

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ  
ОДЕСЬКИЙ НАЦІОНАЛЬНИЙ МЕДИЧНИЙ  
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**Syllabus of the academic discipline**

"Electronic health system e-Health and telemedicine"

<b>Scope of the academic discipline</b>	Total number of hours per discipline: 90 hours, 3 credits. Semester: V, VI 3rd year of study.
<b>Days, time, place of educational discipline</b>	Time and place (number of the lecture hall, auditorium, laboratory, studio etc) carrying out of the academic discipline is determined in accordance with the approved class schedule.
<b>Staff</b>	Full Professor, Leonid Godlevsky, Doctor of Medicine, head of the department. Associate professors: Oleksandr Mandel, Ph.D., Andrii Ponomarenko, Doctor of Medicine. Senior Lecturers: Serhii Marchenko, Tetyana Pribolovets.
<b>Contact Information</b>	E-mail: <a href="mailto:medphys@onmedu.edu.ua">medphys@onmedu.edu.ua</a> Face-to-face consultations: from 14.00 to 16.00 every Thursday. Online consultations by appointment with the teacher.

**COMMUNICATION**

Communication with applicants will be conducted in the classroom (face-to-face).

During distance learning, communication with applicants can be carried out through the Microsoft Teams platform, as well as through e-mail, social networks, and telephone.

**ABSTRACT OF THE EDUCATIONAL DISCIPLINE**

*Subject of discipline* there is a system of eHealth and telemedicine, which are formed at the intersection of such sciences as: medicine, telecommunications and information technologies, computer equipment, software for personal computers, modern technologies for processing medical and biological information.

*Prerequisites and postrequisites of the discipline:* is based on the students' study of academic disciplines such as medical and biological physics, medical informatics, mathematical statistics, serves as a basis for studying such disciplines as hygiene, medical documentation, social medicine, medical ecology, medical information systems and integrates with these disciplines.

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*The purpose of the discipline* - the formation of the acquirers of the system of knowledge about the basic characteristics of electronic health (e-Health) and telemedicine, the circulation of medical information in the medical community and the health care system, the organization of various forms of communication between the patient and the doctor, between doctors during teleconsiliums, about the forms and standards of medical data transfer, the organization of networks during video conferences, telemonitoring, biotelemetry, as well as studying the legal basis of telemedicine.

*Tasks of the discipline:*

- formation and development of the base of knowledge, abilities and skills necessary for the effective use of modern medical information systems in medical practice.
- acquiring practical skills and working skills with the e-Health system.
- formation of medical and biological data processing skills using standard procedures of modern information technologies.
- acquisition of theoretical and practical knowledge on the organization of telemedical services.
- studying the basics of medical data transfer, the organization and structure of eHealth and the telemedicine system of Ukraine.
- familiarization with the classes and principles of application of telemedicine registration and data transfer equipment.
- study of the legal basis of the organization of the e-Health system and telemedicine.
- acquisition of skills of interpretation and analysis of medical information, skills to correctly assess new and complex phenomena and problems critically, independently and creatively.
- acquiring skills to identify unsolved problems in the information medical space and determine ways to solve them using the e-Health system and telemedicine technologies.
- acquiring the ability to formulate hypotheses, goals and tasks when providing informational medical services to the patient.
- skills in performing and improving modern research methods in the chosen field of professional and educational activity using the e-Health system and telemedicine technologies.
- acquiring skills for managing ethical principles in working with patients in the medical information space.
- formation in the acquirer of the principles of academic integrity and responsible behavior regarding medical information, its reliability and circulation.

*Expected results:*

*As a result of studying the academic discipline, the applicant must:*

*Know:*

- modern trends and prospects for the development of providing informational

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medical services to the population in the e-Health system;

- procedure for working with typical electronic documents in the eHealth system;
- procedure for working with typical modern telemedicine networks and telemedicine equipment;
- the main technical groups and classes of modern telemedicine equipment used in Ukraine and abroad;
- the principle of operation and arrangement of modern telemedicine equipment by areas of application;
- technical and functional safety rules when working with the main classes of telemedicine networks and telemedicine equipment;
- the basics of metrological control of measuring devices in the provision of informational medical services;

*Be able:*

- determine the mandatory components of the information medical model of the circulation of medical information at the workplace of a medical specialist, provided for by e-Health;
- choose equipment for organizing the workplace of a specialist who provides medical information services;
- organize and work with existing telemedicine servers to organize communication and transfer medical data;
- choose medical data transfer standards and the appropriate medical information system that ensure the efficient work of a specialist;
- work with computerized medical devices and determine the main diagnostic characteristics of the received information;
- observe safety rules when using medical devices;
- use the instructions and descriptions of self-learning the rules of operation of telemedicine devices and networks.

