

**MINISTRY OF HEALTH OF UKRAINE**  
**BOGOMOLETS NATIONAL MEDICAL UNIVERSITY**

**GUIDELINES**  
**to practical classes**

Academic discipline	Actual problems of pharmacy education
Branch of knowledge	22 “Health care”
Specialty	226 “Pharmacy, industrial pharmacy”
Specialization	226.01 “Pharmacy”
Department	Analytical, physical and colloid chemistry

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## Topic of lesson N 1: “Bologna process and quality of education”

### Competencies:

– **integral competence:** ability to solve tasks of research and/or innovative nature in the field of pharmacy;

– **general competencies (GC):**

1. Ability for abstract thinking, analysis and synthesis (GC 01).
2. Knowledge and understanding of the subject area; understanding of professional activity (GC 02).
3. Ability to work in a team (GC 06).
4. The ability to make decisions and act in compliance with the principle of inadmissibility of corruption and any other manifestations of dishonesty (GC 10).

– **professional competences of the specialty (PC):**

1. Ability to integrate knowledge and solve complex problems of pharmacy / industrial pharmacy in broad or multidisciplinary contexts (PC 01).
2. Ability to collect, interpret and apply data necessary for professional activity, carrying out research and implementation of innovative projects in the field of pharmacy (PC 02).
3. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to persons who are studying (PC 04).

**Purpose:** analyze the main stages of implementation of the education system in accordance with the Bologna Declaration and the set of specified objectives of Bologna Process.

**Equipment:** practical tasks, student’s notebook.

### Lesson plan and organizational structure:

Stage	Description of the stage	Learning levels	Time
Preparatory	Organizational issues (checking the presence of students)	Familiarization	1 min.
	Formation of motivation, activation of cognitive activity	Perception	3 min.
	Control of the initial level of teaching: test control and/or individual survey, verification of the performance of tasks of extra-auditory independent work	Reproductive	10 min.
Main	Discussion of theoretical material according to the subject of the topic	Comprehension Understanding	10 min.
	Solving practical tasks	Application in practice	25 min.

		Search creative activity	
	Independent work of the student under the supervision of the teacher (auditory work of the student)	Application in practice Search creative activity	10 min.
	Generalization of knowledge	Fixing	5 min.
Final	Control of the final level of teaching (test control and/or practical tasks)	Reproduction	15 min.
	General evaluation of the student's educational activity	Familiarization	10 min.
	Informing students about the topic of the next lesson and tasks for independent work	Familiarization	1 min.

### Recommended literature:

#### *Basic*

1. Kushnir, I. (2016). The role of the Bologna Process in defining Europe. *European Educational Research Journal*, 15(6), 664-675. URL: <https://journals.sagepub.com/doi/full/10.1177/1474904116657549> (date of access: 20.08.2024).

2. Law of Ukraine "On Higher Education" URL: <https://zakon.rada.gov.ua/laws/show/en/1556-18?lang=en#Text> (date of access: 20.08.2024).

3. Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). (2015). Brussels, Belgium. URL: [https://enqa.eu/wp-content/uploads/2015/11/ESG\\_2015.pdf](https://enqa.eu/wp-content/uploads/2015/11/ESG_2015.pdf) (date of access: 20.08.2024).

#### *Additional*

1. Quality assurance in higher education institutions in Ukraine 2016 through the prism of European Guidelines and Standards ESQ 2015 / Edited by Mazurkiewicz, EXANTE, Wroclaw, 2016. URL: <https://projects.lnu.edu.ua/quaere/wp-content/uploads/sites/6/2018/03/QA-in-Ukraine-reports.pdf> (date of access: 20.08.2024).

#### *Information resources*

1. <https://nmuofficial.com/en/zagalni-vidomosti/kafedri/departament-medical-general-chemistry/>

2. <https://likar.nmu.kiev.ua/md/course/view.php?id=7410>

### Questions for the student's self-preparation for the practical lesson:

1. Main theses of Bologna Declaration.
2. Importance of Bologna Process.

**The methodical instruction is developed by:**

Yaroslava Pushkarova – Associate Professor of Analytical, Physical and Colloid Chemistry Department, PhD in Chemistry, Associate Professor,

Tetiana Reva – Doctor of Pedagogical Sciences, Professor, Professor of Analytical, Physical and Colloid Chemistry Department.

## Topic of lesson N 2: “Restructuring of the higher education in Ukraine according to the Law “On Higher Education”, ISCED-2013 and NQFs”

### Competencies:

– **integral competence:** ability to solve tasks of research and/or innovative nature in the field of pharmacy;

– **general competencies (GC):**

1. Ability for abstract thinking, analysis and synthesis (GC 01).
2. Knowledge and understanding of the subject area; understanding of professional activity (GC 02).
3. Ability to work in a team (GC 06).
4. The ability to make decisions and act in compliance with the principle of inadmissibility of corruption and any other manifestations of dishonesty (GC 10).

