MINISTRY OF HEALTH OF UKRAINE

NATIONAL UNIVERSITY OF PHARMACY

DEPARTMENT PHARMACEUTICAL TECHNOLOGY OF DRUGS

WORK PLACEMENT IN PHARMACY BASED TECHNOLOGY OF DRUGS

Guidelines
for students of higher education
specialty 226 Pharmacy, industrial pharmacy
educational program "Pharmacy (for foreign students)"

Kharkiv
NUPh
2023

UDC: 51(075)

Approved by the Central Methodological Commission of the National University of Pharmacy (protocol № 1 of «1» *September 2023)*

Reviewed by:

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Work placement in Pharmacy based Technology of Drugs: Guidelines for for students of higher education specialty 226 Pharmacy, industrial pharmacy educational program "Pharmacy (for foreign students)" /L. I. Vyshnevska, N. P. Polovko, S. V. Oliinyk, M. V. Buryak, and others.; under the editorship of prof. L. I. Vyshnevska. - Kharkiv: NUPh, 2023. - 36 p.

The methodical recommendations outline the purpose, task, program (scope and content) of Work placement in Pharmacy based Technology of Drugs and the system of evaluating practice results under the conditions of the credit-module system of organizing the educational process; samples of reporting documentation are given, as well as a list of questions for the semester control of knowledge of higher education seekers.

Compiled for students of higher education specialty 226 Pharmacy, industrial pharmacy educational program "Pharmacy (for foreign students)", as well as for practice managers from the department in order to ensure high-quality passing by students of Work placement in Pharmacy based Technology of Drugs.

UDC: 51(075)

CONTENT

INTRODUCTION

Work placement in Pharmacy based Technology of Drugs of students of higher education of the National University of Pharmacy is an integral part of the educational and professional training program of specialists.

Work placement in Pharmacy based Technology of Drugs is based on the study of such educational disciplines as propaedeutic practice, pharmacy drug technology, pharmacognosy, pharmacology, pharmaceutical chemistry and is integrated with these educational components. It is aimed at consolidating practical skills and theoretical knowledge of the technology of drugs in pharmacy production, obtained during studies at a higher educational institution, and adapting them to the real conditions of modern pharmacies.

According to the curriculum, Work placement in Pharmacy based Technology of Drugs takes place within three weeks (15 working days) in pharmacy institutions. which meet the requirements for practice bases and necessarily have a license for the right to manufacture extemporaneous medicines.

The general organization of the practice of students of higher education is carried out by the first vice-rector of the university. The direct organization and control over the implementation is entrusted to the Department of Practice, Employment and Career Development of the National University of Pharmacy and the Department of Pharmacy Technology of Drugs.

These methodological recommendations set out the main issues related to the organization, implementation and evaluation of Work placement in Pharmacy based Technology of Drugs. They will help the student of higher education navigate through all the stages of this practice and successfully complete its program.

I. PURPOSE AND TASKS OF PRODUCTION OF WORK PLACEMENT IN PHARMACY

Purpose of practice: to consolidate, deepen and expand and systematize students' theoretical knowledge and practical skills acquired by them during the study of pharmacy technology of drugs in a higher educational institution; to acquire practical skills in the manufacture of medicinal preparations, to evaluate their quality and to prepare the preparations for release, which are necessary for solving specific tasks in the future practical activity of the pharmacist.

Tasks of Work placement in Pharmacy based Technology of Drugs:

1. Conduct an analysis of extemporaneous pharmacy prescriptions, choose the most interesting, complex prescriptions for preparation and describe them in a diary.

2. Calculate the number of ingredients in the prescriptions received by the pharmacy.

3. Choose the optimal technology option in accordance with the prescription, taking into account the physical and chemical properties of medicinal and auxiliary substances.

4. Consolidate practical skills regarding the manufacture, packaging and preparation for release of drugs in various dosage forms, according to doctors' prescriptions, hospital requirements, and intra-pharmacy preparations.

4. To learn to analyze the composition of extemporaneous medicinal preparations, to determine the peculiarities of the technology of preparation of these medicinal preparations.

II. TRAINING OF HIGHER EDUCATION ACQUISITIONS TO OF WORK PLACEMENT IN PHARMACY

Before completing the internship, the student of higher education is obliged to:

- if necessary, no later than a month before the start of practice, provide the practice department with a referral to a pharmacy for industrial practice with ATL;
- to receive a practice diary from the practice department (order for practice from the head of the practice department of the National Academy of Sciences of Ukraine);
- provide your contact details for prompt communication between the heads of practice from the National Institute of Health and Medical Sciences and interns;
- get methodical recommendations for production practice with ATL in the library;
- to come to the department for a consultation on passing practice and finding to have an individual task from the head of production practice.

III. OBLIGATIONS OF HIGHER EDUCATION ACQUISITIONS AT PROCESSES OF WORK PLACEMENT IN PHARMACY

During the internship, the student of higher education is obliged to:

- to arrive at the pharmacy on time for practice;
- to observe the rules of labor protection, safety technology, fire safety and pharmaceutical procedure;
- fully perform the tasks provided for by the industrial practice program;
- obey the rules of the internal work schedule in effect in the pharmacy, adhere to the work schedule;
- not to allow shortening of practice periods due to compression and extension of the working day;

- keep a practice diary in which to write down two recipes daily (made in accordance with the requirements of the methodological recommendations for production practice), for which 1 hour is allocated from the total working time;
- present the diary daily to their immediate pharmacy practice manager for review.