**DESCRIPTION OF THE EDUCATIONAL DISCIPLINE**

The discipline will be taught in the form of practical classes (30 classroom hours); organization of the applicant's independent work (60 hours).

*Teaching methods:* verbal, visual and practical teaching methods.

*Content of the academic discipline*

Topic 1. History of the development of e-Health technologies.

The main stages of formation and development of e-Health in the world and Ukraine. World experience in the transmission of medical data over a distance.

Topic 2. Basic concepts and definitions of e-Health and telemedicine.

What is e-Health, interdependence and technological interaction with telemedicine, the main areas of use.

Topic 3. Biotelemetry and telemonitoring in e-Health.

Tasks, areas of application, hardware and software, principles of building

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telemedicine systems. The main types of distance medical data transmission: teleconferences, bioradiotelemetry, home telemedicine, teleassistance, telelearning. Types of biotelemetry: space, aviation, military, clinical, disaster telemedicine.

Topic 4. Remote e-Health services. Teleconsultation. Teleassistance in the e-Health system.

Classification, areas of application, principles of building teleconsultation systems and teleassistance Equipment what is used Keeping documentation during teleconsultation.

Topic 5. e-Health and home telemedicine.

Telescreening. Distance education of doctors. Tasks, areas of use, features of building home telemedicine systems, necessary equipment.

Topic 6. Diagnostic equipment for the functioning of the e-Health network.

Means of visualization, registration and processing of electrograms, measurement of physiological indicators, broadcasting of examinations. Means of remote control of medical devices. Means of digital visualization. Elements of artificial intelligence and automation of diagnostic procedures.

Topic 7. Medical information compression protocols. Data transfer protocols in e-Health.

Information protection in telemedicine. Application of cloud technologies in eHealth and telemedicine. Telemedicine software and servers in Ukraine and the world.

Topic 8. Organization of the national e-Health and telemedicine system of Ukraine.

Its participants are telemedicine software developers. Regulatory framework and state e-Health programs.

*List of recommended literature:*

*Basic:*

1. Medical informatics: a textbook for students of medical universities / [Antyufeeva O.I., Balyk I.A., Batiuk L.V., Kyzhavko V.G.]; under the editorship V. G. Kizhavka. / — Kharkiv: KhNMU, 2015. - 240 p.
2. Medical informatics: a study guide for students of medical universities / V. G. Kyzhavko, O. V. Zaitseva, M. A. Bondarenko, L. V. Batiuk, O. S. Rukin. - Kharkiv: KhNMU, 2019. - 65 p.
3. Medical informatics in modules: practicum: study guide  
(University of the IV year of the a.) / [Bulak I.E., Voitenko L.P., Mruga M.R. etc.]; under the editorship Bulakh I.E. — 2nd ed., ed. 2012.
4. Godlevsky L.S., Bayazitov M.R., Mandel O.V., Marchenko S.V., Bidniuk K.A., Lyashenko A.V. Telemedicine technologies in the healthcare system. Educational and methodological manual 2021 ONMedU (electronic edition) 327 pages.
5. Bayazitov D.M., Liashenko A.V., Bayazitov M.R., Bidnyuk K.A., Godlevska

