DESCRIPTION/Syllabi of Curricula/Module

Short Name of the University/Country code Date (Month / Year)	DSEA/ P11 Jan 2021
TITLE OF THE MODULE	**Code**
Methods of mathematical processing of medical biological data	

Teacher(s)	Department
Coordinating: Iryna Getman, 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	4th semester (second year) for Bachelor	**elective**

Form of delivery (theory/lab/exercises)	Duration (weeks/months)	Language(s)
lectures, lab	18 weeks 4th semester	Ukrainian / English

Prerequisites	
Prerequisites: the study of the disciplines "Probability theory, probability processes and mathematical statistics", "Digital Processing of Biomedical Signals"	**Co-requisites (if necessary):** Statistica, MS Excel

ECTS (Credits of the module)	Total student workload hours	Contact hours	Individual work hours
5	150	72	78

Aim of the module (course unit): competencies foreseen by the study programme		
The student must be able to: - complex analysis of data from biomedical research using modern regression analysis tools; - constructing a qualitative prediction model of survival analysis; - Preliminary data analysis based on Kaplan-Meier life tables and estimates; - checks built analytical models on the adequacy; - ability to interpret simulation results including ROC analysis.		
Learning outcomes of module (course unit)	**Teaching/learning methods (theory, lab, exercises)**	**Assessment methods (written exam, oral exam, reports)**
Knowledge: - methods of constructing linear regression, prerequisites for obtaining reliable estimates of linear regression by least squares; - regressions with binary and ordered dependent variables; - regressive survival models (Cox, lognormal, exponential, normal); - methods of constructing survival tables, finding Kaplan Meier estimates, criteria for division of survival into subgroups.	Work with the lecture notes as well as on the available fundamental subject literature	Knowledge test
Skills: - to build adequate regression linear equations, to monitor them and give a qualitative interpretation of the simulation results; - to build adequate binary regression models and to interpret simulation results; - to perform ROC analysis, to calculate specificity and sensitivity; - to construct different regression models of survival, to check their adequacy of the real model of a possible process; - to apply modern information tools for the analysis of medical and biological data	Lectures, lab, consultation	Attendance on lectures, individual work and presentation
Competences: - readiness to execute, perform, report and reasonably protect the results of	Lectures, practiacl work, consultation	Individual work and presentation

the work done - the ability to understand the main problems in their subject area, to choose methods and means of solving them		

Themes	Contact work hours							Time and tasks for individual work	
	Lectures	Consultations	Seminars	Practiacl work	Laboratory work	Placements	**Total contact work**	**Individual work**	**Tasks**
1 The construction of one-factor linear regression.	6					6	12	9	Reply of laboratory work
2 The construction of regression models with binary dependence of variables.	4					4	8	10	Reply of laboratory work
3 The construction of regression models with ordered alternatives in the dependent variable.	4					4	8	10	Reply of laboratory work
4 The construction of survival tables. Finding Kaplan-Meier estimates, constructing survival curves.	4					4	8	10	Reply of laboratory work
5 The construction of regression models of survival analysis.	4					4	8	10	Reply of laboratory work
6 The construction of impact measurement models. DiD method.	4					4	8	10	Reply of laboratory work
7 The assessment of sensitivity and specificity of regression models of survival analysis.	4					4	8	10	Reply of laboratory work
8 The evaluation of sensitivity and specificity of regression models of survival analysis. Conduct ROC analysis for models with discrete dependent variable. Construction of clipping curves.	6				6		12	9	Reply of laboratory work
Total	36				36		72	78	

Assessment strategy	Weight in %	Deadlines	Assessment criteria

Computer testing, theoretical written answers to questions	40%	during the semester	пood response to the questions
Reply of laboratory work	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				
A. Glanz	1998	Primer of IOSTATISTICS		Institute for Health Policy Studies University of California, San Francisco
Popechetelev E.P.	1997	Methods of biomedical research. System Aspects: Tutorial.		Zhytomyr: ZhITI
Additional literature				
Rebrova O.Yu.	2002	Statistical analysis of medical data. Application of the STATISTICA application package		Media sphere
Gojko O.V.	2004	Practical use of the STATISTICA package for the analysis of biomedical data: a tutorial for university students		Kiev, Tutorial for university students (Recommended by MES of Ukraine,ISBN 966-8326-31-8)