SYLLABUS
of the ELECTIVE COURSE of

RESEARCH METHODOLOGY IN CLINICAL PHARMACY RELEVANT TO MASTER'S THESIS RESEARCH TOPIC

1. General information	
Faculty Name	Faculty of Pharmacy
Educational Program(area of study, major, educational level, mode of study)	22 Healthcare, 226 Pharmacy, Industrial Pharmacy, Second (Master's) level of Higher Education, full-time mode of study
Academic Year	2023-2024
Course Title and Code (URL directory on the website of Danylo Halytsky LNMU)	Research methodology in clinical pharmacy relevant to master's thesis research topic code VB 3.5, http://
Department (name, address, phonenumber, e-mail)	Department of Healthcare Management, Pharmacotherapy and Clinical Pharmacy 69 Pekarska Street, Lviv,79010, Ukraine phone:+38 (032)2587410, phone/fax: +38(032)2944748, 11 Mykolaichuka Street, Lviv, 79059, Ukraine e-mail: kaf_clinicalpharm@meduniv.lviv.ua
Head of Department (contact e-mail)	Zimenkovskyi Andrii Borysovych, Doctor of Medicine, Professor, Merited Figure of Science and Technology of Ukraine, azimenkovsky@ukr.net
Academic years cheduled for course teaching	V
Semester/Terms cheduled for course teaching	10
Course type (compulsory/optional)	Optional
Course Instructors	N.H. Stepaniuk, Doctor of Medicine, associate Professor, natali.stepanuyk@gmail.com O.I. Lopatynska– PhD in Pharmaceutical Sciences, associate professor, Oksana.lo@gmail.com Ch.I. Makuch - PhD in Pharmaceutical Sciences, associate professor, makuh.hrystyna@gmail.com O.B. Boretskka - PhD in Pharmaceutical Sciences, assistant professor, o.boretska@gmail.com O. Yu. Horodnycha– PhD in Pharmaceutical Sciences, assistant professor, gor.oxana.27@gmail.com M.M. Zayats - PhD in Pharmaceutical Sciences, associate professor, zayatsmarta@gmail.com Yu. S. Nastiukha – PhD in Pharmaceutical Sciences, associate professor, y.nastyukha@gmail.com T. B. Ryvak – PhD in Pharmaceutical Sciences, assistant professor, tanusha1905@gmail.com M.Ia. Sech - PhD in Pharmaceutical Sciences, assistant professor, pidgirna2016@ukr.net S.D. Babliak– PhD in Medical Sciences, assistant professor bablserg2@gmail.com

ErasmusYes/No (course access for students within *Erasmus*+Programme)	No access
Person in charge of Syllabus	O.I. Lopatynska– PhDin Pharmaceutical Sciences, associateprofessoratthe Department of Healthcare Management, Pharmacotherapy and Clinical Pharmacy, Oksana.lo@gmail.com
ECTS credits	15
Course in struction hours (lectures/workshop classes/individual work and self-studying)	4/24/420
Language of tuition	English
Information about tutorials	Tutorials are held according to scheduled time, both offline (face-to-face) and online with the use of information and communication technology means available to students and teachers.
Clinical base address, contact phone and regulations (if needed)	

2. Short annotation to the course

The elective course of «Research methodology in clinical pharmacy relevant to Master's thesis research topic» is one of the educational components within the range of courses oriented towards the training of professional competences of specialists in «Pharmacy, industrial pharmacy» programme subject area.The syllabus lays the foundations for pharmacist professional performance in rational pharmacotherapy procedures and high-quality provision of pharmaceutical care service.

3.The aims and objectives of the academic discipline.

1.1. The course **teaching goal** in «Research methodology in clinical pharmacy relevant to Master's thesis research topic» is to develop higher education students' basic knowledge and skills in research methodology, application of scientific research methods and organization of research activity to ensure their professional socialization as researchers and to provide an underlying basis for writing graduate (Master's) theses.

1.2. The course **learning objectives** in «Research methodology in clinical pharmacy relevant to Master's thesis research topic» are oriented towards the training of professionals able to solve complex tasks and problems in clinical pharmacy and equipped with necessary knowledge and skills to manage planning, writing and defending a Master's thesis, therefore, demonstrating the ability to analyze advanced scientific evidence-based information in carrying out clinical pharmaceutical scientific research.

1.3 The course facilitates development of **competencies** and achievement of student **learning outcomes** within interrelationship with the normative content of higher education applicants training, formulated in terms of learning outcomes in the Standard of Higher Education.

