

MINISTRY OF HEALTH OF UKRAINE
KHARKIV NATIONAL MEDICAL UNIVERSITY

Department of Propaedeutics of Internal Medicine №1, Fundamentals of Bioethics
and Biosafety
The academic year 2021/2022

SYLLABUS OF THE EDUCATIONAL COMPONENT

"FUNDAMENTALS OF CARDIAC ULTRASOUND"
(name of educational component)

Normative or selective educational component: selective

Form of education: full-time

Field of knowledge: 22 "Health care"

Specialty: 222 "Medicine"

Specialization (if available) _____

Educational-professional program (educational-scientific program) "Medicine" of
the second (master's) level of higher education

Course: 6th

The syllabus of the discipline was
approved at the meeting of the
Department of Propaedeutics of Internal
Medicine №1, Fundamentals of Bioethics
and Biosafety

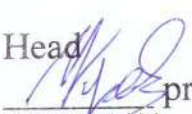
Protocol from
"27" August 2021 №16

Head of Department
 prof. Ashcheulova TV

(signature) (initials,
surname)

Approved by the methodical
commission of KhNMU on the
problems of therapeutic profile

Protocol from
"31" August 2021 №1

Head
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Consultations	According to the schedule posted on the information stand of the Department of Propaedeutics of Internal Medicine №1, Fundamentals of Bioethics and Biosafety
Location	Department of Propaedeutics of Internal Medicine №1, Fundamentals of Bioethics and Biosafety; therapeutic building of the MNE "City Clinical Hospital №13" of Kharkiv City Council, Gagarina Ave., 137B, 1st floor

INTRODUCTION

The syllabus of the discipline "Fundamentals of cardiac ultrasound" is made for the educational-professional program "Medicine" of the second (master's) level, field of knowledge 22 "Health", specialty 222 "Medicine".

Description of the discipline (abstract).

Fundamentals of cardiac ultrasound examination is a selective discipline of the clinical stage of undergraduate training, the study of which allows students to master the general principles of using diagnostic medical ultrasound and the basics of its use for diagnosing cardiovascular disease. Thus, Fundamentals of cardiac ultrasound is an educational clinical discipline that studies the physical foundations of ultrasound in medicine, ultrasound anatomy of the heart and blood vessels, methods and techniques of ultrasound examination of the cardiovascular system, ultrasound manifestations of certain diseases of the cardiovascular system.

The organization of the educational process is carried out according to the requirements of the European credit transfer system of the educational process, which is based on determining the study load of the higher education student, necessary to achieve certain learning outcomes, and is accounted for in ECTS credits. The amount of one loan is 30 hours. The workload of one academic year is usually 60 ECTS credits. ECTS credit includes all types of student work: classroom, independent, practical training, preparation and preparation of certification, etc.

The subject of study of the discipline "Fundamentals of cardiac ultrasound" is a set of theoretical and practical issues aimed at mastering the theoretical principles and methodology of ultrasound of the heart and blood vessels, as well as ultrasound semiotics of the most common diseases of the cardiovascular system.

Interdisciplinary links: according to the curriculum, the study of the discipline "Fundamentals of cardiac ultrasound" is carried out in the XI-XII semesters, after mastering the knowledge of certain sections of biological physics, human anatomy and pathomorphology, with which the discipline program is closely integrated. In turn, the discipline "Fundamentals of cardiac ultrasound" contributes to a deeper understanding of the basics of ultrasound diagnosis of cardiovascular diseases in the study of the following clinical disciplines - internal medicine, family medicine, oncology, anesthesiology and intensive care, providing integration with these disciplines. ability to apply ultrasound methods of examination of the patient in the process of further training and in professional activities

Prerequisites. The study of the discipline involves the prior mastering of disciplines in medical and biological physics, human anatomy, pathomorphology in higher education.

Postrequisites. The main provisions of the discipline should be applied in the study of professional disciplines.

