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**Federal State Autonomous Educational Institution of Higher Education**

**PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA**

**NAMED AFTER PATRICE LUMUMBA**

**RUDN University**

**Institute of Medicine**

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

## **COURSE SYLLABUS**

**Medical Elementology**

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course title

**Recommended by the Didactic Council for the Education Field of:**

**31.05.03 Dentistry**

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field of studies / speciality code and title

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

**Dentistry**

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higher education programme profile/specialisation title

**2024-2025**

## 1. COURSE GOAL(s)

The goal of the course “Medical Elementology” is to equip students with the knowledge of biological role of macro- and microelements and their implications for human health;

- to form of clinical thinking in students for diagnosis, evaluation of disease prognosis and successful treatment;
- to applicate of new methods and schemes of correction of various metabolic disorders and pathological processes.

## 2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) “Medical Elementology” is aimed at the development of the following competences /competences in part: **(GPC)-8,9, (PC)-1,11.**

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

Competence code	Competence descriptor	Competence formation indicators (within this course)
GPC-8	GPC-8 Able to analyze the results of their own activities to prevent professional errors; readiness to use basic physical, chemical, mathematical and other natural science concepts and methods in solving professional problems	GPC-8 Students should be able to analyze the results of their own activities to prevent professional errors; readiness to use basic physical, chemical, mathematical and other natural science concepts and methods in solving professional problem
GPC-9	GPC-9 able for medical use of drugs and other substances and their combinations in solving professional problems	GPC-9 Students should be able for medical use of drugs and other substances and their combinations in solving professional problems
PC-1	P-11 Able to implement a set of measures aimed at maintaining and strengthening health, including the formation of a healthy lifestyle, preventing the occurrence and (or) spread of dental diseases, their early diagnosis, identifying the causes and conditions for their emergence and development, as well as on elimination of harmful influence on human health of factors of its habitat	PC-1 Students should be able to implement a set of measures aimed at maintaining and strengthening health, including the formation of a healthy lifestyle, preventing the occurrence and (or) spread of dental diseases, their early diagnosis, identifying the causes and conditions for their emergence and development, as well as on elimination of harmful influence on human health of factors of its habitat

Competence code	Competence descriptor	Competence formation indicators (within this course)
PC-11	PC-11 collecting and analyzing patient complaints, data of his medical history, examination results, laboratory, instrumental and other studies for the purpose of recognizing the condition or establishing the presence or absence of a dental disease; readiness to determine the need for natural therapeutic factors, medicinal, non-medicinal therapy and other methods in patients with dental diseases who need medical rehabilitation and sanatorium treatment	PC-11 Students should be able to collecting and analyzing patient complaints, data of his medical history, examination results, laboratory, instrumental and other studies for the purpose of recognizing the condition or establishing the presence or absence of a dental disease; readiness to determine the need for natural therapeutic factors, medicinal, non-medicinal therapy and other methods in patients with dental diseases who need medical rehabilitation and sanatorium treatment

### 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-8	GPC-8 Able to analyze the results of their own activities to prevent professional errors; readiness to use basic physical, chemical, mathematical and other natural science concepts and methods in solving	-	-

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
	professional problems		
GPC-9	GPC-9 able for medical use of drugs and other substances and their combinations in solving professional problems	-	-
PC-1	PC-1 Able to implement a set of measures aimed at maintaining and strengthening health, including the formation of a healthy lifestyle, preventing the occurrence and (or) spread of dental diseases, their early diagnosis, identifying the causes and conditions for their emergence and development, as well as on elimination of harmful influence on human health of factors of its habitat	-	-
PC-11	PC-11 collecting and analyzing patient complaints, data of his medical history, examination results, laboratory, instrumental and other studies for the purpose of recognizing the condition	-	-

#### 4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course is 2 credits (72 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>		<b>51</b>	<b>51</b>			
including:		-	-			
Lectures (LC)		-	-			
Lab work (LW)		51	51			
Seminars (workshops/tutorials) (S)			-			
<i>Self-studies</i>		<b>15</b>	<b>15</b>			
<i>Evaluation and assessment (exam/passing/failing grade)</i>		<b>6</b>	<b>6</b>			
<b>Course workload</b>	academic hours	<b>72</b>	<b>72</b>			
	credits	<b>2</b>	<b>2</b>			

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

## 5. COURSE CONTENTS

*Table 5.1. Course contents and academic activities types*

Course module title	Course module contents (topics)	Academic activities types
Introduction to Medical Elementology	Subject of medical elementology. Biological classification of chemical elements. The concept of bioelements.	LW
	Biogeochemistry and factors affecting the elemental status of the population.	LW
General Elementology	Factors affecting the homeostasis of microelements. Interaction between microelements	LW
	Elemental status of a person. Personalized assessment of human elemental status.	LW
Particular Elementology	Elements-organogenes (carbon, oxygen, nitrogen, hydrogen): a role in the body; suction; excretion; associated diseases; sources.	LW
	Macroelements (potassium, sodium, calcium, magnesium, phosphorus, sulfur, chlorine): role in the body; suction; excretion; deficiency and excess; toxicity; associated diseases; sources.	LW
	Essential trace elements (iron, zinc, copper, manganese, chromium, cobalt, molybdenum, selenium, iodine): role in the body; suction; excretion; deficiency and toxicity; associated diseases; sources.	LW
	Conditionally essential microelements (lithium, strontium, vanadium, nickel, tin, silicon, fluorine): role in the body; suction; excretion; deficiency and toxicity; associated diseases; sources	LW