– **professional competences of the specialty (PC):**

1. Ability to integrate knowledge and solve complex problems of pharmacy / industrial pharmacy in broad or multidisciplinary contexts (PC 01).

2. Ability to collect, interpret and apply data necessary for professional activity, carrying out research and implementation of innovative projects in the field of pharmacy (PC 02).

3. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to persons who are studying (PC 04).

**Purpose:** analyze the main provisions of Law “On Higher Education”, consider education levels according to the National Qualification Framework (NQF) and the education levels according to the International Standard Classification of Education (ISCED).

**Equipment:** practical tasks, student’s notebook, Table “National Qualification Framework”.

### Lesson plan and organizational structure:

Stage	Description of the stage	Learning levels	Time
Preparatory	Organizational issues (checking the presence of students)	Familiarization	1 min.
	Formation of motivation, activation of cognitive activity	Perception	3 min.
	Control of the initial level of teaching: test control and/or individual survey, verification of the performance of tasks of extra-auditory independent work	Reproductive	10 min.
Main	Discussion of theoretical material according to the subject of the topic	Comprehension Understanding	10 min.

	Solving practical tasks	Application in practice Search creative activity	25 min.
	Independent work of the student under the supervision of the teacher (auditory work of the student)	Application in practice Search creative activity	10 min.
	Generalization of knowledge	Fixing	5 min.
Final	Control of the final level of teaching (test control and/or practical tasks)	Reproduction	15 min.
	General evaluation of the student's educational activity	Familiarization	10 min.
	Informing students about the topic of the next lesson and tasks for independent work	Familiarization	1 min.

### **Recommended literature:**

#### *Basic*

1. OECD (2017), "Definition and classification of educational programmes: The practical implementation of ISCED 2011", in OECD Handbook for Internationally Comparative Education Statistics: Concepts, Standards, Definitions and Classifications, OECD Publishing, Paris. URL: <https://www.oecd-ilibrary.org/docserver/9789264279889-8-en.pdf?expires=1661516332&id=id&accname=guest&checksum=1B2B4854B46BB2F99ECFCBA949A5CB33> (date of access: 20.08.2024).

2. International Standard Classification of Education. Fields of education and training 2013 (ISCED-F 2013) – Detailed field descriptions. UNESCO Institute for Statistics, Canada, 2015, 96 p. URL: <https://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-fields-of-education-and-training-2013-detailed-field-descriptions-2015-en.pdf> (date of access: 20.08.2024).

#### *Additional*

1. Law of Ukraine "On Higher Education" URL: <https://zakon.rada.gov.ua/laws/show/en/1556-18?lang=en#Text> (date of access: 20.08.2024).

2. Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). (2015). Brussels, Belgium. URL: [https://enqa.eu/wp-content/uploads/2015/11/ESG\\_2015.pdf](https://enqa.eu/wp-content/uploads/2015/11/ESG_2015.pdf) (date of access: 20.08.2024).

#### *Information resources*

1. <https://nmuofficial.com/en/zagalni-vidomosti/kafedri/departament-medical-general-chemistry/>

2. <https://likar.nmu.kiev.ua/md/course/view.php?id=7410>

**Questions for the student's self-preparation for the practical lesson:**

1. Mission Statement and Strategy of the National Agency for Higher Education Quality Assurance (NAQA).
2. National Qualification Framework (NQF).
3. International Standard Classification of Education (ISCED).

**The methodical instruction is developed by:**

Yaroslava Pushkarova – Associate Professor of Analytical, Physical and Colloid Chemistry Department, PhD in Chemistry, Associate Professor,

Tetiana Reva – Doctor of Pedagogical Sciences, Professor, Professor of Analytical, Physical and Colloid Chemistry Department.



## Topic of lesson N 3: “Organization and control of independent work of students”

### Competencies:

– **integral competence:** ability to solve tasks of research and/or innovative nature in the field of pharmacy;

– **general competencies (GC):**

1. Ability for abstract thinking, analysis and synthesis (GC 01).
2. Knowledge and understanding of the subject area; understanding of professional activity (GC 02).
3. Ability to work in a team (GC 06).
4. The ability to make decisions and act in compliance with the principle of inadmissibility of corruption and any other manifestations of dishonesty (GC 10).

– **professional competences of the specialty (PC):**

1. Ability to integrate knowledge and solve complex problems of pharmacy / industrial pharmacy in broad or multidisciplinary contexts (PC 01).

