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

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

COURSE SYLLABUS

BASICS OF PSYCHOPHYSIOLOGY
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

2026

1. COURSE GOAL(s)

The course "Basics of Psychophysiology" is included in the specialist program "General Medicine" under the specialty code 31.05.01 "General Medicine" and is studied in semester 3 of the second year. The discipline is delivered by the Department of Normal Physiology. The discipline consists of 5 sections and 16 topics and is aimed at studying the physiological causes and mechanisms of mental phenomena and human behavior.
The goal of mastering the course is for the student to acquire knowledge about the psychophysiological mechanisms of basic mental processes, functions, and states from the perspective of a systems approach.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course " Basics of Psychophysiology " is aimed at developing the following competencies (or parts thereof) in students:

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

Competence code	**Competence descriptor**	**Competence formation indicators** (within this course)
PC-5	Able to conduct and monitor the effectiveness of measures for prevention and promotion of a healthy lifestyle and sanitary-hygienic education of the population	ПК-5.10 Able to develop healthy lifestyle programs, including programs for reducing alcohol and tobacco consumption, prevention and control of non-medical use of narcotic drugs and psychotropic substances;

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***
PC-5	Able to conduct and monitor the effectiveness of measures for prevention and promotion of a healthy lifestyle and sanitary-hygienic education of the population	Introduction to Nutriology**;	Outpatient Therapy; Pediatrics; Obstetrics and Gynecology; Propaedeutics of Internal Diseases; Reproductive Health; Urology; Clinical Dentistry; Endoscopic Urology; Epidemiology; Infectious Diseases; Phthisiology; Outpatient Cardiology**; Ophthalmology; Outpatient Pulmonology; Hygiene; Dermatology and

			Venereology; Neurology, Medical Genetics, Neurosurgery; Endocrinology; Fundamentals of Pediatric Nutriology**; Occupational Diseases; General Practitioner Internship: assistant to a physician in an outpatient clinic; General Practitioner Internship: assistant to a pediatrician;

* - to be completed in accordance with the competency matrix and the HEP Curriculum and Work Plan

** - elective disciplines/practices

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course" Basics of Psychophysiology " is 2 credits (72 academic hours)

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*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
			3
Contact work, academic hours	*34*		*34*
Lectures (LC)	0		0
Lab work (LW)	0		0
Seminars (workshops/tutorials) (S)	34		34
Self-studies	*29*		*29*
Evaluation and assessment (exam/passing/failing grade)	*9*		*9*
Course workload	**academic hours**	*72*	*72*
	credit units	*2*	*2*

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

5. COURSE CONTENTS

Table 5.1. Content of the discipline (module) by types of academic work

Course module title	Course module contents (topics)	Academic activities types
Section 1 Methods of Psychophysiological Research	1.1 Electrophysiological and non-electrophysiological methods in psychophysiology. Pneumography. Plethysmography. X-ray computed tomography. Structural magnetic resonance imaging (MRI). Positron emission tomography (PET). Functional magnetic resonance imaging (fMRI). Eye-tracking. Galvanic skin response (GSR), electrooculography, electromyography. Electrocardiography and fundamentals of vector analysis.	S
	1.2 Electroencephalography (EEG). Electrode placement schemes (standard montages). Main EEG rhythms, age-related norms and differences. EEG in states: active wakefulness, relaxed wakefulness, drowsiness, slow-wave and REM sleep. Spectral analysis of EEG and its application in psychophysiology. Interhemispheric asymmetry on EEG.	S

	Evoked brain potentials recorded by encephalograph. Averaging technique.	
	1.3 Evoked potential method. Computer brain mapping. Polygraphy. Concept of evoked potentials. Differences between visual, auditory, and somatosensory evoked potentials. Computer brain mapping: main technologies and methods, computational approaches, clinical applications, prospects. Polygraphy: registered physiological parameters.	S
Section 2 Main Approaches to Studying Psychophysiological Mechanisms	2.1 Hierarchy of physiological processes in the CNS. Systems approach in psychophysiology. Behavior. Anatomo-functional hierarchy of the CNS (spinal, brainstem, subcortical, cortical levels). Principles of hierarchical interaction in psychophysiology. Neurophysiological mechanisms of integration. Psychophysiology of behavior.	S
	2.2 Architectonics of purposeful behavior. Functional system. Motivation. Memory. Goal of action. Anticipatory reflection. Action acceptor. Action programming. Reinforcement.	*S*
	2.3 Mechanisms of systemic specialization and backward afferentation of neurons. Backward afferentation. Systemogenesis. Systemic specialization of neurons.	S
	2.4 Concept of psyche. Origin and development of psyche in phylogenesis. Interaction of cognitive systems in purposeful behavior. Origin and development of psyche in phylogenesis. Problem of qualitative specificity of human psyche. Structure of human psyche. Concept of mindset (mental set).	S
Section 3 Psychophysiology of Emotions	3.1 Theories of emotions. Neuroanatomy of emotions. Biologically and socially significant stimuli as a source of emotions. Need-informational factors in emotion emergence. Cognitive processes in emotion genesis.	S
	3.2 Expression of emotions in animals and humans. Means of nonverbal emotional communication. Correlation of facial muscle activity and emotions. Functional asymmetry and emotions. Individual differences and emotions. Influence of extraversion, introversion, anxiety.	S
	3.3 Neurophysiology of emotional-vegetative integration. Reactivity of the cardiovascular system. Gender differences in emotions. Centers of positive and negative emotions. Self-stimulation. Limbic system. Central autonomic network.	S
Section 4 Psychophysiology of Thinking and Speech	4.1 Signal systems and speech function of the brain according to I.P. Pavlov. Signal systems according to I.P. Pavlov. Interaction of first and second signal systems. Symbolic representation of stimulus. Speech development. Perception of speech signals. Significance and types of phonemes and their identification by psychophysiological methods. Wernicke's area. Oral speech. Generation of second signal system reactions with participation of command neurons: articulation, gestures, written signs. Broca's area.	S
	4.2 Readiness potential and brain functions in intellectual activity. Readiness potential. Motor potential. Semantic evoked potential. Inner speech. Thinking as externally unexpressed operations with memory traces. Areas of brain activity and thinking. Functional asymmetry of the brain and features of intellectual activity. Verbal and nonverbal intelligence.	S