Course module title	Course module contents (topics)	Academic activities types
	Toxic and potentially toxic microelements (arsenic, aluminum, lead, cadmium, mercury): role in the body; suction; excretion; toxicity; associated diseases; sources.	LW
The role of chemical elements in dentistry	Imbalances of chemical elements for various diseases of the oral cavity: caries, pulpitis, periodontitis, gingivitis, periodontitis, periodontitis	LW

\* - 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)
Lecture	A lecture hall for lecture-type classes, equipped with a set of specialised furniture; board (screen) and technical means of multimedia presentations.	
Lab work	A classroom for laboratory work, individual consultations, current and mid-term assessment; equipped with a set of specialised furniture and machinery.	List of specialised laboratory equipment, machinery, stands, etc.
Seminar	A classroom for conducting seminars, group and individual consultations, current and mid-term assessment; equipped with a set of specialised furniture and technical means for multimedia presentations.	List of specialised equipment, stands, visual posters, etc.
Computer Lab	A classroom for conducting classes, group and individual consultations, current and mid-term assessment, equipped with personal computers (in the amount of ___pcs), a board (screen) and technical means of multimedia presentations.	List of specialised software installed on computers for mastering the discipline
Self-studies	A classroom for independent work of students (can be used for seminars and consultations), equipped with a set of specialised furniture and computers with access to the electronic information and educational environment.	

## 7. RESOURCES RECOMMENDED FOR COURSE STUDY

### *Main readings:*

- 1) An Introduction to Medical Elementology: A Textbook. I.V. Radysh, A.V. Rocky. - Moscow: PFUR, 2015. - 200 p.: ill. ISBN 978-5-209-06691-0.
- 2) Oberlis D., Harland V., Skalny A. Biological role of macro and microelements in humans and animals. - SPb.: Science, 2008. - 544 p.
- 3) Skalny A.V., Lakarova E.V., Kuznetsov V.V., Skalnaya M.G. Analytical methods in bioelementology. - St. Petersburg: Science, 2009. – 264 p.

### *Additional readings:*

- 1) World Health Organization. (1996). Trace elements in human nutrition and health.
- 2) Skalny A.V. Bioelements and bioelementology in pharmacology and nutrition: fundamental and practical aspects // Pharmacology and nutritional intervention in the treatment of disease, Edited by Faik Atroshi. 2014.-P. 225-241.
- 3) Skalny A.V., Rudakov I.A. Notova S.V., Burtseva T.I., Skalny V.V., Baranova O.V., Gubaydulina S.G., Bioelementology: basic concepts and terms. IPK GOU OSU - Orenburg. - 2005. – 50 p.
- 4) Ibragimova M.Ya., Skalnaya M.G., Sabirova L.Ya., Skalny A.V., Zhdanov R.I. Exchange of macro and microelements in the human body. Modern methods of determining chemical elements in biological materials / Selected chapters of fundamental and translational medicine. R.I. Zhdanov, the manager. Ed. - Kazan: Kazan Publishing House. University. 2014. P. 330-346.
- 5) Skalny A.V. Microelements // Laboratory diagnostics of infectious diseases. Reference book / Ed. IN AND. Pokrovsky, M.G. Tvorogovoy, G.A. Shipulina. - Moscow: Publishing House BINOM, 2013 - 447- 467p.
- 6) Skalny A.V., Tsygan V.N. Pathophysiology of macro-and microelement exchange // Pathophysiology of Metabolism: a Textbook / Ed. V.N. Gypsy. - St. Petersburg: SpetsLit, 2013. - P. 262-333.
- 7) Skalny A.V. Chemical elements in human physiology and ecology. -M .: ONYX 21 Century: The World, 2004. -216 p.
- 8) Skalny A.V. Physiological aspects of the application of macro- and microelements. IPK GOU OSU - Orenburg, 2005. - 206 p.
- 9) Agadzhanyan N.A., Veldanova M.V., Skalny A.V. Ecological portrait of man and the role of microelements. -M., 2001. -236 p.
- 10) Skalny A.V., Rudakov I.A. Bioelements in medicine. -M.: ONYX 21 Century: The World, 2004. -272 p.

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

1. The set of lectures on the course “Medical Elementology”
2. The laboratory workshop (if any).on the course “Medical Elementology”
3. The guidelines for writing a course paper / project (if any) on the course “Medical Elementology”.
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)-8,9, PC-1,11.) 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:**

Senior Lecturer of Department

of Medical Elementology  
\_\_\_\_\_

position, department

signature

A.A. Skalny

\_\_\_\_\_

name and surname

Head of the Department  
of Medical Elementology

\_\_\_\_\_

position, department

signature

A.V. Skalny

\_\_\_\_\_

name and surname

### **HEAD OF EDUCATIONAL DEPARTMENT:**

of Medical Elementology  
\_\_\_\_\_

name of department

signature

A.V. Skalny

\_\_\_\_\_

name and surname

### **HEAD**

### **OF HIGHER EDUCATION PROGRAMME:**

Deputy Director of Institute of  
Medicine in the field of Dentistry

\_\_\_\_\_

position, department

signature

S.N. Razumova

\_\_\_\_\_

name and surname