2. Ability to collect, interpret and apply data necessary for professional activity, carrying out research and implementation of innovative projects in the field of pharmacy (PC 02).

3. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to persons who are studying (PC 04).

**Purpose:** analyze the role, types and organization of independent students’ work.

**Equipment:** practical tasks, student’s notebook.

### Lesson plan and organizational structure:

Stage	Description of the stage	Learning levels	Time
Preparatory	Organizational issues (checking the presence of students)	Familiarization	1 min.
	Formation of motivation, activation of cognitive activity	Perception	3 min.
	Control of the initial level of teaching: test control and/or individual survey, verification of the performance of tasks of extra-auditory independent work	Reproductive	10 min.
Main	Discussion of theoretical material according to the subject of the topic	Comprehension Understanding	10 min.
	Solving practical tasks	Application in practice Search creative activity	25 min.

	Independent work of the student under the supervision of the teacher (auditory work of the student)	Application in practice Search creative activity	10 min.
	Generalization of knowledge	Fixing	5 min.
Final	Control of the final level of teaching (test control and/or practical tasks)	Reproduction	15 min.
	General evaluation of the student's educational activity	Familiarization	10 min.
	Informing students about the topic of the next lesson and tasks for independent work	Familiarization	1 min.

### **Recommended literature:**

#### *Basic*

1. Sattarov, A. R. (2021). Mobile learning technology for organizing independent work in the educational process of higher education. *Novateur Publications*, 7(2), 260-266. URL: <https://repo.journalnx.com/index.php/nx/article/view/2355> (date of access: 20.08.2024).

2. Elisafenki, M. K., Kruglikova, G. A., & Protasova, E. E. (2019). Digital technologies for organizing an independent work of students // *Advances in economics, Business and Management Research* (1st International Scientific Conference “Modern Management Trends and the Digital Economy: from Regional Development to Global Economic Growth” (MTDE 2019), 81, 644-646. URL: <https://www.atlantispress.com/proceedings/mtde-19/125908910> (date of access: 20.08.2024).

#### *Additional*

1. Law of Ukraine “On Higher Education” URL: <https://zakon.rada.gov.ua/laws/show/en/1556-18?lang=en#Text> (date of access: 20.08.2024).

#### *Information resources*

1. <https://nmuofficial.com/en/zagalni-vidomosti/kafedri/department-medical-general-chemistry/>

2. <https://likar.nmu.kiev.ua/md/course/view.php?id=7410>

### **Questions for the student's self-preparation for the practical lesson:**

1. Organization of independent work of students' on credit technology.
2. Types of independent activities of students.
3. Role of independent students' work.

### **The methodical instruction is developed by:**

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## Topic of lesson N 4: “Current trends in the development of higher pharmacy education”

### Competencies:

– **integral competence:** ability to solve tasks of research and/or innovative nature in the field of pharmacy;

– **general competencies (GC):**

1. Ability for abstract thinking, analysis and synthesis (GC 01).
2. Knowledge and understanding of the subject area; understanding of professional activity (GC 02).
3. Ability to work in a team (GC 06).
4. The ability to make decisions and act in compliance with the principle of inadmissibility of corruption and any other manifestations of dishonesty (GC 10).

– **professional competences of the specialty (PC):**

1. Ability to integrate knowledge and solve complex problems of pharmacy / industrial pharmacy in broad or multidisciplinary contexts (PC 01).

2. Ability to collect, interpret and apply data necessary for professional activity, carrying out research and implementation of innovative projects in the field of pharmacy (PC 02).

3. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to persons who are studying (PC 04).

**Purpose:** analyze the factors, which affect the learning process in pharmacy education and particularly lifelong learning; consider a student-centered approach to teaching.

**Equipment:** practical tasks, student’s notebook.

### Lesson plan and organizational structure:

Stage	Description of the stage	Levels of assimilation	Time
Preparatory	Organizational issues (checking the presence of students)	Familiarization	1 min.
	Formation of motivation, activation of cognitive activity	Perception	3 min.
	Control of the initial level of teaching: test control and/or individual survey, verification of the performance of tasks of extracurricular independent work	Reproductive	10 min.
Main	Discussion of theoretical issues according to the subject of the class	Comprehension Understanding	10 min.
	Solving practical tasks	Application in practice	25 min.

		Search creative activity	
	Independent work of the student under the supervision of the teacher (auditory work of the student)	Application in practice Search creative activity	10 min.
	Generalization of knowledge	Fixing	5 min.
Final	Control of the final level of teaching (test control and/or practical tasks)	Reproduction	15 min.
	General evaluation of the student's educational activity	Familiarization	10 min.
	Informing students about the topic of the next lesson and tasks for independent work	Familiarization	1 min.