NB! **After completing the internship, the student of higher education must appear at the Department pharmaceutical technology of drugs to prepare a report and semester control**

IV. MANAGEMENT OF THE WORK PLACEMENT IN PHARMACY OF STUDENT OF HIGHER EDUCATION

Educational and methodical management of production pharmaceutical practice of students of higher education in drug technology of pharmacy production is carried out by the department of pharmacy technology of drugs.

Responsibilities of the teacher-head of practice from the department

- The teacher-supervisor of industrial practice from the department is obliged before the beginning of practice:
- to instruct students regarding the purpose, term, content of practice, setting of individual tasks;
- to inform students about the reporting system: drawing up a practice diary, submitting a written report, completing qualifying work, the requirement to draw up a completed individual task, etc. (see section VI);

during internship:

- monitor the student's timely arrival at the practice base, the progress of the practice program;
- take practice credit;
- to study the wishes of managers from practice bases;
- in close contact with managers from the base of practice (pharmacy institution) to ensure its high-quality completion in accordance with the program.

The responsibility for organizing and carrying out practice directly in the pharmacy is assigned to the head of the pharmacy or his deputy, and the supervision of students' practice in certain areas of work in accordance with the order of the head of the pharmacy – to highly qualified specialists of the pharmacy

Responsibilities of the head of the practice base (pharmacy institution)

- The head of the pharmacy during the period of practical training is obliged to:
- to check the presence of relevant documents in the student's possession (practice diary - order for practice) and make entries in them (see section VI);
- acquaint students with the production facilities, departments and staff of the pharmacy;
- ensure the passing of briefings on labor protection, equipment operation rules, safety techniques, internal rules of procedure;
- by order of the pharmacy, appoint experienced specialists as supervisors of students' practice in departments, monitor their work;
- to create the necessary conditions for students to obtain the expected professional knowledge in full, as well as knowledge in the field of pharmaceutical deontology;
- control the completion of practice according to the schedule, the implementation of its program according to methodical recommendations and keeping diaries (see section VI);

- control the interns' compliance with industrial discipline and labor regulations;
- at the end of the internship, check the quality of diaries and reports prepared by students and approve them with a personal signature and seal.

Responsibilities of the head of practice from the pharmacy to individual workersplaces

The head of the practice at a separate workplace from the pharmacy is obliged to:

- conduct briefings and acquaint interns with the organization of work at specific workplaces, with the location of medicinal substances and auxiliary materials, devices and apparatus used in the manufacture of medicinal preparations; rules of labor protection and safety equipment;
- monitor the student's compliance with the pharmaceutical order in the pharmacy, as well as compliance with sanitary and hygienic rules in the manufacture of medicinal products;
- to carry out constant control over the work of interns, to help them correctly perform all tasks at this workplace;
- before making medicinal preparations by students, check their calculations, control the correctness of measuring, weighing medicinal substances and preparation of the medicinal preparation;
- control the timely maintenance of diaries by interns, make appropriate comments and sign them every day;
- check the quality of the diary design and sign it upon completion of practice; to characterize theoretical knowledge and practical skills of students.

V. WORK PLACEMENT IN PHARMACY PROGRAM

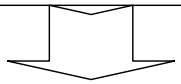
Schedule of distribution of working time of student of higher education

The content of the work	*Number of days*
Acquaintance with the production premises of the pharmacy. Training in safety techniques, compliance with sanitary regime and pharmaceutical procedure. Acquaintance with the methods of obtaining purified water	1
Preparation of solid medicinal forms according to the prescriptions of doctors and the requirements of hospital institutions	2
Preparation of liquid dosage forms (solutions, mixtures, suspensions, emulsions, etc.)	4
Preparation of soft medicinal forms (liniments, ointments) and suppositories	3
Preparation of medicinal forms that require aseptic conditions (solutions for injections, eye medicines, medicinal forms with antibiotics, etc.)	2
Preparation of internal pharmacy preparations (concentrated solutions, semi-finished products). Issuance of documentation	2
Compilation of a report on production practice, credit	1
Total:	**15**

NB! **The working time distribution schedule is indicative and may vary depending on the volume and type of work in the pharmacy**

First day

Acquaintance with the production premises of the pharmacy. Training in safety techniques, sanitary regime, compliance with the pharmaceutical procedure. Acquaintance with obtaining purified water

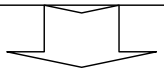


A student of higher education must:

- familiarize yourself with the pharmacy and the pharmacy's work schedule;
- to learn the rules of safety technology, sanitary regime in the pharmacy;
- observe the pharmaceutical order in the pharmacy and especially in production premises;
- learn the process of obtaining purified water and water for injections in the pharmacy;
- to study normative and methodical documentation regulating the sanitary regime and pharmaceutical order in the pharmacy;
- make appropriate entries in the practice diary.

