

**The Ministry of Health of Ukraine
Bogomolets National Medical University**

**METHODICAL RECOMMENDATIONS
to practical classes
Modul 2**

Academic discipline	Pharmacology
Field of knowledge	22 “Health care”
Specialty	226 “Pharmacy, Industrial pharmacy”
Specialization	226.01 “Pharmacy”
Form of education	Full-time study
Department	Pharmacology

Approved at the Department of Pharmacology meeting
on August 26, 2024, protocol № 1

Head of the Department



prof. G.V. Zaychenko

Reviewed and approved by the CMC of specialty 226 “Pharmacy, Industrial
Pharmacy” meeting on August 30, 2024, protocol № 1

2024-2025 a. y.

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Topic 1. Medicines affecting the respiratory system.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding medicinal substances that affect the respiratory system.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh ; London ; New York : Elsevier, 2020. – P. 228-232, 244, 371-381.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. - 4th ed., updatet. - Vinnytsia : Nova Knyha, 2018. – P. 281-294.
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 346-366.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login): http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics and classification of medicines affecting respiratory functions
2. General characteristics of medicines used for the treatment of rhinosinusitis
3. Pharmacological characteristics of decongestants (mechanisms of action, classification, indications, side effects, contraindications)
4. General characteristics of medicines used for the treatment of cough.
5. Pharmacological characteristics of antitussive medicines (mechanisms of action, classification, indications, side effects, contraindications)
6. Pharmacological characteristics of expectorant medicines (mechanisms of action, classification, indications, side effects, contraindications)
7. General characteristics of medicines used for the treatment of asthma
8. Pharmacological characteristics of bronchodilator medicines (mechanisms of action, classification, indications, side effects, contraindications)
9. Algorithm of emergency care for acute asthma attack.
10. Modern medicines for the treatment of idiopathic pulmonary fibrosis.
11. Pharmacological characteristics of medicines included in the "KROK-1. Pharmacy" exam: glaucine hydrochloride, libexin, acetylcysteine, ambroxol

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 2. Medicines affecting the digestion.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding medicinal substances that affect the function of the digestive organs.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh ; London ; New York : Elsevier, 2020. – P. 395-407.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. - 4th ed., updat. - Vinnytsia : Nova Knyha, 2018. – P. 295-316.
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 1087-1119.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login): http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5