### Recommended literature:

#### Basic

1. Skyba, M. (2018). The main tendencies of higher education in Ukraine in the context of the current challenges of European integration. *International Entrepreneurship*, 4(2), 43-54. URL: <https://ier.uek.krakow.pl/index.php/pm/article/view/1627/> (date of access: 20.08.2024).

2. Anderson, C., & Arakawa, N. (2021). Pharmacy education development. *Pharmacy*, 9(4), 168-172. URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8544723/> (date of access: 20.08.2024).

#### Additional

1. Voloshinov, S., Kruglyk, V., Osadchy, V., Osadcha, K., & Symonenko, S. (2020). Realities and prospects of distance learning at higher education institutions of Ukraine. *Ukrainian Journal of Educational Studies and Information Technology*, 8(1), 1-16. URL: <https://uesit.org.ua/index.php/itse/article/view/265> (date of access: 20.08.2024).

#### Information resources

1. <https://nmuofficial.com/en/zagalni-vidomosti/kafedri/department-medical-general-chemistry/>

2. <https://likar.nmu.kiev.ua/md/course/view.php?id=7410>

### Questions for the student's self-preparation for the practical lesson:

1. Learning to teach.
2. Students' thinking and reasoning.
3. Changing pharmacy teaching.

### The methodical instruction is developed by:

Yaroslava Pushkarova – Associate Professor of Analytical, Physical and Colloid Chemistry Department, PhD in Chemistry, Associate Professor,

Tetiana Reva – Doctor of Pedagogical Sciences, Professor, Professor of Analytical, Physical and Colloid Chemistry Department.

## Topic of lesson N 5: “Education of a leader in the pharmaceutical industry”

### Competencies:

– **integral competence:** ability to solve tasks of research and/or innovative nature in the field of pharmacy;

– **general competencies (GC):**

1. Ability for abstract thinking, analysis and synthesis (GC 01).  
2. Knowledge and understanding of the subject area; understanding of professional activity (GC 02).

3. Ability to work in a team (GC 06).

4. The ability to make decisions and act in compliance with the principle of inadmissibility of corruption and any other manifestations of dishonesty (GC 10).

– **professional competences of the specialty (PC):**

1. Ability to integrate knowledge and solve complex problems of pharmacy / industrial pharmacy in broad or multidisciplinary contexts (PC 01).

2. Ability to collect, interpret and apply data necessary for professional activity, carrying out research and implementation of innovative projects in the field of pharmacy (PC 02).

3. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to persons who are studying (PC 04).

**Purpose:** analyze the reasons why leadership is important for pharmacy education; analyze seven-star pharmacist concept and eight-star pharmacist concept.

**Equipment:** practical tasks, student’s notebook.

### Lesson plan and organizational structure:

Stage	Description of the stage	Learning levels	Time
Preparatory	Organizational issues (checking the presence of students)	Familiarization	1 min.
	Formation of motivation, activation of cognitive activity	Perception	3 min.
	Control of the initial level of teaching: test control and/or individual survey, verification of the performance of tasks of extra-auditory independent work	Reproductive	10 min.
Main	Discussion of theoretical material according to the subject of the topic	Comprehension Understanding	10 min.
	Solving practical tasks	Application in practice Search creative	25 min.

		activity	
	Independent work of the student under the supervision of the teacher (auditory work of the student)	Application in practice Search creative activity	10 min.
	Generalization of knowledge	Fixing	5 min.
Final	Control of the final level of teaching (test control and/or practical tasks)	Reproduction	15 min.
	General evaluation of the student's educational activity	Familiarization	10 min.
	Informing students about the topic of the next lesson and tasks for independent work	Familiarization	1 min.

### Recommended literature:

#### *Basic*

1. Van Diggele, C., Burgess, A., Roberts, C., & Mellis, C. (2020). Leadership in healthcare education. *Medical Education*, 20, 456-462. URL: <https://bmcmmededuc.biomedcentral.com/articles/10.1186/s12909-020-02288-x> (date of access: 20.08.2024).

2. Reed, B. N., Klutts, A. M., & Mattingly II, T. J. (2019). A systematic review of leadership definitions, competencies, and assessment methods in pharmacy education. *American Journal of Pharmaceutical Education*, 83(9), 1873-1885. URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6920635/> (date of access: 20.08.2024).

#### *Additional*

1. Quality assurance in higher education institutions in Ukraine 2016 through the prism of European Guidelines and Standards ESQ 2015 / Edited by Mazurkiewicz, EXANTE, Wroclaw, 2016. URL: <https://projects.lnu.edu.ua/quaere/wp-content/uploads/sites/6/2018/03/QA-in-Ukraine-reports.pdf> (date of access: 20.08.2024).

