MINISTRY OF HEALTH OF UKRAINE
NATIONAL UNIVERSITY OF PHARMACY
Faculty pharmaceutical
Department pharmaceutical technology of drugs

WORK PLACEMENT IN PHARMACY BASED TECHNOLOGY OF DRUGS

(name educational components)

WORK PROGRAM
of educational component

training __ **second master's level** _____

(name of higher education level)

field of knowledge __ **22 Public Health** _____

(code and name of field of knowledge)

in specialty __ **226 Pharmacy, industrial pharmacy** _____

(code and specialty name)

of educational program _ **Pharmacy (for foreign students)** _____

(name of educational program)

in specialization(s) _____

(name of specialization, if available)

2024 year
year of creation

The work program of the educational component Work placement in Pharmacy based Technology of Drugs specialty 226 Pharmacy, industrial pharmacy of the educational program Pharmacy Fm (4.10d), Fm* (4.10d) and for students of higher education in the 5th year of full-time education.

Developers:

Liliya VYSHNIEVSKA, head of the department of pharmaceutical technology of drugs, Doctor of Pharmacy, professor
Svitlana OLIYNYK, associate professor of a higher education institution of the pharmaceutical technology of drugs department, Ph.D.,
Maryna BURYAK, associate professor of a higher education institution of the pharmaceutical technology of drugs department, Ph.D.

(indicate SURNAME, name of authors, their positions, scientific degrees and scientific titles)

Work program has been considered and approved at the Department meeting
Pharmaceutical Technology of Drugs
Record from of August 30, 2024 No. 1

Head of the department_____ prof. Liliia VYSHNEVSKA

Work program has been approved at the meeting of the Methodical Commission of technological disciplines
Record from of September 05, 2024 No. 1

/Head of the specialized commission _____ prof. Olena RUBAN

1. Description educational component

Language of study: English
Status of the educational component: obligatory
Prerequisites for studying the educational component: based on the study of the technology of drugs of pharmacy production; the educational component, along with other professional OCs, contributes to the formation of technical and pharmaceutical thinking necessary for the pharmaceutical specialty;
together with other professionally-oriented educational components and social sciences, industrial pharmaceutical practice in the technology of drugs of pharmacy production plays an important role in providing special technological training for the implementation of professional activities.
The subject Work placement in Pharmacy based Technology of Drugs is the main provisions and trends in the development of pharmaceutical technology in the countries of the world and in Ukraine; assimilation of modern principles of regulatory documentation and technologies for the production of medicinal products in various medicinal forms with the use of new groups of auxiliary substances and modern types of equipment in pharmacy conditions .
Information content of the educational component. 3 weeks (135 hours) are allotted for Work placement in Pharmacy based Technology of Drugs **4.5 ECTS credits** .

2. Objectives and tasks of the educational component

The purpose of the educational component «Work placement in Pharmacy based Technology of Drugs» is to consolidate, deepen and expand theoretical knowledge of the pharmaceutical technology of drugs and practical skills in the preparation of solid, liquid, soft, injection, extraction extemporaneous drugs and in-pharmacy preparations , their packaging, labeling and storage taking into account the requirements of good pharmacy practice (GMP); and also acquire skills in performing technological stages (dissolving, grinding, mixing, suspending, emulsifying, dosing, packaging, etc.); implementation of continuous in-pharmacy control; procedure for maintaining production documentation, drawing up technological instructions; use of means of small mechanization, which are necessary to solve specific tasks in the future practical activity of a pharmacist.

The **main tasks of the educational component** «Work placement in Pharmacy based Technology of Drugs» are: deepening of knowledge regarding the technology of various medicinal forms (solid, liquid, soft) based on the theoretical provisions of the technology of medicinal preparations, knowledge of properties, medicinal and auxiliary substances; study of the modern range and physical and chemical properties of medicinal products; assimilation of the requirements of current regulatory documents (GPP and current orders) for the organization of production activities of pharmacies for the manufacture of medicinal products in various dosage forms; use in professional activity of regulatory and legislative acts, requirements of good pharmacy practice (GPP) for the manufacture of medicinal products in pharmacies; formation of higher education candidates' knowledge of the theoretical foundations of technology and practical skills necessary for the manufacture of various types of dosage forms, conducting step-by-step control, ways of improving the technology of dosage forms in the conditions of pharmacies; studying the influence of storage conditions and the type of packaging on the stability of dosage forms.

