

MINISTRY OF HEALTH OF UKRAINE  
KHARKIV NATIONAL MEDICAL UNIVERSITY

Department of Medical and Biological Physics and Medical Informatics  
Academic year: 2022-2023

SYLLABUS OF THE EDUCATIONAL COMPONENT

**«TECHNOLOGY OF TELEMEDICINE»**

Normative or selective educational component selective

Form of education full-time

(full-time, part-time, remote)

Field of knowledge 22 "Health care"

(code and name of the direction of training)

Major field 223 "Nursing"

(code and name of the specialty)

Specialization (if present) \_\_\_\_\_

Educational professional program "Nursing"

The first (bachelor's) level of higher education

Year: 2

This syllabus was approved at the meeting of the department of medical and biological physics and medical informatics

Approved by the methodological committee on international students training (KhNMU)

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Acting Head of Department



prof. O.V. Zaytseva

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Head



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## INTRODUCTION

**Syllabus of the educational component "Technologies of telemedicine"** compiled in accordance with the educational and professional program (hereinafter referred to as the OPP) "Nursing" and the Standard of Higher Education of Ukraine (hereinafter referred to as the Standard), the first (bachelor's educational and scientific) level of higher education, field of knowledge 22 "Health Care", specialties 223 "Nursing".

**Description of the educational component (abstract).** The educational component "Technologies of telemedicine" is taught with the aim of familiarizing students with higher education with issues of standardization in medicine, the ideology of E-health, with an electronic medical record, with telemedicine technologies for providing medical assistance and services in the field of health care at the point of need (in those in cases where geographic distance is a critical factor), with a set of organizational, financial, technological and other measures that ensure the provision of remote medical services using electronic document management.

The **subject of study** of the educational component is telecommunications and computer technologies that operate with medical information between remote points, as well as the process of information exchange, which is characterized by the type of transmitted information and the method of its transmission.

**Interdisciplinary connections.** The study of the educational component is based on the assimilation of educational components in the fields of medical informatics, medical and biological physics; medical information technologies.

**Prerequisites** The study of the educational component involves the prior learning of the basic components of medical informatics.

**Post-requisites.** The main provisions of the educational component should be applied when studying professional educational components.

**Link to the page of the educational component in MOODLE**  
<https://distance.knmu.edu.ua/course/view.php?id=5086>

## **1. PURPOSE AND TASK OF THE EDUCATIONAL COMPONENT**

**1.1 The purpose of teaching the educational component** "Technology of telemedicine" is: the formation and development of future doctors' competencies in effective information management, knowledge of the structure of electronic health care, competencies in the use of information and communication technologies both in a given specific place and at a distance for an optimal solution tasks of the public health care system; possession of electronic document management.

**1.2 The main tasks of the educational component** "Technologies of telemedicine" are the acquisition by students of education of competencies in accordance with the general and professional competencies of the educational and professional program "Nursing" of the first (bachelor's) level of higher education in the specialty 223-Nursing.

**1.3. Competencies and learning outcomes**, the formation of which is facilitated by the educational component (relationship with the normative content of the training of higher education applicants, formulated in terms of learning outcomes in the OPP and the Standard):

**1.3.1. The study of the educational component ensures that students acquire the following competencies:**

**- integral:**

the 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 conducting research and/or implementing innovations and is characterized by the complexity and uncertainty of conditions and requirements.

**- general:**

ability to abstract thinking, analysis and synthesis; the ability to apply knowledge in practical activities; skills in using information and communication technologies; the ability to search, process and analyze information from various sources; ability to adapt and act in a new situation; ability to work in a team; the ability to preserve and multiply moral, cultural, scientific values and achievements of society based on an understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technologies, to use various types and forms of motor activity for active recreation and leading a healthy lifestyle.

**- special (professional, subject):**

the ability to search for analytical information regarding new information technologies in the field of telemedicine; ability to process and analyze professional information from various sources; the ability to master the principles of building and using telemedicine systems; the ability to evaluate the role of new information and communication technologies in professional activity; the ability to independently master the software tools used in telemedicine networks and to

update and integrate the acquired knowledge.