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- T.L. Digital images classification in automatic laparoscopic diagnostics Wiad Lek. (Poland), May, 2022 (accepted for publication) (Scopus)
6. Bayazitov D.N., Kresyun N.V., Buzinovskiy A.B., Bayazitov N.R., Lyashenko A.V., Godlevskiy L.S., Prybolovets T.V., Bidnyuk K.A. (2017). The effectiveness of automatic laparoscopic diagnostics of liver pathology using different methods of digital images classification. Pathologia. Vol.,14. Issue 2. Pp182-187. URL: <http://pat.zsmu.edu.ua> (Web of Science)
  7. Lyashenko A.V., Bayazitov N.R., Godlevskiy L.S., Bayazitov D.N., Buzinovskiy A.B. Informational -technical system for the automatized laparoscopic diagnostics. Radio Electronics, Computer Science, Control [Ukraine]. 2016/17; 4: 90-96 INFORMATIONAL-TECHNICAL SYSTEM FOR THE AUTOMATIZED LAPAROSCOPIC DIAGNOSTICS | Radio Electronics, Computer Science, Control (zntu.edu.ua) (Web of Science).
  8. Bayazitov M.R., Bayazitov D.M., Buzynovskiy A.B., Lyashenko A.V., Novikov D.V., Godlevskiy L.S. Comparative efficiency of image classifiers during recognition of regions of interest during laparoscopic interventions. Medical informatics and engineering. 2020, No. 2 С.62-69.
  9. Lyashenko A.V., Godlevskiy L.S., Bayazitov D.M., Buzynovskiy A.B. Application of the algorithm based on the texture descriptor in the recognition of video laparoscopic images. Bulletin of the Kherson National Technical University. - 2017. - No. 2. - P. 212-217.
  10. Buzinovskiy A.B., Kovalenko O.S., Bayazitov N.R., Godlevskiy L.S. The effectiveness of surgeon decision on pain syndrome of pelvic origin treatment in women estimated with the model of decision tree. Cybernetics and computer technology.- 2018.- No. 2(192).- P.60-72.
  11. Bayazitov D.M., Buzynovskiy A.B., Godlevskiy L.S., Novikov D.V. Evaluation of the effectiveness of providing surgical care to patients with pelvic pain syndrome. Achievements of biology and medicine.- 2018.- No. 1.- P. 18-22.
  12. Bidnyuk K.A., Lyashenko A.V., Bayazitov D.N., Buzinovskiy A.B., Nenova O.N. A method for assessing the color of digital images of a biological surface using the example of remote diagnostics of the condition of tooth enamel. Current problems of transport medicine. 2017.-No. 3,(45).- P.117-123.

*Additional*

1. Bayazitov D.M., Buzynovskiy A.B., Lyashenko A.V., Godlevskiy L.S. Retrospective comparative effectiveness of surgical and medical treatment of patients using the decision tree method. Current issues of distance education and telemedicine 2018. Mat. All-Ukrainian scientific and methodical video conference. From international Participation (April 25-26, 2018, Zaporizhzhia). - Zaporizhzhia, 2018. P.97-98
2. The Law of Ukraine "On improving the availability and quality of medical care service in rural areas" from 14.11. 2017 No. 2206-VIII (Vedomosti Verkhovna

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Rada (VVR), 2018, No. 5, Article 32).

3. Order of the Ministry of Health of Ukraine dated October 19, 2015 No. 681 "On approval regulatory documents regarding the use of telemedicine in the field Health Care" approved by the Ministry of Justice of Ukraine dated November 9, 2015 under No. 1400/27845.
4. Dubchak L. O. Telemedicine: modern state and development prospects / L. O. Dubchak // Information processing systems. - 2017. - Issue 1. - P. 144-146. - Access mode: [http://nbuv.gov.ua/UJRN/soi\\_2017\\_1\\_28](http://nbuv.gov.ua/UJRN/soi_2017_1_28).
5. Order Ministry of Health of Ukraine dated 25.05.2007 No. 269 "On the formation of the State of the Clinical Scientific and Practical Center of Telemedicine of the Ministry of Health of Ukraine".
6. Law of Ukraine "Basic Principles of Information Society Development in Ukraine for 2007-2015" dated January 9, 2007 No. 537-V.
7. Law of Ukraine "Basics of the legislation of Ukraine on health care" dated November 19, 1992 No. 2801-XI, as amended.
8. Order of the Ministry of Health of Ukraine dated 23.03. 2020 No. 698 "On the approval of Temporary measures in health care facilities to ensure their readiness to provide medical assistance to patients with acute respiratory disease COVID-19 caused by the SARS-CoV-2 coronavirus"
9. Remote consultations. Telemedicine platform "doctor-patient" Telemed24.
10. Order of the Ministry of Health of Ukraine No. 722 dated March 28, 2020. Organization of medical care for patients with coronavirus disease (COVID-19) // Collection of regulatory and directive documents on health care. - 2020. - No. 6. - P. 87-89.
11. Voronenko Yu.V., Orabina T.M., Moiseyenko R.I. etc. "Methodical recommendations for the diagnosis and treatment of certain diseases when providing telemedicine services (for general practitioners - family medicine)" / NMAPO named after P.L. Shupyka, 2019. 104 p.
12. Franke M., Lipinski W. Electrocardiographic changes In infectious diseases // PolskaGazeta Lekarska.- 1936.- Y.15, N9.-1-11 p.