3. Competence and planned educational outcomes

Competencies and planned learning outcomes, the formation of which is facilitated by the educational component (relationship with the normative content of the training of higher education applicants, formulated in terms of learning outcomes in the Standard).

According to the requirements of the standard, the educational component ensures the acquisition of higher education

- *integral* ***:***

the ability to solve typical and complex specialized tasks and practical problems in professional pharmaceutical activity with the application of provisions, theories and methods of fundamental, chemical, technological, biomedical and socio-economic sciences; integrate knowledge and solve complex issues, formulate judgments based on insufficient or limited information; clearly and unambiguously convey their conclusions and knowledge, rationally justifying them, to a professional and non-specialist audience.

- *general* ***:***

GC 6. Knowledge and understanding of the subject area and understanding of professional activity.
GC 11. Ability to assess and ensure the quality of performed work.

- *special (professional, subject):*

PC 14. The ability to organize and carry out the production activities of pharmacies for the manufacture of medicinal products in various dosage forms according to the prescriptions of doctors and orders of medical institutions, including the justification of technology and the selection of auxiliary materials in accordance with the rules of Good Pharmacy Practice (GPP).

Integrative final *program learning outcomes* (PLO), the formation of which is facilitated by the educational component:
PLO 1. To carry out professional activities in social interaction based on humanistic and ethical principles; to identify future professional activities as socially significant for human health.
PLO 2. To apply knowledge of general and professional disciplines in professional activities.
PLO 3. To adhere to the norms of sanitary and hygienic regime and safety requirements in carrying out professional activities.
PLO 4. To demonstrate the ability to independently search, analyze and synthesize information from various sources and use these results to solve typical and complex specialized tasks of professional activity.
PLO 12. To analyze the information obtained as a result of scientific research, summarize, systematize and use it in professional activities.
PLO 26. To choose rational technology, to make medicines in various dosage forms according to the prescriptions of doctors and orders of medical institutions, to issue them before release. To perform technological operations: weigh, measure, dose a variety of medications by weight, volume, etc. To develop and draw up technological documentation for the manufacture of medicines in pharmacies.

In result the student of higher education must study the educational component

to know **:**

- modern requirements of regulatory documentation regulating the technology and quality control of extemporaneous medicinal products in Ukraine and abroad;
- characterization and classification of dosage forms as dispersed systems ;
- theoretical foundations of technology various medicinal forms;
- rules of rational technology of solid, liquid, soft, sterile and aseptic medicinal forms;
- the influence of the physicochemical properties of medicinal substances on the technology of extemporaneous solid, liquid, soft, sterile and aseptic dosage forms,
- assortment and characteristics of excipients used in the technology of extemporaneous medicinal products;
- assortment and principles of using modern means of small mechanization ;
- quality control medicinal forms;

- stability of extemporaneous medicinal products (types, factors influencing the stability of medicinal products);
- types and tasks of documentation when preparing medicines in pharmacies;

be able:

- ...to work with normative documentation that regulates the prescription, preparation and release of extemporal medicine and intra-pharmacy product, scientific and reference literature;
- ...to be oriented in the classification of medicinal products by application, aggregate state, dispersal characteristics;
- ...select auxiliary substances depending on the properties of medicinal substances and justify the need for their introduction;
- ...calculate the amount of active and auxiliary substances;
- ...choose equipment for the production of extemporal medicine and intra-pharmacy product;
- ...choose and substantiate the optimal technology for the preparation of various medicinal forms, taking into account the physicochemical properties of medicinal substances;
- ...carry out preparation, packaging, labeling of non-sterile and sterile extemporal medicine in various medicinal forms;
- ...use the means of small mechanization and the equipment available in the pharmacy;
- ...select taro packaging material taking into account the properties of the ingredients and the purpose of the medicinal product;
- ...to select labels for labeling extemporal medicine and prepare drugs for release;
- ...to draw up technological instructions for the preparation of intra-pharmacy product;
- ...observe the basic rules of safety and pharmaceutical regime in the pharmacy;
- ...observe the necessary storage conditions of prepared extemporal medicine and intra-pharmacy product.