2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics of medicines affecting the gastrointestinal tract
2. Pharmacological and ATC classification of medicines affecting the gastrointestinal tract.
3. General characteristics of medicines used for the treatment of acid-dependent diseases.
4. Pharmacological characteristics of antacids (mechanisms of action, classification, indications, side effects, contraindications).
5. Pharmacological characteristics of medicinal products that inhibit gastric gland secretion (mechanisms of action, classification, indications, side effects, contraindications).
6. Pharmacological characteristics of cytoprotective agents (mechanisms of action, classification, indications, side effects, contraindications).
7. Pharmacological principles of combined use of medicines for the treatment of acid-dependent diseases.
8. Pharmacological characteristics of emetic and antiemetic medicines (mechanisms of action, classification, indications, side effects, contraindications).
9. General characteristics of medicines used for the treatment of liver and biliary tract diseases.
10. Pharmacological characteristics of choleric medicines (mechanisms of action, classification, indications, side effects, contraindications).
11. Pharmacological characteristics of hepatoprotective medicines mechanisms of action, classification, indications, side effects, contraindications).
12. General characteristics of medicines used for the treatment of pancreatitis.
13. Pharmacological characteristics of medicines that stimulate or substitute pancreatic excretory function (mechanisms of action, classification, indications, side effects, contraindications).
14. Pharmacological characteristics of medicines used for constipation (mechanisms of action, classification, indications, side effects, contraindications).
15. General principles of pharmacological correction of diarrhea.
16. Pharmacological characteristics of antidiarrheal medicines (mechanisms of action, classification, indications, side effects, contraindications).
17. General characteristics of medicines used for the prevention and treatment of dysbiosis: probiotics, prebiotics, eubiotics, symbiotics.
18. Pharmacological characteristics of medicines included in the "KROK-1. Pharmacy" exam: famotidine, ranitidine, omeprazole, aluminum hydroxide/magnesium hydroxide, loperamide, bisacodyl, buckthorn bark extract, metoclopramide, silymarin, pancreatin, contrical.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 3. Medicines affecting hematopoiesis and hemostasis.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding medicinal substances that affect hematopoiesis and hemostasis.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh; London; New York: Elsevier, 2020. – P. 228-232, 319-333, 334-342.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. - 4th ed., updatet. - Vinnytsia : Nova Knyha, 2018. – P. 252-280.
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 591-625.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login): http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics of medicines affecting hematopoiesis and hemostasis.
2. Pharmacological classification of medicines affecting hematopoiesis and hemostasis.
3. Pharmacological characteristics of medicines that stimulate erythropoiesis (mechanisms of action, classification, indications, side effects, contraindications).
4. Characteristics of absorption, distribution, and pharmacological effects of Fe²⁺, Fe³⁺, and liposomal iron preparations.
5. Combined use of medicines for the treatment of anemias and management of their side effects.
6. Pharmacological characteristics of medicines that stimulate leukopoiesis (mechanisms of action, classification, indications, side effects, contraindications).
7. General characteristics of medicines affecting hemostasis.
8. Pharmacological characteristics of medicines affecting platelet aggregation (mechanisms of action, classification, indications, side effects, contraindications).
9. Pharmacological characteristics of medicines affecting coagulation (mechanisms of action, classification, indications, side effects, contraindications).
10. Pharmacological characteristics of medicines affecting fibrinolysis (mechanisms of action, classification, indications, side effects, contraindications).
11. Pharmacological characteristics of coagulants (mechanisms of action, classification, indications, side effects, contraindications).
12. Use of medicines affecting hemostasis and hematopoiesis in emergency therapy.
13. Medicines – antidotes and reversal agents for overdose or to stop the action of anticoagulants: mechanisms of action, special considerations for administration and discontinuation.
14. Pharmacological characteristics of medicines included in the "KROK-1. Pharmacy" exam: heparin, warfarin, cyanocobalamin, menadione, ascorbic acid, methyluracil, acetylsalicylic acid, aminocaproic acid.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 4. Medicines affecting kidney function and reproductive processes.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding medicinal substances that affect kidney function and reproductive processes.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh ; London ; New York : Elsevier, 2020. – P. 382-394, 465-468.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. - 4th ed., updatet. - Vinnytsia : Nova Knyha, 2018. – P. 317-333.
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 254-276.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login):
http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics of medicines affecting kidney function.
2. Pharmacological characteristics of diuretic drugs (mechanisms of action, classification, indications, side effects, contraindications).