#### *Information resources*

- <https://nmuofficial.com/en/zagalni-vidomosti/kafedri/department-medical-general-chemistry/>
- <https://likar.nmu.kiev.ua/md/course/view.php?id=7410>

### Questions for the student's self-preparation for the practical lesson:

- Seven-star pharmacist concept and eight-star pharmacist concepts.
- Leadership competencies.

### The methodical instruction is developed by:

Yaroslava Pushkarova – Associate Professor of Analytical, Physical and Colloid Chemistry Department, PhD in Chemistry, Associate Professor,

Tetiana Reva – Doctor of Pedagogical Sciences, Professor, Professor of Analytical, Physical and Colloid Chemistry Department.

## **Topic of lesson N 6: “Pharmacy education in Ukraine and abroad, stages of its development”**

### **Competencies:**

– **integral competence:** ability to solve tasks of research and/or innovative nature in the field of pharmacy;

– **general competencies (GC):**

1. Ability for abstract thinking, analysis and synthesis (GC 01).
2. Knowledge and understanding of the subject area; understanding of professional activity (GC 02).
3. Ability to work in a team (GC 06).
4. The ability to make decisions and act in compliance with the principle of inadmissibility of corruption and any other manifestations of dishonesty (GC 10).

– **professional competences of the specialty (PC):**

1. Ability to integrate knowledge and solve complex problems of pharmacy / industrial pharmacy in broad or multidisciplinary contexts (PC 01).
2. Ability to collect, interpret and apply data necessary for professional activity, carrying out research and implementation of innovative projects in the field of pharmacy (PC 02).
3. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to persons who are studying (PC 04).

**Purpose:** analyze the specific peculiarities, principles and features of the occupational training of pharmaceutical industry professionals; consider the main stages of development of the occupational training of pharmaceutical industry professionals in Ukraine.

**Equipment:** practical tasks, student’s notebook.

### **Lesson plan and organizational structure:**

Stage	Description of the stage	Learning levels	Time
Preparatory	Organizational issues (checking the presence of students)	Familiarization	1 min.
	Formation of motivation, activation of cognitive activity	Perception	3 min.
	Control of the initial level of teaching: test control and/or individual survey, verification of the performance of tasks of extra-auditory independent work	Reproductive	10 min.
Main	Discussion of theoretical material according to the subject of the topic	Comprehension Understanding	10 min.
	Solving practical tasks	Application in	25 min.

		practice Search creative activity	
	Independent work of the student under the supervision of the teacher (auditory work of the student)	Application in practice Search creative activity	10 min.
	Generalization of knowledge	Fixing	5 min.
Final	Control of the final level of teaching (test control and/or practical tasks)	Reproduction	15 min.
	General evaluation of the student's educational activity	Familiarization	10 min.
	Informing students about the topic of the next lesson and tasks for independent work	Familiarization	1 min.

### **Recommended literature:**

#### *Basic*

1. Anderson, C., & Arakawa, N. (2021). Pharmacy education development. *Pharmacy*, 9(4), 168-172. URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8544723/> (date of access: 20.08.2024).
2. Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). (2015). Brussels, Belgium. URL: [https://enqa.eu/wp-content/uploads/2015/11/ESG\\_2015.pdf](https://enqa.eu/wp-content/uploads/2015/11/ESG_2015.pdf) (date of access: 20.08.2024).

#### *Additional*

1. Kushnir, I. (2016). The role of the Bologna Process in defining Europe. *European Educational Research Journal*, 15(6), 664-675. URL: <https://journals.sagepub.com/doi/full/10.1177/1474904116657549> (date of access: 20.08.2024).

#### *Information resources*

1. <https://nmuofficial.com/en/zagalni-vidomosti/kafedri/departament-medical-general-chemistry/>
2. <https://likar.nmu.kiev.ua/md/course/view.php?id=7410>

### **Questions for the student's self-preparation for the practical lesson:**

1. Basic trends of the system of the occupational training of pharmaceutical industry professionals in Ukraine.
2. Formation and development of the pharmaceutical science in Ukraine.
3. Development stages of the occupational training of pharmaceutical industry professionals in Ukraine.

### **The methodical instruction is developed by:**

Yaroslava Pushkarova – Associate Professor of Analytical, Physical and Colloid Chemistry Department, PhD in Chemistry, Associate Professor,



Tetiana Reva – Doctor of Pedagogical Sciences, Professor, Professor of Analytical, Physical and Colloid Chemistry Department.