Second - third (second - fourth) day

Preparation of solid dosage forms



A student of higher education must:

- to analyze the extemporaneous formulation of the pharmacy from solid dosage forms in order to determine the optimal technology;
- carry out the necessary calculations for the preparation of powders and fees according to doctors' prescriptions (requirements);
- prepare powders with medicinal substances that have different physico-chemical properties, with dry or thick extracts, semi-finished products, pack and arrange them before release;
- prepare plant collections from medicinal plant raw materials and select packaging material for them;
- each person should enter 2 prescriptions in the practice diary;
- use normative and methodical documentation regulating the production of extemporaneous medicines.

Fourth - seventh (fifth - ninth) day

Preparation of liquid dosage forms

A student of higher education must:

- gain practical experience in preparing solutions of medicinal substances;
- determine the optimal technology for the preparation of liquid medicinal forms based on the analysis of the composition of the doctor's prescription or the requirements of the hospital;
- carry out the necessary calculations for the preparation of extemporaneous drugs in the form of liquid medicinal forms according to the prescriptions of doctors (requirements);
- prepare mixtures using dry substances and concentrated solutions, non-aqueous solutions, drops, solutions of high-molecular compounds and colloids, suspensions and emulsions, aqueous extracts from plant raw materials and extracts-concentrates, liniments;
- choose a taro sealing material depending on the type of medicinal form and properties of the active substances;
- use normative and methodical documentation regulating the manufacture of extemporaneous medicines;
- each to enter 2 prescriptions in the practice diary.

Eighth - tenth (tenth - thirteenth) day

Preparation of soft medicinal forms and suppositories

A student of higher education must:

- gain practical experience in the preparation of soft dosage forms;
- prepare liniments; homogeneous ointments (solution ointments, alloy ointments, extraction ointments); heterogeneous ointments (suspension ointments, emulsion ointments, combined ointments);
- to prepare suppositories in pharmacy conditions by the pouring and pumping method;
- choose taro sealing material for ointments and suppositories;

- use normative and methodical documentation regulating the manufacture of extemporaneous medicines;
- each to enter 2 prescriptions in the practice diary.

Eleventh - twelfth (fourteenth - sixteenth) day

Preparation of dosage forms that require aseptic conditions

A student of higher education must:

- learn practical work on the organization of an aseptic block;
- acquire skills in working with sterilizers, autoclaves, drying cabinets and other means of sterilization in pharmacy conditions;
- prepare injectable dosage forms and dosage forms that require aseptic conditions using methods of stabilization, isotonization and sterilization and conduct quality control of sterile preparations for the absence of mechanical impurities;
- prepare dosage forms with antibiotics and medicinal products for newborns;
- choose taro sealing material for packing and packaging of aseptically produced dosage forms;
- use normative and methodical documentation regulating the production of extemporaneous medicines;
- each to enter 2 prescriptions in the practice diary.

Thirteenth - fourteenth (seventeenth - nineteenth) day

Preparation of internal pharmacy preparations

A student of higher education must:

- conduct an analysis of the nomenclature of extemporaneous prescriptions in order to determine the need for the preparation of concentrated solutions, semi-finished products, bases and prescriptions that are often found in the pharmacy nomenclature;
- prepare concentrated solutions, carry out the necessary calculations for their preparation, dilution and strengthening;
- carry out calculations and prepare semi-finished products of ointments and powders, eye foundations and blanks for eye drops;

- ☞ choose the optimal container for storing concentrated solutions and semi-finished products in the pharmacy, as well as taro sealing material for internal pharmacy preparations;
- ☞ use normative and methodical documentation regulating the production of extemporaneous medicines;
- ☞ each to enter 2 prescriptions in the practice diary.

Fifteenth (twentieth) day

Report on industrial pharmaceutical practice.
Preparation of documentation

As a result of passing industrial pharmaceutical practice with Technology of Drugs, the student of higher education must:

know:

- the content of the general articles of the DFU, the main provisions of the instructions and orders that regulate the prescription, preparation and dispensing of medicinal products; modern assortment and physicochemical properties of medicinal and auxiliary substances; peculiarities of working with poisonous, narcotic and potent substances, checking their single and daily doses, as well as their release rates; the principle of operation of the most common means of small mechanization; the main provisions of safety technology and pharmaceutical order in the pharmacy; storage conditions of different groups of medicines;
- ***on the section "Solid dosage forms"***- general rules for preparation of powders and assemblies with various components; packaging, preparation for release and storage of solid medicinal forms;
- ***in the section "Liquid dosage forms"***- rules and mode of operation of water distillers; storage and shelf life of purified water in the pharmacy; calculations for the dilution of ethanol and standard pharmacopoeial liquids; general rules for preparation of liquid medicines from dry substances and concentrated solutions; special cases of preparation of solutions; technology of solutions of high molecular weight compounds and protected colloids, non-aqueous solutions, drops, suspensions, emulsions, aqueous extracts from medicinal plants

raw materials and plant extracts-concentrates; liniment technology; packaging, preparation for release and storage of liquid medicinal forms;