1. PURPOSE AND TASKS OF THE COURSE

- 1.1. The purpose of teaching the discipline "Fundamentals of cardiac ultrasound" is to provide students with basic theoretical knowledge and professional competencies of ultrasound examination of the cardiovascular system.
- 1.2. The main tasks of studying the discipline "Fundamentals of cardiac ultrasound" are:
 - Mastering by the student of theoretical knowledge necessary for performance of ultrasonic research
 - Mastering the practical techniques and methods of ultrasound examination of the heart and blood vessels
 - Assimilation of ultrasound semiotics of the most common diseases of the cardiovascular system.

1.3. Competences and learning outcomes, the formation of which is facilitated by the discipline (relationship with the normative content of training of higher education, formulated in terms of learning outcomes in the OPP and Standard).

Discipline ensures the acquisition by students of the following *competences* :

- *integral* :

ability to solve typical and complex specialized tasks and practical problems in professional activities in the field of health care, or in the learning process, which involves research and / or innovation and is characterized by complexity and uncertainty of conditions and requirements.

- *general*:

1. Ability to abstract thinking, analysis and synthesis.
2. Ability to learn and master modern knowledge.
3. Ability to apply knowledge in practical situations.
4. Knowledge and understanding of the subject area and understanding of professional activity.
5. Ability to adapt and act in a new situation.
6. Ability to make informed decisions.
7. Skills in the use of information and communication technologies.

- *special (professional, subject)*:

1. Ability to establish a syndromic diagnosis of the disease.
2. Ability to diagnose emergencies.
3. Ability to carry out sanitary and hygienic and preventive measures.
4. Ability to keep medical records.

1.3.1. The study of the discipline provides students with the acquisition of **competences**:

Detailing of competencies according to NQF descriptors in the form of "Competence Matrix".

Competence matrix

No	Competence	Knowledge	Skills	Communication	Autonomy and responsibility
Integral competence					
1.	On the usefulness solve common and complex specialized tasks and practical problems in careers in health care or in learning, which provides research and / or innovation and implementation is characterized by complexity and uncertainty of conditions and requirements.				
General competencies					
1.	Ability to abstract thinking , analysis and synthesis, the ability to learn and be modernly trained	Know the methods of analysis, synthesis and further modern learning	Be able to analyze professional information, make informed decisions, acquire modern knowledge	Establish appropriate commun - ing for achievements - in g purposes.	Bear responsibility - tions for the timely acquisition of modern knowledge .
2.	Ability to apply knowledge in practical situations	Have specialized conceptual knowledge, being in the learning process.	In myths solvability - wool complicated backside chi and problems that arise in professional activities.	Clearly not - ambiguous untilit - Senna own conclusions, knowledge and explanations that they are grounded - tion to specialists and non-specialists.	Responsible for making decisions in difficult conditions

№	Competence	Knowledge	Skills	Communication	Autonomy and responsibility
3.	Knowledge and understanding of the subject area and understanding of professional activity	Have in-depth knowledge of the structure - tours profession.	To be able to carry out professional Diyala - ness that needs updating and integration of knowledge.	Ability effective - wise to form a communication strategy in professional activities	Bear responsibility - tions for occupations - tion development, pass - ness away to - Shogo professional Nav - Channa high-autonomous - ness.
4.	Ability to adapt and act in a new situation.	Know the types and methods of adaptation, principles of action in a new situation	To be able to use tools samorehu - lyatsiyi to be able to at - hundred - sovuv atysya to new situations (circumstances) life and work.	Establish appropriate commun - ing to reach - Nan - ing result.	Bear responsibility - ness timely use of methods of self-regulation.
5.	Ability to make an informed decision	Have the principles of comprehensive critical analysis of input data	To be able to make informed RI - tion, which best meets the patient disposable ultrasound symptom	Use strategy Union - ing skills and interpersonal interaction	Bear responsibility - tions for the choice of tactics and research and an opinion on the results
6.	Skills in the use of information and communication technologies	Have deep knowledge in the field of information and communication technologies used in professional activities	Able are used - vuvaty informa - tion and commune - tion technology professional ga - a meadow in need of renovation and integration of knowledge.	Use information and communication technologies in professional activities	Bear responsibility - tions for the development of professional knowledge and skills.
Special (professional) competencies					
1.	Ability to establish a syndromic diagnosis of the disease	Have specialized knowledge about the anatomical and morphological features of the cardiovascular system ; al algorithms for the selection of leading symptoms and syndromes; methods of ultrasound examination; knowledge of human condition assessment.	In order to conduct an ultrasound examination of the cardiovascular system ; be able to make informed decisions about the form l spare wire Kleene co-instrumental syndrome	On the basis of normative documents to keep medical documentation of the patient (card of the inpatient , etc.).	Following ethical and Jurassic dychnyh rules adopted take responsibility for cha grounded tovaryh decisions and actions to correct the established son dromnoho diagnosis of disease
2.	Ability to diagnose emergencies	Mother, special Wani knowledge of people ynu, his	Able , in the absence of information, using standard	Under any circumstances, in accordance with the	Be responsible for timely - ness and effective - ness for health - moves on