have:

- ...skills in working with normative documentation regulating the prescription, preparation and release of medical devices, scientific and reference literature ;
- ..skills of working with technological documentation in the pharmacy (use general and technological instructions, make production records in the passport of written control and relevant journals);
- ..method of drawing up technological instructions for extemporal medicine and intra-pharmacy product;
- ..skills to navigate modern requirements for the production of medicinal products, including the requirements of proper manufacturing practice and proper pharmacy practice;
- ..identify physical, chemical and pharmacological incompatibilities, resolve the issue of the possibility of manufacturing and dispensing medicinal products taking into account the compatibility of prescription components;
- ..technological methods of preparation of medicines in various dosage forms;
- ..the skills of calculating active and auxiliary substances for the preparation of extemporal medicine;
- ..skills of working with means of small mechanization, equipment and devices used in extemporal medicine and intra-pharmacy product
- ..methods of carrying out permanent internal pharmacy quality control of extemporal medicine and intra-pharmacy product.

4. Structure educational component

Names of content modules and topics	Volume in hours					
	Full-time					
	everything	including				
		l	family	pz	Lab .	with. p
1	2	3	4	5	6	7
Content module 1. Practical implementation of the main provisions of the pharmacy technology of drugs						
Topic 1. Getting to know the premises and equipment of the pharmacy. Analysis of requirements of good pharmacy practice for premises and equipment of the pharmacy.	18			12		6
Topic 2. Normative documents regulating the production activity of the pharmacy. Work with prescriptions for extemporaneous medicinal products.	18			12		6
Topic 3. Preparation of non-sterile and sterile extemporaneous medicinal products: - preparation of solid extemporaneous medicines; - preparation of liquid extemporaneous medicines; - preparation of soft extemporaneous medicines; - preparation of extemporaneous medicines in aseptic conditions.	63			42		21
Topic 4. Preparation of internal pharmacy preparations, packaging, repackaging. Technological documentation of the production department of the pharmacy.	18			12		6
Topic 5. Packaging, labeling and storage conditions of medicines. Stability of prepared extemporaneous medicines.	14			10		4
Semester credit from module 1	4			2		2
The whole amount of hours module 1	135			90		45
The whole amount of hours	135			90		45

5. Contents of the educational component

Content module 1. Practical implementation of the main provisions of the pharmacy technology of drugs

Topic 1. Getting to know the premises and equipment of the pharmacy. Analysis of requirements of good pharmacy practice for premises and equipment of the pharmacy.

Availability and location of production premises in the pharmacy. Equipping workplaces with the necessary furniture and equipment. Means of small mechanization. Instruction on safety techniques and pharmaceutical procedure in the pharmacy. Normative base regulating the sanitary regime and pharmaceutical order in the pharmacy.

Topic 2. Normative documents regulating the production activity of the pharmacy. Work with prescriptions for extemporaneous medicinal products.

Ensuring the requirements of proper pharmacy practice in the production activity of the pharmacy; regulatory documents regulating the preparation, packaging, labeling and storage of medical

devices in the pharmacy. Documentation of the production process of pharmacies (general and technological instructions, production records). Checking the correctness of prescriptions (requirements), compatibility of prescription ingredients.

Topic 3. Preparation of non-sterile and sterile extemporaneous medicinal products:

- preparation of solid extemporaneous medicines;

- preparation of liquid extemporaneous medicines;

- preparation of soft extemporaneous medicines;

- preparation of extemporaneous medicines in aseptic conditions.

Justification of the method of introduction of medicinal substances with different physicochemical properties into the composition of various forms of extemporal medicine. Nomenclature of solvents and auxiliary substances used in the pharmacy in the preparation of solid, liquid, soft extemporal medicine. Selection of taro-packaging materials. Determination of the sequence of the technological process of various forms of extemporal medicine.

- Preparation of solid extemporal medicine. Calculations of the amount of active and auxiliary substances. Techniques for performing technological operations (shredding, mixing, dosing, packaging, etc.).

- Preparation of liquid extemporal medicine. Performing technological operations (dissolving, filtering, emulsifying, dispersing, mixing, extraction, etc.). Preparation of homogeneous and heterogeneous liquid medicines (aqueous and non-aqueous solutions, drops, solutions of standard pharmacopoeial liquids, high-molecular compounds and protected colloids, suspensions, emulsions, aqueous extracts). Difficult cases of preparation of solutions.

