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Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
RUDN University

Institute of Medicine

educational division (faculty/institute/academy) as higher education programme developer

COURSE SYLLABUS

CHEMISTRY

course title

Recommended by the Didactic Council for the Education Field of:

31.05.01 General Medicine

field of studies / speciality code and title

The course instruction is implemented within the professional education programme of higher education:

General Medicine

higher education programme profile/specialisation title

2022-2023

1. COURSE GOAL(s)

The goal of the course “Chemistry” is formation of systemic knowledge about the structure of matter, the patterns of chemical reactions, the main classes of inorganic compounds and their chemical properties, the basics of analytical chemistry, necessary to use this knowledge as a base when studying subsequent special courses in both chemical and special areas.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) “Chemistry” is aimed at the development of the following competences /competences in part: GPC-3, PC-6.

Table 2.1. List of competences that students acquire through the course study

Competence code	Competence descriptor	Competence formation indicators (within this course)
PC-6	Able to identify and implement the priorities of their own activities and ways to improve it on the basis of self-assessment and lifelong education.	PC-6.1. Evaluates his resources and their limits (personal, situational, temporary), uses them optimally for the successful completion of the assigned task.
GPC-3	Capable of counteracting the use of doping in sports and the fight against it	GPC-3.2. Able to analyze the biochemical, physicochemical and molecular biological mechanisms of development of pathological processes in the cells of the tissues of the athlete's body when taking illegal drugs, determining the principles of the course of biochemical processes when taking illegal drugs.

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The course refers to the core/variable/elective* component of (B1) block of the higher educational programme curriculum.

* - Underline whatever applicable.

Within the higher education programme students also master other (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the course study.

Table 3.1. The list of the higher education programme components/disciplines that contribute to the achievement of the expected learning outcomes as the course study results

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
GPC-3.2	Able to analyze biochemical, physicochemical and molecular biological mechanisms of the development of pathological processes in the cells of the tissues of the athlete's body when taking prohibited drugs, determining the principles of the course of biochemical processes when taking prohibited drugs. no Organic chemistry, biochemistry, pharmacology	-	Organic chemistry, biochemistry, pharmacology,
PC-6.1	Assesses his resources and their limits (personal, situational, temporary), uses them optimally for the successful completion of the assigned task. no Organic chemistry, biochemistry, pharmacology.	-	Organic chemistry, biochemistry, pharmacology,

* To be filled in according to the competence matrix of the higher education programme.

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course “Chemistry” is 3 credits (108 academic hours).

Table 4.1. Types of academic activities during the periods of higher education programme mastering (**full-time training**)*

Type of academic activities		Total academic hours	Semesters/training modules	
			1	
<i>Contact academic hours</i>		68	68	
including:				
Lectures (LC)				
Lab work (LW)		68	68	
Seminars (workshops/tutorials) (S)				-
<i>Self-studies</i>		31	31	
<i>Evaluation and assessment (exam/passing/failing grade)</i>		9	9	
Course workload	academic hours	108	108	
	credits	3	3	

* To be filled in regarding the higher education programme correspondence training mode.

5. COURSE CONTENTS

Table 5.1. Course contents and academic activities types

Modules and Topics	Content of the topics	Type of academic activities
Module 1 Section 1. Repetition of chemical elements.	1.1 Repetition of chemical elements. Simple substance. Complex basic information about chemical substances. A mole is the amount of a substance. from the school polar mass of the equivalent of a substance. Gas chemistry laws course. The law of equivalents.	LW
Module 2 Basic laws of the configuration of atoms and ions.	Periodic Chemistry No.1. Mendeleev. The method of valence bonds. alence. hybridization of orbitals. bond in complex compounds Thermochemistry. Fundamentals of thermochemistry. Enthalpy. Law of Chemical Entropy. Gibbs free energy. balance balance. Mass action law. Chemical equilibrium shift	LW
Module 3 Solutions. General	Electrolytic solutions. Ways of expressing concentration and dissociation of solutions:	LW

