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BIOSTATISTICS

(7 pages)



Course: Biostatistics

Course Coordinator: Gordana Žauhar, PhD, Associate Professor

Department: Medical Physics and Biophysics

Study program: Integrated Undergraduate and Graduate University Study of Medicine in English

Study year: second

Academic year: 2020/21

SYLLABUS

Course description (a brief description of the course, general instructions, where and in what form the lessons are organized, necessary equipment, instructions for attendance and preparation for classes, student obligations, etc.):

Biostatistics is a compulsory course on the second year of the Integrated Undergraduate and Graduate University Study of Medicine, with 15 hours of lectures and 15 hours of exercises. It is held during IV. Semester. Lectures are held in lecture hall number 9, and practical in the computer classroom at the Faculty of Medicine. The estimated duration of course is 7 weeks.

COURSE STRUCTURE

Formal lectures: 15 hours

Practicals: 15 hours

Total hours: 30

The objective of the course is to teach students about statistical reasoning, when and how to apply and how to interpret the basic statistical tests. In this way students will develop the ability of quantitative approach to data gathering, analysis and interpretation within the fields of biological sciences and humanities, which is the necessary requirement for their professional development, ability to critically follow the scientific and technical literature and participate in its creation.

Assigned reading:

Triola M.M, Triola M.F, Biostatistics for the Biological and Health Sciences, Pearson, 2018.

Optional/additional reading:

Dawson B, Trapp R.G, Basic & Clinical Biostatistics, McGraw-Hill, 2004.

COURSE TEACHING PLAN:

The list of lectures (with topics and descriptions):

L1 Introduction to Statistics. Statistics in Medicine. Scales of Measurement.

L2 Presenting of Data in Tables and Graphs. Summarizing and Displaying Numerical Data in Graphs. Empirical Distribution and Data Grouping Within Intervals of a Continuous Variable and Classes.

L3 Measures of central tendency - arithmetical mean, mode, median, geometrical mean and harmonic mean.

L4 Measures of Variation - range, mean deviation, variance, and standard deviation. Variability

coefficient. Percentiles, deciles and quartiles.

L5 Normal Probability Distributions. The position of a result within the group (z-Scores).

L6 The population and the sample. Inferences about the population based on sample-results. Confidence limit. Sample comparison tests. Statistical significance of differences between the means of mutually independent samples.

L7 Correlation between variables.

L8 Regression analysis.

L9 Statistical significance of differences between the means of mutually dependent (correlated) samples.

L10 Multivariate testing. Analysis of Variance (ANOVA).

L11 Analysis and Comparison of Qualitative Data. Proportions. Inferences about Two Proportions: Independent Samples.

L12 Chi-Square Test

L13 Mc-Nemar test (Chi-Square Test for Dependent Samples)

L14 Written Knowledge Assessment

L15 Final Lecture and Preparation for the Exam

The list of practical with descriptions:

P1-2 Preparing and Writing Data Into The Data Processing Program.

P3 Visualising of Data. Histograms. Pie Charts. Time Series Graph.

P4 Descriptive Statistics. Calculation of Basic Measures of Centre and Variation of the Numerical Data. Graphic Representation of Empirical Distribution

P5 Testing of Data Distribution for Normality with Kolmogorov-Smirnov test

P6 z-Scores (determination of the position for each results in the normal distribution with z-scores)

P7 Comparing the means of two independent samples with Student t-test

P8 Correlation and regression

P9 Comparing the means of two dependent samples

P10 Analysis of Variance (ANOVA)

P11 Comparison of Qualitative Data

V12 The Chi-squared Test

P13 Non-Parametric Methods

P14 Repeating and Testing of Knowledge

P15 Repeating and Testing of Knowledge

Students' obligations:

Students' obligations are course attendance and active participation in all practicals.