According to the requirements of the Standard of Higher Education, the course of «Research methodology in clinical pharmacy relevant to Master's thesis research topic» ensures that students acquire the following ***competencies:***

- ***integral*:**

Ability to solve typical and complex specialized tasks and practical problems in professional activity in the area of pharmacy using the principles, theories and methods of fundamental, chemical, technological, biomedical, social and economic sciences; integrate knowledge to resolve complex issues; formulate sound judgements in the experiences of processing insufficient or limited information; communicate one's conclusions and convey knowledge clearly and unambiguously, providing compelling rationale to professional as well as to non-professional audience;

- ***general:***

GC 01. Ability to think abstractly, logically, analytically and synthetically.
GC 02. Knowledge and understanding of the subject area; understanding of professional activity and professional awareness.
GC 03. Ability to establish both oral and written communication in a national language.
GC 04. Ability to communicate in a foreign language (mainly English) fluently enough to ensure effective professional practice.
GC 05. Ability to assess and ensure high standard quality of work performance.
GC 06. Skills of teamwork.
GC 08. Ability to preserve, strengthen and promote moral, cultural, scientific values and achievements of society through understanding of the history, development patterns and principles of pharmacy, its significance in the general system of knowledge about the nature and society, in the development of society and in technological progress; capacity to use various types and forms of physical active recreation and maintain a healthy lifestyle.
GC 09. Ability to use information and communication technologies.

- ***professional (subject area):***

PC 01. Ability to integrate knowledge and solve complex pharmacy/industrial pharmacy problems within the range of broad or multidisciplinary contexts.
PC 03. Ability to solve pharmacy problems in new or non-standard environments under conditions of being given insufficient or limited information and taking into account the issues of social and ethical responsibility.
PC 04. Ability to clearly and unambiguously convey one's own knowledge, findings and arguments in the field of pharmacy to professionals and non-professionals, in particular to learners.
PC 05. Ability to demonstrate and apply communication skills and fundamental principles of pharmaceutical ethics and deontology in practical activities.
PC 07. Ability to conduct sanitary and educational work among the population for the purpose of prevention and protection from common, dangerous infectious, viral and parasitic diseases, promotion of timely detection and support of adherence to treatment of these diseases in accordance with their biomedical characteristics and microbiological features.
PC 08. Ability to maintain rational use and provide advice on prescription and non-prescription medicines as well as other pharmacy products, to conduct pharmaceutical care in drug selection and sale by assessing the risk/benefit ratio, compatibility, with due regard to biopharmaceutical, pharmacokinetic, pharmacodynamic, physico-chemical and chemical characteristics of medicines, indications/contraindications for their use, in accordance with health status data for a particular patient.
PC 09. Ability to provide first aid to patients and injured persons in extreme situations and in case of emergencies.
PC 10. Ability to monitor drug efficacy and safety of medicines in their public use according to data on clinical and pharmaceutical characteristics of medicinal products.
PC15. Ability to review and evaluate the social and economic processes in the area of pharmacy, to conduct analysis of the forms, methods and functions of the public system of pharmaceutical service provision and its components in global practice, to assess and monitor the indicators of public demand for pharmaceutical care service, its effectiveness, availability and accessibility with reference to medical insurance, pharmaceutical pricing and medicine reimbursement policies.

4. Prerequisites of the course

Teaching and learning within the elective course framework of «Research methodology in clinical pharmacy relevant to Master's thesis research topic» as a curriculum educational component is based

on the students study of the following science courses: «Anatomy», «Physiology», «Basic concepts in biology related to genetics», as well as such professionally oriented courses as «Information technologies in pharmacy», «Basic concepts in microbiology related to immunology», «Ethics and deontology in pharmacy», «Pathological physiology», «Pharmacology», «Pharmacotherapy and pharmacokinetics», «Clinical pharmacy and pharmaceutical care», «Pharmacoeconomics», «Pharmaceutical technology», «Pharmacy organisation and economics».

5.Program learning outcomes

List of learning outcomes

Learning outcome code	The content of the learning outcome	Link to the matrix code Competencies
Kn-1	Know the general characteristics of scientific research processes in clinical pharmacy.	*LO -01, LO -02, LO -03, LO -04, LO -06, LO -08, LO -09*
Kn -2	Know the components of the health care system, planning and evaluation of scientific research.	*LO -01, LO -02, LO -03, LO -05, LO -06, LO -08, LO -09*
Kn -3	Know the functionality and principles of using general and special application programs to solve professional problems.	*LO -02, LO -03, LO -05, LO -06, LO -08, LO -09*
Kn -4	Know the principles of formulating a clinical-pharmaceutical request and interpreting the results of scientific research.	*LO -02, LO -03, LO -04, LO -06, LO -08, LO -09*
Kn -5	Know the methodological aspects of conducting clinical-pharmaceutical, clinical-pharmacological, pharmacoeconomic, pharmacoepidemiological scientific research.	*LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -24, LO -26*
Kn -6	Know the peculiarities of implementing the results of scientific research into the production process and practical health care.	*LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -10, LO -11, LO -24, LO -26*
Kn -7	Know the basic methods of statistical data analysis.	*LO -02, LO -03, LO -06, LO -08, LO -09, LO -26*
Kn -8	Know the general provisions regarding the preparation of writing, design and defense of a final qualification (master's) thesis.	*LO -01, LO -02, LO -03, LO -04, LO -06, LO -08, LO -09, LO -11, LO -24, LO -26*
Kn -9	Know the principles of rational use of prescription and non-prescription drugs in accordance with the characteristics of a specific disease and evidence-based approaches to its treatment.	*LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -10, LO -11, LO -12, LO -26*
Kn -10	Know the principles of monitoring the effectiveness and safety of the use of medicinal products according to data on their clinical and pharmaceutical characteristics.	*LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -11, LO -13, LO -24, LO -27*
Kn -11	Know the main mechanisms of state regulation of pharmaceutical activity and the principles of organizing the provision of pharmaceutical care to the population	*LO -01, LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -10, LO -11, LO -12, LO -26, LO -27*
Sm-1	To be able to carry out professional activities using high-quality databases, Internet resources, software and other information and communication technologies.	*LO -02, LO -03, LO -04, -06, LO -08, LO -09, LO -26*