№	Competence	Knowledge	Skills	Communication	Autonomy and responsibility
5		organs and systems, standard methods of examination Liu dyny	techniques, by making an informed decision to assess the human condition and the need for emergency care	relevant ethical and legal norms, make an informed decision regarding the assessment of the human condition and the organization of non-essential medical measures depending on the human condition.	diagnosing urgent conditions
3.	Ability to plan and conduct sanitary, preventive and anti-epidemic measures, including infectious diseases	Know the system of sanitary and hygienic and preventive measures in a medical hospital . Know the principles of asepsis and antiseptics	Have the skills to organize the sanitary and hygienic regime of the ultrasound diagnostics room.	From Nata principles for presenting informa - tion on Sanitary th state note- schen and observance ing g o-hospital and medical Ojo Ronnie mode jacks management structural units Zak treatment system; use lectures and interviews.	Bear responsibility - tions for timely and high-quality event and from pro bak es ting self - sanitary and sanitary and health-protective mode main divisions diliv hospital promoting a healthy lifestyle .
4 .	Ability to keep medical records	Know formal documents in a professional first work of medical personnel , including modern computer information technology	To be able to determine the source and locat ion of the desired informat ion in dependence o f its type ; in myths processed informati on and conduct an analysis of the received informatio n	Get the necessary information from certain sources and analysis based on its shape - cotton appropriate conclusions	Be responsible for the completeness and quality of the analysis of information and conclusions based on its analysis.

1.3.2. The study of the discipline provides students with the acquisition of the following **program learning outcomes:**

Knowledge and understanding:

1 - acquisition by a person of general and special fundamental and professionally-oriented knowledge, skills, abilities, competencies necessary for the performance of typical professional tasks related to his activity in the medical field in the relevant position

2 - knowledge of psychophysiological features of the person, human health, support of health, prevention of diseases, treatment of the person, health of the population

Application of knowledge and understanding:

3 - the ability to apply the acquired knowledge, skills and understanding to solve typical problems of the doctor, the scope of which is provided by lists of syndromes and symptoms, diseases, emergencies, laboratory and instrumental research, medical manipulations

4 - collection of patient information

5 - evaluation of survey results, physical examination, laboratory and instrumental research data

7 - determination of the nature, principles of treatment of diseases

10 - diagnosing emergencies, determining the tactics of emergency medical care

11 - carrying out sanitary and hygienic and preventive measures

17 - maintenance of medical documentation, processing of state, social and medical information

Formation of judgments:

18 - ability to assess human health and provide support taking into account the impact of the environment and other health factors

Learning outcomes:

As a result of studying the discipline "Fundamentals of ultrasound examination of the heart" the student has

I. To master modern knowledge about:

- physical principles of using diagnostic ultrasound in medical practice;
- ultrasound anatomy of the cardiovascular system;
- methodical bases of ultrasonic research of heart and vessels;
- ultrasound semiotics of the most common diseases of the cardiovascular system.