Assessment (exams, description of written / oral / practical exam, the scoring criteria):

Evaluation of students' work:

Students can obtain a total of 100 credits (a maximum of 70 credits during the course and a maximum of 30 credits on the final exam). Students are allowed to take the final exam if they acquire a minimum of 35 credits during the trimester.

Evaluation of Students' Work During the Course (Maximum 70 credits)

- a) Active participation during practicals (3 credits)
- b) Midterm exam (32 credits)
- c) Colloquium (35 credits)

The attendance at lectures and practicals is mandatory. If necessary, a student can be absent from 30% of the classes.

a) Active participation during seminars:

During the practicals student participation and dedication will be monitored. At the end of each practical, students are also given homework assignments. A maximum of 3 points is awarded through active participation. Activities scoring is done in the following way:

number of correctly assigned homework assignments	credits
0	0
1	1
2	2
3	3

b) Midterm Exam (32 credits)

Students have to pass the written midterm exam (in form of a test consisting of 3 problem tasks). In order to pass the midterm exam students have to score at least 50% (16 credits).

c) Colloquium from practical (35 credits)

Practicals end up with a colloquium. The colloquium examines the resolution of statistical tasks in the computer program "Statistica". It is possible to collect up to 35 credits.

Final exam:

Students have to pass the written exam (in form of a test consisting of 29 questions, each containing 5 statements). In order to pass the written part of the exam students have to score at least 50% (15/29 correct answers).

Assessment of the written part of the final exam:

Number of correct answers	Credits
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	30

The ECTS grading system is defined by the following criteria:

- A (5) – 90-100 credits
- B (4) – 75-89,9 credits
- C (3) – 60-74,9 credits
- D (2) – 50-59,9 credits

Other important information regarding to the course:

Retaking the course:

A student who acquires less than 35 credits during the course has failed the course and is graded with **F** and must retake the course **BIOSATISTICS**.

COURSE SCHEDULE (for academic year 2020/2021)

Date	Lectures (time and place)	Seminars (time and place)	Instructor
19/4/2021 Monday	L1-3 (12,00-15,00) LH9		Gordana Žauhar, PhD, Associate Professor
20/4/2021 Tuesday		P1-2 g2 (9.00-11.00) LH9	Diana Mance, PhD, Assistant Professor
22/4/2021 Thursday		P1-2 g3 (9.00-11.00) LH9	Doris Šegota, Assistant
		P1-2 g1 (11.00-13.00) LH9	Doris Šegota, Assistant
		P1-2 g4 (14.00-16.00) LH9	Diana Mance, PhD, Assistant Professor
26/4/2021 Monday	L4-5 (13,00-15,00) LH9		Gordana Žauhar, PhD, Associate Professor
27/4/2021 Tuesday		P3-4 g2 (9.00-11.00) LH9	Diana Mance, PhD, Assistant Professor
29/4/2021 Thursday		P3-4 g3 (9.00-11.00) LH9	Doris Šegota, Assistant
		P3-4 g1 (11.00-13.00) LH9	Doris Šegota, Assistant
		P3-4 g4 (14.00-16.00) LH9	Diana Mance, PhD, Assistant Professor
03/5/2021 Monday	L6-7 (13,00-15,00) LH9		Gordana Žauhar, PhD, Associate Professor
04/5/2021 Tuesday		P5-6 g2 (9.00-11.00) LH9	Diana Mance, PhD, Assistant Professor
06/5/2021 Thursday		P5-6 g3 (9.00-11.00) LH9	Doris Šegota, Assistant
		P5-6 g1 (11.00-13.00) LH9	Doris Šegota, Assistant
		P5-6 g4 (14.00-16.00) LH9	Diana Mance, PhD, Assistant Professor
10/5/2021 Monday	L8-9 (13,00-15,00) LH9		Marta Žuvić, PhD, Associate Professor
11/5/2021 Tuesday		P7-8 g2 (9.00-11.00) LH9	Diana Mance, PhD, Assistant Professor
13/5/2021 Thursday		P7-8 g3 (9.00-11.00) LH9	Doris Šegota, Assistant
		P7-8 g1 (11.00-13.00) LH9	Doris Šegota, Assistant
		P7-8 g4 (14.00-16.00) LH9	Diana Mance, PhD, Assistant Professor
17/5/2021 Monday	L10-11 (13,00-15,00) LH9		Marta Žuvić, PhD, Associate Professor
18/5/2021 Tuesday		P9-10 g2 (9.00-11.00) LH9	Diana Mance, PhD, Assistant Professor
20/5/2021 Thursday		P9-10 g3 (9.00-11.00) LH9	Doris Šegota, Assistant
		P9-10 g1 (11.00-13.00)	Doris Šegota, Assistant