Sm -2	Be able to search for scientific sources of information; to choose the methods of scientific research; use methods of mathematical analysis and modeling, theoretical and experimental research in pharmacy.	*LO -01, LO -02, LO -03, LO -04, LO -06, LO -08, LO -09, LO -24, LO -26*
Sm -3	To be able to solve complex tasks and problems when planning, writing and defending a final qualification paper, which demonstrates the ability to analyze modern evidentiary information for the purpose of carrying out scientific research in the clinical and pharmaceutical direction.	*LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -10, LO -24, LO -26*
Sm -4	Be able to independently monitor the effectiveness and safety of the use of medicinal products by the population 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 the patient.	*LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -11, LO -13, LO -24, LO -27*
Sm -5	Be able to work with clinical and pharmaceutical information, process it and present it in abstract form.	*LO -01, LO -02, LO -03, LO -04, LO -06, LO -08, LO -09, LO -24, LO -26*
C-1	To establish connections with subjects of practical activity.	*LO -03, LO -05, LO -06, LO -08, LO -09, LO -10*
C -2	Apply knowledge in practical situations	*LO -03, LO -05, LO -06, LO -08, LO -09, LO -10, LO -11, LO -12, LO -13, LO -24*
C -3	Apply abstract thinking, analysis and synthesis, be able to learn and be modernly educated.	*LO -01, LO -02, LO -03, LO -04, LO -06, LO -08, LO -09*
C -4	To show initiative and entrepreneurship in professional activities.	*LO -05, LO -06, LO -09, LO -10*
C -5	Apply knowledge and understanding of the subject area and understanding of professional activity in practical activities.	*LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -10, LO -11, LO -12, LO -13, LO -24, LO -27*
C -6	Be able to adapt and act in a new situation.	*LO -05, LO -06, LO -09*
C -7	Use information data from scientific sources.	*LO -01, LO -02, LO -03, LO -04, ПLO -06, LO -08, LO -09, LO -24, LO -26*
C -8	Form a communication strategy in professional activities.	*LO -03, LO -04, LO -05, LO -10, LO -11, LO -12, LO -13*
C -9	Evaluate and ensure quality performance of works.	*LO -02, LO -03, LO -06, LO -09*
C -10	Conduct research at the appropriate scientific level.	*LO -01, LO -02, LO -03, LO -06, LO -08, LO -09*
C -11	To be able to ensure the rational use of prescription and non-prescription drugs and other products of the pharmacy assortment in accordance with the physico-	*LO -02, LO -03, ПLO -05, LO -06, LO -08, LO -09, LO -10, LO -11,*

	chemical, pharmacological characteristics, biochemical, pathophysiological features of a specific disease and pharmacotherapeutic schemes of its treatment.	*LO -13, LO -24, LO -27*
C -12	Be able to analyze socio-economic processes in pharmacy, forms, methods and functions of the system of pharmaceutical provision of the population and its components in global practice, indicators of the need, efficiency and availability of pharmaceutical care in terms of medical insurance and reimbursement of the cost of medicines.	*LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -10, LO -11, LO -13, LO -24, LO -26, LO -27*
AR -1	Be responsible for the timeliness of the decisions made.	*LO -02, LO -03, LO -06*
AR -2	Be responsible for professional development with a high level of autonomy.	*LO -02, LO -03, ПРН-06, LO -08, LO -09*
AR -3	To be responsible for quality performance of works.	*LO -02, LO -03, LO -06, LO -09*
AR -4	To be responsible for the development and implementation of planned projects.	*LO -02, LO -03, LO -06, LO -08, LO -09*
AR -5	Be responsible for the validity of management decisions regarding the improvement of the quality of pharmaceutical care.	*LO -02, LO -03, LO -06, LO -08, LO -09, LO -11, LO -27*
AR -6	To be responsible for the implementation of pharmaceutical care when dispensing over-the-counter medicines.	*LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -10, LO -11, LO -26, LO -27*
AR-7	To be responsible for the high-quality and timely use of regulatory documents in professional activities.	*LO -01, LO -02, LO -03, LO -05, LO -06, LO -08, LO -09, LO -26*

6. Course type		
Course type (compulsory/optional)	Optional	
Kind of occupations	Number of hours	Number of groups
Lectures	4	According to the distribution of groups
Practical	26	According to the distribution of groups
Seminars	–	–
Self-study	420	According to the distribution of groups