II. To be able to apply the acquired knowledge in practical situations:

1. Demonstrate mastery of the method of ultrasound examination of the heart.
2. Demonstrate mastery of the method of ultrasound examination of the main vessels of the neck.
3. Demonstrate mastery of the technique of ultrasound examination of peripheral vessels..
4. Determine the leading symptoms and syndromes in the clinic of internal medicine, taking into account the data of ultrasound.
5. Demonstrate the ability to methodically correctly present the results of the patient's examination in the form of a conclusion.

1.3.3. The study of the discipline provides students with the following **social skills (Soft skills):**

communicativeness (implemented through: method of working in pairs and groups, brainstorming, method of self-presentation), teamwork (implemented through: project method, openwork saw), conflict management (implemented through: dramatization method, game methods), time management (implemented through: project method, group work, trainings), leadership skills (implemented through: group work, project method, self-presentation method).

2. INFORMATION SCOPE OF THE COURSE

Name of indicators	Field of knowledge, direction of training, educational and qualification level	Characteristics of the discipline
		full-time education
Number of credits - 4	Training direction 22 "Health care"	Normative
The total number of hours is 120	Specialty: 222 "Medicine"	Year of preparation:
		6th
		Semester

		11th / 12th
		Lectures
		0 years
		Practical, seminar
		20 years
		Laboratory
		0 years
		Individual work
		100 years
		Individual tasks: 0 hours.
		Type of control: Credit
Hours for full-time study: Practical classes - 20 Independent student work - 100	Education level: master	

2.1 Description of the discipline

2.2.1 Lectures

Not provided

2.2.2 Seminars

Not provided

2.2.3 Practical classes

№ s / n	Name topics	Number hours	Methods teaching	Forms control
1	Physical basics of ultrasound. Fundamentals of image formation in the main modes of operation of the ultrasound scanner	5	explanation, conversation, illustration, demonstration, presentation, videos	oral inquiry; written survey; test control
2	Ultrasound anatomy of the heart	5	explanation, conversation, illustration, demonstration, presentation, videos	oral inquiry; written survey; test control
3	Methods of ultrasound examination of the heart	5	explanation, conversation, illustration, demonstration, presentation, videos	oral inquiry; written survey; test control
4	Ultrasound semiotics of heart disease. Test	5	explanation, conversation, illustration, demonstration, presentation, videos	oral inquiry; written survey; test control
	Hours in general	20		

2.2.4. Laboratory classes

Not provided

2.2.5. Individual work

No s / n	Name topics	Number hours	Methods teaching	Forms control
1	Physical basics of ultrasound. Fundamentals of image formation in the main modes of operation of the ultrasound scanner	5	illustration, demonstration, presentation, videos	oral inquiry; written survey; test control
2	Ultrasound anatomy of the heart	15	illustration, demonstration, presentation, videos	oral inquiry; written survey; test control
3	Methods of ultrasound examination of the heart	25	illustration, demonstration, presentation, videos	oral inquiry; written survey; test control
4	Ultrasound semiotics of heart disease. Test	55	illustration, demonstration, presentation, videos	oral inquiry; written survey; test control
	Hours in general	100		

3. EVALUATION CRITERIA

• **The current learning activity (hereinafter - CLA)** is carried out by the teacher of the academic group, after the students master each topic of the discipline and grades are set using a 4-point (traditional) system. At the end of the semester, the teacher automatically receives the average grade (to the nearest hundredth) for the current activity with the help of an electronic journal of the ACS system. In the future, if in the current semester the discipline ends with a credit, the average score of the current success of the teacher of the department is translated into a 200-point ECTS scale, but if the discipline does not end in the current semester, the control in the semester is current or credit then the average score of the current success. translated into a 120-point ECTS scale.

• **The final semester control** is carried out after the completion of the discipline in the form of a test.

- **credit** is conducted by the teacher of the academic group at the last lesson in the discipline and involves taking into account the CEA (**Table 2**) and checking the mastery of all topics in the discipline. The assessment of the test (or transitional test) is determined in points from 120 to 200 and the mark of the test - "passed", "not credited".