- Preparation of soft extemporal medicine. Performing technological operations (dissolving, emulsifying, dispersing, mixing, dosing, etc.). Preparation of liniments and ointments of various dispersion systems, suppositories by rolling, pouring and pressing methods.

- Preparation of extemporal medicine in aseptic conditions. Ensuring aseptic conditions for the preparation of extemporal medicine. Sequence of technological operations (dissolving, filtering, sterilization, etc.). Selection of auxiliary substances and calculations of their quantity for stabilization and isotonization of solutions. Preparation, filtering and sterilization of solutions for injections, eye drops, preparation of eye ointments and drugs with antibiotics.

Topic 4. Preparation of internal pharmacy preparations, packaging, repackaging. Technological documentation of the production department of the pharmacy.

Normative documents regulating the conditions of preparation of intra-pharmacy products, packaging, repackaging of medicinal products. Rules for cooking intra-pharmacy products, nomenclature, calculations, technology. Conditions and terms of storage of intra-pharmacy products in a pharmacy, the main signs of their instability. Post-stage in-pharmacy quality control of extemporal medicine (written, survey, organoleptic, physical, control upon discharge). General and technological instructions, production records (log of registration of laboratory and packaging works, log of registration of individual stages of production of injection, intravenous infusion and ophthalmic drugs, log of registration of sterilization of drugs, auxiliary materials, dishes, etc.).

Topic 5. Packaging, labeling and storage conditions of medicines. Stability of prepared extemporaneous medicines.

The influence of taro packaging materials on the stability of prepared medicines. Rules of labeling of extemporal medicine. Conditions and terms of storage of extemporal medicine. The main signs of instability of various forms of extemporal medicine.

Semester credit from module 1 - grade credit

Computer testing on practically oriented questions about the technology of drugs according to the prescriptions described by the student of higher education during practice. Checking reporting documentation (practice diary, workbook and report).

6. Topics of lectures

not provided for educational curriculum _

7. Topics seminary classes

not provided for educational curriculum _

8. Topics practical classes

No s/p	Topic name	The volume ofhours
Content module 1. Practical implementation of the main provisions of the pharmacy technology of drugs		
1	**Topic 1.** Getting to know the premises and equipment of the pharmacy. Analysis of requirements of good pharmacy practice for premises and equipment of the pharmacy.	12
2	**Topic 2.** Normative documents regulating the production activity of the pharmacy. Work with prescriptions for extemporaneous medicinal products.	12
3	**Topic 3.** Preparation of non-sterile and sterile extemporaneous medicinal products: - preparation of solid extemporaneous medicines; - preparation of liquid extemporaneous medicines; - preparation of soft extemporaneous medicines; – - preparation of extemporaneous medicines in aseptic conditions.	42
4	**Topic 4.** Preparation of internal pharmacy preparations, packaging, repackaging. Technological documentation of the production department of the pharmacy.	12
5	**Topic 5.** Packaging, labeling and storage conditions of medicines. Stability of prepared extemporaneous medicines.	10
6	**Semester credit from module 1**	2
	Total hours	90

9. Topics laboratory classes

not provided for educational curriculum _

10. Independent work

No s/p	Name topics	The volume of hours
Content module 1. Practical implementation of the main provisions of the pharmacy technology of drugs		
1	**Topic 1.** Getting to know the premises and equipment of the pharmacy. Analysis of requirements of good pharmacy practice for premises and equipment of the pharmacy.	6
2	**Topic 2.** Normative documents regulating the production activity of the pharmacy. Work with prescriptions for extemporaneous medicinal products.	6

3	**Topic 3.** Preparation of non-sterile and sterile extemporaneous medicinal products: - preparation of solid extemporaneous medicines; - preparation of liquid extemporaneous medicines; - preparation of soft extemporaneous medicines; – - preparation of extemporaneous medicines in aseptic conditions.	21
4	**Topic 4.** Preparation of internal pharmacy preparations, packaging, repackaging. Technological documentation of the production department of the pharmacy.	6
5	**Topic 5.** Packaging, labeling and storage conditions of medicines. Stability of prepared extemporaneous medicines.	4
6	**Semester credit from module 1**	2
	Total hours	**45**