3. Combined use of diuretic medicines and management of their side effects.
4. General characteristics of medicines used for the treatment of gout.
5. Pharmacological characteristics of medicines affecting uric acid metabolism (mechanisms of action, classification, indications, side effects, contraindications).
6. Combined use of medicines for the treatment of acute gout attacks and prevention of gout.
7. General characteristics of medicines affecting myometrial contractility.
8. Pharmacological characteristics of medicines affecting myometrial contractility (mechanisms of action, classification, indications, side effects, contraindications).
9. Pharmacological characteristics of prostate protectors and medicines used for the treatment of benign prostatic hyperplasia (BPH), erectile dysfunction (ED), and lower urinary tract symptoms (LUTS).
10. Pharmacological characteristics of medicines included in the "KROK-1. Pharmacy" exam: furosemide, hydrochlorothiazide, spironolactone, allopurinol, drotaverine hydrochloride, oxytocin.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 5. Antihypertensive medicines.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding medicinal substances for the treatment of arterial hypertension.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh ; London ; New York : Elsevier, 2020. – P. 290-304.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. - 4th ed., updat. - Vinnytsia : Nova Knyha, 2018. – P. 226-239.
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 173-193.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login):
http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics of antihypertensive medicines.
2. Classification of antihypertensive medicines.
3. General characteristics of first-line antihypertensive medicines.
4. Pharmacological characteristics of angiotensin-converting enzyme (ACE) inhibitors (mechanisms of action, classification, indications, side effects, contraindications).
5. Pharmacological characteristics of angiotensin II receptor blockers (ARBs) (mechanisms of action, classification, indications, side effects, contraindications).
6. Pharmacological characteristics of calcium channel blockers (mechanisms of action, classification, indications, side effects, contraindications).
7. Pharmacological characteristics of diuretics with antihypertensive action (mechanisms of action, classification, indications, side effects, contraindications).
8. General characteristics of second-line antihypertensive medicines.
9. Combined use of antihypertensive medicines.
10. Pharmacological characteristics of fixed-combination antihypertensive medicinal products: pharmacological rationale, advantages for the patient.
11. Emergency care for hypertensive crisis.
12. Pharmacological characteristics of medicines included in the "KROK-1. Pharmacy" exam: captopril, enalapril, lisinopril, losartan, nifedipine, amlodipine, clonidine, sodium nitroprusside, magnesium sulfate, furosemide.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 6. Antianginal and hypolipidemic medicines. Angioprotectors.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding medicinal substances for the treatment of ischemic heart disease, acute ischemia, hyperlipidemia, atherosclerosis, and related conditions.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh ; London ; New York : Elsevier, 2020. – P. 271-279, 286-288, 310-318.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. – 4th ed., updatet. – Vinnytsia : Nova Knyha, 2018. – P. 208-223,
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 194-211, 626-641.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login):
http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics of antianginal medicines.
2. Classification of antianginal medicines.
3. Pharmacological characteristics of nitrates and molsidomine (mechanisms of action, pharmacological effects, indications, main side effects, contraindications).
4. Pharmacological characteristics of beta-adrenergic blockers (mechanism of action, indications, side effects, contraindications).
5. Pharmacological characteristics of calcium channel blockers (mechanism of action, pharmacological effects, indications, side effects, contraindications).
6. Pharmacological characteristics of ivabradine (mechanism of action, pharmacological effects, indications, side effects, contraindications).
7. Pharmacological characteristics of metabolic agents used in ischemic heart disease (mechanisms of action, pharmacological effects, indications, side effects, contraindications).
8. Fundamental principles of drug therapy for angina pectoris.
9. Fixed-combination medicines for the treatment of ischemic heart disease and atherosclerosis: examples, pharmacological rationale, advantages for the patient.
10. Emergency management of angina attacks and acute coronary syndrome (myocardial infarction).
11. General characteristics of hypolipidemic medicines.
12. Pharmacological characteristics of hypolipidemic medicines (mechanisms of action, indications, side effects, contraindications).
13. Special considerations for the use of hypolipidemic drugs (pharmacovigilance).
14. Pharmacological characteristics of angioprotectors (mechanisms of action, classification, indications, side effects, contraindications).
15. Pharmacological characteristics of medicines included in the "KROK-1. Pharmacy" exam: glycerol trinitrate (nitroglycerin), isosorbide mononitrate, fenofibrate, atorvastatin, lovastatin.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 7. Antiarrhythmic medicines. Cardiotonic medicines. Cardiac glycosides.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding medicinal substances for the treatment of acute and chronic heart failure, as well as cardiac rhythm disturbances (arrhythmias).

