

## SYLLABUS OF THE EDUCATIONAL COMPONENT

**PHARMACOECONOMICS**

for applicants for higher education of 5 year of study  
full time study form of education (4.10 year of study)  
of educational program «Pharmacy»  
in specialty «226 Pharmacy, industrial pharmacy»  
field of knowledge «22 Health Care»  
training for Master

## TEACHERS



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- 1. The name of higher education establishment and department:** National University of Pharmacy, Department of Pharmaceutical Management and Marketing.
- 2. Address of the department:** 61121, Kharkiv, Valentinovskaya street,4, 3rd floor, tel.0572-67-91-72.
- 3. Web site of the department:** <https://mmf.nuph.edu.ua/>
- 4. Information about teachers:**

**Gerasymova Olga Oleksandrivna**

Candidate of Pharmaceutical Sciences, Assistant Professor of the Department of Pharmaceutical Management and Marketing of the National University of Pharmacy. Scientific experience is 25 years, scientific and pedagogical experience is 21 years. Teaches courses: «"Pharmacoeconomics", "Pharmacoeconomic bases of medical standardization", "Evaluation of clinical evidence and pharmacoeconomic feasibility of medical technologies", "Training of a pharmaceutical representative", "Evidence-based medicine". Research interests: pharmacoeconomics, drug consumption assessment, experimental pharmacology.

**Bondarieva Iryna Vasylivna**

Candidate of Pharmaceutical Sciences, Associate Professor, Department of Pharmaceutical Marketing and Management, National University of Pharmacy. Experience of scientific activity - 16 years, experience of scientific and pedagogical activity - 13 years. She teaches courses: "Pharmaceutical marketing and management", "Ethics and deontology in pharmacy", "Fundamentals of consumer behavior in pharmacy", "Introduction to the specialty", "Marketing audit", "Consumer behavior". Research interests: adaptive management, marketing, management

**Zhadko Svitlana Victorivna**

Candidate of Pharmaceutical Sciences, Associate Professor, Department of Pharmaceutical Marketing and Management, National University of Pharmacy. Experience in teaching - 22 years, including scientific and pedagogical - 18 years. She teaches courses: "Pharmaceutical management and marketing", "Ethics and deontology in pharmacy", "Digital marketing tools", "Pharmacoeconomics". Scientific interests: management, marketing, marketing research, marketing communications, management of marketing activities of enterprises, in particular with an orientation to the specifics of the pharmaceutical sector of the healthcare industry.

**5. Consultations are conducted** online in accordance with the schedule posted on the website of the Department of Pharmaceutical Management and Marketing.

**6. Brief summary of the educational component:**

Pharmacoeconomics provides a methodology for comparative assessment of various medical technologies (methods of diagnosis, treatment and prevention of various diseases) based on a simultaneous complex interrelated analysis of the clinical results obtained and the costs of using these technologies. The main essence of pharmacoeconomics is made up of methodological approaches that allow analyzing the efficiency of expenditures in the field of health care with the aim of rational spending money both for an individual consumer and for the state as a whole. The results of pharmacoeconomic research today can be used in the practice of all participants in the pharmaceutical market: drug manufacturers, pharmaceutical companies, pharmacists and doctors. In this regard, the acquisition of theoretical knowledge in pharmacoeconomics and mastery of the methodology of pharmacoeconomic analysis will allow future specialists working in the field of pharmacy not only to successfully solve various professional problems, but will also contribute to the optimal use of budgetary funds allocated for medical care to the population of the country, increase the level public health, increasing the life expectancy of the population, improving its quality, maintaining the health of the nation.

**7. The purpose statement of studying the educational component:** is to train specialists for the pharmaceutical industry who have a sufficient amount of theoretical knowledge and practical skills in conducting pharmacoeconomic analysis of methods of prevention, diagnostics, drug and non-drug treatment and rehabilitation of various diseases to improve the quality of medical care, rational use of funds for health care as by individual consumers, as well as by healthcare institutions and the state as a whole, optimization of the process of creation, production and use of pharmaceutical products in a market economy.

**8. Competences in accordance with the educational program:****Soft- skills / General competences (GC):**

GC 9. Skills in the use of information and communication technologies.