## Topic of lesson N 7: “Innovative technologies of teaching disciplines”

### Competencies:

– **integral competence:** ability to solve tasks of research and/or innovative nature in the field of pharmacy;

– **general competencies (GC):**

1. Ability for abstract thinking, analysis and synthesis (GC 01).
2. Knowledge and understanding of the subject area; understanding of professional activity (GC 02).
3. Ability to work in a team (GC 06).
4. The ability to make decisions and act in compliance with the principle of inadmissibility of corruption and any other manifestations of dishonesty (GC 10).

– **professional competences of the specialty (PC):**

1. Ability to integrate knowledge and solve complex problems of pharmacy / industrial pharmacy in broad or multidisciplinary contexts (PC 01).
2. Ability to collect, interpret and apply data necessary for professional activity, carrying out research and implementation of innovative projects in the field of pharmacy (PC 02).
3. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to persons who are studying (PC 04).

**Purpose:** analyze the different types of innovative technologies in the process of online education; analyze the place and role of information technology in the innovative education development.

**Equipment:** practical tasks, student’s notebook.

### Lesson plan and organizational structure:

Stage	Description of the stage	Learning levels	Time
Preparatory	Organizational issues (checking the presence of students)	Familiarization	1 min.
	Formation of motivation, activation of cognitive activity	Perception	3 min.
	Control of the initial level of teaching: test control and/or individual survey, verification of the performance of tasks of extra-auditory independent work	Reproductive	10 min.
Main	Discussion of theoretical material according to the subject of the topic	Comprehension Understanding	10 min.
	Solving practical tasks	Application in practice Search creative	25 min.

		activity	
	Independent work of the student under the supervision of the teacher (auditory work of the student)	Application in practice Search creative activity	10 min.
	Generalization of knowledge	Fixing	5 min.
Final	Control of the final level of teaching (test control and/or practical tasks)	Reproduction	15 min.
	General evaluation of the student's educational activity	Familiarization	10 min.
	Informing students about the topic of the next lesson and tasks for independent work	Familiarization	1 min.

### **Recommended literature:**

#### *Basic*

1. Ivzhenko, I., Sokol, I., Kochyna, V., Noskova, M., Yeromina, L., & Blokhina, V. (2020). Information and Innovative Technologies in Distance Learning in Higher Education Institutions of Ukraine. *Systematic Reviews in Pharmacy*, 11(9). 462-465. URL: <https://www.sysrevpharm.org/abstract/information-and-innovative-technologies-in-distance-learning-in-higher-education-institutions-of-ukraine-66253.html> (date of access: 20.08.2024).

2. Digital technologies for organizing an independent work of students // Advances in economics, Business and Management Research (1st International Scientific Conference “Modern Management Trends and the Digital Economy: from Regional Development to Global Economic Growth” (MTDE 2019), 81, 644-646. URL: <https://www.atlantis-press.com/proceedings/mtde-19/125908910> (date of access: 20.08.2024).

#### *Additional*

1. Sattarov, A. R. (2021). Mobile learning technology for organizing independent work in the educational process of higher education. *Novateur Publications*, 7(2), 260-266. URL: <https://repo.journalnx.com/index.php/nx/article/view/2355> (date of access: 20.08.2024).

#### *Information resources*

1. <https://nmuofficial.com/en/zagalni-vidomosti/kafedri/department-medical-general-chemistry/>
2. <https://likar.nmu.kiev.ua/md/course/view.php?id=7410>

### **Questions for the student's self-preparation for the practical lesson:**

1. Top innovative technologies in education.
2. Development and application of innovative technologies in the process of online education.

**The methodical instruction is developed by:**

Yaroslava Pushkarova – Associate Professor of Analytical, Physical and Colloid Chemistry Department, PhD in Chemistry, Associate Professor,

Tetiana Reva – Doctor of Pedagogical Sciences, Professor, Professor of Analytical, Physical and Colloid Chemistry Department.

## Topic of lesson N 8: “Research work of students”

### Competencies:

– **integral competence:** ability to solve tasks of research and/or innovative nature in the field of pharmacy;

– **general competencies (GC):**

1. Ability for abstract thinking, analysis and synthesis (GC 01).
2. Knowledge and understanding of the subject area; understanding of professional activity (GC 02).
3. Ability to work in a team (GC 06).
4. The ability to make decisions and act in compliance with the principle of inadmissibility of corruption and any other manifestations of dishonesty (GC 10).

– **professional competences of the specialty (PC):**

1. Ability to integrate knowledge and solve complex problems of pharmacy / industrial pharmacy in broad or multidisciplinary contexts (PC 01).
2. Ability to collect, interpret and apply data necessary for professional activity, carrying out research and implementation of innovative projects in the field of pharmacy (PC 02).
3. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to persons who are studying (PC 04).