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh ; London ; New York : Elsevier, 2020. – P. 271-278, 279-284, 304-306.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. - 4th ed., updatet. - Vinnytsia : Nova Knyha, 2018. – P. 196-207, 224-238, 254-268
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 212-253.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login):
http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics of cardiotonic medicines.
2. Classification of cardiotonic medicines.
3. Sources of cardiac glycosides, chemical structure characteristics (role of the glycone and aglycone).
4. Pharmacological characteristics of glycoside cardiotonic medicines. (mechanism of action, classification, indications, side effects, contraindications).
5. Pharmacological characteristics of non-glycoside cardiotonic medicines. (mechanisms of action, classification, indications, side effects, contraindications).
6. Medicines used in acute and chronic heart failure.
7. Acute and chronic toxicity from cardiac glycosides: principles of emergency treatment (list of medicinal products and explanation of their effects on various aspects of toxicity).
8. General characteristics of antiarrhythmic medicines.
9. Classification of antiarrhythmic medicines.
10. Pharmacological characteristics of antiarrhythmic medicines – sodium channel blockers (class I membrane stabilizers) (mechanisms of action, classification, indications, side effects, contraindications). Comparative characteristics of class IA, IB, and IC drugs
11. Pharmacological characteristics of antiarrhythmic medicines – beta-adrenergic blockers (class II) (mechanisms of action, classification, indications, side effects, contraindications)
12. Pharmacological characteristics of antiarrhythmic medicines – potassium channel blockers (class III) (mechanisms of action, classification, indications, side effects, contraindications)
13. Pharmacological characteristics of antiarrhythmic medicines – calcium channel blockers (class IV) (mechanisms of action, classification, indications, side effects, contraindications)
14. Pharmacological characteristics of antiarrhythmic medicine – potassium supplements (mechanisms of action, classification, indications, side effects, contraindications)
15. Place of M-cholinergic blockers (atropine) and adrenergic agonists in the treatment of bradyarrhythmia.
16. Pharmacovigilance: typical side effects of representatives from each drug group.
17. Pharmacological characteristics of medicines included in the "KROK-1. Pharmacy" exam: digoxin, corglycon, amiodarone, atropine sulfate.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 8. Antiseptics and synthetic antimicrobial medicines.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding antiseptics and synthetic antimicrobial medicinal products.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh : London ; New York : Elsevier, 2020. – P. 228-232, 661-663, 671-673.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. – 4th ed., updatet. – Vinnytsia : Nova Knyha, 2018. – P. 429-455.
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 834-842. 895-903.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login):
http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics of antiseptic and disinfectant medicines.
2. Pharmacological classification of antiseptic and disinfectant medicines.
3. Pharmacological characteristics of oxidizing antiseptics (mechanisms of action, indications, side effects, contraindications).
4. Pharmacological characteristics of antiseptics in the chlorine and iodine compounds group (mechanisms of action, indications, side effects, contraindications).
5. Pharmacological characteristics of antiseptics in the alkali and kiloid group (mechanisms of action, indications, side effects, contraindications).
6. Pharmacological characteristics of antiseptics in the metal salts group (mechanisms of action, indications, side effects, contraindications).
7. Pharmacological characteristics of antiseptics in the dye group (mechanisms of action, indications, side effects, contraindications).
8. Pharmacological characteristics of antiseptics in the aldehyde and alcohol group (mechanisms of action, indications, side effects, contraindications).
9. Pharmacological characteristics of antiseptics in the aromatic compound group (mechanisms of action, indications, side effects, contraindications).
10. Pharmacological characteristics of antiseptics in the detergent group (mechanisms of action, indications, side effects, contraindications).
11. Pharmacological characteristics of antiseptics, nitrofurans derivatives (mechanisms of action, indications, side effects, contraindications).
12. Clinical picture of acute poisoning with metal salts, formaldehyde, phenol. Measures of assistance.
13. Pharmacological characteristics of synthetic antimicrobial agents (mechanisms of action, classification, indications, side effects, contraindications).
14. Pharmacological characteristics of medicines for the "KROK-1. Pharmacy" exam: iodine alcohol solution, hydrogen peroxide, potassium permanganate, ethyl alcohol.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 9. Antibiotics.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding antibiotics.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh ; London ; New York : Elsevier, 2020. – P. 649-659, 663-671.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. - 4th ed., updatet. - Vinnytsia : Nova Knyha, 2018. – P. 462-492.
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 793-833.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login):
http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LANG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. Concept of antibiosis, antibiotics, and the spectrum of antibiotic activity. History of the discovery and implementation of antibiotics in medical practice. L. Pasteur, I.I. Mechnikov, A. Fleming, H.W. Florey, E.B. Chain, Z.V. Yermolyeva, S. Waksman, B.C. Derkach. Principles of antibiotic therapy.
2. General characteristics of antibiotics.
3. Classification of antibiotics by chemical structure, spectrum, and mechanism of action.
4. Pharmacological characteristics of penicillin group drugs (mechanisms of action, classification, indications, side effects, contraindications).
5. Pharmacological characteristics of cephalosporin group drugs (mechanisms of action, classification, indications, side effects, contraindications).
6. Pharmacological characteristics of carbapenem group drugs (mechanisms of action, classification, indications, side effects, contraindications).
7. Pharmacological characteristics of monobactam group drugs (mechanisms of action, classification, indications, side effects, contraindications).
8. Pharmacological characteristics of glycopeptide group drugs (mechanisms of action, classification, indications, side effects, contraindications).
9. Pharmacological characteristics of aminoglycoside group drugs (mechanisms of action, classification, indications, side effects, contraindications).
10. Pharmacological characteristics of tetracycline group drugs (mechanisms of action, classification, indications, side effects, contraindications).
11. Pharmacological characteristics of macrolide and azalide group drugs (mechanisms of action, classification, indications, side effects, contraindications).
12. Pharmacological characteristics of phenicol group drugs (mechanisms of action, classification, indications, side effects, contraindications).
13. Pharmacological characteristics of lincosamide group drugs (mechanisms of action, classification, indications, side effects, contraindications).
14. Pharmacological characteristics of polypeptide group drugs (mechanisms of action, classification, indications, side effects, contraindications).
15. Pharmacology of antibiotics from different chemical groups.
16. Basic principles of antibiotic therapy.
17. Principles and goals of combining penicillin group drugs with β -lactamase inhibitors.
18. Emergency care for anaphylactic shock during antibiotic administration.
19. Antibiotic resistance: prevention, reduction, and overcoming bacterial resistance to antibiotics.

