APPROVED
Vice-Rector for Educational Work

_____ *Ph.D. in Chemistry Soika L.D.*
«___»_____2022

SYLLABUS
of the discipline
"MEDICAL INFORMATICS"
for training of specialists for the Bachelor degree of higher education
branch of knowledge: 22 "Health care"
Specialty: 223 "Nursing"

Discussed and approved at the meeting of Department of Fundamental Disciplines
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Protocol № ___ from «___»_____, 2022
Head of the Department_____ assoc. professor Sopneva N.B., Ph.D. in Pedagogy

	Syllabus of the discipline **"Medical informatics"**
Branch of knowledge	22 "Health care"
Specialty	223 "Nursing"
Specialization	Nursing
Academic degree	Bachelor
Discipline status	**Normative**
Group	**II MCi-21, II MCi-22**
The language of instruction	English
The department to which the discipline is assigned	Department of Fundamental Disciplines
Teacher of the discipline	Viktoriia Korotka, Ph.D. in Engineering Sciences.
Teacher's contact information	E-mail: v.korotka@lma.edu.ua The presence of the group in the TelegramViber, Google Classroom.
Consultations	According to the consultation schedule. Online consultations are possible through ZOOM, Meet, Moodle or similar resources. To agree on the time of online consultations students should write to the teacher's e-mail or call.
Discipline page	https://vl.lma.edu.ua/course/view.php?id=363
Information scope of academic discipline	The amount of credits – 3 credits The amount of total hours – 90 hours Modules –2 The year of training – 2nd Semester – 4th Lectures – 8 hours Laboratory works/ Practical classes – 24 hours Self-study – 58 hours.
Short annotation of the discipline	The normative academic discipline "Medical Informatics" in the specialty 223 Nursing is aimed at acquiring knowledge, skills and abilities for the effective use of modern programs of general and special purpose in the field of health care; acquainting students with the importance and possibilities of new information and communication technologies with the prospects of their development; development of the ability to independently master software tools for various purposes and update and integrate the acquired knowledge; explanation of the principles of formalization and algorithmization of medical tasks, principles of modeling in biology and medicine; formation of basic skills in working with PCs and searching for medical information using information technology; use of methods of medical-biological data processing. The subject of the discipline is: computer information technology, which involves their use in the field of health care.
Purpose and goals of	*The purpose* of studying the normative discipline "Medical Informatics" is to

the discipline	obtain knowledge of the discipline "Fundamentals of Medical Informatics" for the formation and development of future bachelors of nurses in order to apply in practice information computer technology, use modern general software and special purpose in the processing of medical and biological data. According to the requirements of the educational-professional program, students must **know:** – principles of structure and operation of the computer; – basic functional devices of the PC; – discrete and analog medical data; – basic statistical characteristics; – examples of elementary statistical method of data processing; – basics of working with Windows operating systems; – text processing systems; – data processing in spreadsheets; – MIS of treatment and prevention facilities implemented in Lviv; – modern computer methods of examination and treatment used in Ukraine; – general concepts of telemedicine; – structure of an electronic medical card; **be able to:** – perform basic skills to use the main medical Internet resources by e-mail or in the local network of the health care institution (CHP), to search for medical information; – apply statistical methods in processing the results of medical and biological research; – use a ready-made database (DB) created in the Excel spreadsheet: fill in the DB, filter, organize data, make simple queries; – perform skills in using statistical functions and criteria for the analysis of bio-medical data; – analyze the principles of construction and operation of decision support systems in medicine; – formalize the process of solving medical and biological problems; – use the automated system of professional examination and medical examination of the population, which is used in the CHP; – use anti-virus programs; – support patient record keeping in the e-Health system.
Program learning outcomes	- Systematize information in order to increase efficiency on the basis of a systematic approach to the subject activity; - To increase information literacy, to deepen knowledge of practical application of information and computer technologies in the professional activity of medical workers of laboratory diagnostics; - Be responsible for the work performed and observe medical secrecy.
Course police	**Adherence to the principles of academic integrity.** No form of violation of academic integrity is tolerated. Students' work is expected to be independent, with their own original research or reasoning. For people with special educational needs, this requirement is applied taking into account their individual needs and abilities. The use of external sources during written tests, modular tests, testing, preparation for the answer to the exam is prohibited. Detection of signs of academic dishonesty in the student's written work is the basis for its non-inclusion by the teacher. **Adherence to the principles and norms of ethics and professional deontology**. During classes, students of higher (professional higher) education act from the standpoint of academic integrity, professional ethics and deontology, follow the

rules of the Academy. During the fight against the COVID-19 epidemic, all the instructions of the anti-epidemiological regime are followed: they wear masks, adhere to social distance, and use antiseptics. Behave tolerantly, friendly and balanced in communication between themselves and teachers.

