

# INTERNATIONAL HIGHER SCHOOL OF MEDICINE

## Department of Cardiac Surgery and Radiology

### SYLLABUS

#### Cardiosurgery

2025-2026 academic year

for students of medical faculty

5th course X semester, groups (according to the timetable)

2 credits (60 h, including auditorial 32 h, independent work – 28 h)

- Lecturer:** **ass. Nurbekov Kairat Nurbekovich**  
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The Syllabus is considered  
at the meeting of the department of Cardiac Surgery and Radiology

Protocol № 1 dated 03.09.2025

Head of the department \_\_\_\_\_ I.H.Bebezov

**Course Objective:** consists of mastering knowledge on diagnosis, surgical treatment and postoperative clinical observation in the field of the most common cardiac surgical diseases, as well as the principles of international recommendations, skills and abilities in the treatment and prevention of cardiac surgical diseases.

After study of the discipline the student must:

**Knowledge:**

- Types of modern non-invasive and invasive methods for diagnosing cardiovascular diseases.
- Types of surgical and minimally invasive methods of treating CVD diseases.
- Indications and contraindications for surgical and minimally invasive treatment methods, as well as know the methodology for their implementation.
- Possible complications of cardiac surgery and minimally invasive methods of treating cardiovascular diseases.
- Methods of postoperative rehabilitation and medical examination of cardiac surgery patients.

**Skill:**

- Conduct an adequate survey (complaints and anamnesis) of a patient with heart and vascular diseases.
- Conduct a physical examination of the heart and blood vessels based on complaints, anamnesis and objective examination, and establish a preliminary diagnosis.
- Determine a plan for laboratory and instrumental examination of patients with cardiovascular pathology.
- Interpret the results of laboratory and instrumental non-invasive (ECG, functional tests of bicycle ergometry, daily ECG monitoring, echocardiography) and invasive diagnostic methods (coronary angiography, ventriculography, aortography, probing of the heart cavities, electrophysiological research methods).
- Determine indications and contraindications for endovascular treatment methods, as well as know the methodology for their implementation.
- Determine indications and contraindications for surgical interventions for CVD, as well as know various surgical treatment methods.

**Attitude:**

- Skills in clinical examination of a patient with pathology of the cardiovascular system, preoperative preparation and postoperative management of patients.
- Algorithm for surgical treatment techniques with/without the use of artificial circulation, adequacy of perfusion, features of anesthesia for cardiac surgery.

**Pre-requisites.** To study this academic discipline requires knowledge, skills and abilities, formed by previous disciplines: Macro- and microanatomy, Normal physiology, Pathological physiology, Pathological anatomy, Operative surgery, Basic pharmacology, General surgery, Internal medicine (cardiology), Childhood diseases, Radiation diagnostics

**Post-requisites.** The subject is studied in the 10th semester and the discipline of cardiac surgery is included in the questions of the state exam in surgery.

**THEMATIC PLAN OF LECTURES**

THEMATIC PLAN OF LECTURES				
№	UNIT	Theme of lectures	Hours	Date
1	Congenital heart disease and pediatric cardiac surgery	L 1: Congenital heart disease and pediatric cardiac surgery. Congenital heart disease and pediatric cardiac surgery. Etiology, classification of congenital heart disease. Embryology of the heart.	2	03.09.2025-12.11.2025
		L 2: A segmental approach to assessing of congenital heart disease. Hemodynamics. Non-invasive research methods	2	03.09.2025-12.11.2025
		L 3: Invasive research methods for congenital heart disease. Treatment: conservative, surgical and percutaneous interventions	2	03.09.2025-12.11.2025
2	Adult cardiac surgery	L 4: Historical aspects. Heart: anatomy, dimensions. Hypothermia, Cardiopulmonary bypass. Coronary heart disease. Acquired (valvar) heart disease	2	03.09.2025-12.11.2025
		L 5: Heart failure. Etiology, pathophysiology, drug and surgical treatment.	2	03.09.2025-12.11.2025
		L 6: Rhythm and conduction disturbances. Classification and mechanisms. Invasive electrophysiological examination and ablation of arrhythmias. Pacemakers	2	03.09.2025-12.11.2025
Total			12	