**Purpose:** analyze purposes, tasks and objectives of research work of students; analyze the role of research work in pharmacy education; consider research work as one of the mechanisms for the integration of higher professional education into a modern innovative society.

**Equipment:** practical tasks, student’s notebook.

### Lesson plan and organizational structure:

Stage	Description of the stage	Learning levels	Time
Preparatory	Organizational issues (checking the presence of students)	Familiarization	1 min.
	Formation of motivation, activation of cognitive activity	Perception	3 min.
	Control of the initial level of teaching: test control and/or individual survey, verification of the performance of tasks of extra-auditory independent work	Reproductive	10 min.
Main	Discussion of theoretical material according to the subject of the topic	Comprehension Understanding	10 min.
	Solving practical tasks	Application in practice	25 min.

		Search creative activity	
	Independent work of the student under the supervision of the teacher (auditory work of the student)	Application in practice Search creative activity	10 min.
	Generalization of knowledge	Fixing	5 min.
Final	Control of the final level of teaching (test control and/or practical tasks)	Reproduction	15 min.
	General evaluation of the student's educational activity	Familiarization	10 min.
	Informing students about the topic of the next lesson and tasks for independent work	Familiarization	1 min.

### **Recommended literature:**

#### *Basic*

1. Walkington, H. (2015). Students as researchers: Supporting undergraduate research in the disciplines in higher education. *The higher education academy, 1*, 1-34. URL: <https://info.lse.ac.uk/staff/divisions/Teaching-and-Learning-Centre/Assets/Documents/URI-documents/HEA-Students-as-researchers-1.pdf> (date of access: 20.08.2024).

#### *Additional*

1. Reed, B. N., Klutts, A. M., & Mattingly II, T. J. (2019). A systematic review of leadership definitions, competencies, and assessment methods in pharmacy education. *American Journal of Pharmaceutical Education, 83*(9), 1873-1885. URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6920635/> (date of access: 20.08.2024).

#### *Information resources*

1. <https://nmuofficial.com/en/zagalni-vidomosti/kafedri/department-medical-general-chemistry/>
2. <https://likar.nmu.kiev.ua/md/course/view.php?id=7410>

### **Questions for the student's self-preparation for the practical lesson:**

1. Purposes, tasks and objectives of research work of students.
2. Importance of research work for students.

### **The methodical instruction is developed by:**

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Tetiana Reva – Doctor of Pedagogical Sciences, Professor, Professor of Analytical, Physical and Colloid Chemistry Department.

## Topic of lesson N 9: “Today's and problems of higher education in Ukraine”

### Competencies:

– **integral competence:** ability to solve tasks of research and/or innovative nature in the field of pharmacy;

– **general competencies (GC):**

1. Ability for abstract thinking, analysis and synthesis (GC 01).  
2. Knowledge and understanding of the subject area; understanding of professional activity (GC 02).

3. Ability to work in a team (GC 06).

4. The ability to make decisions and act in compliance with the principle of inadmissibility of corruption and any other manifestations of dishonesty (GC 10).

– **professional competences of the specialty (PC):**

1. Ability to integrate knowledge and solve complex problems of pharmacy / industrial pharmacy in broad or multidisciplinary contexts (PC 01).

2. Ability to collect, interpret and apply data necessary for professional activity, carrying out research and implementation of innovative projects in the field of pharmacy (PC 02).

3. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to persons who are studying (PC 04).

**Purpose:** analyze the main trends in the higher education in Ukraine; analyze the role of distance learning at higher education institutions of Ukraine; identify trends in the development of the educational environment in the near and distant future in the context of globalization.

**Equipment:** practical tasks, student's notebook.

### Lesson plan and organizational structure:

Stage	Description of the stage	Learning levels	Time
Preparatory	Organizational issues (checking the presence of students)	Familiarization	1 min.
	Formation of motivation, activation of cognitive activity	Perception	3 min.
	Control of the initial level of teaching: test control and/or individual survey, verification of the performance of tasks of extra-auditory independent work	Reproductive	10 min.
Main	Discussion of theoretical material according to the subject of the topic	Comprehension Understanding	10 min.
	Solving practical tasks	Application in	25 min.

		practice Search creative activity	
	Independent work of the student under the supervision of the teacher (auditory work of the student)	Application in practice Search creative activity	10 min.
	Generalization of knowledge	Fixing	5 min.
Final	Control of the final level of teaching (test control and/or practical tasks)	Reproduction	15 min.
	General evaluation of the student's educational activity	Familiarization	10 min.
	Informing students about the topic of the next lesson and tasks for independent work	Familiarization	1 min.

