Khanty-Mansiysk Autonomous Okrug-Yugra
"Surgut State University"

APPROVING
Deputy Rector for Academic Affairs
_____ E.V. Konovalova

June 11, 2026 , protocol №5

MODULE OF GENERAL PROFESSIONAL DISCIPLINES
Cardiovascular Surgery and Functional Diagnostics
Syllabus

Assigned to the department **Cardiology**
The curriculum s310501-ЛечДеЛоИн-26-6.plx
31.05.01 General Medicine
Specialization: General Medicine

The form of education **full-time**

Overall labor intensity **2 Z**

Hours according to the curiculum 72
including:
classroom classes 48
self-study 24

Types of control in semesters:
control work 12
credit 12

The distribution of discipline hours by

Semester (<Course>.<Semester on course>)	**12 (6.2)**		Total	
Weeks	17 4/6			
Type of lessons	C	WP	C	WP
Lectures	16	16	16	16
Practical	32	32	32	32
Total classroom	48	48	48	48
Contact work	48	48	48	48
Self-study	24	24	24	24
Total	72	72	72	72

The program was compiled:
MD, Professor, Oleg A. Malkov

The work program of the discipline
Cardiovascular Surgery and Functional Diagnostics

developed in accordance with the
Federal State Educational Standard for Higher Education - Specialization in a Field of Study 31.05.01 General Medicine (Order of the Ministry of Education and Science of the Russian Federation dated 12.08.2020. № 988)

compiled on the basis of the curriculum:
31.05.01 General Medicine
Specialization: General Medicine
approved by the University's Academic and Methodological Council since 11.06.2026 protocol № 5.

The work program was approved at the meeting of the department
Cardiology

Head of the Department, PhD, reader Irina A. Urvanceva

1. LEARNING OBJECTIVES OF THE DISCIPLINE	
1.1	To identify objective opportunities for improving the efficiency of diagnostics of cardiovascular and other somatic diseases in adults by using functional diagnostics methods, as well as to establish the degree of deviation of the functions of affected organs and systems from age-related standards.

2. PLACE OF THE DISCIPLINE IN THE STRUCTURE OF THE OOP	
Cycle (section)OOP:	Б1.О.04
2.1	Requirements for the student's pre-training:
2.1.1	Obstetrics and Gynecology
2.1.2	Anesthesiology, resuscitation, and intensive care
2.1.3	Hospital surgery, pediatric surgery
2.1.4	Forensic medicine
2.1.5	Infectious diseases
2.1.6	Oncogynecology
2.1.7	Pathophysiological Foundations of Emergency Conditions in Internal Medicine
2.1.8	Perinatology
2.1.9	Pactical training
2.1.10	Practical training, clinical (doctor - assistant in outpatient clinics)
2.1.11	Practical training, research study
2.1.12	Psychiatry, medical psychology
2.1.13	Dermatovenerology
2.1.14	Traumatology, orthopedics
2.1.15	Phthisiology
2.1.16	Neurology, medical genetics, neurosurgery
2.1.17	Pediatrics
2.1.18	Pactical training, clinical (doctor - assistant in inpatient clinics)
2.1.19	Clinical pathological anatomy
2.1.20	Clinical pathophysiology
2.1.21	Otorhinolaryngology
2.1.22	Ophthalmology
2.1.23	Dentistry
2.1.24	Topographic Anatomy and Operative Surgery
2.1.25	Adaptive and age-related physiology
2.1.26	Immunology
2.1.27	Compensatory and adaptive processes in pathology (adaptive program)
2.1.28	General surgery, radiation diagnostics
2.1.29	Pathological anatomy
2.1.30	Pathological Syndromes in Clinical Medicine
2.1.31	Pathophysiology
2.1.32	Pathophysiology of extreme conditions
2.1.33	Hygiene
2.1.34	Image in the profession
2.1.35	Clinical anatomy
2.1.36	Normal physiology
2.1.37	Anatomy
2.1.38	Biochemistry of micronutrients
2.1.39	Histology, Embryology, and Cytology
2.1.40	Molecular Biology
2.1.41	Physiological Foundations of Human Adaptation in the North
2.1.42	Human genetics