**EVALUATION**

*Forms and methods of current control:* oral (survey), testing, evaluation of practical exercises, evaluation of communication skills, solution of situational clinical tasks, evaluation of activity in the class and independent work of students.

*Current assessment criteria for practical training:*



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«5 »	The student is fluent in the material, takes an active part in the discussion of the topic of the lesson, confidently demonstrates practical skills when performing tasks, expresses his opinion on the topic of the lesson, demonstrates creative thinking. The level of competence is high, the ability to independently replenish knowledge.
«4 »	The student has a good command of the material, participates in the discussion of the topic of the lesson, demonstrates practical skills while performing tasks with some errors, expresses his opinion on the topic of the lesson. The level of competence is sufficient.
«3 »	The acquirer does not have sufficient knowledge of the material, takes part in the discussion without confidence topics occupation. Level competence average, reproductive. Has the knowledge to overcome the mistakes made.
«2 »	The applicant does not own the material, does not take part in the discussion of the subject of the lesson. The level of competence is low.

*Forms and methods of final control:* the credit is given to the applicant who has completed all sections of the educational program of the elective discipline, has taken an active part in practical classes, has an average current grade of at least 3.0 and has no academic debt.

*The possibility and conditions of obtaining additional (bonus) points:* not provided.

### **INDEPENDENT WORK OF HIGHER EDUCATION ACQUIRES**

The student's independent work involves preparation for practical classes and is evaluated as a result of preparation for the corresponding class.

### **EDUCATIONAL DISCIPLINE POLICY**

*Deadlines and Rescheduling Policy:*

- Absences of classes for non-respectable reasons will be worked out according to the schedule of the teacher on duty.
- Absences for valid reasons are worked out according to an individual schedule with the permission of the dean's office.

*Academic Integrity Policy:*

Applicants must observe academic integrity, namely:

- independent performance of all types of work, tasks, forms of control provided for by the work program of this educational discipline;
- references to sources of information in case of use of ideas, developments, statements, information;

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- compliance with the legislation on copyright and related rights;
- provision of reliable information about the results of one's own educational (scientific) activity, used research methods and sources of information.

Unacceptable in educational activities for participants of the educational process are:

- the use of family or work connections to obtain a positive or higher grade when exercising any form of control of learning outcomes or advantages in academic work;
- use of prohibited auxiliary materials or technical means (cheat sheets, notes, micro-earphones, telephones, smartphones, tablets, etc.) during control measures;
- going through procedures for monitoring the results of training by fake persons.

For violation of academic integrity, students may be held to the following academic responsibility:

- a decrease in the results of assessment of the control work, assessment in class, credit, etc.;
- retaking the assessment (test, credit, etc.);
- assignment of additional control measures (additional individual tasks, control works, tests, etc.);
- conducting an additional inspection of other works authored by the violator.

*Attendance and Tardiness Policy:*

Uniform: a medical gown that completely covers the outer clothing, or medical pajamas, a cap, a mask, and a change of shoes.

Equipment: textbook, notebook, dictionary, pen.

State of health: applicants suffering from acute infectious diseases, including respiratory diseases, are not allowed to attend classes.

A student who is late for class can attend it, but if the teacher has put "nb" in the journal, he must complete it in the general order.

*Use of mobile devices:*

Mobile devices may be used by students with the permission of the instructor if they are needed for the assignment.

*Behavior in the audience*

While in the audience, the following values should be cultivated: respect for colleagues; tolerance for others; receptivity and impartiality; argumentation of agreement or disagreement with the opinion of other participants in the discussion, as well as one's own opinion; respecting the dignity of the opponent's personality during communication; compliance with the ethics of academic relationships.