Theoretical questions and tasks for independent work

1. Analysis of extemporaneous pharmacy prescription.
2. Calculations for the preparation of extemporaneous medicines and intra-pharmacy products.
3. Determination of optimal technology and preparation of extemporaneous medicines .
4. Selection of packaging materials depending on the type of dosage form and properties of active substances.
5. Packaging and marking before the release of electronic devices.
6. Work with means of small mechanization, devices and equipment.
7. Carrying out in-pharmacy control (except chemical) for prepared extemporaneous medicines .
8. Technological instructions at the intra-pharmacy products, production documentation at the pharmacy.

11. Criteria and evaluation order of educational outcomes

Criteria for assessing the knowledge and skills of higher education graduates from the educational component are developed in accordance with the "Regulations on the procedure for assessing students' knowledge in the credit-module organization of the educational process at NUPh".

Assessment of the student's progress in the educational component is a rating, exhibited on a 100-points scale and has a definition for the ECTS system and according to the traditional scale adopted in Ukraine.

Current control. Verification of the passing of Work placement on the basis of a pharmacy. It is evaluated based on the completeness of practical tasks, the quality of work and report documentation: workbook, practice report, practice journal, and taking into account the assessment given to the applicant by the practice manager from the pharmacy. The assessment is carried out in points: the minimum number is 36, the maximum number is 60 points.

When evaluating Work placement in Pharmacy, the current rating of a higher education student consists of the following indicators: the quality and completeness of filling out the workbook, the results of computer testing and the analysis of the quality of the practice, reflected in the report.

evaluation criteria	**Scores**
theoretical training: ➢ correct answers to 100% of the proposed test tasks; ***practical training:*** ➢ 100% correctness design working notebook and correct registration of 25 prescriptions prescriptions ; ➢ the report contains a complete and thorough analysis of the quality of practice.	54-60

theoretical training: ➢ correct answers to 82-99% of the proposed test tasks; ***practical training:*** ➢ formatting errors _ working notebook and correct registration of 25 prescriptions prescriptions ; ➢ the report contains a complete but formal analysis of the quality of practice.	49-53
theoretical training: ➢ correct answers to 74-81% of the proposed test tasks; ***practical training:*** ➢ errors in the design of the workbook and/or minor errors in the design of 25 prescription prescriptions (prescription prescription, WCP reverse side, WCP front side; description of technological processes); ➢ the report contains an incomplete and formal analysis of the quality of practice.	44-48
theoretical training: ➢ correct answers to 64-73% of the proposed test tasks; ***practical training:*** ➢ formatting errors _ working notebook and\ or errors in the design of 25 prescriptions prescriptions (registration of a prescription prescription, reverse WCP side, WCP front side description technological processes); ➢ the report does not contain an analysis of the quality of practice and is of a formal nature.	37-43
theoretical training: ➢ correct answers to 61-63% of the proposed test tasks; ***practical training:*** ➢ formatting errors _ working notebook and\ or rough errors in the design of 25 prescriptions prescriptions (registration of a prescription prescription, reverse WCP side, WCP front side description technological processes); ➢ the internship report reflects 1-2 quality indicators of the internship and is formal in nature.	21-36
theoretical training: ➢ correct answers are fewer than 60% of the proposed test tasks; ***practical training:*** ➢ design working notebook in a volume insufficient for performance practical parts (design less than 25 prescription prescriptions); ➢ there is no internship report.	1-20

Students who scored from 36 to 60 points are admitted to the differentiated semester assessment.

Independent work is monitored during Work placement in Pharmacy based Technology of Drugs, during a differentiated semester assessment.