2.1.45	Anesthesiology, resuscitation, and intensive care
2.1.46	The module of general education disciplines
2.1.47	Oncology, radiation therapy
2.1.48	Gynecology
2.1.49	Production practice in obstetrics and gynecology
2.1.50	Psychiatry, medical psychology
2.1.51	Infectious diseases
2.1.52	Phthisiology
2.1.53	Dermatovenerology
2.1.54	Ophthalmology
2.1.55	Endocrinology
2.1.56	Pactical training of general practicioner
2.1.57	Pediatric Gynecology
2.1.58	Practical training to acquire professional skills and experience in the positions of middle medical personnel
2.1.59	Perinatology
2.1.60	Pharmacology
2.1.61	Immunology and allergology
2.1.62	Radiation diagnostics
2.1.63	Pediatrics
2.1.64	Neurology, medical genetics, neurosurgery
2.1.65	Otorhinolaryngology
2.1.66	Professional Diseases
2.1.67	Propaedeutics of Internal Diseases
2.1.68	Faculty Therapy
2.1.69	Practical training of the Therapeutic Profile
2.1.70	General Surgery
2.1.71	Faculty Surgery
2.1.72	Urology
2.1.73	Practical training of the surgical profile
2.1.74	Dentistry
2.1.75	Nursing. Theoretical foundations of studying the patient care
2.1.76	Human genetics
2.2	Disciplines and practices for which the development of this discipline (module) is necessary as a prerequisite:
2.2.1	Endovascular diagnostics (adaptive program)
2.2.2	Hospital therapy, endocrinology
2.2.3	Polyclinic therapy

3. LEARNER'S COMPETENCIES THAT ARE FORMATED AS A RESULT OF MASTERING THE DISCIPLINE (MODULE)
PC-8.2: Manages medical documentation, including electronic documentation
PC-5.1: Demonstrates knowledge of the mechanisms of action, methods of pharmacotherapy, therapeutic nutrition, medical devices, and methods of non-pharmacological treatment, palliative and personalized medical care
PC-5.2: Provides treatment to various categories of patients with diseases in outpatient settings, inpatient settings, and high-tech medical care centers (HTC) using medications, medical devices, and therapeutic nutrition, taking into account the clinical picture, in accordance with current regulations, medical care standards, and clinical guidelines (treatment protocols).

PC-5.4: Demonstrates knowledge of the side effects of medications, methods of administration, knowledge of the duration of their use, and evaluates the effectiveness and safety of pharmacotherapy, therapeutic nutrition, and the use of non-pharmacological treatment, therapeutic nutrition, and palliative medical care.
PC-3.1: Examines a patient (collects and analyzes the patient's complaints, medical history data, physical examination results, determines the necessary examination plan, evaluates the parameters of laboratory, instrumental, pathological-anatomical, and other research methods for the purpose of diagnosing diseases, evaluates the prognosis (short-term, medium-term, and long-term) of the disease course and outcomes
PC-3.2: Formulates a preliminary and clinical diagnosis in accordance with the International Statistical Classification of Diseases and Health Problems X – XI revisions and relevant clinical classifications
PC-3.3: Conducts early and differential diagnosis of diseases
PC-3.4: Performs patient routing and management based on current legislation (standards, medical care procedures, Clinical guidelines)
PC-1.1: Demonstrates knowledge about etiology, pathogenesis, diagnostic criteria (clinical – subjective, physical, laboratory, instrumental), determines the main pathological conditions, symptoms, disease syndromes in the patient and diagnoses nosological forms according to the International Statistical Classification of Diseases and Health-Related Problems, X – XI revisions
PC-1.2: Conducts differential diagnostics, evaluates the prognosis (short-, medium- and long-term) of the course of the disease, identifies acute complications and complications of chronic diseases

As a result of mastering the discipline, the student should

3.1	**To know:**
3.1.1	**methods of studying the cardiovascular system in adults: electrocardiography, Holter ECG monitoring, stress tests, bicycle ergometry, echocardiography, 24-hour blood pressure monitoring, high-resolution ECG, and surface ECG mapping;**
3.1.2	**The technique of registration, the features of conducting an ECG in adults; the main parameters of a normal ECG: the P, Q, R, S, T waves, the P, PQ, QRS, QT, RR, PP intervals, the signs of sinus rhythm, the electrical axis of the heart, and the methods of its determination;**
3.1.3	**The structure of the cardiac conduction system;**
3.1.4	**The causes and classification of rhythm disorders;**
3.1.5	**The ECG pattern in various rhythm and conduction disorders of the heart;**
3.1.6	**assessment of autonomic rhythm regulation using cardiorhythmography, KIG, and heart rate variability methods; drug tests in the ECG;**
3.1.7	**signs of atrial and ventricular myocardial hypertrophy on the ECG;**
3.1.8	**indications for 24-hour ECG and blood pressure monitoring;**
3.1.9	**standard accesses and positions;**
3.1.10	**methods of studying the central and autonomic nervous system: electroencephalography, reoencephalography, echoencephalography, and cardiointervalography;**
3.1.11	**methods of studying the respiratory system>**
3.2	**Be able to:**
3.2.1	**determine the main indications and contraindications for conducting an examination;**
3.2.2	**take an ECG on your own;**
3.2.3	create an ECG report;
3.2.4	to determine the position of the electrical axis of the heart;
3.2.5	to evaluate and draw an ECG conclusion in arrhythmias;