### THEMATIC PLAN OF PRACTICAL CLASSES

№	Topic of Unit	Theme of practical classes	Hours	Date
1	Congenital heart disease and pediatric cardiac surgery	1: Congenital heart disease and pediatric cardiac surgery. Etiology, classification of congenital heart defects. Embryology of the heart. A segmental approach to assessing CHD. Hemodynamic changes in the main types of CHD. Non-invasive research methods	2	20.10.25-13.11.25
		2: Cardiac catheterization for congenital heart disease. The main parameters of intracardiac hemodynamics, prognostic value	2	20.10.25-13.11.25
		3: Surgical treatment of various congenital heart disease. Indications, operation stages	2	20.10.25-13.11.25
		4: Transcatheter treatment of congenital heart disease. Types, indications, procedures stages	2	20.10.25-13.11.25
		5: Unit control № 1	2	20.10.25-13.11.25
2	Adult cardiac surgery	6: Historical aspects of cardiac surgery. Heart: surgical anatomy, dimensions of the heart chambers, heart valves. Hypothermia, history of creation and application, definition and methodology. Cardiopulmonary bypass, history of creation and use, definition and methodology. Coronary heart disease. Etiology, classification, pathogenesis, diagnosis, surgical treatment	2	20.10.25-13.11.25
		7: Acquired heart disease. Pathology of the aortic, pulmonary valve, mitral, tricuspid valves. Procedures. Aortic Surgery	2	20.10.25-13.11.25
		8: Heart failure. Etiology, pathophysiology, drug and surgical treatment	2	20.10.25-13.11.25
		9: Rhythm and conduction disturbances. Classification and mechanisms. Invasive electrophysiological examination and ablation of arrhythmias. Pacemakers	2	20.10.25-13.11.25
		10: Control unit № 2. Final class.	2	20.10.25-13.11.25
Total			20	20.10.25-13.11.25

### THEMATIC PLAN OF INDEPENDENT WORK OF STUDENTS

№	Unit name	Theme of independent work	Hours	Date
Unit 1	Congenital heart disease and pediatric cardiac surgery	Studying patient histories. Results of non-invasive research methods. Situational tasks. ECG. Abstracts and presentations on specific topics. Lecture material.	14	20.10.25-13.11.25
Unit 2	Adult cardiac surgery	Case histories of patients. Results of non-invasive research methods. Situational tasks. ECG. Abstracts and presentations on specific topics. Lecture material.	14	20.10.25-13.11.25
<b>Total</b>			<b>28</b>	

#### Recommended reading for the discipline:

##### Basic

№	Authors	Title	Year of publication
1	Kirklin/Barratt-Boyes	Cardiac Surgery. Fourth edition	2013
2	Hideaki Senzaki	Congenital Heart Disease Morphological and Functional Assessment	2015

##### Additional

№	Authors	Title	Year of publication
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3	ESC Guidelines		Updated every year
4	Eduardo M. da Cruz	Pediatric and Congenital Cardiology Cardiac Surgery and Intensive Care	2014
5	Paul Leeson	Echocardiography (Oxford Specialist Handbooks in Cardiology), Second Edition	2012

### Resources of the information and telecommunication network "Internet"

1. Electronic library of the ISM
2. [www.heart-valve-surgery.com](http://www.heart-valve-surgery.com)
3. <https://evtoday.com/center/carotid/articles>
4. <https://1drv.ms/f/s!AvznOzw-xFKHmBTVY4Z7-wTX85hs>
5. <https://cardiothoracicsurgery.biomedcentral.com/>
6. <https://jamanetwork.com/collections/5549/cardiothoracic-surgery>

### Grading policy and procedures for all types of work

For the period of studying the discipline, the student gains points for the relevant parameters (per unit):

current score - 40 points

independent work - 20 points

control score (final assessment of knowledge per unit) - 40 points

Maximum score - 100 (40+20+40)

### Grading system for student's achievements

Grading criteria per discipline				
Maximum score	Intervals			
	«unsatisfactory»	«satisfactory»	«good»	«excellent»
Current control- 40	0-23	24-30	31-35	36-40
Interval description	Not ready for class	Passive, does not participate in the discussion of the lesson topic	Actively participates in the discussion of the topic of the lesson, periodically gets confused in the details.	Actively participates in the discussion of the topic of the lesson, gives a complete and accurate answer to the question.
Independent work - 20	0-11	12-15	16-17	18-20
Interval description	Doesn't answer questions on the topic	Has difficulty answering, has poor knowledge of the topic	Answers well, but occasionally gets confused in some answers	Confident, complete answer. Shows good knowledge of the topic, does not get confused in answers
Control work (module) – 40	0-23	24-30	31-35	36-40
Interval description	Doesn't answer questions	Has difficulty answering, does not know the answer well	Answers well, occasionally gets confused in some answers	Answers all questions correctly, completely. Don't get confused with answers

### Conduct Policy: (lateness, absence, behavior in the auditorium, late submission of work).

- Punctuality and completion of tasks.
- Mandatory attendance of classes.
- Attending class in a clean medical uniform.
- Eliminating conversations on a cell phone in the classroom.
- Active participation in the learning process.
- Doing homework on time.
- Academic detention at the time specified by the teacher.

For violations of the Conduct Policy, the total points for discipline might be reduced to 1-10 points.