### Recommended literature:

#### *Basic*

1. Voloshinov, S., Kruglyk, V., Osadchyi, V., Osadcha, K., & Symonenko, S. (2020). Realities and prospects of distance learning at higher education institutions of Ukraine. *Ukrainian Journal of Educational Studies and Information Technology*, 8(1), 1-16. URL: <https://uesit.org.ua/index.php/itse/article/view/265> (date of access: 20.08.2024).

2. Skyba, M. (2018). The main tendencies of higher education in Ukraine in the context of the current challenges of European integration. *International Entrepreneurship*, 4(2), 43-54. URL: <https://ier.uek.krakow.pl/index.php/pm/article/view/1627/> (date of access: 20.08.2024).

#### *Additional*

1. Anderson, C., & Arakawa, N. (2021). Pharmacy education development. *Pharmacy*, 9(4), 168-172. URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8544723/> (date of access: 20.08.2024).

#### *Information resources*

- <https://nmuofficial.com/en/zagalni-vidomosti/kafedri/department-medical-general-chemistry/>
- <https://likar.nmu.kiev.ua/md/course/view.php?id=7410>

### Questions for the student's self-preparation for the practical lesson:

- The main trends in the higher education in Ukraine.
- Distance learning at higher education institutions of Ukraine.
- Trends in the development of the educational environmental in the context of globalization.

### The methodical instruction is developed by:

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Tetiana Reva – Doctor of Pedagogical Sciences, Professor, Professor of Analytical, Physical and Colloid Chemistry Department.

## Topic of lesson N 10: “The role of chemical and humanities in the education of pharmacists”

### Competencies:

– **integral competence:** ability to solve tasks of research and/or innovative nature in the field of pharmacy;

– **general competencies (GC):**

1. Ability for abstract thinking, analysis and synthesis (GC 01).
2. Knowledge and understanding of the subject area; understanding of professional activity (GC 02).
3. Ability to work in a team (GC 06).
4. The ability to make decisions and act in compliance with the principle of inadmissibility of corruption and any other manifestations of dishonesty (GC 10).

– **professional competences of the specialty (PC):**

1. Ability to integrate knowledge and solve complex problems of pharmacy / industrial pharmacy in broad or multidisciplinary contexts (PC 01).
2. Ability to collect, interpret and apply data necessary for professional activity, carrying out research and implementation of innovative projects in the field of pharmacy (PC 02).
3. Ability to clearly and unambiguously communicate one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to persons who are studying (PC 04).

**Purpose:** analyze the role of chemistry in the education of pharmacists; analyze the role of humanities in the education of pharmacists.

**Equipment:** practical tasks, student’s notebook.

### Lesson plan and organizational structure:

Stage	Description of the stage	Learning levels	Time
Preparatory	Organizational issues (checking the presence of students)	Familiarization	1 min.
	Formation of motivation, activation of cognitive activity	Perception	3 min.
	Control of the initial level of teaching: test control and/or individual survey, verification of the performance of tasks of extra-auditory independent work	Reproductive	10 min.
Main	Discussion of theoretical material according to the subject of the topic	Comprehension Understanding	10 min.
	Solving practical classes	Application in practice Search creative	20 min.

		activity	
	Independent work of the student under the supervision of the teacher (auditory work of the student)	Application in practice Search creative activity	10 min.
	Generalization of knowledge	Fixing	5 min.
Final	Control of the final level of teaching (test control and/or practical classes)	Reproduction	10 min.
	General evaluation of the student's educational activity	Familiarization	10 min.
	Calculation of the sum of points for the current activity.	Familiarization	11 min.

### Recommended literature:

#### *Basic*

1. Owens, C. T., & Baergen, R. (2021). Pharmacy practice in high-volume community settings: barriers and ethical responsibilities. *Pharmacy*, 9(2), 74. URL: <https://www.mdpi.com/2226-4787/9/2/74> (date of access: 20.08.2024).

2. Costa, R. C. (2019). The place of the humanities in today's knowledge society. *Palgrave Communications*, 5(38), 1-5. URL: <https://www.nature.com/articles/s41599-019-0245-6> (date of access: 20.08.2024).

#### *Additional*

1. Van Diggele, C., Burgess, A., Roberts, C., & Mellis, C. (2020). Leadership in healthcare education. *Medical Education*, 20, 456-462. URL: <https://bmcmmededuc.biomedcentral.com/articles/10.1186/s12909-020-02288-x> (date of access: 20.08.2024).

#### *Information resources*

1. <https://nmuofficial.com/en/zagalni-vidomosti/kafedri/department-medical-general-chemistry/>
2. <https://likar.nmu.kiev.ua/md/course/view.php?id=7410>

### Questions for the student's self-preparation for the practical lesson:

1. Importance of chemistry knowledge for a pharmacist.
2. Importance of humanistic subjects for a pharmacist.

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