Attending classes.

Students must attend all lectures, practical classes of the course and inform the teacher about the impossibility of attending classes.

Deadline policy.

Students are required to adhere to the deadlines set by the course and set for all types of work.

The order of working off missed classes.

Missing classes without a good reason is done according to the schedule of rehearsals and consultations. Missing classes for a good reason can also be done at any convenient time for the teacher.

Rearrangement of the final grade in order to increase it is not allowed, except in situations provided by the regulations of the Academy, or non-appearance for the final control for a good reason.

Structure of the discipline

TOPICS OF LECTURES

No	Name of the topic	
1.	Introduction to medical informatics. Medical information. Modern PC software in the healthcare system	2
2.	Medical Information Systems (MIS)	2
3.	Medical computer communications (MCC)	2
4.	Medical specialized computer systems	2
	Total:	**8**

PRACTICAL CLASSES TOPICS

No	Name of the topic	
1.	Personal computer (PC) in the activities of of the bachelor of nursing	2
2.	Research of properties of graphic data and formats of their representation	2
3.	Creating medical documentation using a word processor	2
4.	Primary data processing using Microsoft Excel	2
5.	Medical information systems. Clinical decision support systems	2
6.	*Modular control 1*. **Fundamentals of information technology in the health care system. Processing and analysis of medical and biological data**	**2**
7.	Statistical processing of medical research results	2
8.	Computer systems for keeping medical records. Working with the database	2
9.	Medical resources of the Internet. Telemedicine	2
10.	Working with expert systems (EU)	2
11.	Fundamentals of formalization and algorithmization of patient care tasks. The concept of algorithm	2
12.	*Modular control 2*. **Health information systems. Strategies for obtaining medical knowledge**	**2**
	Total:	**24**

STUDENT'S SELF-STUDY TOPICS

No	Name of the topic	

1.	Assignment of the main components of the hardware of the information system and their main characteristics	3
2.	Work with system shells of operating systems and rules of work with file system	3
3.	Work with databases (DB) and database management systems (DBMS)	3
4.	Creating a complex medical document	3
5.	Rules for working with spreadsheets and the ability to process/present medical and biological data using word/spreadsheets, presentation tools	3
6.	Formalization and algorithmization of medical problems	3
7.	Applying statistical criteria for processing of medical and biological data and their interpretation	3
8.	PubMed Medical and Biological Publications Database	3
	Total Module 1	*24*
9.	Work in the local computer network of the hospital	2
10.	Functions of various elements of computer networks and the current state of telecommunications in the world	3
11.	The role of e-mail in the development of medical science	2
12.	Public health information networks	3
13.	Home telemedicine	3
14.	Search, sort and display of information	3
15.	The state of development and implementing of expert systems (ES) in medicine	3
16.	Main principles of evidence-based medicine and their usage	3
17.	Ethical and legal principles of information management in the health care system	2
18.	The latest information technology in medicine	3
19.	Traditional and electronic medical records (EMR) content structuring	4
20.	Medical computer imaging systems: computed tomography, electromagnetic field tomography, ultrasound	3
	Total Module 2	*34*
	Total:	**58**

List of recommended literature	*Basic:*
	1. Informatics and Nursing 6th Edition / Jeanne P. Sewell – Philadelphia, USA: «Lippincott Williams & Wilkins», 2018. – 472 p.
	2. Nursing Informatics for the Advanced Practice Nurse: 2nd Edition / Susan McBride, Mari Tietze. – NYC, USA: «Springer publishing company», 2018. – 798 p.
	3. Medical Informatics: Practical Guide for Healthcare and Information Technology Professionals Fourth Edition (Hoyt, Medical informatics) / Robert E. Hoyt, Ann Yoshihashi. – Morrisville, USA: «Lulu Press», 2010. – 392 p.
	4. Medical Informatics: textbook / I.Y. Bulakh, Y.Y. Liakh, V.P. Martseniuk, I.Y. Khaimzon. – 4th edition. – Kyiv: «AUS Medicine Publishing», 2018. – 368 p.
	5. Healthcare Systems and Health Informatics: Using Internet of Things / Pawan Singh Mehra, Lalit Mohan Goyal, Arvind Dagur, Anshu Kumar Dwivedi. – London, United Kingdom: «Taylor & Francis Ltd», 2022. – 249 p.
	6. Momotok L.O., Yushyna L.V., Rozhnova O.V. Osnovy medychnoi informatyky. – Kyiv: «Medytsyna», 2008. – 232 s.
	7. Bondarenko T.I. Osnovy medychnoi nformatyky. Praktykum: navchalnyi posibnyk (I—III r. a.) / T.I. Bondarenko. – VSV «Medytsyna», 2018. – 128 s.
	8. Bulakh I.Ie., Liakh Yu.Ie., Martseniuk V.P., Khaimzon I.I. Medychna informatyka. Pidruchnyk dlia studentiv II kursu medychnykh spetsialnostei. – Ternopil, TDMU, «Ukrmedknyha», 2008. – 316 s.