7. Topics and content of the course				
Class type code	Topic	Learning content	Learning outcome code	Teacher
L-1	Research methodology and scientific methods. Concept of development of electronic health care of Ukraine. Conceptual foundations of the development of Ukrainian electronic	Science and scientific research in the modern world. Theoretical and methodological principles of science. Types and signs of scientific research. Methods of scientific research. Organization of scientific activity in health care in Ukraine. The concept of e-Health development in	*Kn-1, Kn -2, Kn -3, Kn -4, Kn -6, Kn -7, Kn -9, Sm-1, Sm -2, Sm -3, Sm -5, C-2, C-3, C-5, C- 7, AR-1, AR-3*	PhD O.I. Lopatynska

	health care.	Ukraine.		
L-2	Organisation and information support of researchin clinical pharmacy.	General characteristics of scientific research processes in clinical pharmacy. Formulation of the topic of scientific research and definition of a working hypothesis in clinical pharmacy. Determination of the goal, tasks, object and subject of research in clinical pharmacy. Carrying out theoretical and applied scientific research in clinical pharmacy.	*Kn -1, Kn - 4, Kn -11, Sm-1, Sm - 2, Sm -3, Sm -5, C-1, C-2, C-3, C-4, C-5, C- 7, C-9, C- 10, AR-2, AR-3, AR-4, AR-5*	PhD O.I. Lopatynska
P-1	Research methodology and scientific methods. Basic information about the two-level architecture of the electronic health care system (EHS) in Ukraine. Central EHS database.	Science and scientific research in the modern world. Theoretical and methodological principles of science. Types and characteristics of scientific research. Research methods in science. Organizational features of healthcare research activities in Ukraine. General characteristics of scientific research processes in clinical pharmacy. Research problem (topic) formulation, generation and statement of a working hypothesis in clinical pharmacy. Defining the goal, research objectives, the object and subject of research in clinical pharmacy. Carrying out theoretical and applied research in clinical pharmacy. Electronic health care system as a two-level architecture, including a central database and medical information systems.	*Kn-1, Kn - 2, Kn -3, Kn -4, Kn -6, Kn -7, Kn - 9, Sm-1, Sm -2, Sm -3, Sm -5, C-2, C-3, C-5, C- 7, AR-1, AR-3, AR-7*	According to load distribution
P-2	Methodological aspects of evidence-based searching for clinical pharmaceutical information in clinical pharmacy research.	Search system services in the main evidence-based medicine databases. Basic approaches to searching MEDLINE for scholarly articles. Benefits of clinical inquiry-based information retrieval. Conceptual framework of the MeSH system of health care	*Kn-1, Kn - 2, Kn -4, Kn -11, Sm-1, Sm -2, Sm - 3, Sm -4, Sm -5, C-2, C-3, C-5, C-7, C-9, C-10, AR-1, AR-3, AR-5,*	According to load distribution

		indicators. Structured question elements as search terms. Structure of the Cochrane Library. Evidence-based medicine online resources: NICE, SIGN, EMBASE, MEDLINE/PubMed, Cochrane Library, CINAHL, Clinical Evidence databases. Principles of formulating a clinical pharmaceutical query and interpretation of clinical research results. Evidence rating scale in research, levels of evidence/hierarchy of evidence. Assessment of clinical research methodological quality. Criteria for the assessment of research results and clinical endpoints. Pharmacoepidemiological studies as the main source of information on medicine efficacy and safety. Evidence-based approach to pharmacotherapy of common diseases as one of the current directions of healthcare service development in Ukraine. Structure of evidence-based research methodology (technically user-friendly and professionally oriented levels). Systematization of evidence-based information by keywords, phrases, authors. Simple and complex information search, authorization and registration on websites and in specific databases. Specific examples of methodology implementation and producing an evidence-based report. Clinical and drug information resources and forms of data retrieval and provision to specialists.	*AR-6*	
P-3	The nature and scope of clinical pharmaceutical,	Principles of conducting and methodological aspects of clinical pharmaceutical,	*Kn-3, Kn - 5, Kn -7, Sm-1, Sm -*	According to load distribution

	clinical pharmacological, pharmacoeconomic and pharmacoepidemiological research. Risk management during the implementation of information systems and technologies. Principles of introduction of cyber culture.	clinical pharmacological, pharmacoeconomic and pharmacoepidemiological scientific research. Research Regulatory Documentation. Guidelines for research planning and conducting. Data sources and information provision for clinical pharmaceutical, clinical pharmacological, pharmacoeconomic and pharmacoepidemiological research. Risk management of the introduction of modern medical information systems and technologies in Ukraine. Development of cyber culture in the pharmaceutical educational and scientific environment: modern digital learning tools and principles of academic integrity.	*2, Sm -3, Sm -4, Sm -5, C-2, C-3, C-5, C-7, C-11, C-12, AR-2, AR-3, AR-5, AR-7*	
P-4	Interpretation, presentation, forms of implementation and use of research findings in clinical pharmacy. Protection of the patient's personal data when working with information and communication systems of electronic health care.	Types and features of presentation of research findings. Forms of reporting in scientific research. Presentation of numerical data findings obtained in scientific research. Statistical analysis of scientific research results. Theoretical validation of the results within the framework of a relevant clinical pharmacy branch. Graphical, tabular and other types of visual presentation of scientific research findings. Main types of research publications. Methods of preparation and formatting the manuscripts for scholarly publication. Strategies of research finding implementation into the processes of production industry and health care practices. Acts of implementation, information letters, clinical and pharmaceutical reports. Key aspects of protection and	*Kn-1, Kn -3, Kn -4, Kn -6, Kn -7, Sm-1, Sm -2, Sm -3, Sm -5, C-2, C-3, C-5, C-6, C-7, C-8, C-9, C-11, AR-2, AR-3, AR-4, AR-5*	According to load distribution