20. Pharmacological characteristics of medicines for the "KROK-1. Pharmacy" exam: benzylpenicillin sodium salt, tetracycline hydrochloride, doxycycline, clarithromycin.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 10. Antituberculosis, antiviral, antimycosis and antiprotozoal medicines.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding antituberculosis, antiviral, antimycosis and antiprotozoal medicines.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh ; London ; New York : Elsevier, 2020. – P. 673-675, 675-688, 690-694.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. - 4th ed., updatet. - Vinnytsia : Nova Knyha, 2018. – P. 455-461, 493-510.
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 842-894.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login):
http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics of antituberculosis medicines.
2. Basic principles of tuberculosis treatment and prevention.
3. Classification of antituberculosis medicines.
4. Pharmacological characteristics of synthetic antituberculosis medicines (mechanisms of action, classification, indications, side effects, contraindications).
5. Pharmacological characteristics of antibiotics used for tuberculosis treatment (mechanisms of action, classification, indications, side effects, contraindications).
6. Principles and goals of combining antituberculosis medicines.
7. Basic principles of tuberculosis pharmacotherapy.
8. Resistance to antituberculosis medicines: prevention, reduction, and overcoming of mycobacterium resistance to drugs.
9. General characteristics and classification of antisyphilitic medicines.
10. Pharmacological characteristics of antisyphilitic medicines (mechanisms of action, classification, indications, side effects, contraindications).
11. Principles of syphilis treatment.
12. General characteristics and classification of antimycotic medicines.
13. Pharmacological characteristics of antimycotic medicines (mechanisms of action, classification, indications, side effects, contraindications).
14. Basic principles of fungal disease treatment and prevention.
15. General characteristics and classification of antiviral medicines.
16. Pharmacological characteristics of interferons and interferon synthesis inducers (mechanisms of action, classification, indications, side effects, contraindications).
17. Pharmacological characteristics of antiviral medicines used for influenza prevention and treatment (mechanisms of action, indications, side effects, contraindications).
18. Pharmacological characteristics of antiviral medicines used for herpetic infections (mechanisms of action, indications, side effects, contraindications).
19. Pharmacological characteristics of antiviral medicines used for treating hepatitis C (mechanisms of action, indications, side effects, contraindications).