**1.3.2. The study of the educational component "Technology of telemedicine" ensures that the students acquire the following learning outcomes:**

PRN 2. Carry out nursing diagnosis: identify and assess the patient's problems. In the conditions of health care facilities, at home, predictable circumstances, to be able to identify the real problems of the patient, assess their priority and establish a nursing diagnosis.

PRN 4. Monitor the work of junior medical staff and the state of inventory. In the conditions of health care facilities in accordance with job duties, in order to comply with sanitary and anti-epidemic measures regime, to be able to: - conduct training of junior medical personnel on issues of performance of functional duties and occupational health and safety; monitor compliance with safety rules by junior medical personnel; - monitor the work of junior medical personnel; control the implementation of the rules of the internal procedure by staff and patients; monitor compliance with measures of sanitary and hygienic regime in wards and medical offices.

PRN 14. To be able to prepare the patient, collect and direct biological material for laboratory and instrumental research.

PRN 20. Appropriate medical documentation should be kept.

**1.3.3. The study of the educational component ensures that students of higher education acquire the following social skills (soft skills):**

- communication skills (implemented through: the method of working in groups and brainstorming during analysis, clinical cases, the method of presenting the results of independent work and defending them in a group),

- teamwork (implemented through: group work method and brainstorming during analysis, clinical cases),

- conflict management (implemented through: business games),

- time management (implemented through: self-organization method during classroom work in groups and independent work),

- leadership skills (implemented through: a method of presenting the results of independent work and defending them in a group).

## 2. INFORMATION VOLUME OF THE EDUCATIONAL COMPONENT "TECHNOLOGY OF TELEMEDICINE"

|   |   |   |
|---|---|---|
| Name indicators   | Field of knowledge, specialty, educational degree, EPP  | Characteristics of the educational component          |
|   |   | <b>full-time form of education</b>                    |
| Number of credits – <b>3,0</b>  | Field of knowledge<br>22 " <u>Health care</u> "<br>(code and name)  | <b>selective</b>                                      |
| The total number of hours is – <b>90</b><br><br>Hours of correspondence education:<br>classrooms - <b>32</b> ,<br>independent works - <b>58</b> | Specialty:<br>223 " <u>Nursing</u> "<br>(code and name)<br><br>Qualification level:<br><u>The first (bachelor) level of higher education</u><br><br>EPP<br><u>"Nursing"</u> | <b>Year of training (course):</b><br>2st              |
|   |   | <b>Semester</b>                                       |
|   |   | <b>Lectures:</b><br>0 hours                           |
|   |   | <b>Practical training:</b><br>32 hours                |
|   |   | <b>Seminar classes/Laboratory classes:</b><br>0 hours |
|   |   | <b>Independent work:</b><br>58 hours                  |
|   |   | <b>Individual tasks:</b><br>0 hours                   |
|   |   | <b>Type of control:</b><br>credit                     |

### 2.1 Description of the educational component

#### 2.1.1 Lectures

Not provided for in the curriculum.

#### 2.1.2 Seminar classes

Not provided for in the curriculum.

#### 2.1.3 Practical lessons

| № | Name of topic  | Number of hours | Methods learning  | Forms control                  |
|---|--|-----------------|---|--------------------------------|
| 1 | Types, architecture and standards of computer networks.                        | 4               | presentation on the platform<br>Google meet, story-explanation, | test control (Moodle platform) |
| 2 | Telemedicine networks. concept of creation of territorial telemedical services | 4               |   |                                |

|                            |  |   |  |  |
|----------------------------|--|---|--|--|
| 3                          | Safety and ethics of telemedicine  | 4 | conversation   |  |
| 4                          | Databases of medical information   | 4 |  |  |
| 5                          | Medical information systems as a component of telemedical technologies                               | 4 |  |  |
| 6                          | Methods of managing knowledge and resources in the healthcare system using telemedicine technologies | 4 |  |  |
| 7                          | The concept of electronic management in medicine and related industries                              | 4 |  |  |
| 8                          | Control and efficiency of electronic means of state management of health care                        | 2 |  |  |
| 9                          | Final control  | 2 | Test control (Moodle platform), report with presentation |  |
| <b>A total of 32 hours</b> |  |   |  |  |

#### 2.1.4. Laboratory classes

Not provided for in the curriculum.

