Short Name of the University/Country code Date (Month / Year)	DSEA/ P11 Jan 2020
TITLE OF THE MODULE	**Code**
Algorithmization and programming, medical data processing	**P11**

Teacher(s)	Department
Coordinating: Svitlana Malyhina, PhD Others:	Department of Computer and Information Technology (CIT)

Study cycle (BA/MA)	Level of the module (Semester number)	Type of the module (compulsary/elective)
Bachelor	1- th semester for Bachelor	compulsory

Form of delivery	Duration	Langage(s)
Lectures, laboratory work	15 weeks	Ukrainian / English

Prerequisites	
Prerequisites: school course "Mathematics", "Computer Science".	**Co-requisites (if necessary):** Visual Studio

ECTS (Credits of the module	Total student workload hours	Contact hours	Individual work hours
4,0	120	75	45

Aim of the module (course unit): competences foreseen by the study program

The student must be able to:

- to develop algorithms for solving functional problems of the applied sphere of use, to know the technical means of program implementation, maintenance of system and application software of the PC;

- to the intellectual multidimensional analysis of medical data and their operative analytical processing with visualization of results of the analysis by means of modern information technologies.

Learning outcomes of module (course unit)	Teaching/learning methods	Assessment methods
knowledge: - acquaintance with the principles, methods of structural programming, modern procedural-oriented languages, basic data structures and the ability to use them during the software implementation of algorithms for professional tasks; - have a thorough training in the field of programming, have algorithmic thinking, methods of software engineering for software implementation, taking into account the requirements for its quality, reliability, performance characteristics; - Professionally own a computer and information technology.	Lectures	Knowledge test
skills: - programmatically implement algorithms for solving problems, develop systems and application software for information systems and technologies; - use programming languages, information resource description languages, specification languages, as well as tools for designing and creating information technology systems, products and services..	Lectures, laboratory work, consultation	Attending lectures, performing individual work and presentations
Competencies: - readiness to draw up, present, report and defend the results of the work performed; - the ability to understand the main problems in their subject area, to choose methods and means of solving them	Lectures, labs, consultations	Reports and presentations

Themes	Contact work hours							Time and tasks for individual work	
	Lectures	Consultations	Seminars	Practical work	Laboratory work	Placements	Total contact work	Individual work	Tasks
1 Fundamentals of algorithmization of medical problems. Algorithms and their properties. Ways to present algorithms. Types of algorithms. Drawing up a block diagram of a simple and branched algorithm. Drawing up a block diagram of an algorithm with an	3				2		**5**	**5**	Lab work protection
2 Formal logic in solving problems of diagnosis, treatment and prevention of diseases. Logical operations and truth tables. A logical approach to the diagnosis of diseases. Conditional operators	3				4		**7**	**5**	Lab work protection
3 Methods of decision support. Strategies for obtaining medical knowledge. Organization of cycles. Switch operator, break operator, goto operator. Organization of multi-branching in the program.	4				5		**9**	**5**	Lab work protection
4. Clinical decision support systems. One-dimensional numerical arrays. Selective processing of elements of an array of medical data. Finding the minimum and maximum elements of the array. Sorting one-dimensional arrays of medical data	5				8		**13**	**5**	Lab work protection
5 The concept of a multidimensional array of medical data. Nested loops. Ordering in one-dimensional arrays. Initialization of arrays. Switches. Alternative choice Processing of elements of matrices.	5				8		**13**	**7**	Lab work protection
6. Modeling of clinical decision support systems. Plotting a function graph. Working with files.	5				8		**13**	**8**	Protection laboratory, independent work
7. Dynamic data structures. Dynamic memory, its allocation and release. The concept of a pointer and operations with pointers. Functions. Built-in (inline) functions. Calculating the value of functions. Recursion. Overloading functions. Generalized functions (function template)	5				10		**15**	**10**	Protection laboratory, independent work
Total	**30**				**45**		**75**	**45**	

Assessment strategy	Weight in %	Deadlines	Assessment criteria
Computer testing, written answers to theory questions	40%	during the semester	Good response to the questions
Lab work protection	60%	during the semester	The work is done completely without mistakes or minor errors

Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or internet link
Compulsory literature				
Thomas Cormen, Charles Leiserson, Ronald Rivest, Clifford Stein	2009	Introduction to Algorithms Third Edition		MIT Press
Stanley B. Lippman, Josée Lajoie, Barbara E. Moo	2013	C++ Primer: Fifth Edition		Addison Wesley
Petzold Ch	2004	Programming in key C		M.: Russian edition
Additional literature				
Shpak Z.Ya.	2006	C Programming: A Textbook		Lviv: Oriana - Nova
SL Zagrebelny, SV Malihina, MV Bruce, SS Gurkovskaya	2019	C ++ programming in Visual Studio 2010: Tutorial		Kramatorsk: DSEA