- ***in the section "Soft dosage forms and suppositories"***- characteristics of ointment bases and their properties; principles of selection of ointment bases for the preparation of ointments with different medical purposes; rules for introducing medicinal substances into liniments and ointments, technology of liniments and ointments; calculations of the number of suppository bases and rules for manufacturing suppositories by pumping and pouring, rules for introducing medicinal substances into the composition of suppositories; packaging, preparation for release and storage of ointments and suppositories;
- ***according to the section "Sterile dosage forms and dosage forms requiring aseptic conditions"*** -provisions of orders and instructions regarding the creation and provision of aseptic conditions; preparation of injection, ophthalmic medicinal forms, medicinal forms with antibiotics and for newborn children; rules for obtaining, collecting and storing water for injections; methods of filtering, stabilization and sterilization of aseptic preparations; calculations of isotonic concentrations; rules for working with distillers, sterilizers, filtering units, etc.; technology of injection solutions, eye drops and lotions, eye ointments and bases for them; properties of antibiotics and their introduction into dosage forms; selection of taro sealing materials for aseptic dosage forms; packaging, preparation for release and their storage;
- ***in the section "Preparation of internal pharmacy preparations"***- provisions of orders and instructions regarding the preparation of concentrated solutions and other internal pharmacy preparations, their nomenclature, calculations of the amount of medicinal substances and solvents for concentrates;

<u>be able:</u>

- ***on the preparation of solid dosage forms***– work with prescription and manual scales, weigh and grind loose substances,

follow the order of mixing the ingredients according to their physical and chemical properties, determine the quality of the powder mixture; select auxiliary material for packaging and prepare powders for release; use means of small mechanization (shredders, powder dispensers, etc.); prepare meetings, select auxiliary material for packaging and prepare them for release;

- ***on the preparation of liquid dosage forms***– dose liquids with the help of burettes, pipettes, calibrate non-standard drop meters; prepare aqueous and non-aqueous solutions of medicinal substances by the mass-volume method and by mass; use special technological methods for preparing solutions of certain medicinal substances (heating, grinding, simultaneous dissolution, complex formation, etc.); dilute ethyl alcohol, standard pharmacopoeial liquids; prepare drops, solutions of high molecular weight compounds, protected colloids and suspensions, select stabilizers; prepare water extracts from medicinal plant raw materials, as well as using extracts-concentrates; assess the quality, seal and prepare liquid dosage forms before release; use means of small mechanization (burette devices, dispensers, infusion devices, devices for obtaining purified water, etc.);
- ***on the preparation of soft dosage forms and suppositories***– select ointment bases depending on the medical purpose of the ointment; prepare liniments and ointments taking into account the dispersed type (solution, alloy, suspension, emulsion, combined); prepare suppositories of various shapes by pumping and pouring; assess the quality, pack and prepare soft dosage forms and suppositories for release;
- ***for the preparation of sterile dosage forms and dosage forms that require aseptic conditions***– to ensure and observe aseptic conditions for the preparation of medicinal products; prepare injection solutions, eye drops and lotions, stabilize, isotonize, filter, verify

inspect them for the absence of mechanical inclusions, sterilize, select vials and sealing material; prepare eye base and sterilize it, prepare eye ointments and various dosage forms with antibiotics; assess the quality of manufactured drugs, seal them and prepare them for release; use means of small mechanization (apparatus for obtaining pyrogenic water, mixers, filter units, capping machines, sterilizers, equipment for controlling the purity of injection solutions, etc.);

- ***for the preparation of concentrated solutions, semi-finished products and other internal pharmacy preparations***– calculate the amount of solvent and medicinal substance and prepare concentrated solutions; to correct concentrations and prepare the barbell for use; carry out disassembly, processing and assembly of the burette unit, fill it with solutions; prepare semi-finished products, in-house pharmacy preparations, register them in relevant journals; to work with means of small mechanization (mixers, burette units, liquid dispensers, etc.), to observe safety rules.

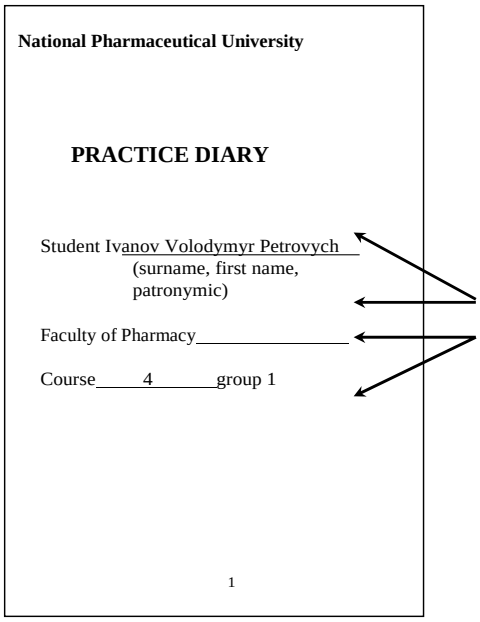
VI. REPORTING DOCUMENTATION

Reporting documentation includes:

1. Practice diary (practice order) issued by the practice department.
2. Diary of production practice.
3. Report on production practice.
4. Individual task.