	Additional: 1. Khaimzon I.I., Hulchak Yu.P., Koval B.F., Didych V.M. Osnovy informatsii-nykh tekhnolohii v systemi okhorony zdorovia. Obrobka ta analiz medychnykh danykh. – Vinnytsia: «Meduniversytet», 2006. – 294 s. 2. Bulakh I.Ie. Medychna informatyka v moduliakh. – Kyiv: «Medytsyna», 2009. – 206s. 3. Medychna informatsiina systema «Doktor Eleks»: osnovy roboty: Navcha-lnyi posibnyk / za red. I. Berezovskoi, Yu. Tryusa. – Lviv: «Liha Pres», 2018. – 186 s. 4. Levchenko O. M. Osnovy Internetu. Kyiv: «Vydavnycha hrupa BHV», 2009. – 285 s. 5. Matviienko M.P., Rozen V. P., Zakladnyi O.M. Arkhitektura kompiutera. – Kyiv: «Vydavnytstvo Lira – K», 2013. – 264 s. 6. Rudenko V.D. Bazy danykh v informatsiinykh systemakh. Kyiv: «Feniks», 2010, –235 s.
Control methods	**Current control** is realized on the basis of the control of theoretical knowledge, skills and abilities. *Forms of current control.* 1. Oral survey (frontal, individual, combined survey); 2. Practical test of formed professional skills; 3. Test control (open and closed tests). **Individual work** of students is evaluated on practical classes and is part of the final grade of the student. **Final control** is carried out in the form of a written exam.
Teaching methods	✓ verbal methods (lectures, discussion); ✓ visual methods (illustration, demonstration, frontal experiment); ✓ practical methods (laboratory work and solving of problems with professional ✓ content); ✓ individual work of students with comprehension and learning of material; ✓ use of control and training computer software in the discipline; ✓ use of project method for interdisciplinary integration.
Necessary equipment	**In normal training mode.** Studying the course involves joining each student to the learning environment MOODLE, or Google Classroom. **In the distance learning mode during quarantine,** the study of the course additionally involves joining each student to the programs ZOOM, or Meet (for classes in video conferencing). In this case, the student must take care of the quality of Internet access.
Evaluation criteria	**Assessment scale: national and ECTS** | On a 100-point scale	On a national scale	On the ECTS scale
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90-100	*Excellent*	A
80-89	*Good*	B
70-79	*Good*	C
60-69	*Satisfactory*	D
51-59	*Satisfactory*	E
35-50	*Unsatisfactory with the possibility of re-passing*	FX
0-34	*Unsatisfactory with compulsory re-course of the discipline for the specified semester*	F	
List of questions for final module control	1. Medical informatics as a science. Tasks and structure of the discipline. 2. Basic concepts of cybernetics and medical cybernetics, tasks and directions of medical cybernetics development.

	3. Information and information processes.
	4. Medical information, its properties and classification.
	5. Knowledge, data. Medical data and forms of their presentation.
	6. Informativity and validity of medical data.
	7. Medical data standards.
	8. Computer hardware.
	9. Personal computer (PC) software.
	10. System programs. Applications.
	11. Windows operating systems (OS).
	12. Integrated Microsoft Office application package.
	13. Methods of medical information processing.
	14. Medical Statistics Services.
	15. Statistical analysis as one of the elements of evidence-based medicine. Basic concepts of evidence-based medicine.
	16. Elementary statistical characteristics.
	17. Processing of clinical and experimental data in medicine.
	18. Fundamentals of formalization and algorithmization of medical problems.
	19. Medical computer communications.
	20. Basic concepts of computer networks.
	21. Local and global networks. World Wide Web. Email.
	22. Search for information on the Internet. Medical resources online.
	23. Telecommunication technologies in medicine. Telemedicine.
	24. Possibilities of using telecommunication technologies in medicine in Ukraine.
	25. Medical Information Systems (MIS). Functions of a nurse in the MIS.
	26. The structure of MIS and the classification of technologies used in them.
	27. Electronic health care system e-Health.
	28. Structure of the electronic medical record.
	29. Expert systems (ES).
	30. Helsi Medical Information System, its connection with the e-Health system.
	31. Telemedicine, its scope, benefits for patients and health professionals.
Survey	A questionnaire to assess the quality of the course will be provided upon completion of the course