20. Pharmacological characteristics of antiviral medicines used for treating HIV/AIDS (mechanisms of action, classification, indications, side effects, contraindications).
21. Possibilities of using combinations of antiviral medicines in the treatment of HIV/AIDS.
22. Pharmacological characteristics of antiviral medicines used for the prevention and treatment of COVID-19 (mechanisms of action, indications, side effects, contraindications).
23. Pharmacological characteristics of medicines for the "KROK-1. Pharmacy" exam: benzylpenicillin sodium salt, nystatin, isoniazid, rifampicin, olivomycin, acyclovir, rimantadine.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 11. Antiparasitic and antiprotozoal medicines.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding antiparasitic and antiprotozoal medicines.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh ; London ; New York : Elsevier, 2020. – P. 696-708, 710-714.
2. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. - 4th ed., updatet. - Vinnytsia : Nova Knyha, 2018. – P. 511-536.
3. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 917-947.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login):
http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics of anthelmintic medicines.
2. Classification of anthelmintic medicines.
3. Pharmacological characteristics of medicines used for the treatment of nematodoses (mechanisms of action, side effects, contraindications).
4. Pharmacological characteristics of medicines used for the treatment of trematodoses (mechanisms of action, side effects, contraindications).
5. Pharmacological characteristics of medicines used for the treatment of cestodoses (mechanisms of action, side effects, contraindications).
6. Pharmacological characteristics of broad-spectrum and extra-broad-spectrum medicines (mechanisms of action, side effects, contraindications).
7. Basic principles of helminthiasis treatment. Features of medicines used in different types of helminthiasis.
8. General characteristics of antimalarial medicines. Classification of antimalarial medicines.
9. Pharmacological characteristics of antimalarial medicines (mechanisms of action, side effects, contraindications).
10. Basic principles of malaria treatment and prevention. Features of use in different types of malaria. Therapy for malaria coma.
11. Pharmacological characteristics of medicines for treating amebiasis (mechanisms of action, classification, indications, side effects, contraindications).
12. Pharmacological characteristics of medicines for treating trichomoniasis (mechanisms of action, classification, indications, side effects, contraindications).
13. Pharmacological characteristics of medicines for treating giardiasis (mechanisms of action, classification, indications, side effects, contraindications).
14. Pharmacological characteristics of medicines for treating toxoplasmosis (mechanisms of action, classification, indications, side effects, contraindications).
15. Pharmacological characteristics of medicines for treating leishmaniasis (mechanisms of action, classification, indications, side effects, contraindications).
16. General characteristics of medicines for treating scabies and pediculosis.
17. Pharmacological characteristics of medicines for the "KROK-1. Pharmacy" exam: chingamin, metronidazole.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 12. Antitumor medicines.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by the higher education student of theoretical knowledge and practical skills regarding antitumor medicines.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Rang and Dale's Pharmacology / [H. P. Rang, J. M. Ritter, R. J. Flower et al.]. – [9th ed.]. – Edinburgh ; London ; New York : Elsevier, 2020. – P. 716-731.
2. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 948-976.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login):
http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. General characteristics of antineoplastic medicines.
2. General principles of tumor chemotherapy. Current understanding of mechanisms of action of antineoplastic agents. Cytostatic and cytotoxic effects of antineoplastic drugs. Correction of immune system protection. Resistance to cytostatics.
3. Classification of antineoplastic chemotherapy medicines.
4. Pharmacological characteristics of alkylating antineoplastic medicines (mechanisms of action, classification, indications, side effects, contraindications).
5. Pharmacological characteristics of antimetabolite antineoplastic medicines (mechanisms of action, indications, side effects, contraindications).
6. Pharmacological characteristics of antineoplastic antibiotics (mechanisms of action, indications, side effects, contraindications).
7. Pharmacological characteristics of plant-derived antineoplastic cytostatics (mechanisms of action, indications, side effects, contraindications).
8. Pharmacological characteristics of enzyme medicines with antineoplastic activity (mechanisms of action, indications, side effects, contraindications).
9. Pharmacological characteristics of medicines used for treating hormone-dependent tumor diseases (mechanisms of action, indications, side effects, contraindications).
10. Pharmacological management of side effects of major groups of antineoplastic medicines.
11. Innovative approaches to treating malignant tumors. Immunobiological treatment as a modern and safest method for treating oncological pathology. Targeted therapy. Prospects and advantages of immunobiological treatment.
12. Pharmacological characteristics of medicines for the "KROK-1. Pharmacy" exam: methotrexate, 5-fluorouracil.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.