3.2.6	To apply the criteria and make an ECG conclusion in case of myocardial hypertrophy in different age periods;
3.2.7	To determine the signs of electrolyte disorders on the ECG;
3.2.8	To conduct functional (stress and drug) tests;
3.2.9	Evaluate the data of Holter ECG monitoring;
3.2.10	to evaluate data of daily monitoring of BP, EEG, REG, ECHOCG;
3.2.11	to understand the indicators of spirography

4. STRUCTURE AND CONTENT OF THE DISCIPLINE (MODULE)						
Class code	**Name of sections and topics / type of activity /**	**Semester / Course**	**Hours**	**Competen-cies**	**References**	**Annotations**
	Section 1. Special examination methods and artificial circulation					
1.1	Special examination methods and artificial circulation /Lect/	12	2	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.2 L3.3	
1.2	Special examination methods and artificial circulation /Pr/	12	4	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
1.3	Special examination methods and artificial circulation /Self/	12	1	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
	Section 2. CHD with increased pulmonary blood flow. CHD with decreased pulmonary blood flow					
2.1	CHD with increased pulmonary blood flow. CHD with reduced pulmonary blood flow /Lect/	12	2	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
2.2	CHD with increased pulmonary blood flow. CHD with reduced pulmonary blood flow /Pr/	12	4	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
2.3	CHD with increased pulmonary blood flow. CHD with reduced pulmonary blood flow /Self/	12	1	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
	Section 3. Valvular heart disease. Surgical treatment of cardiac arrhythmias					

3.1	Valvular heart disease. Surgical treatment of cardiac arrhythmias /Lecture/	12	2	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
3.2	Valvular heart disease. Surgical treatment of cardiac arrhythmias /Pract/	12	4	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3 E3	
3.3	Valvular heart disease. Surgical treatment of cardiac arrhythmias /Self/	12	1	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
	Section 4. Fundamentals of Transplantology					
4.1	Fundamentals of Transplantology /Lect/	12	2	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
4.2	Fundamentals of Transplantology /Pract/	12	4	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
4.3	Fundamentals of Transplantology /Self/	12	1	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
	Section 5. Diseases of the Aorta and Peripheral Arteries					
5.1	Diseases of the Aorta and Peripheral Arteries/Lect/	12	2	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
5.2	Diseases of the Aorta and Peripheral Arteries/Pract/	12	4	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
5.3	Diseases of the Aorta and Peripheral Arteries /Self/	12	0	PC-1.1 PC- 1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC- 5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	

	Section 6. Clinical phlebology. Pulmonary embolism. Surgical interventions for narrowing of systemic veins.					
6.1	Functional Diagnostics and Telemedicine in Cardiovascular Surgery/Lect/	12	2	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
6.2	Functional Diagnostics and Telemedicine in Cardiovascular Surgery/Pract/	12	4	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
6.3	Functional Diagnostics and Telemedicine in Cardiovascular Surgery/Self/	12	0	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
	Section 7. Radiation Diagnostics in Cardiovascular Surgery					
7.1	Ultrasound and Tomographic Research Methods in Cardiovascular Surgery /Lect/	12	2	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
7.2	Ultrasound and Tomographic Research Methods in Cardiovascular Surgery/Pract/	12	4	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
7.3	Ultrasound and Tomographic Research Methods in Cardiovascular Surgery /Self/	12	0	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
	РазделL 8. Зачёт					
8.1	/Credit/	12	0	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
	Section 9. Endovascular Diagnostics in Cardiovascular Surgery					

9.1	Endovascular Diagnostics in Cardiovascular Surgery /Lect/	12	2	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
9.2	Endovascular Diagnostics in Cardiovascular Surgery /Pract/	12	4	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3	
9.3	Endovascular Diagnostics in Cardiovascular Surgery /Self/	12	0	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2	L1.1 L1.2L2.1 L2.2 L2.3L3.1 L3.3 E1 E2 E3 E4 E5	Control work
9.4	/Credit/	12	20	PC-1.1 PC-1.2 PC-3.1 PC-3.2 PC-3.3 PC-3.4 PC-5.1 PC-5.2 PC-5.4 PC-8.2		Credit