1. **Practice diary (orders for practice), issued by the practice department**

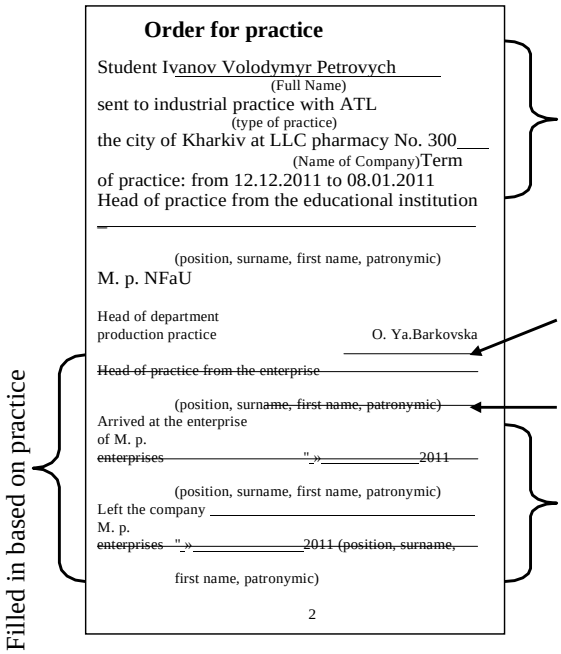
The practice diary (practice order) issued by the practice department is reporting documentation and must be submitted to the department after completing the practice.



To be completed by the practice department

The diary must be on p. 2, the position, surname, first name and patronymic of the head of the practice from the enterprise, the name of the enterprise, the date of arrival/departure to/from the enterprise are indicated, the surname, first name and patronymic of the head of the pharmacy are indicated, his signature and the seal of the enterprise are put.

The following items must be filled in: 2 (calendar schedule of practice), 3 (feedback and evaluation of the student's work during practice (characteristics) signed by the practice manager from the pharmacy or the head of the pharmacy, certified by the pharmacy's seal); 4 (indicate other types of work performed by the student in addition to the internship program).



Order for practice

Student Ivanov Volodymyr Petrovych
(Full Name)
sent to industrial practice with ATL
(type of practice)
the city of Kharkiv at LLC pharmacy No. 300___
(Name of Company)Term
of practice: from 12.12.2011 to 08.01.2011
Head of practice from the educational institution
_____
(position, surname, first name, patronymic)
M. p. NFaU

Head of department
production practice O. Ya.Barkovska

~~Head of practice from the enterprise~~ _____
(position, surname, first name, patronymic)
Arrived at the enterprise
of M. p.
~~enterprises "_»_____2011~~

(position, surname, first name, patronymic)
Left the company _____
M. p.
~~enterprises "_»_____2011 (position, surname,~~

~~first name, patronymic)~~

2

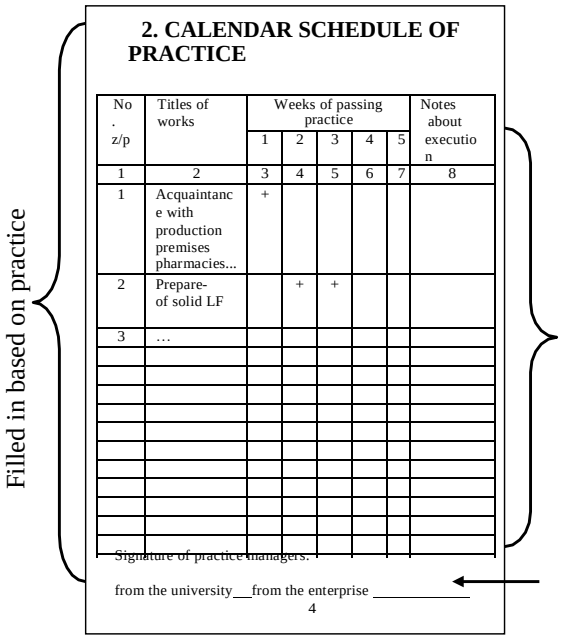
Filled in based on practice

To be completed by the practice department

The position, surname, first name, and patronymic of the head of practice from the enterprise are indicated

The name of the enterprise is indicated

The seal of the enterprise is affixed, the date of arrival/departure to/from the enterprise. P.I.P. is indicated. chief Apt. and put his signature



2. CALENDAR SCHEDULE OF PRACTICE

No. z/p	Titles of works	Weeks of passing practice					Notes about execution
		1	2	3	4	5	
1	2	3	4	5	6	7	8
1	Acquaintance with production premises pharmacies...	+					
2	Prepare- of solid LF		+	+			
3	…						

Signature of practice managers:

from the university___from the enterprise _____
4

Filled in based on practice

It is indicated:

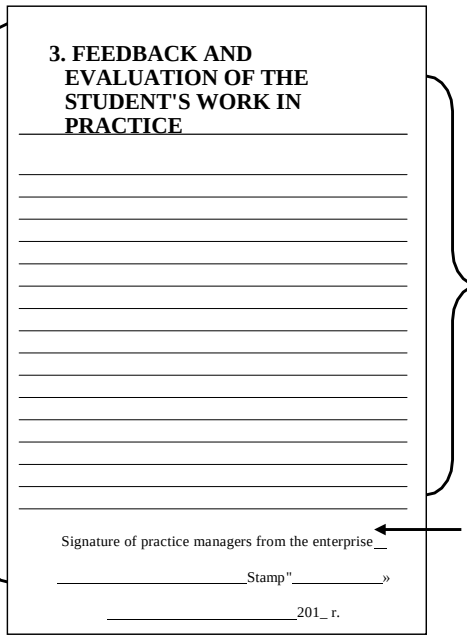
2 column- the name of the work (for example, "acquaintance with the production premises of the pharmacy...");