#### 2.1.5. Independent work

| №                          | Name of topic  | Number of hours | Methods learning       | Forms control  |
|----------------------------|--|-----------------|------------------------|--|
| 1                          | Evaluation of the quality and effectiveness of telemedicine services | 8               | electronic information | test control as a component of final control (Moodle platform) |
| 2                          | Means of organizing video conferences in telemedicine                | 8               |                        |  |
| 3                          | Organization of video conferences based on ISDN and IP networks      | 8               |                        |  |
| 4                          | Communication channel standards                                      | 8               |                        |  |
| 5                          | The structure of the telemedicine system                             | 10              |                        |  |
| 6                          | Standards for the exchange of medical data in electronic form        | 8               |                        |  |
| 7                          | HL7 and DICOM medical data processing and transmission standards     | 8               |                        |  |
| <b>A total of 58 hours</b> |  |                 |                        |  |



### 3. EVALUATION CRITERIA

**3.1.1** The evaluation of the educational success of education seekers is carried out on the basis of the current "Instructions for evaluating the educational activity of education seekers of the Khznyu University".

**Control methods:**

Oral and written control of mastering the topic is carried out in practical classes.

**Control of the acquisition of practical abilities and skills** is carried out in practical classes by the method of observation.

**Control of the performance of independent work** is carried out in written (the written form involves presentation in both paper and / or electronic form) and oral forms.

**Current control** is carried out at each practical session in accordance with the specific objectives of the topic. In all practical classes, types of standardized control of theoretical training and control of the acquisition of practical skills are used: computer tests, performance of practical tasks, including competence-oriented ones.

**Final control** involves the use of computer tests on the MOODLE remote platform to check the level of theoretical knowledge and the formation of practical skills in the process of performing a practical task on the computer.

**The assessment for each practical lesson from the educational component "Advertising and information technologies in medicine" is comprehensive**, including control of the theoretical and practical training of the student of higher education, is given by the teacher according to the traditional four-point scale in the ASU, which is then converted into the corresponding points.

**Evaluation criteria of the final control on the remote MOODLE platform.**

**The final control contains 25 questions, including:**

15-19 correct answers - 15-19 points - grade "3",

20-23 correct answers - 20-23 points - grade "4",

24-25 correct answers - 24-25 points - grade "5".

**Evaluation of the current educational component (CEC):**

After conducting the last practical lesson and posting the grade in the electronic journal, the ASU calculates the student's average score for the year, and if there is no academic debt / missing a lesson, a credit is issued. The recalculation of the average grade for the current activity into a multi-point scale is carried out in the ACS in accordance with the "Instructions for evaluating the educational activity of students of KhNMU", approved by KhNMU Order No. 181 dated 08/21/2021. (Table 1).

Table 1

**Recalculation of the average grade for the current activity into a multi-point scale (for the educational component that ends with a credit)**