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

PC 5. Ability to monitor the effectiveness and safety of the population of medications according to the data on their clinical and pharmaceutical characteristics, as well as taking into account subjective signs and objective clinical, laboratory and instrumental criteria for the examination of a patient.

PC 11. Ability to analyze socio-economic processes in Pharmacy, forms, methods and functions of the pharmaceutical supply system and its components in world practice, indicators of need, efficiency and availability of pharmaceutical care in terms of health insurance and reimbursement of the cost of medications.

**9. The program learning outcomes: (PLO):**

PLO 9. To carry out professional activities using information technology, "Information Databases", navigation systems, Internet resources, software and other information and communication technologies.

PLO 17. To use clinical, laboratory and instrumental research data to monitor the efficacy and safety of medicines.

PLO 23. To take into account the data on socio-economic processes in society for the pharmaceutical provision of the population, determine the effectiveness and availability of pharmaceutical care in terms of health insurance and reimbursement of the cost of medicines.

**10. Status of the educational component:** Elective

**11. Prerequisites of the educational component:** «Pharmacology», «Pharmacotherapy with pharmacokinetics», «Clinical pharmacy and pharmaceutical care», «Pharmaceutical marketing and management», «Organization and economics of pharmacy».

**12. The volume of the educational component:** 3 ECTS credits, 90 hours: 30 hours of classroom studies, of which 6 hours of lectures, 24 hours of practical training; 60 hours of individual work.

**13. Organization of training:**

**The format of teaching the educational component:** lectures, practical classes.

**Content of the educational component:**

**CONTENT MODULE 1. *Theoretical foundations of pharmacoeconomics and pharmacoepidemiology. Search and analysis of information on the effectiveness, safety of medical technologies and the costs of their use. Mathematical modeling in pharmacoeconomics***

**Topic 1.** Evidence-based medicine as a modern methodology in health care. Historical and socio-economic preconditions for the emergence of pharmacoeconomics as an applied science.

**Topic 2.** Pharmacoeconomics as a science, its goals and objectives. Main pharmacoeconomic categories.

**Topic 3.** Pharmacoepidemiology: essence and objectives. Quantitative pharmacoepidemiological studies of drug usage study.

**Topic 4.** Safety of medicines as a pharmacoeconomic category. Types of undesirable side action of a drug. Pharmacovigilance system.

**Topic 5.** Pharmacoinformatics as a science. Systematized sources of information.

**Topic 6.** Costs as a pharmacoeconomic category. Ways to optimize healthcare costs.

**Topic 7.** Mathematical modeling in pharmacoeconomics. The method of mathematical modeling is "decision analysis".

**Topic 8.** Markov mathematical model.

**CONTENT MODULE 2. *Applied Pharmacoeconomics. Pharmacoeconomic analysis methods. Application of the results of pharmacoeconomic research in practical pharmacy and medicine.***

**Topic 9.** Pharmacoeconomic analysis: general provisions. Pharmacoeconomic analysis methods. Cost Of Illness Analysis. Cost Minimization Analysis.

**Topic 10.** Cost Effectiveness Analysis. The effectiveness of drugs as a pharmacoeconomic category.

**Topic 11.** Indicators of the usefulness of medical technologies: "quality of life", QALY and DALY. Tools for assessing the "quality of life". Cost Utility Analysis.

**Topic 12.** Cost-Benefit Analysis. Sensitivity Analysis of the results of pharmacoeconomic studies

**Topic 13.** Pharmacoeconomic evaluation of symptomatic treatment of pathological conditions using non-prescription medical products. Pharmacoeconomic evaluation of prescription medical products used for the prevention and treatment of the most common diseases.

**Topic 14.** Quality of medical care. The list of essential pharmaceutical products as a document of state guarantees of the quality of medical care. Standardization in healthcare.

**Topic 15.** Formulary system. Formulary as an element of the formulary system.

**Topic 16.** Application of pharmacoeconomic research in the creation of medicines and in the regulation of the life cycle of medicines.

**14. Forms and types of academic achievements supervision:**

***Forms and types of academic achievements supervision***

*Knowledge control at each lesson:* answers to theoretical questions, writing test tasks, solving situational (calculation) tasks.

*Control of content modules:* answers to theoretical questions, preparation of test tasks, solving calculation problems.