3-7 columns- the number of days of performance of this type of work (for example, on the first day there was an introduction to the production premises of the pharmacy, so put a "+" in the third column

8 column– the head of the practice from the enterprise puts his signature in the case of performing this type of work

The signature of the head of practice from the university and from the enterprise is affixed

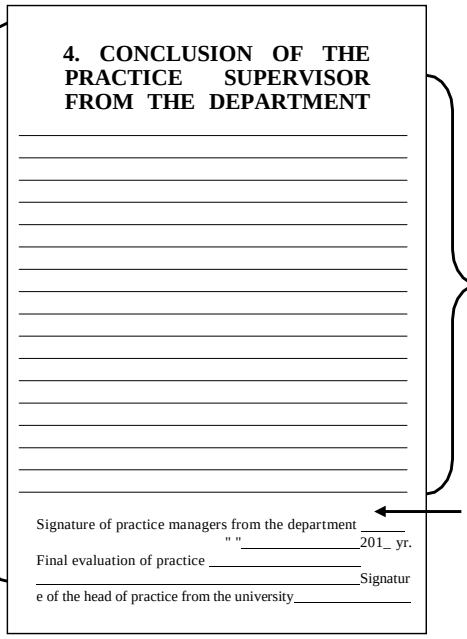
Filled in based on practice



It is filled out by the head of practice from the enterprise

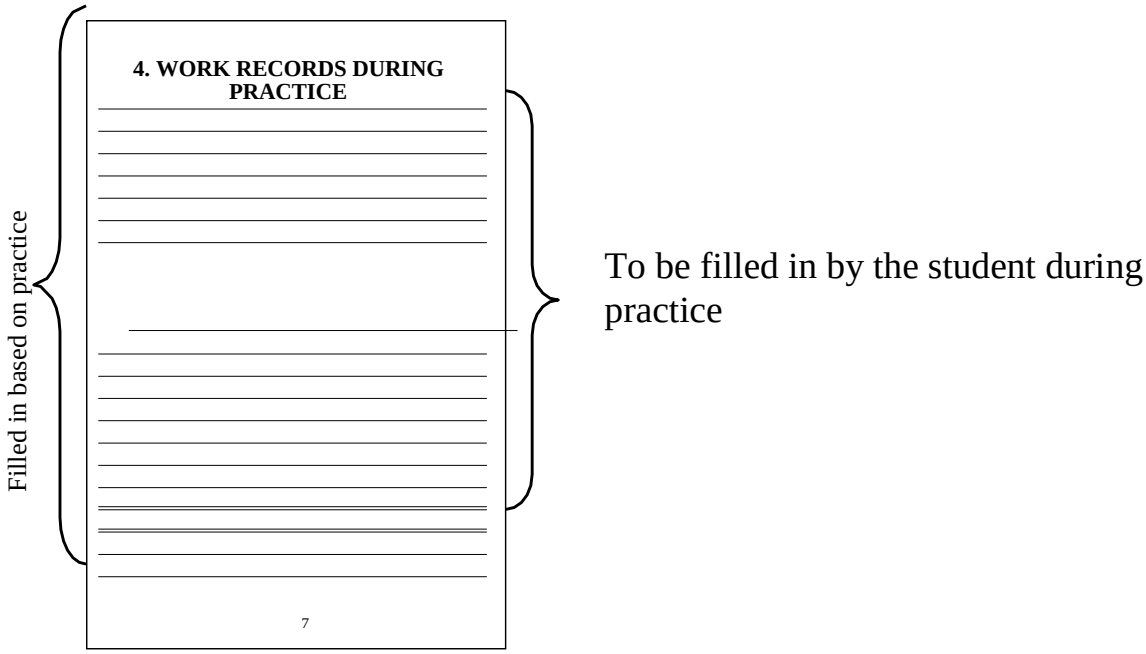
The signature of the head of practice from the enterprise, the seal of the enterprise and the date of writing the review are put

Filled on the cphaedra



It is filled out by the head of practice from the department

The signature of the head of practice from the department, the date of acceptance of the credit and the grade are put



2. Diary of production practice

During the industrial practice, students must keep a practice diary.

The diary is an official document and must be submitted to the department. Without a diary or if it is completed in a timely manner, the production practice cannot be counted. The intern must record the work done in the diary every day.

First, it is necessary to describe the organization of the production process in the pharmacy, draw a plan of the pharmacy, assistant room, aseptic block, describe in detail the equipment of workplaces, the principle of operation of devices for obtaining purified water and water for injections, its quality control and storage .

During practice, the student must write down 12 prescriptions in the diary, choosing them from among the most complex and independently

melted medicines. Prescriptions must be written in Latin, without abbreviations, and all records must be written correctly and legibly.

A sample of the title of the diary of production practice with ATL and an example of the preparation of recipes is given below.