Modules and Topics	Content of the topics	Type of academic activities
<p>concepts of disperse systems.prerequisites for political fragmentation, its essence and consequences</p>	<p>mass fraction, molar molar concentration equivalents water hardness. Theory of electrolytic dissociation Dissociation Weak electrolytes. dilution law. Effect of LR weak and strong common ion. buffer solutions. Strong electrolytes. electrolytes. Activity and activity coefficient. Salt hydrolysis power. Ionic product of water. Hydrogen index. Salt hydrolysis. Dependence of hydrolysis on temperature and concentration of solutions Heterogeneous instant solubility, Solubility. LR equilibrium conditions. dissolution and precipitate formation. electrolytic Coordination association and instability constant of the compound of coordination compounds</p>	
<p>Module 4 Oxidation constant of solubility. Solubility.</p>	<p>4.1. conditions are reducing dissolution and precipitate formation. Electrolytic reactions, association and instability constant of coordination compounds The main classes of the solubility constant. Solubility. LR conditions for inorganic dissolution and precipitate formation. Electrolytic compounds association and instability constant of coordination compounds Fundamentals of the solubility constant. Solubility. LR Conditions for Qualitative Dissolution and Precipitation Formation. Electrolytic analysis of association and instability constant of coordination compounds</p>	LW
<p>Module 5 Fundamentals Fundamentals of quantitative analysis.</p>	<p>Methods of quantitative neutralization, complexometry, oxidimetry and photolorimetry analysis</p>	LW

Modules and Topics	Content of the topics	Type of academic activities
Module 21 USSR in the era Leonid Brezhnev	<p>Features of the country's political course in 1964–1985, strengthening of conservative SZ</p> <p>Name of the section of the discipline Content of the section (topic) Type of educational work</p> <p>Leonid Brezhnev trends, changes in the political system, the emergence of a dissident movement; economic reforms of the mid-1960s, their role and significance, growing contradictions and disproportions in the economy; development of the social sphere; achievements and problems in the development of culture; transition from confrontation to detente, peace initiatives of the USSR, the “Brezhnev Doctrine”, the aggravation of international tension at the turn of the 70s and 80s.</p>	LW
Module 22 USSR in 1985–1991 Perestroika	Prerequisites and goals of perestroika, essence and consequences of economic and political reforms; changes in the sphere of state structure; the concept of "new political thinking" in foreign policy; stages of restructuring	LW
Module 23 The collapse of the USSR and the creation CIS	The collapse of the USSR and the formation of the CIS; the formation of a new Russian statehood; way of socio-economic modernization of Russia; foreign policy of the country in the 1990s.	LW
Module 24 Russian Federation in the 1990s	RF at the beginning of the 20th century. V.V. Putin. Ways of socio-economic modernization of Russia; features of the development of the Russian Federation in 2010-2020s: reform of the Constitution, national programs; the problem of the annexation of Crimea; the country's foreign policy in the 21st century, including mechanisms to combat external threats.	LW

Modules and Topics	Content of the topics	Type of academic activities
Module 25 The role of RUDN as "soft power" in international relations	Peace initiatives of the USSR in the post-war period, features of the opening of the UDN in 1960, the mission of the University, features of the activities of the first rector - S.V. Rumyantsev, the second rector - V.F. Stanis, the third rector - V.M. Filippov. NW	

* - to be filled in only for **full**-time training; LC - lectures; LW - lab work; S - seminars.

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom equipment and technology support requirements

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
Lab work	Chemical laboratory for laboratory studies and current control, equipped with a set of specialized laboratory furniture.	A set of specialized laboratory furniture with a water tray, a set of special chemical glassware, a set of necessary chemical reagents, an analytical balance, a distillate, prices and ha.
Self-studies	Auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to eios.	Set of specialized furniture, chalk board, chalk, rag, marker board, markers, sponge.