Evaluation of current learning activities (CLA)

When assessing the mastery of each subject of the discipline (**CLA**), the student is graded according to the traditional 4-point system: "excellent", "good", "satisfactory" and "unsatisfactory".

The final score for the CLA is defined as the arithmetic mean of traditional grades for each lesson, rounded to 2 decimal places and listed in a multi-point scale according to the table.

The conversion of the average grade for CLA into a multi-point scale for disciplines that end with a test is carried out in accordance with the table. To enroll, a student must receive from 120 to 200 points.

Table

Recalculation of the average score for current activities in a multi-point scale
(for disciplines ending with a credit)

4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale
5	200	4.22-4.23	169	3.45-3.46	138
4.97-4.99	199	4.19-4.21	168	3.42-3.44	137
4.95-4.96	198	4.17-4.18	167	3.4-3.41	136
4.92-4.94	197	4.14-4.16	166	3.37-3.39	135
4.9-4.91	196	4.12-4.13	165	3.35-3.36	134
4.87-4.89	195	4.09-4.11	164	3.32-3.34	133
4.85-4.86	194	4.07-4.08	163	3.3-3.31	132
4.82-4.84	193	4.04-4.06	162	3.27-3.29	131
4.8-4.81	192	4.02-4.03	161	3.25-3.26	130
4.77-4.79	191	3.99-4.01	160	3.22-3.24	129
4.75-4.76	190	3.97-3.98	159	3.2-3.21	128
4.72-4.74	189	3.94-3.96	158	3.17-3.19	127
4.7-4.71	188	3.92-3.93	157	3.15-3.16	126
4.67-4.69	187	3.89-3.91	156	3.12-3.14	125
4.65-4.66	186	3.87-3.88	155	3.1-3.11	124
4.62-4.64	185	3.84-3.86	154	3.07-3.09	123
4.6-4.61	184	3.82-3.83	153	3.05-3.06	122
4.57-4.59	183	3.79-3.81	152	3.02-3.04	121
4.54-4.56	182	3.77-3.78	151	3-3.01	120
4.52-4.53	181	3.74-3.76	150	Less than 3	Not enough
4.5-4.51	180	3.72-3.73	149		
4.47-4.49	179	3.7-3.71	148		
4.45-4.46	178	3.67-3.69	147		
4.42-4.44	177	3.65-3.66	146		
4.4-4.41	176	3.62-3.64	145		
4.37-4.39	175	3.6-3.61	144		

4.35-4.36	174	3.57-3.59	143
4.32-4.34	173	3.55-3.56	142
4.3-4.31	172	3.52-3.54	141
4.27-4.29	171	3.5-3.51	140
4.24-4.26	170	3.47-3.49	139

Discipline assessment technology

Assessment of the results of the study of disciplines is carried out immediately after the test. The grade in the discipline is defined as points for **CLA** and is min - 120 to max - 200.

The grade in the discipline is given only to students who have passed all the final tests and credit.

After completing the discipline, the head teacher or teacher puts the student the number of points and the corresponding grade in the record book and fill in the information about the success of students in the discipline in the forms: U-5.03A - **credit**. The grade "**unsatisfactory**" is **given** to students who were admitted to the test, diff. credit, exam but did not pass it and who are not admitted to credit, diff. credit or exam.

4. DISCIPLINE POLICY

It is expected that male and female students will attend all lectures and practical classes. If they missed classes, it is necessary to work it out (according to the schedule on the information stand of the department)

Written and homework must be completed completely and on time, if students have questions, you can contact the teacher in person or by e-mail, which the teacher will provide at the first practical lesson.

During the lecture, students are recommended to keep a synopsis of the lesson and keep a sufficient level of silence. Asking questions to the lecturer is perfectly normal.