| 4-point scale | 200-point scale | 4-point scale | 200-point scale | 4-point scale      | 200-point scale   |
|---------------|-----------------|---------------|-----------------|--------------------|-------------------|
| 5,00          | 200             | 4,30-4,31     | 172             | 3,60-3,61          | 144               |
| 4,97-4,99     | 199             | 4,27-4,29     | 171             | 3,57-3,59          | 143               |
| 4,95-4,96     | 198             | 4,24-4,26     | 170             | 3,55-3,56          | 142               |
| 4,92-4,94     | 197             | 4,22-4,23     | 169             | 3,52-3,54          | 141               |
| 4,90-4,91     | 196             | 4,19-4,21     | 168             | 3,50-3,51          | 140               |
| 4,87-4,89     | 195             | 4,17-4,18     | 167             | 3,47-3,49          | 139               |
| 4,85-4,86     | 194             | 4,14-4,16     | 166             | 3,45-3,46          | 138               |
| 4,82-4,84     | 193             | 4,12-4,13     | 165             | 3,42-3,44          | 137               |
| 4,8-4,81      | 192             | 4,09-4,11     | 164             | 3,40-3,41          | 136               |
| 4,77-4,79     | 191             | 4,07-4,08     | 163             | 3,37-3,39          | 135               |
| 4,75-4,76     | 190             | 4,04-4,06     | 162             | 3,35-3,36          | 134               |
| 4,72-4,74     | 189             | 4,02-4,03     | 161             | 3,32-3,34          | 133               |
| 4,7-4,71      | 188             | 3,99-4,01     | 160             | 3,30-3,31          | 132               |
| 4,67-4,69     | 187             | 3,97-3,98     | 159             | 3,27-3,29          | 131               |
| 4,65-4,66     | 186             | 3,94-3,96     | 158             | 3,25-3,26          | 130               |
| 4,62-4,64     | 185             | 3,92-3,93     | 157             | 3,22-3,24          | 129               |
| 4,60-4,61     | 184             | 3,89-3,91     | 156             | 3,20-3,21          | 128               |
| 4,57-4,59     | 183             | 3,87-3,88     | 155             | 3,17-3,19          | 127               |
| 4,54-4,56     | 182             | 3,84-3,86     | 154             | 3,15-3,16          | 126               |
| 4,52-4,53     | 181             | 3,82-3,83     | 153             | 3,12-3,14          | 125               |
| 4,50-4,51     | 180             | 3,79-3,81     | 152             | 3,10-3,11          | 124               |
| 4,47-4,49     | 179             | 3,77-3,78     | 151             | 3,07-3,09          | 123               |
| 4,45-4,46     | 178             | 3,74-3,76     | 150             | 3,05-3,06          | 122               |
| 4,42-4,44     | 177             | 3,72-3,73     | 149             | 3,02-3,04          | 121               |
| 4,40-4,41     | 176             | 3,70-3,71     | 148             | 3,00-3,01          | 120               |
| 4,37-4,39     | 175             | 3,67-3,69     | 147             | <b>Less than 3</b> | <b>Not enough</b> |
| 4,35-4,36     | 174             | 3,65-3,66     | 146             |                    |                   |
| 4,32-4,34     | 173             | 3,62-3,64     | 145             |                    |                   |

### 3.1.2. Evaluation of individual tasks of education seekers.

Not provided by the curriculum.

### 3.1.3. Evaluation of the educational component "Advertising and information technologies in medicine".

The assessment of the educational component is determined by points for the POK and ranges from 120 to 200 points.

Correspondence of grades on a 200-point scale according to the ECTS scale to a four-point scale is shown in Table 2.

Table 2

**Correspondence of grades on a 200-point scale to the ECTS scale and to a four-point (national) scale**

| Assessment on a 200-point scale | Assessment on the ECTS scale | Assessment on four-point scale |
|---------------------------------|------------------------------|--------------------------------|
| 180–200                         | A                            | Excellent                      |
| 160–179                         | B                            | Good                           |
| 150–159                         | C                            | Good                           |
| 130–149                         | D                            | Satisfactory                   |
| 120–129                         | E                            | Satisfactory                   |
| Less than 120                   | F, Fx                        | Unsatisfactory                 |

An education seeker receives the mark "enrolled" in the record book if he scored from 120 to 200 points.

### 3.2. Questions for credit

Not provided for in the curriculum.

