** of study of the educational component "Functional Biochemistry" is the study of the peculiarities of the functioning of biochemical processes in various organs and tissues of the human body.

7. **The purpose statement of studying the educational component: The purpose** of teaching the discipline "Functional Biochemistry" is to train specialists who have a significant amount of theoretical and practical knowledge regarding the biochemical basis of life: the chemical structure of organic compounds and the nature of metabolic processes occurring in the human body.

8. **Competences in accordance with the educational program: "Pharmacy "**

Ability to solve typical and complex specialized tasks and practical problems in the professional pharmaceutical activity of the industry health care on a socially oriented basis or in the process of training, which involves chemical, biopharmaceutical, biomedical, sociological and other research and/or

implementation of innovation and is characterized by uncertainty of conditions and requirements; integrate knowledge, critically comprehend and solve complex issues, make decisions in complex unpredictable conditions, formulate judgments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility; clearly and unambiguously communicate their findings and knowledge, reasonably justifying them, to professional and non-specialist audiences.

Soft- skills / General competences (GC):

After graduation from the educational program "Pharmacy, industrial pharmacy" specialty 226 Pharmacy, industrial pharmacy fields of knowledge 22 Health care specialist can perform professional work according to DK 003: 2010: 23157 laboratory assistant (pharmacy) (CP code - 3228); 24427 pharmacist-intern (CP code - 3228); 2224.1 junior researcher (pharmacy). After training at the internship, the specialist is able to perform the professional work specified in SC 003:2010 work and can hold the appropriate primary position from Section 2224 "Professionals in the field of pharmacy" (2224.1 Scientific researcher (pharmacy), 2224.1 Scientific Research Associate (Pharmacy), and 2224.2 Pharmacists), as well as 23 "Professionals in the field of education and training".

GC 4. Ability to abstract thinking, analysis and synthesis, to learn and be modernly trained.

GC 9. Skills of using information and communication technologies.

GC 11. Ability to evaluate and ensure the quality of work performed.

Hard-skills / Professional (special) competences (PC):

PC 4. Ability to ensure the rational use of prescription and non-prescription medicines and other pharmacy products in accordance with physicochemical, pharmacological characteristics, biochemical, pathophysiological characteristics of a particular disease and pharmacotherapeutic regimens for its treatment.

9. The program learning outcomes: (PLO):

PLO 14. Determine the advantages and disadvantages of medicines of different pharmacological groups, taking into account their chemical, physicochemical, biopharmaceutical, pharmacokinetic and pharmacodynamic features. Recommend over-the-counter medicines and other pharmacy products to consumers with the provision of advisory assistance and pharmaceutical care.

PLO 16. Determine the influence of factors that affect the processes of absorption, distribution, deposition, metabolism and excretion of medicines and are due to the state, characteristics of the human body and physicochemical properties of medicines.

PLO 18. Select biological objects of analysis, determine xenobiotics and their metabolites in biological media and evaluate the results obtained taking into account their distribution in the body.

10. Status of the educational component: selective.

11. Prerequisites of the educational component: "Functional Biochemistry" is to train pharmacists-specialists with a significant amount of theoretical and practical knowledge about the chemical bases of life: the chemical composition of organic compounds and natural metabolic processes in the human body, features of their tissue localization and integration at the whole body. Functional biochemistry is based on the knowledge that students have acquired in the study of such disciplines as human physiology and anatomy, organic chemistry, pathological physiology, biological chemistry and pharmacology, and lays the necessary foundations for the study of clinical biochemistry, laboratory diagnostics, biotechnology, which involves the formation of skills and abilities to apply the acquired knowledge in further professional activities.

12. The volume of the educational component: 3.0 ECTS credits, educational component number of hours per general 90 hours. Lectures - 9 hours, practical classes - 21 hours, independent work - 60 hours.

13. Organization of training: conducting lectures, practical classes, consultations, writing written works, testing, interviews and watching video content with comments for better learning of the educational material.

The format of teaching the educational component

Content of the educational component:

Module 1. Functional biochemistry

Content module 1. ***Functional biochemistry of the gastrointestinal tract and blood.***

Topic 1. Introduction to the Functional biochemistry. Nutrition, digestion and absorption.

Topic 2. Functional biochemistry of blood.
Topic 3. Functional biochemistry of liver. Final test of CM 1 assimilation.

Content module 2. ***Functional biochemistry of the excretory system, muscle and connective tissue.***
Topic 4. Functional biochemistry of the kidneys and urine formation.
Topic 5. Functional biochemistry of muscle tissue. Functional biochemistry of connective tissue. Final test of CM 2 assimilation.

Semester credit of the module "Functional Biochemistry "

14. Forms and types of academic achievements supervision:

- *Current control:* oral questioning, written tasks, solving situational tasks, computer testing.
- *Control of content modules:* this is the control of the assimilation of the amount of knowledge that was obtained by the applicant for higher education during the content module. It is conducted in the form of written work and computer testing.
- *Semester control:* this is conducted in the form of computer testing.