DIARY TITLE SAMPLE

WORK PLACEMENT IN PHARMACY BASED TECHNOLOGY OF DRUGS

DAILY

industrial practice in the pharmacy technology of

the student's drugs__course_____groups

National Pharmaceutical University

(last name, first name, patronymic of the student)

Place of production practice_____

(pharmacy number, address, phone)

_____

Term of production practice

with "__»_____201_.

_____»_____201_ r._____

The head of production practice from the pharmacy_____

(Full Name)

Head of production practice from the department_____

(Full Name)

_____

_____

To substantiate the technology, the student can use the DFU, educational manuals on drug technology, lecture notes and all available reference literature available in the pharmacy. It is absolutely necessary to specify the characteristics of the active substances and, if necessary, check the doses of poisonous, narcotic and potent substances, as well as the norms of their one-time release. The technology of the medicinal product should be formulated concisely and indicate the type of packaging and design before release.

It is absolutely necessary to bring the passport of written control (PPK): front side and back side.

Due to the fact that in most pharmacies, a pharmacist prepares various dosage forms during a shift, students are allowed to describe the technology of drugs so that the number of prescriptions in the diary for one or another dosage form corresponds to the number of days allocated for it according to the schedule (for example , powders should be described: 2 days x 2 = 4 prescriptions).

In the diary, it is necessary to reflect the technology of intra-pharmacy preparations and make relevant entries in the journal of laboratory and packaging work (a copy of the journals). In addition, it is necessary to describe the storage conditions in the pharmacy of concentrated solutions, other intrapharmacy preparations and extemporaneous medicinal products. It is necessary to indicate the means of small mechanization used in the process of manufacturing extemporaneous medicinal preparations.

The diary is filled out after the end of the working day and kept in the pharmacy. It is strictly forbidden to take the diary home. It must be available to the head of practice from the department at any time of the working day. Students are obliged to present the diary to the direct supervisor of practice from the pharmacy institution every day, who signs and dates the control. At the end of practice, the diary must be certified with the signature of the pharmacy manager and the seal of the institution.

3. Report on Work placement in Pharmacy

The report is one of the main documents and is compiled by the student on the basis of the completed practice program, own observations, and is not certified by the institution (a sample title of the report on industrial practice with ATL is provided below).

The report should display:

- characteristics of the pharmacy, the contingent of visitors and the list of institutions served;
- practice conditions, equipping workplaces with equipment;
- means of small mechanization used in the process of preparation and packaging of various drugs and in-pharmacy preparations.

Also, the report should include deficiencies in the production process (equipment, organization, control) and their causes.

The report can be written at the end of the diary or separately and issued under separate headings and headings.

5. Individual task

The student must receive an individual assignment before completing the practice from the teacher - practice supervisor from the department.

Content of the individual task:

1. ***Fill out the pharmacy card (the form is given below).***
2. ***Provide a list of extemporaneous prescriptions produced by the pharmacy and analyze them. To specify the national peculiarities of the preparation of extemporaneous medicinal preparations in the case of industrial practice abroad.***

Pharmacy card form

1. The name of the department to which the pharmacy is subordinated.
2. The name of the pharmacy.
3. Address of the pharmacy.
4. Pharmacy phone number.
5. Name of the head of the pharmacy institution.
6. The name of the person responsible for the practice of students in a pharmacy institution.
7. Managers of trainee students: full name, specialty, total work experience, experience in the specialty, qualification category.
8. General characteristics of the pharmacy institution: availability of a license for retail and wholesale trade in medicinal products; production of medicinal products in pharmacies, pharmacy equipment.
9. Pharmacy license number for the right to manufacture extemporaneous medicinal products.

VII. PROCEDURE FOR CARRYING OUT THE CALCULATION

The student's credit is taken by the head of the ATL department named after D.P. The hall and teachers are the supervisors of the practice within the term set by the dean's office and the department (within two weeks after the end of the practice). It includes:

- ***Current control.*** Verification of the completion of practice on the basis of a pharmacy institution and receipt of reporting documentation on industrial practice with ATL, interview and assessment of practical skills acquired by students (maximum 60 points).
- ***Final modular control.*** Test control of students' knowledge level(maximum 40 points).

The success of each student in industrial practice with ATL is evaluated according to the 100-point rating scale given below. The maximum number of points that a student can receive for industrial practice is 100 points.

The rating of a higher education applicant is calculated as follows:

- During the current control of the content module, the theoretical preparation of the student, the acquisition of practical skills, the content and design of reporting documentation (daily practice diary, practice diary (orders for practice), report on practical practice), the characteristics of the practice manager from the pharmacy are taken into account.
(maximum 60 points).

- Semester control is assessed at a maximum of 40 points. Students who have completed all types of work provided by the curriculum and scored at least the minimum number of points (35 points) during the assessment of the content module are admitted to the final module control. Final control takes place in the form of testing. The list of questions for the final modular control is given in point VIII.