Evaluation of independent work of the student:

during the current control: checking the reporting documentation on production practice in the technology of pharmacy drugs (quality and completeness of filling out the workbook, practice diary, practice report)

during semester modular control: computer testing includes theoretical questions for independent work

Semester modular control. Computer testing on practically oriented questions about the technology of pharmaceutical drugs according to prescriptions (120 tests), described by the student of higher education during practice. Checking reporting documentation (practice journal, workbook and report). The number of correct answers to the test questions corresponds to the number of points scored

according to the differentiated semester assessment. If the student of higher education scored less than 24 points, he must prepare additionally and retake the differentiated semester assessment.

evaluation criteria	**Scores**
correct answers to 100% of the proposed test tasks	40
correct answers to 92-99% of the proposed test tasks	37-39
correct answers to 84-91% of the proposed test tasks	33-36
correct answers to 76-83% of the proposed test tasks	28-32
correct answers to 71-75% of the proposed test tasks	24-27
correct answers in less than 70% of the proposed test tasks	1-23

Assessment of passing Work placement in Pharmacy based Technology of Drugs

The success of each student of higher education in Work placement in Pharmacy based Technology of Drugs is evaluated on a 100-point rating scale, in ago number for the current one educational activity - 36-60 points, by the results of the differentiated semester assessment - 24-40 points

Scale assessment: national and ECTS

Sum points by all types of educational activities	ECTS assessment	Rating by national scale	
		for the exam course the project (work), practice	for credit
90 - 100	**A**	perfectly	counted
82-89	**B**	fine	
74-81	**C**		
64-73	**D**	satisfactorily	
60-63	**E**		
35-59	**FX**	unsatisfactorily with the possibility repeated drafting	not counted with the possibility repeated drafting
0-34	**F**	unsatisfactorily with mandatory repeated study plastic discs	not counted with mandatory repeated study of the discipline

Evaluation of the module from the educational component

Module	Content module 1		Together
	Mandatory points		
	Current control*	Semester modular control **	
	60 points	40 points	
Together	60 points	40 points	100

Rating scale assessment

Nationalscale	**Scale ECTS**	**Ratingrating, points**
5	AND - excellent	90-100
4	IN - very good	84-89
4-	WITH - fine	75-83
3	D - satisfactory	68-74
3-	IS - enough (satisfying minimal criteria)	60-67
2	FX - unsatisfactory	35-59
not allowed	F – unsatisfactory (required additional work)	1-34

12. Teaching methods

- *explanatory (informational and reproductive) method:* Lecture-based learning – video materials;
- *problem-based teaching:* Problem-based learning - problem-based seminar/webinar; Case-based learning - method of cases;
- *partial research method:* Project-based learning - method of projects.

13. Forms current and final control successful studies - credit.

Assessment of current educational activities (oral, written). Verification of the passage of Work placement in Pharmacy on the basis of a pharmacy institution and reception and verification of reporting documentation from industrial pharmaceutical practice on the technology of drugs (quality and completeness of filling out the workbook, analysis of the quality of the passage of practice reflected in the report), computer testing.

Semester control is carried out in the form of a differentiated semester credit after the completion of Work placement in Pharmacy, during the first week of theoretical training. Completion of computer testing – 40 tests (maximum 40 points).

It is carried out in the amount of educational material determined by the educational program and in the terms established by the educational plan.

The form of control is a semester differentiated assessment.

14.Methodological support

1. Work program of the educational component.
2. Algorithm of passing Work placement.
3. Methodical recommendations of Work placement.
4. Video films.
5. Workbook for preparation to the licensed examination “KROK-2” in pharmacy-based technology of drugs: for English-speaking applicants of higher education of specialty “Pharmacy”: Practical aids. For individual work / T. G. Yarnykh, O. A. Rukhmakova, V. V. Kovalyov, M. V. Buryak – Kh.: NUPh, 2017. – 56 p.
6. Tests. Pharmacy-based technology of drugs: A handbook for the out-of-classwork of English applicants/ T. G. Yarnykh, O. I. Tykhonov, O. A. Rukhmakova, G. B. Yuryeva, M. V. Buryak, V.V.; ed. by T.G. Yarnykh. – Kh.: NUPh, 2019. – 156 p.
7. Resource for preparing for the test at the link: https://tests.nuph.edu.ua/course/view.php?id=209.