	4.3 Main aspects of A.N. Leontiev's activity theory and structure of human consciousness. Main provisions of A.N. Leontiev's activity theory. Needs, motives, emotions, personal meaning. Structure of human consciousness according to A.N. Leontiev. Concepts of individuality, temperament, character, and personality.	S
Section 5 Principles of Polygraphic Examination (Instrumental Lie Detection)	5.1 Theoretical foundations of instrumental "lie detection". Physiological basis of the method. Main methodological difficulties and errors arising during polygraph examinations. Factors reducing reliability. Methods of counteracting the polygraph.	S
	5.2 Methods and tests of polygraphic examinations. Stages of polygraph research. Testing methodology. General requirements for compiling a polygraph questionnaire. Classical methods, advantages and disadvantages. Methodological techniques of control question technique. Use of the set (ustanovka) phenomenon in the practice of instrumental lie detection.	S
	5.3 Significance of cognitive process features of the subject in conducting and interpreting results of polygraphic examination. Use of cognitive process features (sensation, perception, attention, memory) in the practice of polygraphic examinations.	*S*

* – to be completed only for **FULL-TIME** study: LC – lectures; LW – laboratory work; S – practical/seminar classes.

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom Equipment and Technology Support Requirements

Type of auditorium	Equipment of the auditorium	Specialized educational/laboratory equipment, software and materials for mastering the discipline (if necessary)
Lecture	Auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; board (screen) and technical means for multimedia presentations.	Set of specialized furniture; technical means: multimedia projector "Optoma", speakers "Genius", nettop Lenovo, wall-mounted screen with electric drive.
Seminar	Auditorium for conducting seminar-type classes, group and individual consultations, current monitoring and interim assessment, equipped with a set of specialized furniture and technical means for multimedia presentations.	Set of specialized furniture; technical means: multimedia projector "Optoma", speakers "Genius", nettop Lenovo, wall-mounted screen with electric drive. Educational computer programs used in practical classes: testing program "Mytest". Technical means: complex (BIOZHEZL).
Self-studies	Audience for independent work of students (may be used for conducting seminar classes and consultations), equipped with a set of specialized furniture and computers with access to the Electronic Information and Educational Environment (EIEE).	Set of specialized furniture; technical means: multimedia projector "Optoma", speakers "Genius", nettop Lenovo, wall-mounted screen with electric drive. Educational computer programs used in practical classes: testing program "Mytest". Technical means: complex (BIOZHEZL).

* – audience for independent work of students must be indicated **MANDATORILY!**

7. RESOURSES RECOMMENDED SOURCES FOR COURSE STUDY

a) Main readings:

1. Kostas N. Fountoulakis, Ioannis Nimatoudis Psychobiology of Behaviour.- Springer Cham. 2019. 458 p. https://link.springer.com/book/10.1007/978-3-030-18323-3 (28/04/2026)
2. Hugo Humberto Plácido da Silva, Hugo Filipe Silveira Gamboa, Rui Pedro Sousa Varandas, Guilherme Alexandre dos Santos Espadanal Ramos. Biosignal Acquisition and Processing. A Project-Based Learning Approach. Springer Cham. 2024. 352 p. https://link.springer.com/book/10.1007/978-3-031-35187-7 (28/04/2026)

Additional literature:

1. Marcelo Bigliassi, Edson Filho. Sport and Exercise Psychophysiology. Springer Cham. 2025. 439 p. https://link.springer.com/book/10.1007/978-3-031-90034-1 (28/04/2026)
2. Dean Cvetkovic, Irena Cosic. States of Consciousness. Experimental Insights into Meditation, Waking, Sleep and Dreams. Springer Berlin, Heidelberg. 2011. 282 p. https://link.springer.com/book/10.1007/978-3-642-18047-7 (28/04/2026)
3. Ivan Nyklíček, Ad Vingerhoets, Marcel Zeelenberg Emotion Regulation and Well-Being. Springer New York, NY. 2011. 331 p. https://link.springer.com/book/10.1007/978-1-4419-6953-8 (28/04/2026)

Resources of the information and telecommunication network "Internet":

1. RUDN ELS and third-party ELS to which university students have access based on concluded agreements:
- Electronic Library System of RUDN – ELS RUDN http://lib.rudn.ru/MegaPro/Web
- ELS "University Library Online" http://www.biblioclub.ru
- ELS Yurait http://www.biblio-online.ru/
- ELS "Consultant Student" www.studentlibrary.ru
- ELS "Troitsky Most"

2. Databases and search engines:
- Electronic fund of legal and normative-technical documentation http://docs.cntd.ru/
- Search engine Yandex https://www.yandex.ru/
- Search engine Google https://www.google.ru/
- Abstract database SCOPUS http://www.elsevierscience.ru/products/scopus/

*Educational and methodological materials for independent work of students in mastering the discipline/module:**

1. Course of lectures on the discipline " Basics of Psychophysiology ".

* – all educational and methodological materials for independent work of students are placed in accordance with the current procedure on the discipline page **in E-SYSTEM!**

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