EVALUATION OF THE MODULE WITH EDUCATION COMPONENT

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

RATING SCALE

National scale	**ECTS scale**	**Rating, points**
5	A - excellent	90-100
4	B - very good	84-89
4-	C is good	75-83
3	D – satisfactory	68-74
3-	E is enough (meets minimum criteria)	60-67
2	FX is unsatisfactory	35-59
not allowed	F – unsatisfactory (additional work required)	1-34

VIII. LIST OF QUESTIONS FOR THE SEMESTER CONTROL

1. Define powders as a dosage form, their classification and requirements for them. Evaluation of the quality of powders.
2. Rules for preparing powders with substances that differ in density, bulk mass, and particle structure.
3. Rules for preparing powders with poisonous, narcotic, potent substances and substances prescribed in different quantities.
4. Trituration - preparation technology, storage conditions and design, justification of their use.
5. Give the classification of extracts by state of aggregation. Methods of introducing various extracts into the composition of powders.
6. Give examples of odorous and hard-to-powder substances. Features of powder technology with them.
7. Properties of substances affecting the order of mixing powders. Features of the technology of powders with colored substances.
8. Name the solvents for liquid dosage forms, give a brief description. Features of the technology of mixtures with different contents of dry substances (up to 3% and more).
9. List the methods of obtaining purified water and the equipment used. Requirements, types of control and terms of use of purified water.
10. Rules for preparation of concentrated solutions, their quality control and storage conditions.
11. Rules for the preparation of mixtures by volume method using concentrated solutions and the procedure for adding tinctures, extracts, syrups to them in accordance with the order of the Ministry of Health No. 197 dated 09.07.93.

12. Describe the drops as a dosage form, their classification. Give methods of checking doses of poisonous and potent medicinal substances in drops.
13. Specify the causes of difficulties in the technology of aqueous solutions and ways to eliminate them.
14. List of standard pharmacopoeial liquids with indication of concentration, features of prescribing them in recipes.
15. Assortment of non-aqueous solvents and their characteristic features.
16. Specify the peculiarities of preparing non-aqueous solutions with various substances (volatile, non-volatile).
17. Define a standard dropper and indicate the factors affecting the accuracy of dosing. Calibration of a non-standard dropper.
18. Give the classification of the Navy. Specify the features of the dissolution of infinitely swelling IUDs.
19. Application of the Navy in pharmacy. Give the features of the dissolution of limited swelling IUDs.
20. Define colloidal solutions; list the factors affecting their stability. Name the preparations of protected colloids and indicate the features of their technology.
21. Give cases of the formation of suspensions. List the factors affecting their stability.
22. List the methods of preparation of suspensions and give a brief description of them.
23. Types of oil emulsions and methods of their determination. Assortment of emulsifiers. Name the stages of emulsion technology.
24. Peculiarities of preparation of althea root infusion from raw materials and extract-concentrate.

25. List the factors affecting the process of extraction of active substances from raw materials and the quality of aqueous extracts.
26. Give the peculiarities of preparing aqueous extracts from plant raw materials containing tannins, anthraglycosides, saponins.
27. Assortment and classification of extracts-concentrates. The difference in technology and rules for introducing medicinal substances into infusions from raw materials and extracts-concentrates.
28. Characteristics of liniments as a medicinal form, their classification depending on the basis and medical purpose. Features of suspension liniment technology.
29. Classification of liniments depending on the physical and chemical properties of the ingredients. Features of the technology of liniments-solutions.
30. Classification of ointments by medical purpose and place of application. Name hydrophobic ointment bases.
31. Classification of ointments depending on the physical and chemical properties of medicinal substances. Name hydrophilic ointment bases.
32. Pastes, their classification. Features of preparation of dermatological pastes. Name the emulsifiers used in difil ointment bases.
33. Combined ointments; peculiarities of their technology depending on the properties and percentage of the input ingredients.
34. Stages of the technological process of suppositories by the pumping method. Basics suitable for this method.
35. Stages of the technological process of suppositories by pouring method. List of bases used for this cooking method. The influence of the percentage content of active substances on the calculation of the amount of the base.
36. Requirements of SFU for suppositories, meaning of their geometric shape. Prescribing and checking the doses of poisonous and potent substances in them.

37. Classification of sterilization methods. Name the methods adopted in pharmacy practice.
38. Requirements of DFU for dosage forms for injections. The principle of selecting stabilizers.
39. List solvents for injection solutions, requirements for them. Types of quality control, conditions and terms of storage of water for injections.
40. Define isotonic solutions and name the phenomena that occur when non-isotonic solutions are introduced. Quality control of injection solutions at individual stages of the technological process.
41. Classification of infusion (physiological) solutions. Implementation of the requirements of isotonicity, isohydry, etc. imposed on them.
42. List the dosage forms used in ophthalmology. Requirements for ophthalmic dosage forms, their substantiation.
43. Ensuring the stability of eye drops and lotions in the process of preparation, use and storage. Classification of stabilizers.
44. Ensuring the sterility of eye drops and lotions before and after opening the package. Nomenclature of preservatives.
45. List the features of the technology of eye drops depending on the solubility of the ingredients included in their composition.
46. Requirements for eye ointments. Characteristics of bases for eye ointments.
47. Requirements of DFU for pharmaceutical dosage forms with antibiotics. Cooking conditions. Peculiarities of administration of antibiotics in different dosage forms.
48. Determination of incompatibilities and their classification. Name the reasons for physical incompatibilities. Obligations of the pharmacist in relation to incompatible prescriptions. Concept of pharmacological incompatibilities.
49. Name the causes of chemical incompatibilities.

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