		processing of personal data in the electronic health care system.		
P-5	Graduate (Master's) thesis: preparation, writing, formatting, defense. Text, spreadsheet and presentation software from the world's leading suppliers.	Basic principles of Master's thesis, its structure and scope. General guidelines on Master's thesis preparation. Overview of scientific procedures, techniques and instruments of conducting Master's thesis research in clinical pharmacy (preliminary examination of the source materials and scholarly literature; statement of the research problem and goal; examining the problem while working with literary sources; clarification of the goal, definition of the object and subject of research; development of a thesis plan; systematic accumulation of materials; summary and mathematical processing of the results; theoretical validation of research findings; formulation of conclusions; implementation of research results into health care practices). Master's thesis individual plan: basic requirements and structure. Master's thesis supervision. Standard formatting requirements for writing a Master's thesis. Procedures for thesis reviewing and preparation for defense. Thesis defense policies and formal procedure for a Master's thesis public defense.	*Kn-3, Kn -8, Kn -9, Kn -10, Kn -11, Sm-1, Sm -2, Sm -3, Sm -4, Sm -5, C-2, C-3, C-5, C-6, C-7, C-8, C-9, C-10, AR-2, AR-3, AR-4, AR-5, AR-7*	According to load distribution
IW-1	Research methodology and scientific methods. Basic information about the two-level architecture of the electronic health care system (EHS) in Ukraine. Central EHS	Theoretical and methodological principles of science. Types and signs of scientific research. Methods of scientific research. Organization of scientific activity in health care in Ukraine. General characteristics of scientific	*Kn-1, Kn -2, Kn -3, Kn -4, Kn -6, Kn -7, Kn -9, Sm-1, Sm-2, Sm-3, Sm-5, C-2, C-3, C-5, C- 7, AR-1,*	According to load distribution

	database.	research processes in clinical pharmacy. Formulation of the topic of scientific research and definition of a working hypothesis in clinical pharmacy. Determination of the goal, tasks, object and subject of research in clinical pharmacy. Carrying out theoretical and applied scientific research in clinical pharmacy. Electronic health care system as a two-level architecture, including a central database and medical information systems.	*AR-3, AR-7*	
IW-2	Methodological aspects of evidence-based searching for clinical pharmaceutical information in clinical pharmacy research.	Search system in the main computer databases of evidence-based medicine. Basic approaches to finding articles in MEDLINE. Benefits of clinical inquiry-based information retrieval. The concept of the system of medical indicators MeSH. Structured question components as search terms. Structure of the Cochrane Library. Other Internet resources of evidence-based medicine: NICE, SIGN, MedLine/PubMed, CochraneLibrary databases. Principles of formulating a clinical-pharmaceutical request and interpretation of clinical research results. Scale of levels of evidence in research, hierarchy of evidence. Assessment of the methodological quality of clinical research. Criteria for evaluation of results and endpoints of clinical trials.	*Kn-1, Kn -2, Kn -4, Kn -11, Sm-1, Sm -2, Sm -3, Sm -4, Sm -5, C-2, C-3, C-5, C-7, C-9, C-10, AR-1, AR-3, AR-5, AR-6*	According to load distribution
IW-3	The nature and scope of clinical pharmaceutical, clinical pharmacological, pharmacoeconomic and pharmacoepidemiological research. Risk management during	Principles of conducting and methodological aspects of clinical-pharmaceutical, clinical-pharmacological, pharmacoeconomic, pharmacoepidemiological scientific research. Normative documents on conducting research. Rules for planning and conducting research.	*Kn-3, Kn -5, Kn -7, Sm-1, Sm -2, Sm -3, Sm -4, Sm -5, C-2, C-3, C-5, C-7, C-11, C-12, AR-2, AR-3, AR-5, AR-7*	According to load distribution