15. Evaluation system of the educational component: the results of semester control in the form of semester exam are evaluated on the ECTS scale, 100-point and four-point scale ("excellent", "good", "satisfactory", "unsatisfactory").

Points from the educational component are calculated according to this ratio:

Types of evaluation	**Maximum number of points (% of the number of points per module - for content modules)**
Module 1 Functional biochemistry	
Content module 1: Functional biochemistry of the gastrointestinal tract and blood. - evaluation of topics (1-3) (work in classes 1-3); assessment of topics (1-3): oral questioning, written assignments. - supervision of content module 1 performance of written tasks and passing test tasks.	50 (50 %)
Content module 2: Functional biochemistry of the excretory system, muscle and connective tissue. - evaluation of topics (1-2) (work in classes 1-2); assessment of topics (1-3): oral questioning, written assignments. - supervision of content module 1 performance of written tasks and passing test tasks.	50 (50 %)
Semester credit of the module: "Functional Biochemistry"	-
Semester Supervision of Module 1	100

The individual work of applicants for higher education is evaluated during the progress supervision and during the content module supervision

16. Academic policies of the educational component:

- *Policy on academic integrity.* It is based on the principles of academic integrity, given in the POL "On measures to prevent cases of academic plagiarism in NUPh". Cheating in assessing the performance of a higher education applicant during control activities in practical (laboratory) classes, control of content modules and semester offset are prohibited (including with the use of mobile devices). Detection of signs of academic dishonesty in the written work of the student is the basis for its non-enrollment by the teacher.
- *Policy on attendance.* The applicant for higher education is obliged to attend classes (POL "On the organization of the educational process of NUPh") according to the schedule (https://nuph.edu.ua/rozklad-zanyat/), adhere to ethical standards of conduct.
- *Policy on deadlines, working out, rating increase, elimination of academic debt.* Working out of missed classes by a higher education student is carried out in accordance with the Regulation "Regulations on working out missed classes by students classes and the procedure for eliminating academic differences in

curricula at NUPh" according to the established at the department schedule of working out missed classes. Raising rating and elimination of academic debt from the educational component is carried out by applicants for education in accordance with the procedure specified in the Regulations "On the procedure for evaluating results of higher education applicants at NUPh". Applicants for higher education are obliged to comply with all deadlines set by the department for the performance of types of written work on educational component. Works that are submitted in violation of deadlines without good reason, are evaluated at a lower grade - up to 20% of the maximum number of points for this type of work.

- *Policy on appealing the assessment of the educational component (appeals).* Applicants for higher education have the right to appeal (appeal) the assessment of the educational component received during control measures. The appeal is carried out in accordance with the Regulations on Appealing the results of semester control of knowledge of higher education applicants at NUPh". Any form of violation of academic integrity is not tolerated. In case of such events - response in accordance with the provisions of NUPh.

17. Information and educational and methodical support of the discipline:

The main reading suggestions	1. Functional Biochemistry in Health and Disease: Textbook / Eric Newsholme, Anthony Leech. – Merton College and Department of Biochemistry, University of Oxford, UK. 2017. – 560 p.
Supplementary reading suggestions for in-depth study of the educational component	1. Functional biochemistry: methodical recommendations for organizing self-training work of a higher education student/ V. M. Kravchenko, I. V. Seniuk, V. P. Filimonenko, O. A. Shcherbak. – Kharkiv : NUPh; 2023. – 38 p. 2. Biological chemistry : textbook for the self-training of higher education student / V. M. Kravchenko, G. B. Kravchenko, O. A. Krasilnikova, I. V Seniuk. – Independent electronic edition. – Kharkiv : National University of Pharmacy, 2023. – 392 p. 3. Clinical biochemistry: An illustrated color text / A. Gaw, M.J. Murphy, R.A. Cowan and oth. – ELSEVIER Ltd., 2008.- 179 p. 4. Textbook of biochemistry: with clinical correlations / edited by Thomas M. Devlin.- John Wiley & Sons, Inc., 2011. – 1204 p.
Current electronic information resources (magazines, websites) for in-depth study of the educational component	Educational site http://pharmel.kharkiv.edu. Website of the Department of Biological chemistry and Veterinary medicine http://biochem.nuph.edu. Library of NUPh http://lib.nuph.edu.ua.
Moodle distance learning system	https://pharmel.kharkiv.edu/moodle/course/view.php?id=4621

18. Material, technical and software support of the educational component: LabAnalyt SP-V1000 spectrophotometer, aqua distiller Dl-10, LabAnalyt DM 0412 clinical centrifuge, pH meter pH-305, R-Line personal computer with Intel Core i3-8100 processor, Philips 223V5LSB, R-Line workstation with IntelCore i5-7400 processor, EPSON EB-X05 projector, TC-80 thermostats, Application software and online services: a set of services for organising online and distance learning - Google Workspace for Education Standard, licence type – free licence for education, unlimited; software for organising video conferences ZOOM, licence type - free license for education for 1 year with the possibility of extension; modular object-oriented dynamic learning environment MOODLE 3.9.8, licence type - Open Source.