5. EVALUATION TOOLS

5.1. Assessment materials for current control and intermediate certification

Presented in a separate document

5.2. Assessment materials for diagnostic testing

Presented in a separate document

6. EDUCATIONAL AND INFORMATION SUPPORT FOR THE DISCIPLINE (MODULE)

6.1.Recommended reading

6.1.1. Basical reading

	The authors,	The title	Publisher, year	Number of
L1.1	Gayvoronsky I. V., Kolesnikov L.	Splanchnology and the Cardiovascular System	electronic resource	1
L1.2	Urvanceva I. A., Rudenko A. V., Morgunov D. P.	Emergency Care for Heart Rhythm Disorders: Guidelines for Physicians in Medical Organizations of the Khanty-Mansiysk Autonomous Okrug - Ugra	Surgut: [б. и.], 2015 electronic resource	1

6.1.2. Additional reading

	The authors,	The title	Publisher, year	Number of
L2.1	Faibushevich A. G., Baranovich V. Yu., Veretnik G. I., Maksimkin D. A., Dandarova Zh. B.	Cardiovascular Surgery in Questions and Answers: A Study Guide	Moscow: Peoples' Friendship University of Russia, electronic resource	1

	The authors	The title	Publisher, year	Number of
L2.2	Kulaichev A. P.	Computer electrophysiology and functional diagnostics	Moscow: LLC "Scientific and Publishing Center INFRA-M", 2016, electronic resource	1
L2.3	Kulaichev A. P.	Computer electrophysiology and functional diagnostics	Moscow: LLC "Scientific and Publishing Center electronic resource	1

6.1.3. Methodological developments

	The authors	The title	Publisher, year	Number of
L3.1	Vorobyov A. S.	Electrocardiography: A Guide for Independent Study	St. Petersburg: SpetsLit, 2011	1
L3.2	Ostrovsky Yu. P., Valentyukevich A. V., Ilyina T. V., Kolyadko M. G., Kurlyanskaya E. K., Ostrovsky A. Yu., Shestakova L. G., Shumovets V. V., Ostrovsky Yu. P.	Heart failure	Minsk: Belarusian Science, 2016 electronic resource	1
L3.3	Kolpakov E.V., Lyusov V.A., Volov N.A., Tarasov A.V.	Arrhythmia kezіңdegі ECG: Atlas: Educational Visual Aid	Moscow: GEOTAR-Media, 2017, electronic resource	1

6.2. List of resources on the Internet information and telecommunication network

E1	http://www.freemedicaljournals.com.
E2	//highwire.stanford.edu/lists/freeart.dtl.
E3	http://www.mcponline.org.
E4	http://www.ncbi.nlm.nih.gov/entrez/query.fcgi.
E5	http://193.232.7.200/opacr.htm
E6	http://www.blackwell-synergy.com/servlet/useragent?func=showHome.
E7	http://www.disser.ru/library/66/262.htm http://www.zdr.ru/

6.3.1 List of software

6.3.1.1	"Microsoft Offis Application Package"

6.3.2 List of information reference systems

6.3.2.1	Legal Reference System "Garant"
6.3.2.2	Reference and Legal System "ConsultantPlus"
6.3.2.3	Federal State Statistics Service "Consultant Region"

7. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE (MODULE)

7.1	Academic classrooms for lecture-type classes, seminar-type classes (practical classes), group and individual consultations, current control, and intermediate certification are equipped with standard academic furniture and technical teaching aids for presenting educational information.
7.2	The classrooms for practical classes at the Simulation Center of the Surgut State University and the Surgut City Clinical Polyclinic No. 1 are equipped with the necessary specialized teaching furniture and technical equipment for providing educational information to students, including a media projector, a stationary screen, and educational medical equipment and tools;

7.3	□ System for Holter (24-hour) ECG monitoring, computer station, and accessories for connecting computers to a network;
7.4	□ Apparatus for measuring systolic and diastolic pressure during the day by Bipib;
7.5	□ Apparatus ECG
7.6	□ System ultrasound diagnostic
7.7	□ Scales electronic
7.8	□ stature
7.9	□ Apparatus for ultrasound examinations of the heart and vessels
7.10	□ X-SCRIM stress test system for conducting tests with physical. Load on a bicycle ergometer
7.11	□ ECG and BP recorder wearable
7.12	□ Electrocardiograph multi-channel EKT
7.13	□ Ultrasonic.system
7.14	□ X-ray angiographic unit
7.15	□ Patient monitoring monitor
7.16	□ Ultrasound device
7.17	□ Temporary 1- and 2-chamber
7.18	□ Digital diagnostic system for performing intravascular and intracardial ultrasound examinations
7.19	□ EPHI system
7.20	□ Intravascular ultrasound device