	the implementation of information systems and technologies. Principles of introduction of cyber culture.	Information provision of clinical-pharmaceutical, clinical-pharmacological, pharmacoeconomic, pharmacoepidemiological scientific research. Risk management of the introduction of modern medical information systems and technologies in Ukraine. Development of cyber culture in the pharmaceutical educational and scientific environment: modern digital learning tools and principles of academic integrity.		
IW-4	Interpretation, presentation, forms of implementation and use of research findings in clinical pharmacy. Protection of the patient's personal data when working with information and communication systems of electronic health care.	Types and features of presenting the results of scientific research. Forms of reporting in scientific research. Presentation of numerical data obtained as a result of scientific research. Statistical analysis of the results of scientific research. Theoretical substantiation of the results within the framework of the relevant direction of clinical pharmacy. Graphical, tabular and other types of visual representation of the results of scientific research. Main types of publications. Methods of preparation and design of publications. Key aspects of protection and processing of personal data in the electronic health care system.	*Kn-1, Kn -3, Kn -4, Kn -6, Kn -7, Sm-1, Sm -2, Sm -3, Sm -5, C-2, C-3, C-5, C-6, C-7, C-8, C-9, C-11, AR-2, AR-3, AR-4, AR-5*	According to load distribution
IW-5	Graduate (Master's) thesis: preparation, writing, formatting, defense. Text, spreadsheet and presentation software from the world's leading suppliers.	The essence of the qualification (master's) thesis, its structure and scope. General provisions on the preparation of a final qualification (master's) thesis. Scientific apparatus of master's research in clinical pharmacy. Procedures for review and preparation for the defense of works. The content of the defense procedure and the procedure for the public defense of the	*Kn-3, Kn -8, Kn -9, Kn -10, Kn -11, Sm-1, Sm -2, Sm -3, Sm -4, Sm -5, C-2, C-3, C-5, C-6, C-7, C-8, C-9, C-10, AR-2, AR-3, AR-4, AR-5, AR-7*	According to load distribution

		master's thesis.		

8.Verification of learning outcomes

Current control

Is carriedout during training sessions and aims to check the assimilation of students of educational material (it is necessary to describe the forms of current control during training sessions). Forms of assessment of current educational activities should be standardized and include control of theoretical and practical training. The final grade for the current educational activity is set on a 4-point (national) scale

Learning outcome code	Classtype code	Method of verifying learning outcomes	Enrollment criteria
Kn-1, Kn -2, Kn -3, Kn -4, Kn -5, Kn -6, Kn -7, Kn -8, Kn -9, Kn -10, Kn -11, Sm-1, Sm -2, Sm -3, Sm -4, Sm -5, C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10, C-11, C-12, AR-1, AR-2, AR-3, AR-4, AR-5, AR-6, AR-7	*L-1, P-1, IW-1, P-2, IW-2, P-3, IW-3, P-4, CPC-4, P-5, IW-5*	Current control is carried out in a practical lesson. Forms of assessment of current educational activities are standardized and include control of theoretical and practical training in the form of testing (written, computer).At each practical lesson, the student answers a test of 20 questions, which includes questions of the 1st and 2nd level (situational task) of complexity. Each test on the topic of the relevant practical lesson includes standardized questions, knowledge of which is necessary to understand the current topic, the material of the lecture course and independent work.	The minimum number of correct answers required for enrollment is 11. **Evaluation criteria:** 0-9 answers - "2". 10-13answers - "3" 14-17answers - "4" 18-20 answers - "5"

Final control

General evaluation system	Participation in the work during the semester -100% on a 200-point scale	
Scales assessment	Traditional 4-point scale, multi-point (200-point) scale, ECTS rating scale	
Conditions of admission to final control	The student attended all practical (laboratory, seminar) classes and received at least 120 points for the current academic performance	
Type of summary control	Methodology of final control	Enrollment criteria
Assessment and defense of the master's thesis	The semester credit for the discipline is carried out after the end of the corresponding semester, before the beginning of the examination session. A student is considered admitted to the semester credit for the academic discipline if he has attended all the classroom training sessions provided for in the curriculum for the discipline, completed all types of work provided for in the work program of this educational discipline, and while studying it	The maximum number of points a student can score when taking a test is 200. The minimum number of points for the assessment is at least 120. The maximum number of points that a student can score for a master's project is 200. The minimum number of

	during the semester has scored a number of points not less than the minimum. The grade for the performance of the qualification work is issued on the basis of the assessment of the level of performance of the content part and the level of its public defense and is recorded in the minutes of the meeting of the examination board. The evaluation of the applicant for higher education for the content part of the graduation qualification work is formed by the examination commission in points (from 0 to 120 points) taking into account the feedback of the scientific supervisor (0-100 points) and the review of the external reviewer (0-20 points). Graduation qualification work is not allowed to be defended, if the assessment of the content part of the work is less than 51 points. The level of public defense of the graduation thesis is evaluated by the examination committee in points (from 0 to 80 points), taking into account the following main criteria: conciseness and logic of the report, quality of demonstration material, answers to questions, ability to lead a discussion on the topic of the work. In the event that the evaluation of the defense of the final qualifying work is less than 50 points, it is considered not to be defended.	points for a master's project is at least 120.

The maximum number of points that a student can score for in-process learning performance in studying the course is 200 points.

The minimum number of points that a student is required to receive in the in-process learning performance assessment to become credited in the course is120 points.