*Semester control form:* semester credit

*Conditions for admission to the supervision of content modules:* For example, for admission to the supervision of content module 2, it is necessary to have a minimum number of points for the topics (classes) of content module 1, for the supervision of content module 1

*Conditions for admission to semester supervision:* For example, a current rating of more than 60 points, absence of missed laboratory, practical and seminar classes, fulfillment of all requirements stipulated in the work program of the educational component.

## 15. Evaluation system of the educational component:

### *Evaluation system of the educational component:*

The results of the semester control in the form of a semester credit are evaluated on a 100-point, undifferentiated scale ("credit", "not credited") and on the ECTS scale.

*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	
Content module 1: - evaluation of topics 2-6: work in classes (oral survey, writing test tasks, solving situational tasks); - supervision of content module 1 (evaluation of topics 1-8): the preparation of test tasks and answers to theoretical questions.	50 (50 %)
Content module 2: - evaluation of topics 9-12, 14-15: work in classes (oral survey, writing test tasks, solving situational (calculation) tasks); - supervision of content module 2 (evaluation of topics 9-16): the preparation of test tasks and the solution of calculation tasks.	50 (50 %)
Semester Supervision of Module 1	100

**The individual work of applicants for higher education is evaluated during the control of knowledge at each lesson and during the content module supervision**

## 16. Academic policies of the educational component:

*Academic Integrity Policy.* It is based on the principles of academic integrity stated in the POL "On measures to prevent cases of academic plagiarism at the National University of Pharmacy". Cheating during the evaluation of an applicant for higher education during supervision activities in practical classes, supervision of content modules is prohibited (including the use of mobile devices). Abstracts must have correct text references to the used literature. The detection of signs of academic dishonesty in the student's written work is a reason for the teacher not to credit it.

*Class attendance policy.* An applicant for higher education is obliged to attend classes (POL "On the organization of the educational process of the National University of Pharmacy") according to the schedule (<https://nuph.edu.ua/rozklad-zanyat/>), to observe ethical norms of behavior.

*Policy regarding deadlines, working out, rating increase, liquidation of academic debts.* The completion of missed classes by an applicant for higher education is carried out in accordance with the POL "Regulations on the completion of missed classes by applicants and the procedure for eliminating academic differences in the curricula of the National University of Pharmacy" in accordance with the schedule for working out missed classes established by the department. Increasing the rating and liquidating academic debts from the educational component is carried out by the applicants in accordance with the procedure specified in the POL "On the procedure for evaluating the results of training of applicants for higher education at the National University of Pharmacy". Applicants of higher education are obliged to comply with all deadlines set by the department for the completion of written works from the educational component.

Works that are submitted late without valid reasons are assessed at a lower grade - up to 20% of the maximum number of points for this type of work.

*Policy on appeals of evaluation of the educational component (appeals).* Applicants for higher education have the right to contest (appeal) the evaluation of the educational component obtained during control measures. The appeal is carried out in accordance with the POL "Regulations on appealing the results of the final supervision of knowledge by applicants of higher education at the National University of Pharmacy".