### 3.3. Questions for final control

- Historical prerequisites for the use of computer and telecommunication technologies in
  - to the State Department of Health Protection in Ukraine
- Territorial telemedicine service as an object of state health care management
- Justification of the telemedicine network as an object of state administration
- Basic concepts of creation of territorial telemedical services
- The model of the territorial telemedical service as an object of state management of health care
- The main stages of the organization of the territorial telemedicine service
- Safety and ethics of telemedicine
- Telemedicine as a method of state management of health care
- The concept of using telemedicine as a method of ensuring the implementation of the goals and functions of state health care management

- The method of knowledge management in the healthcare system using telemedicine technologies
- The method of managing resources and auditing the activities of medical and preventive facilities based on the results of the telemedicine service
- Electronic management as a method of state management of health care (co-author V.V. Mozgovoy)
- The concept of electronic management in medicine and related industries
- Basic principles, processes, systems and tools of electronic management
- An example of the application of electronic management in solving strategic tasks of public administration in the field of health care
- Control and effectiveness of electronic means of state health care management
- Justification of the methodology for evaluating the effectiveness of electronic means of state health management
- Criteria for evaluation and planning of telemedicine activity
- Evaluation of the effectiveness of electronic document management
- Comprehensive assessment of the effectiveness of telemedical consultation.
- Evaluation of the quality and effectiveness of telemedicine services
- Means of organizing video conferences in telemedicine
- Organization of video conferences based on ISDN and IP networks
- Communication channel standards
- The structure of the telemedicine system
- Standards for the exchange of medical data in electronic form
- HL7 and DICOM medical data processing and transmission standards.

### **3.4. Individual tasks.**

Not provided by the curriculum.

### **3.5. Rules for challenging the assessment**

If the student of higher education does not agree with the grade received at the class, he can appeal it. In this case, the knowledge of the student of higher education will be evaluated by a commission composed of the head or head of the department, an independent teacher and the teacher of the group in which the student of higher education studies. In order to increase the grade, the teacher of the group can also offer the student of higher education to choose a topic for writing an essay.

## **4. EDUCATIONAL COMPONENT POLICY**

For the successful assimilation of the educational component, it is necessary for the learner to systematically prepare for practical classes, perform the tasks offered for mastering the topics recommended for independent study, read the recommended literature, take an active part in discussing the topic of the class in the classroom / remotely.

Attending practical classes in the discipline is mandatory (except for good reasons). A class missed for any reason must be made up. It is unacceptable to be

late for classes. By the time the class begins, the student must change into a medical gown. When communicating with the teacher and others, he should show courtesy, speak quietly and behave calmly.

## 5. ACADEMIC INTEGRITY

Taking into account the current legislation of Article 42 of the Law of Ukraine "On Higher Education" and the recommendations of the National Agency for Quality Assurance of Higher Education, which were approved by the decision of October 29, 2019 (protocol No. 11), we require students of higher education to strictly observe the rules of academic integrity.

Observance of academic integrity by a student of higher education involves: independent performance of educational tasks and tasks for the final control of learning results; references to sources of information in the case of using ideas, statements, information; compliance with copyright legislation; providing reliable information about the results of one's own educational (scientific, creative) activities.

Plagiarism, plagiarism, cheating, falsification, etc. are considered violations of academic integrity.

For violation of academic integrity, students of higher education may be held liable for the following: retaking the assessment (final control, credit, etc.); repeated completion of the training course; deduction from ZVO.

## 6. REFERENCES

### Basic

1. Gogia, S. B. Fundamentals of Telemedicine and Telehealth. 2019. Elsevier Science. Available at: <https://www.perlego.com/book/1832437/fundamentals-of-telemedicine-and-telehealth-pdf>
2. F. Heston T. Introductory Chapter: Telemedicine [Internet]. Telehealth. IntechOpen; 2019. Available from: <http://dx.doi.org/10.5772/intechopen.82419>
3. Shortiffe E.H. Biomedical Informatics: Computer Applications in Health Care and Biomedicine 4th edition / Edward H. Shortiffe, James J. Cimino // New York: Springer. 2019. – 1037 p.
4. Electronic resource: <https://books.google.ro/books?id=Wn-fFVuUguMC&printsec=frontcover&dq=medical+informatics&hl=ru&sa=X&ved=0ahUKEwis8v2jyvHaAhXBhSwKHQSNBvcQ6AEIWDAAH#v=onepage&q=medical%20informatics&f=false>
5. Updated model of training of nurses / Isaeva O.S./ Theory and methodology of professional education // Issue 12. Vol. 1. 2019.- P.98-101

### Auxiliary

1. Ministry of Health of Ukraine. The concept of health care informatization. – Access mode: <http://moz.gov.ua/article/reformplan/jak-bude-rozvivatisja-enealth-v-ukraini-prezentuvali-proekt-koncepciiinformatizacii-ohoroni-zdorovja>. 2021.