The calculation of the number of points is made on the basis of the grades received by the student on a 4-point (national) scale during the course study, by determining the arithmetic mean (AM), rounded to two decimal places. The obtained value is converted into points on a multi-point scale as follows:

$$x = \frac{CA \times 200}{5}$$

9. Course policy

The policy of the course is determined by the system of requirements for the student when studying the discipline «Research methodology in clinical pharmacy relevant to Master’s thesis research topic»and is based on the principles of academic integrity. Students are explained the value of acquiring new knowledge, the need to independently perform all types of work, tasks provided by the syllabus of this educational discipline. Lack of references to used sources, fabrication of sources, plagiarism, interference in the work of other students are examples of possible academic dishonesty.

The detection of signs of academic dishonesty in a student's work is a reason for the teacher not to enroll it, regardless of the scale of plagiarism or deception. Literary sources can be provided by the teacher exclusively for educational purposes without the right to transfer them to third parties. Students are encouraged to use other literary sources not included in the recommended list.

When organizing the educational process, students, teachers and administration act in accordance with:
Regulations on the organization of the educational process (https://cutt.ly/3ySk64r);
Regulations on evaluation criteria and rules (https://cutt.ly/lySlyw0);
Regulations on academic integrity (https://cutt.ly/EySkNHu)

10. References

Primary references

1. DSTU 3008-95. *Documentation. Reports in the field of science and technology. Structure and rules of formatting*. [Data file]. Retrieved from http://surl.li/rvct
2. DSTU 8302:2015. *Information and documentation.* [Data file]. Retrieved from http://surl.li/rvcx
3. *Law of Ukraine On Higher Education* No. 1556-VII. (2014, July 1). [Data file].Retrieved from http://surl.li/rvcz
4. *Law of Ukraine On Protection of Rights to Inventions and Utility Models* No. 3687-XII. (2012, December 5). [Data file]. Retrieved from http://surl.li/rvda
5. *Law of Ukraine On Innovative Activity* No. 40-IV. (2012, December 5). [Data file]. Retrieved from http://surl.li/rvdb
6. *Law of Ukraine On scientific and scientific and technical activity* No. 848-VIII. (2015, November 26). [Data file]. Retrieved from http://surl.li/rvdc
7. Chernykh, V.P., & Zupanets, I.A. (Eds.). (2011). *Clinical pharmacy (pharmaceutical care): textbook for students of higher educational medical institutions in the programme subject area of "Pharmacy"*. Kharkiv: Zoloti storinky [in Ukrainian].
8. Zupanets, I.A., Chekman, I.S., Popov, S.B., Naliotov, S.V., Propisnova, V.V. (2010). *Clinical pharmacy: Teaching-methodological practicum: teaching manual for students of higher educational institutions*. (L.V. Brun, Trans). Kharkiv: Zoloti storinky [in English].
9. *Code of academic ethics of Lviv National Medical University named after Danylo Halytskyi.* (2019). [Data file]. Retrieved from http://surl.li/rvdd
10. *Methodological guidelines on supporting the principles of academic integrity.* (2018). [Data file]. Retrieved from http://surl.li/rvdg
11. *Order of the Ministry of Education and Culture of Ukraine "Regulations on the organization of scientific, scientific and technical activities in higher educational institutions of III and IV levels of accreditation"* No. 422. (2006, June 1). [Data file]. Retrieved from http://surl.li/rvdh
12. *Scientific professional publications.* [Data file]. Retrieved from http://surl.li/rvdi
13. Zimenkovskyi, B.S., Grzegotskyi, M.R., Hromovyk, B.P., Lesyk, R.B., Solonynko, I.I., Vashchenko, O.O., Kaminskyi, etal. (2019). *Regulations on the preparation and defense of the graduate qualifying thesis by the students of the Faculty of Pharmacy of Lviv National Medical University named after Danylo Halytskyi.* Lviv: Lviv National Medical University named after Danylo Halytskyi. [in Ukrainian].
14. *Regulations on the procedure of preparing scientific research papers, educational and teaching-methodological literature resources for the publication at Lviv National Medical University named after Danylo Halytskyi.* (2019). [Data file]. Retrieved from http://surl.li/rvdl
15. Bezditko, N.V., Blikher, V.E., Zimenkovskyi, A.B., Zupanets, I.A., LishchyshynaO.M. (2011). *Protocols for a pharmacist on dispensing non prescription medicines: a doctor's guide.* Kyiv: Doctor-Media [in Ukrainian].
16. Khukhlina, O.S., Tkach, E.P., Chursina, T.Ya. (2011). *Pharmaceutical care: selected issues: teaching manual.* Vinnytsia: Nova Knyha [in Ukrainian].