Topic 13. Principles of acute medicine poisoning therapy. Antidotes, plasma substitutes, and medicines for parenteral nutrition.

Competencies:

Integral Competence:

- Ability to solve problems of a research and/or innovative nature in the field of pharmacy.

General competences (GC):

- GC02. Knowledge and understanding of the subject area; understanding of professional activity.
- GC 03. Ability to communicate in the state language both orally and in writing.
- GC 04. Ability to communicate in a foreign language.
- GC 06. Ability to work in a team.
- GC 09. Ability to use information and communication technologies.
- GC 10. Ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any other manifestations of dishonesty.

Special (professional, subject) competences (PC):

- PC01. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.
- PC 02. The ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.
- PC 03. Ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
- PC 04. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
- PC 06. The ability to consult on prescription and non-prescription medicines and other products of the pharmacy assortment, pharmaceutical care during the selection and sale of medicines of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetics, pharmacodynamics, physico-chemical and chemical features, indications/contraindications for use, guided by data on the health status of a particular patient.
- PC 08. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to data on their clinical and pharmaceutical characteristics.

Purpose: Acquisition by a higher education student of theoretical knowledge and practical skills regarding drugs used in the treatment of acute poisoning, antidotes, plasma substitutes, and parenteral nutrition products.

Equipment: safety instructions, interactive multimedia system (if needed), collection of pharmaceuticals, reference books.

Lesson Plan and Organizational Structure

Stage Name	Stage Description	Levels of Mastery	Time
Preparatory	Organizational matters (checking student attendance)	Familiarization	10 min.
	Review of tasks assigned for independent preparation	Perception	20 min.
	Control and assessment of students' entry-level knowledge in pharmacology	Reproductive	20 min.
Main	Development of professional skills (students identifying drug groups, mechanisms of action, main pharmacological effects, indications for use, possible side effects).	Comprehension Understanding	90 min.
	Practicing professional competence: solving and evaluating situational tasks	Practical application Exploratory creative activity	45 min.
	Knowledge consolidation	Reinforcement	5 min.
Final	Test control of final preparation level	Reproduction	20 min.
	Overall assessment of student learning activity	Familiarization	10 min.
	Informing students about the next lesson's topic and independent work assignments	Familiarization	5 min.

Recommended Literature

Basic:

1. Pharmacology : textbook for students of medical higher educational institutions / V. M. Bobyrov, O. M. Vazhnicha, T. O. Devyatkina, N. M. Devyatkina; Ministry of health of Ukraine, Ukrainian medical stomatological academy. - 4th ed., updatet. - Vinnytsia : Nova Knyha, 2018. – P. 537-551.
2. Katzung B. G. Basic and clinical pharmacology / B. G. Katzung, S. B. Masters, A. J. Trevor. – [14th ed.]. – The McGraw-Hill Companies, Inc., 2018. – P. 1003-1046.

Secondary:

1. Whalen, K. (Ed.). Lippincott Illustrated Reviews: Pharmacology / K. Whalen, R. Finkel, T. A. Panavelil. – [8th ed.]. – LWW., 2022.

Information Resources:

1. Electronic Library Catalog (select guest login):
http://ek.librarynmu.com/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&LNG=uk&I21DBN=NMU_FULLTEXT&P21DBN=NMU&Z21ID=&S21CNR=5
2. Repository: <http://ir.librarynmu.com/>
3. LIKAR_NMU Page: <https://likar.nmu.kiev.ua/md/course/view.php?id=1189>

Questions for student self-preparation for the practical lesson:

1. Basic principles of pharmacotherapy for acute poisoning with medicines.
2. Symptoms of acute poisoning with medicines from different pharmacological groups.
3. Methods of active detoxification, use of emetics, laxatives, demulcents, astringents, and adsorbents.
4. Use of active diuretics for the removal of toxic substances from the blood (forced diuresis), use of hemodialysis, peritoneal dialysis, hyperbaric oxygenation, hemo- and lymphosorption.
5. Concept of antidotes. Types of antidote therapy.
6. Pharmacological characteristics of dimercaprol, acetylcysteine, calcium disodium edetate, penicillamine, deferoxamine, cholinesterase reactivators, fomepizole, succimer, sodium thiosulfate, protamine sulfate, idarucizumab.
7. Treatment of overdose with narcotic analgesics, tranquilizers from the benzodiazepine derivatives group.
8. General characteristics of plasma expanders.
9. Pharmacodynamics and indications of saline solutions (isotonic sodium chloride solution, Ringer's lactate solution, Trisol, potassium/magnesium asparaginate, Regidron), alkaline solutions (sodium bicarbonate, Trisamin), sugars (glucose), gelatin solution, preparations containing human blood components (human albumin), synthetic preparations (Reopoliglukin, Neohemodez, Refartan, Reosorbilact).
10. Energetic, antitoxic, osmotic effects of dextrose (glucose), indications for the use of isotonic and hypertonic glucose solutions.
11. Parenteral nutrition preparations (Lipofundin).
12. Pharmacological characteristics of medicines included in the "KROK-1. Pharmacy" exam: unithiol, potassium/magnesium asparaginate, protamine sulfate.

Methodical guide prepared by: Prof. Zaychenko G.V., Assoc. Prof. Hnatiuk V.V., Assoc. Prof. Savchenko N.V., Assist. Simonova O.A.