Practical training

Active participation during the discussion in the audience, students should be ready to understand the material in detail, ask questions, express their point of view, discuss. During the discussion it is important:

- respect for colleagues,
- tolerance for others and their experiences,
- susceptibility and impartiality,
- the ability to disagree with the opinion, but to respect the personality of the opponent,
- careful argumentation of one's opinion and courage to change one's position under the influence of evidence,
- self-expression, when a person avoids unnecessary generalizations, describes his feelings and formulates his wishes based on their own thoughts and emotions,
- obligatory acquaintance with primary sources.

A creative approach in its various manifestations is welcome. Students are expected to be interested in participating in city, national and international conferences, competitions and other events in the subject profile.

Occupational Health

The first lesson of the course will explain the basic principles of labor protection by conducting appropriate training. Everyone is expected to know where the nearest evacuation exit is, where the fire extinguisher is, how to use it, and so on.

Behavior in the audience

Basic "yes" and "no"

It is important for students to follow the rules of good behavior at the university. These rules are common to all, they also apply to all faculty and staff, and are not fundamentally different from the generally accepted norms.

During classes it is allowed:

- leave the audience for a short time if necessary and with the permission of the teacher;
- drink soft drinks;
- take photos of presentation slides;
- take an active part in the lesson (see Academic expectations of students).

forbidden:

- eat (except for persons whose special medical condition requires another - in this case, medical confirmation is required);
- smoking, drinking alcohol and even low-alcohol beverages or drugs;
- to use obscene language or use words that offend the honor and dignity of colleagues and faculty;
- gaff;
- to damage the material and technical base of the university (damage inventory, equipment; furniture, walls, floors, litter the premises and territories);
- shouting, shouting or listening to loud music in classrooms and even in corridors during classes.

5. ACADEMIC INTEGRITY

The Department of Propaedeutics of Internal Medicine №1, Fundamentals of Bioethics and Biosafety maintains zero tolerance for plagiarism. Students are expected to constantly raise their awareness of academic writing. The first lessons will provide information on what to consider plagiarism and how to properly conduct research and scientific research.

Procedure for informing about changes in the syllabus: necessary changes in the syllabus are approved by the methodical commission of KhNMU on the problems of professional training of therapeutic profile and published on the site of KhNMU, the site of the Department of Propaedeutics of Internal Medicine №1, basics of bioethics and biosafety of KhNMU

6. RECOMMENDED LITERATURE

Basic

1. Mitkov VV. A practical guide to ultrasound diagnostics. General ultrasound diagnostics. 3rd ed., Reworked. and ext. - M: Vidar, 2019, 756 p.
2. Abdullaev R.Ya. Ultrasonography: a textbook / R.Ya. Абдуллаев, Т.С. Head. - H.: Nove slovo, 2009. - 180 p.: ill.
3. Flaxkamp F.A. Echocardiography course / Edited by VA Sandrikova. M.: MEDpress-inform, 2016. - 326 p.
4. Rybakova MK, Alekhin MN, Mitkov VV. A practical guide to ultrasound diagnostics. Echocardiography. Ed. 2nd, ed. and ext. M.: Vidar-M Publishing House, 2008. - 544 pp., Ill.
5. Lelyuk VG, Lelyuk SE. Ultrasound angiology. - 3rd ed. - M.: Реал-Тайм, 2007. - 416 с.
6. Wilkenshof W. Handbook of echocardiography. Ed. 2nd / Wilkenshof W., Crook I. - M.: Med. literature, 2014. - 304 p.

Auxiliary

1. Color Atlas of Ultrasound Anatomy. 2nd edition / Block B. - Thieme, 2011. - 328 p.
2. Diagnostic Ultrasound. 5th edition / Rumack C., Levine D. - Elsevier, 2017. - 2168 p.
3. The ESC Textbook of Cardiovascular Imaging. 3rd édition / Zamorano JL, Bax Jeroen, Knuuti J., et al. - Oxford University Press, 2021. - 568 p.
4. Ma and Mateers Emergency Ultrasound. 4th edition / Ma OJ, Mateer JR, Reardon RF, et al. - McGraw Hill Education, 2020. - 688 p.

7. INFORMATION RESOURCES

1. <http://ultrasound.net.ua/>