Secondary references

1. Mokin, B.I., Mokin, O.B. (2015). *Methodology and organization of scientific research: teaching manual*. (2nd ed., rev.). Vinnytsia: VNTU [in Ukrainian].
2. Vazhynskyi, S.E. (2016). *Methodology and organization of scientific research: teaching manual.* Sumy: Sumy State Pedagogical University named after A. Makarenko [in Ukrainian]. Methodology and organization of scientific research: study guide. Sumy: Sumy State Pedagogical University named after

A. Makarenko [in Ukrainian].
3. Gallin, D.I. (2013). *Principles and practice of clinical research.* Moskva: Prakticheskaia meditsyna [in Russian].
4. Davtian, L.L., Zahorii, H.V., Voronenko, Yu.V., Korytniuk, R.S., Voitenko, H.M. (2011). *Drug interactions and drug safety: study guide.* Kyiv: Bludchyi M.I. [in Ukrainian].
5. Denysiuk, V.I., Denysiuk, O.V. (2011). *Evidence-based internal medicine: textbook for students of higher educational medical institutions of accreditation levels III - IV.* Vinnytsia: DP DKF [in Ukrainian].
6. Drogovoz, S.M., Gudzenko, A.P., Butko, Y.A., DrogovozV.V. (2010). *Side effects of drugs: textbook-reference.* Kharkov: SIM [in Russian].
7. Zatserkovnyi, V.I., Tishaev, I.V., Demydov, V.K. (2017). *Methodology of scientific research: teaching manual.* Nizhyn: Nizhyn State University named after M. Hohol. [Data file]. Retrieved from http://surl.li/rvdo
8. Kornatskyi, V.M., Silantieva, O.V. (2010). *Ethical aspects of drug research in Ukraine.* Kyiv [in Ukrainian].
9. Zimenkovskyi, A.B., Dumenko, T.M., Matveieva, O.V., Boretska, O.B., NastIukhaYu.S., Zaiats, M.M., Yeremeieva, etal. (2015). *Management of the patient's medication behavior: methodological guidelines.* Lviv: Lviv National Medical University named after Danylo Halytskyi, Department of Operative Printing [in Ukrainian].
10. Zimenkovskyi, A.B., Morozov, A.M., Stepanenko, A.V. (2011). *A unified method for pharmacotherapy evaluation based on prescriptions: methodological guidelines*, MHU. Kyiv, Lviv: Ukrainian Center for Scientific Medical Information and Patent Licensing , Lviv National Medical University named after Danylo Halytskyi, Department of Operative Printing [in Ukrainian].
11. Matvieieva, O.V., Chekman, I.S., Naliotov, S.V. (2013). *Pharmacovigilance and approaches to its implementation: methodological guidelines*, MHU. Kyiv: Ukrainian Center for Scientific Medical Information and Patent Licensing [in Ukrainian].
12. Chmylenko, F.O., Zhuk, L.P. (2014). *A guide to studying the course of "Methodology and organization of scientific research"*. D.: RVVDNU [in Ukrainian].
13. Yurynets, V.E. (2011). Methodology of scientific research: teaching manual. Lviv: LNU named after Ivan Franko [in Ukrainian].

Online resources

1. Compendium online. [Data file]. Retrieved from https://compendium.com.ua/bad
2. Internal diseases: a web portal for doctors [Data file]. Retrieved from http://empendium.mp.pl/ua
3. State Register of Medicinal Products of Ukraine. [Data file]. Retrieved from http://surl.li/rvdq
4. Chumak, V.T., Maltsev, V.I., Morozov, A.M., Pariia, V.D., Stepanenko, A.V. State formulary of medicinal products. 1 - 12. Kyiv: Morion [in Ukrainian].
5. Legislation of Ukraine [Data file]. Retrieved from https://zakon.rada.gov.ua/laws.
6. Order of the Ministry of Health of Ukraine "On approval of pharmacist protocols" No. 875. (2013, October 11)
7. Normative and regulatory documents of the Ministry of Health of Ukraine [Data file]. Retrieved from http://mozdocs.kiev.ua/
8. Cochrane Library search database [Data file]. Retrieved from https://www.cochranelibrary.com
9. MEDLINE search database [Data file]. Retrieved from https://www.nlm.nih.gov/bsd/medline.html.
10. Medscape search database [Data file]. Retrieved from http://www.medscape.com/pharmacists.

11. Equipment, logistical and software support of the discipline/course

To ensure a high level of training of future specialists when studying the discipline «Research methodology in clinical pharmacy relevant to Master's thesis research topic», modern interactive methods of teaching the educational discipline are used: lectures are delivered in the format of multimedia presentations, online access to Internet resources is provided during classes, the system of current control of students' knowledge is fully automated and is conducted on the basis of open computer testing, a specially equipped computer is functioning. Students have the opportunity to use the library of textbooks and manuals, periodicals, as well as their electronic database.

12. Additional information

Responsible for the educational process at the department is Iryna Mykhaylivna Kovalska, senior teacher, e-mail: kovalskaira@gmail.com.

The department operates a student scientific circle, the direction of which is the principles of finding and using evidence-based information about medicinal products.

During lectures and practical classes, students must wear medical gowns.
Classroom classes are held in the premises of the department at the address:
Lviv, st. Mykolaichuka, 11

Website of the department:
https://new.meduniv.lviv.ua/kafedry/kafedra-menedzhmentu-v-ohoroni-zdorov-ya-farmakoterapiyi-i-klinichnoyi-farmatsiyi/

Syllabus head instructor and author

PhDin Pharmaceutical Sciences,
Associate professor _____ Oxana Ivanivna Lopatynska

Acting head of the department
Doctor of Medicine, Professor,
Merited Figure of Science and
Technology of Ukraine _____Andrii Borysovych Zimenkovskyi