2. On the necessity of familiarizing students of higher medical educational institutions with the ISRS-2 coding system / E. B. Radzishavska, O. V. Vysotska, S. S. Grankina and others. // Topical issues of higher medical education in Ukraine (with remote connection of the Ministry of Health of Ukraine by means of video conference communication): materials of the XV Vseukr. science and practice conf. from international with participation (Ternopil, May 17–18, 2018) / Ternopil. state honey. University named after I. Ya. Gorbachevsky. – Ternopil: TDMU, 2018. – P. 254

## 7. INFORMATION RESOURCES

1. Link to the subject page in MOODLE  
<https://distance.knmu.edu.ua/course/view.php?id=5086>
2. Electronic textbook: <http://repo.knmy.edu.ua/handle/123456789/25671>
3. Page of the department of medical and biological physics and medical informatics on the university website:  
<https://knmu.edu.ua/departments/kafedra-medychnoyi-ta-biologichnoyi-fyzyky-i-medychnoyi-informatyky/>
4. Section of the department of medical and biological physics and medical informatics in the Repository of the KhNMU:  
<http://repo.knmu.edu.ua/handle/123456789/162>.

## 8. OTHER

Regulations on academic integrity and ethics of academic relations at the Kharkiv National Medical University

[http://files.knmu.edu.ua:8181/upload/redakt/doc\\_uchproc/polog\\_ad\\_etyka\\_text.pdf](http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/polog_ad_etyka_text.pdf)

The procedure for conducting classes on in-depth study by students of the Kharkiv National Medical University of individual disciplines beyond the scope of the curriculum [http://files.knmu.edu.ua:8181/upload/redakt/doc\\_uchproc/nak-poriad-pogl-vyv-dysc.docx](http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/nak-poriad-pogl-vyv-dysc.docx)

Regulations on the Commission on Academic Integrity, Ethics and Conflict Management of KhNMU

[http://files.knmu.edu.ua:8181/upload/redakt/doc\\_uchproc/polog\\_komis\\_ad\\_text.pdf](http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/polog_komis_ad_text.pdf)

Regulations on recognition of the results of non-formal education at the Kharkiv National Medical University

[http://files.knmu.edu.ua:8181/upload/redakt/doc\\_uchproc/polog\\_neform\\_osv.pdf](http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/polog_neform_osv.pdf)

INCLUSIVE EDUCATION:

[http://www.knmu.kharkov.ua/index.php?option=com\\_content&view=article&id=7108%3A2021-03-10-14-08-02&catid=12%3A2011-05-10-07-16-32&Itemid=33&lang=en](http://www.knmu.kharkov.ua/index.php?option=com_content&view=article&id=7108%3A2021-03-10-14-08-02&catid=12%3A2011-05-10-07-16-32&Itemid=33&lang=en)

ACADEMIC HONESTY:

[http://www.knmu.kharkov.ua/index.php?option=com\\_content&view=article&id=2520%3A2015-04-30-08-10-46&catid=20%3A2011-05-17-09-30-17&Itemid=40&lang=en](http://www.knmu.kharkov.ua/index.php?option=com_content&view=article&id=2520%3A2015-04-30-08-10-46&catid=20%3A2011-05-17-09-30-17&Itemid=40&lang=en)

[http://files.knmu.edu.ua:8181/upload/redakt/doc\\_uchproc/kodex\\_AD.docx](http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/kodex_AD.docx)