* The premises for students' self-studies are subject to **MANDATORY** mention

7. RESOURCES RECOMMENDED FOR COURSE STUDY

Main readings:

1. G. A. Ershov, V. A. Popkov, A. S. Berlyand et al. *General Chemistry. Biophysical chemistry. Chemistry of biogenic elements. Textbook for medical schools...*, M.,: High School, 2010
2. Zelenin K.N. *Chemistry, Textbook for honey. VUZOV, Sp-B: 1997*
Z. V. A. Popkov. *Workshop on General Chemistry. Biophysical chemistry. Chemistry of biogenic elements. Textbook for medical students. M: Higher School, 2008.*

4. *Collection of tasks and exercises in general chemistry. Tutorial.* (SA. Puzakov, VL. Popkov, A.A. Filippova). M. : Higher school, 4th ed., 255 p., 2010

5. Ryabov M.A., Linko R.V. *General and inorganic chemistry. M.: RUDN University, 2007*

6. Strashnova SB, Polyakova E.I., Polyanskaya NA et al. *General and analytical chemistry. M.: RUDN University, 2021.*

b) *basic literature in English:*

1. With Chambers, HK. *Holliday Butterworth. Modern inorganic chemistry. 1975.*

2. Jask Barret. *Inorganic Chemistry in Aqueous Solution. 2003.*

Z. Elizabeth Gordon. *Chemistry and Global Awareness. libretxts. 2018.*

4. Lanna Derry, Maria Connor. *Chemistry for use with the TV Diploma Program. 2017.*

5. Nevskaya E. Ui., Egorova O.A. *General and Inorganic Chemistry. M.: RUDN. 2017*

6. Nevskaya E.Ui. *Chapters in Inorganic Chemistry. M.: RUDN, 2013.*

c) *Further reading*

1. Popkov V.A., Puzakov SA. *General chemistry. M.: GES)TAR Media, 2007.*

2. Glinka N.L. *Tasks and exercises in general chemistry, M.: Vyssh.shk, 2016*

3. Tyukavkina N.A., Baukov Yu.I. *Bioorganic chemistry. M.: Bustard. 2018.*

4. Tyukavkina N.A. *Guide to laboratory studies in bioorganic chemistry, M. : Drofa, 2009.*

5. Glinka. N.L. *General chemistry. M.: Yuray, 2015.*

6. Glinka N.L. *Tasks and exercises in general chemistry. M.: Yuray, 2015.*

7. M. A. Ryabov, E. Yu. Nevskaya, E. A. Sorokina, and Sheshko To. *Collection of basic formulas in chemistry. M.: AST: Astrel, 2009.*

Resources of the information and telecommunications network "Internet":

a) *Databases, reference and search systems in chemistry:*

<http://www.chemport.ru> Chemical Encyclopedia <http://ru.wikipedia.org>
<http://www.xumuk.ru>

b) *Electronic library system rudn*

*Training toolkit for self- studies to master the course *:*

1. The set of lectures on the course "Chemistry"
2. The laboratory workshop (if any).on the course "Chemistry"
3. The guidelines for writing a course paper / project (if any) on the course "Chemistry".

4.

* The training toolkit for self- studies to master the course is placed on the course page in the university telecommunication training and information system under the set procedure.

8. ASSESSMENT TOOLKIT AND GRADING SYSTEM* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL UPON COURSE COMPLETION

The assessment toolkit and the grading system* to evaluate the competences formation level (GPC-3, PC-6.) upon the course study completion are specified in the Appendix to the course syllabus.

* The assessment toolkit and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

DEVELOPERS:

Associate Professor of the
Department of General
Chemistry

position, department

signature

S.B. Strashnova

name and surname

HEAD OF EDUCATIONAL DEPARTMENT:

Department of General
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name of department

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V.V. Davydov

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**HEAD
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