

DESCRIPTION OF THE COURSE OF STUDY

Course code	0912-7LEK-B2.7-BEI	
Name of the course in	Polish	Biostatystyka z elementami informatyki
	English	Biostatistic with elements of informatics

1. LOCATION OF THE COURSE OF STUDY WITHIN THE SYSTEM OF STUDIES

1.1. Field of study	Medicine
1.2. Mode of study	Full-time
1.3. Level of study	Uniform Master's study
1.4. Profile of study*	General academic
1.5. Specialization*	lack
1.6. Unit running the course of study	<i>The Faculty of Mathematics and Natural Sciences</i>
1.7. Person/s preparing the course description	<i>dr Magdalena Chrapek</i>
1.8. Person responsible for the course of study	Dr Artur Michalik
1.9. Contact	a.kubala-kukus@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

2.1. Affiliation with the module	Scientific basis for medicine
2.2. Language of instruction	English
2.3. Semesters in which the course of study is offered	1 st and 2 nd semester
2.4. Prerequisites*	—————

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	semester 1: lectures (15 h), classes (25 h) semester 2: lectures(15 h), classes (15 h)	
3.2. Place of classes	Courses in the teaching rooms of UJK faculty of Mathematics and Natural Science	
3.3. Form of assessment	Exam (lectures), credit with grade (classes)	
3.4. Teaching methods	lectures– informative lectures classes – problem methods, laboratory method (practical classes using Statistica and/or R package as well as MS Excel).	
3.5. Bibliography	Required reading	1] Aviva Petrie, Caroline Sabin “Medical Statistics at a Glance”, Blackwell Science, 2009 [2] Betty R. Kirkwood, Jonathan A.C. Sterne “Essential Medical Statistics”, Blackwell Science, 2003 – or newer
	Further reading	[3] Introduction to Biostatistical Applications in Health Research with Microsoft Office Excel, Robert P. Hirsch, ISBN: 978-1-119-08965-0 [4] 9781119089865 Workbook to Accompany Introduction to Biostatistical Applications in Health Research with Microsoft Office Excel, Wiley, 2016, Robert P. Hirsch

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED TEACHING OUTCOMES

4.1. Course objectives (including form of classes)

Knowledge (lectures and classes)

C1 – To give students an elementary knowledge of databases in medicine.

C2 – Presentation of planning principles and research in medicine as well as basic methods of description and statistical inference in medical research.

Abilities (lectures and classes)

C3 – Developing skills to find information in medical databases.

C4 – Developing skills to use selected statistical methods with the usage of program supporting statistical calculations.

Social competence (classes)

C5 – Developing skills to cooperate in a group on the project.

4.2. Detailed syllabus (including form of classes)

Lectures: Introduction to biostatistics. Population and sample. Statistical variables. Types of statistical data. The distribution of statistical data. Descriptive statistics and data visualization. Elementary concepts of probability. Types of statistical inference. Point and interval estimation of population parameters. Statistical hypotheses. Process of statistical hypothesis testing. Type I and type II errors. The statistical power of a test. Hypothesis testing: one- and two-sample inference. Nonparametric methods. Goodnes-of-fit tests. Test of independence. Regression and correlation methods. Analysis of variance. Study designs in medical research. Experimental and observational studies. Randomized controlled trials. Case reports. Cohort studies. Case-control studies. Cross-sectional studies. The hierarchy of research designs. Statistical methods in population studies. Statistical evaluation of diagnostic tests. Receiver operating characteristic curve. Logistic regression. Survival analysis. Meta-analyses.

Classes: Using Excel for statistical data analysis. Statistics graphs with Excel. Pivot tables in Excel. Data acquisition in Excel. Creating a simple medical database in Excel. Excel data management (merging, sorting, filtering of data). Searching for information in medical bibliographic databases. Introduction to Statistica. Elementary probability concepts. Exploring data by descriptive statistics and graphics. Assessing normality of data by tests and graphical methods. Point and interval estimation – computing and interpretation. Hypothesis testing: one- and two-sample inference. Nonparametric methods. Goodnes-of-fit tests. Test of independence. Regression and correlation methods. Analysis of variance. Statistical methods in population studies. Statistical evaluation of diagnostic tests. Receiver operating characteristic curve – obtaining and interpretation. Application of logistic regression model. Estimation and interpretation of odds ratio. Creation of survival curve. Comparing survivals in groups. Survival analysis in Cox proportional hazard model. Analytical and graphical presentation of meta-analysis results.

Note: for implementation of the above content to support calculation and visualization of data, the program Statistica is used (licensed commercial program) and/or free software R program (released under the GPL), as well as MS Excel program.

4.3 Education outcomes in the discipline

Code	A student, who passed the course	Relation to teaching outcomes
within the scope of KNOWLEDGE:		
W01	knows the basic computer and biostatistical methods used in medicine, including medical databases, spreadsheets and basics of computer graphics;	B.W31.
W02	knows the basic methods of statistical analysis used in population and diagnostic studies;	B.W32.
W03	knows the principles of conducting scientific research, observational and experimental and in vitro studies aimed at the development of medicine.	B. W34
within the scope of ABILITIES:		
U01	uses databases, including online ones, and searches for necessary information using available tools;	B.U11.
U02	selects appropriate statistical tests, performs basic statistical analyzes and uses suitable methods of presentation of results; interprets the results of the meta-analysis and carries out analysis of the likelihood of survival	B.U12.
U03	explains the differences between prospective and retrospective studies, randomized and case/control studies and experimental research, and ranks them according to the reliability and quality of scientific evidence;	B U13
U04	plans and performs basic scientific research, interprets the results and draws conclusions.	B.U14

4.4. Methods of assessment of the intended teaching outcomes																						
Teaching outcomes (code)		Method of assessment (+/-)																				
		Exam oral/written*			Test*			Project*			Effort in class*			Self-study*			Group work*			Participation in Lectures*		
		Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			Form of classes					
		L	C	...	L	C	...	L	C	...	L	C	...	L	C	...	L	C	...	L	C	...
W01		+																				
W02		+																				
W03		+																				
U01		+																				
U02		+																				
U03		+																				
U04		+																				

*delete as appropriate

4.5. Criteria of assessment of the intended teaching outcomes		
Form of classes	Grade	Criterion of assessment
lecture (L)	3	at least 61% and not more than 68% of the total number of available points
	3,5	more than 69% and not more than 76% of the total number of available points
	4	more than 77% and not more than 84% of the total number of available points
	4,5	more than 85% and not more than 92% of the total number of available points
	5	more than 93% of the total number of available points
classes (C)*	3	at least 61% and not more than 68% of the total number of available points
	3,5	more than 69% and not more than 76% of the total number of available points
	4	more than 77% and not more than 84% of the total number of available points
	4,5	more than 85% and not more than 92% of the total number of available points
	5	more than 93% of the total number of available points

- Thresholds are valid from 2018/ 2019 academic year

5. BALANCE OF ECTS CREDITS – STUDENT'S WORK INPUT

Category	Student's workload
	Full-time studies
NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/	70
Participation in lectures*	30
Participation in classes, seminars, laboratories*	40
Preparation in the exam/ final test*	
Others*	
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	45
Preparation for the lecture*	10
Preparation for the classes, seminars, laboratories*	15
Preparation for the exam/test*	20
Gathering materials for the project/Internet query*	
Preparation of multimedia presentation	
Others*	
TOTAL NUMBER OF HOURS	115
ECTS credits for the course of study	5

Accepted for execution (date and signatures of the teachers running the course in the given academic year)

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