#### 17. Information and educational and methodical support of the educational component:

<p><b>The main reading suggestions</b></p>	<ol style="list-style-type: none"> <li>1. Pharmacoeconomics: Manual for students of higher schools / L. V. Iakovlieva, O. O. Gerasymova, O. V. Tkachova, O. Ia. Mishchenko; Edited by Prof. L. V. Iakovlieva – 2-nd edition, revised and expanded. – Kharkiv: NUPh Publ., 2023. – 167 p.</li> <li>2. Workbook on pharmacoeconomics / L. V. Iakovlieva [et al.]. – 2<sup>nd</sup> ed., revised and supplemented. – Kharkiv : NUPH, 2021. – P. 130.</li> <li>3. Pharmacoeconomics : textbook for individual work for candidates of higher education (test tasks book)/ / L. V. Iakovlieva [et al.]. – 2<sup>nd</sup> ed., revised and supplemented. – Kharkiv : NUPh, 2021. – 93 p.</li> </ol>
<p><b>Supplementary reading suggestions for in-depth study of the educational component</b></p>	<ol style="list-style-type: none"> <li>1. Annemans, L. Health economics for non-economists: Principles, methods and pitfalls of health economic evaluations / L. Annemans. – 1<sup>st</sup> ed. – Pelckmans, 2018. – 136 p.</li> <li>2. Peshek, S. C. A Practical Guide to Pharmacoeconomics / S. C. Peshek, J. M. Morrison. – Amer Pharmacists Assn, 2020. – 100 p.</li> <li>3. Goncalves, F. N. R. Pharmacoeconomics Principles and Best Practices: a Practical Guide / F. N. R. Goncalves, L. Gulacsi, N. Abu-Shraie. – Innovative Healthcare Institute, 2020. – 282 p.</li> <li>4. Revikumar, K. G. Pharmacoepidemiology and Pharmacoeconomics Concepts and Practice / K. G. Revikumar. – PharmaMed Press/BSP Books, 2016. – 327 p.</li> <li>5. Fundamentals Of Pharmacoeconomics / S. Fuloria, S. Kumar, N. K. Fuloria, A. Singh. – 1<sup>st</sup> ed. – Nirali Prakashan, 2018. – 264 p.</li> <li>6. Pharmacoeconomics : From Theory to Practice / ed. by R. J. G. Arnold. – 2<sup>nd</sup> ed. – CRC Press, 2020. – 334 p.</li> <li>7. The Art of Pharmacoeconomics: A Guide to Getting Started / ed. by Dr. R. Kaakeh. – Salus Vitae Group LLC, 2021. – 241 p.</li> <li>8. Pradelli, L. Pharmacoeconomics : Principles and Practice / L. Pradelli, A. Wertheimer. – SEEd medical publishers, 2022. – 202 p.</li> <li>9. Rascati, K. L. Essentials of Pharmacoeconomics / K. L. Rascati. – 3<sup>rd</sup> ed. – Lippincott Williams and Wilkins, 2020. – 368 p.</li> <li>10. GünerGören, H. An excel-based inventory control system based on ABC and VED analyses for pharmacy: a case study / H. GünerGören, O. Dağdeviren // Galore International Journal of Health Sciences &amp; Research. – 2017. – Vol. 2, Issue 1. – P. 11-17.</li> </ol>

	<p>11. Ceylan, Z. Drug inventory management of a pharmacy using ABC and VED analysis / Z. Ceylan, S. Bulkan // Eurasian Journal of Health Technology Assessment. – 2017. – Vol. 2, Issue 1. – P. 13-18.</p> <p>12. Biswkarma, V. K. Emerging role of pharmacoconomics into clinical trials and its outcomes: An overview / V. K. Biswkarma, S. Wadhawan // Indian J. Pharm. Pharmacol. – 2020. – Vol. 7, № 2. – P. 66-72.</p> <p>13. Hollingworth, S. Measuring Medicine Use: Applying ATC/DDD Methodology to Real-World Data / S. Hollingworth, T. Kairuz // Pharmacy. – 2021. – Vol. 9, № 60. – P. 1-8.</p> <p>14. Carta, A. On the Use of Markov Models in Pharmacoconomics: Pros and Cons and Implications for Policy Makers / A. Carta, C. Conversano // Front. Public Health. – 2020. – Vol. 8. – P. 1-14.</p>
<b>Current electronic information resources (magazines, websites) for in-depth study of the educational component</b>	<ol style="list-style-type: none"> <li>1. <a href="https://www.who.int">https://www.who.int</a> – World health organization.</li> <li>2. <a href="https://www.ispor.org/">https://www.ispor.org/</a> - The International Society for Pharmacoconomics and Outcomes Research (ISPOR).</li> <li>3. <a href="https://htai.org/">https://htai.org/</a> - An International Society for the promotion of Health Technology Assessment (HTAi).</li> <li>4. <a href="https://pubmed.ncbi.nlm.nih.gov/">https://pubmed.ncbi.nlm.nih.gov/</a> – resource PubMed (access to the MEDLINE database).</li> <li>5. <a href="http://https://www.cochrane.org/">http:// https://www.cochrane.org/</a>– Cochrane Library</li> </ol>
<b>Moodle distance learning system</b>	<a href="https://pharmel.kharkiv.edu/moodle/course/view.php?id=3073">https://pharmel.kharkiv.edu/moodle/course/view.php?id=3073</a>

**18. Material and technical support and software of the educational component:** computers, multimedia device, screen, Google Workspace for Education Standard, ZOOM, MOODLE.