#### **Academic Ethics Policy.**

- Be tolerant, respect the opinions of others.
- Formulate objections in the correct form.
- Constructively support feedback in all classes.
- Plagiarism and other forms of dishonest work are unacceptable. Plagiarism includes the following: the absence of references when using printed and electronic materials, quotes, thoughts and works of other authors or students.
- Prompting and cheating during tests, exams, classes is unacceptable as well as passing an exam for another student, unauthorized copying of materials.

For violations of the Academic Ethics Policy, the total points for the discipline may be reduced to 1-10 points.

#### **Guidelines for the lessons of the discipline**

##### **Unit 1. Congenital heart disease and pediatric cardiac surgery**

**Key questions covered in lesson 1.** 1: Congenital heart disease and pediatric cardiac surgery. Etiology, classification of congenital heart defects. Embryology of the heart. A segmental approach to assessing CHD. Hemodynamic changes in the main types of CHD. Non-invasive research methods

Recommended reading for the lesson:

- 1) Kirklin/Barratt-Boyes. Cardiac Surgery. Fourth edition 2013 Elsevier
- 2) Hideaki Senzaki Congenital Heart Disease Morphological and Functional Assessment 2015 Springer

**Key questions covered in lesson 2.** Cardiac catheterization for congenital heart disease. The main parameters of intracardiac hemodynamics, prognostic value

Recommended reading for the lesson:

- 1) Kirklin/Barratt-Boyes. Cardiac Surgery. Fourth edition 2013 Elsevier
- 2) Hideaki Senzaki Congenital Heart Disease Morphological and Functional Assessment 2015 Springer

**Key questions covered in lesson 3.** 3: Surgical treatment of various congenital heart disease. Indications, operation stages

Recommended reading for the lesson:

- 1) Kirklin/Barratt-Boyes. Cardiac Surgery. Fourth edition 2013 Elsevier
- 2) Hideaki Senzaki Congenital Heart Disease Morphological and Functional Assessment 2015 Springer

**Key questions covered in lesson 4.** Transcatheter treatment of congenital heart disease.

Types, indications, procedures stages.

Recommended reading for the lesson:

- 1) Kirklin/Barratt-Boyes. Cardiac Surgery. Fourth edition 2013 Elsevier
- 2) Hideaki Senzaki Congenital Heart Disease Morphological and Functional Assessment 2015 Springer

##### **Unit 2. Adult cardiac surgery**

**Key questions covered in lesson 1.** Historical aspects of cardiac surgery. Heart: surgical anatomy, dimensions of the heart chambers, heart valves. Hypothermia, history of creation and application, definition and methodology. Cardiopulmonary bypass, history of creation and use, definition and methodology. Coronary heart disease. Etiology, classification, pathogenesis, diagnosis, surgical treatment

Recommended reading for the lesson:

- 1) Kirklin/Barratt-Boyes. Cardiac Surgery. Fourth edition 2013 Elsevier
- 2) Hideaki Senzaki Congenital Heart Disease Morphological and Functional Assessment 2015 Springer

**Key questions covered in lesson 2.** Acquired heart disease. Pathology of the aortic, pulmonary valve, mitral, tricuspid valves. Procedures. Aortic Surgery

Recommended reading for the lesson:

- 1) Kirklin/Barratt-Boyes. Cardiac Surgery. Fourth edition 2013 Elsevier
- 2) Hideaki Senzaki Congenital Heart Disease Morphological and Functional Assessment 2015 Springer

**Key questions covered in lesson 3.** Heart failure. Etiology, pathophysiology, drug and surgical treatment

Recommended reading for the lesson:

- 1) Kirklin/Barratt-Boyes. Cardiac Surgery. Fourth edition 2013 Elsevier
- 2) Hideaki Senzaki Congenital Heart Disease Morphological and Functional Assessment 2015 Springer

**Key questions covered in lesson 4.** Rhythm and conduction disturbances. Classification and mechanisms. Invasive electrophysiological examination and ablation of arrhythmias. Pacemakers

Recommended reading for the lesson:

- 1) Kirklin/Barratt-Boyes. Cardiac Surgery. Fourth edition 2013 Elsevier
- 2) Hideaki Senzaki Congenital Heart Disease Morphological and Functional Assessment 2015 Springer

#### **Methodological instructions for the implementation of independent work on the discipline.**

##### **Unit 1. Unit 1. Congenital heart disease and pediatric cardiac surgery**

Students should prepare clinical case (patient histories). Results of non-invasive research methods. Situational tasks. ECG. Abstracts and presentations on specific topics. Lecture material. Every student is given an individual learning project which must be completed. The results should be reported in the form of presentation.

**Unit 2. Adult cardiac surgery**

Students should prepare clinical case (histories of patients). Results of non-invasive research methods. Situational tasks. ECG. Abstracts and presentations on specific topics. Lecture material. Every student is given an individual learning project which must be completed. The results should be reported in the form of presentation.