15. Recommended Books

The main reading suggestions

1. Pharmacy — based technology of drugs : the manual for applicants of higher education / O. I. Tykhonov , T. G. Yarnykh, O. A. Rukhmakova, G. B. Yuryeva; ed. by O. I. Tykhonov and T. G. Yarnykh. - Kharkiv : NUPh : Golden Pages, 2019. - 488 p.
2. Workbook for Pharmacy-based Technology of Drugs: A tutorial for the 3-rd year English-speaking applicants of higher education of “Pharmacy” specialty / T. G. Yarnykh, O. I. Tykhonov, O. A. Rukhmakova, M. V. Buryak, V. V. Kovalyov, I. V. Herasymova – Kh.: NUPh, 2020. – 149 p.
3. Workbook for preparation to the licensed examination “KROK-2” in pharmacy-based technology of drugs: for English-speaking applicants of higher education of specialty “Pharmacy”: Practical aids. For individual work / T. G. Yarnykh, O. A. Rukhmakova, V. V. Kovalyov, M. V. Buryak – Kh.: NUPh, 2017. – 56 p.

4. Tests. Pharmacy-based technology of drugs: A handbook for the out-of-classwork of English applicants/ T. G. Yarnykh, O. I. Tykhonov, O. A. Rukhmakova, G. B. Yuryeva, M. V. Buryak, V.V.; ed. by T.G. Yarnykh. – Kh.: NUPh, 2019. – 156 p.
5. Handbook to Laboratory Classes in Pharmacy-based Technology of Drugs : for English applicants of higher education of "Pharmacy" speciality / Yarnykh T. G., Rukhmakova O. A., Yuryeva A. B., ed. by T.G. Yarnykh. – Kh.: NUPh, 2021. – 156 p.

Supplementary reading suggestions

1. Державна Фармакопея України / ДП «Український науковий фармакопейний центр якості лікарських засобів». 2-ге вид. Харків : ДП «Український науковий фармакопейний центр якості лікарських засобів», 2015. Т. 1. 1128 с.
2. Державна Фармакопея України / ДП «Український науковий фармакопейний центр якості лікарських засобів». 2-ге вид. Харків : ДП «Український науковий фармакопейний центр якості лікарських засобів», 2014. Т. 2. 724 с.
3. Державна Фармакопея України / ДП «Український науковий фармакопейний центр якості лікарських засобів». 2-ге вид. Харків : ДП «Український науковий фармакопейний центр якості лікарських засобів», 2015. Т. 3. 732 с.
4. Про затвердження правил виробництва (виготовлення) лікарських засобів в умовах аптеки : наказ МОЗ України від 17.10.12 р. № 812. Офіційний вісник України. 2012. № 87. 28 с.
5. Стандарт МОЗ України «Вимоги до виготовлення нестерильних лікарськіх ЗАСОБІВ в условиях аптек» СТ-Н МОЗУ 42 - 4.5 до: 2015 // За ред. проф. О. І. Тихонова и проф. Т.Г. Ярних. - Київ, 2015. - 109 с. (Затверджено наказом МОЗ Украïрі № 398 від 01.07.2015 р.).
6. Стандарт МОЗ України «Вимоги до виготовлення стерильних и асептичних лікарськіх ЗАСОБІВ в условиях аптек» СТ-Н МОЗУ 42 - 4.6 до: 2015 // За ред. проф. О.І. Тихонова и проф. Т.Г. Ярних. - Київ, 2015. - 76 с. (Затверджено наказом МОЗ України № 398 від 01.07.2015 р.).
7. John F Marriott, Keith A Wilson, Christopher A Langleyv, Dawn Belcher Pharmaceutical Compounding and Dispensing. - Published by the Pharmaceutical Press. – 2010. – 288 p.
8. USP Pharmacists' Pharmacopeia. – II ed. – Rockville. The United State Pharmacopeial, Inc., 2008. – 1519 p.

16. Electronic resources, including the Internet

1. Ministry of Health of Ukraine [Electronic resource]: official website. - Access mode: www.moz.gov.ua - (date of application 09/26/18).
2. National Pharmaceutical University [Electronic resource]: Scientific library of the National Pharmaceutical University. – Access mode: http://lib.nuph.edu.ua (access date 09/26/18).
3. National Pharmaceutical University. Department of Medicine Technology [Electronic resource]: website of the Department of Medicine Technology. – Access mode: http:tl.nuph.edu.ua (date of application 09/26/18).
4. Electronic archive of the library of the National Academy of Sciences of Ukraine. http://lib.nuph.edu.ua; e- mail library@nuph.edu.ua
5. Educational portal http://pharmel.kharkiv.edu - the center of distance technologies of the National Academy of Sciences