		LH9	
		P9-10 g4 (14.00-16.00) LH9	Diana Mance, PhD, Assistant Professor
24/5/2021 Monday	L12-13 (13,00-15,00) LH9		Marta Žuvić, PhD, Associate Professor
25/5/2021 Tuesday		P11-12 g2 (9.00-11.00) LH9	Diana Mance, PhD, Assistant Professor
27/5/2021 Thursday		P11-12 g3 (9.00-11.00) LH9	Doris Šegota, Assistant
		P11-12 g1 (11.00-13.00) LH9	Doris Šegota, Assistant
		P11-12 g4 (14.00-16.00) LH9	Diana Mance, PhD, Assistant Professor
31/05/2021 Monday	L14-15 (13,00-15,00) LH9		Gordana Žauhar, PhD, Associate Professor
01/06/2021 Tuesday		P13-15 g2 (8.00-11.00) LH9	Diana Mance, PhD, Assistant Professor
02/06/2021		P13-15 g3 (8.00-11.00) LH9	Doris Šegota, Assistant
		P13-15 g1 (13.00-16.00) LH9	Doris Šegota, Assistant
		P13-14 g4 (14.00-16.00) LH9	Diana Mance, PhD, Assistant Professor

List of lectures and practicals:

	LECTURES (Topics)	Teaching hours	Location/Lecture room
L1	Introduction to Statistics. Statistics in Medicine. Scales of Measurement.	1	Medical faculty Lecture hall 9 (LH9)
L2	Presenting of Data in Tables and Graphs. Summarizing and Displaying Numerical Data in Graphs.	1	LH 9
L3	Measures of Central Tendency	1	LH 9
L4	Measures of Variation - range, mean deviation, variance, and standard deviation. Variability coefficient.	1	LH 9
L5	Normal Probability Distributions. The position of a result within the group (z-Scores).	2	LH 9
L6	The population and the sample. Statistical significance of differences between the means of mutually independent samples.	1	LH 9
L7	Correlation between variables.	1	LH 9
L8	Regression Analysis.	1	LH 9
L9	Statistical significance of differences between the means of mutually dependent (correlated) samples.	1	LH 9
L10	Multivariate testing. Analysis of Variance (ANOVA).	1	LH 9
L11	Comparison of Qualitative Data	1	LH 9
L12	Chi-Square Test	1	LH 9
L13	Mc-Nemar test (Chi-Square Test for Dependent Samples)	1	LH 3 and LH 9
L14	Written Knowledge Assessment	1	LH 3 and LH9
L15	Final Lecture and Preparation for the Exam	1	LH 9
	TOTAL TEACHING HOURS	15	

	PRACTICALS (Topics)	Teaching hours	Location/Lecture room
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P1-2	Preparing and Writing Data Into The Data Processing Program.	2	LH9
P3	Visualising of Data. Histograms. Pie Charts. Time Series Graph.	1	LH9
P4	Descriptive Statistics. Calculation of Basic Measures of Centre and Variation of the Numerical Data.	1	LH9
P5	Testing of Data Distribution for Normality	1	LH9
P6	z-Scores	1	LH9
P7	Comparing the means of two independent samples with Student t-test	1	LH9
P8	Correlation and regression	1	LH9
P9	Comparing the means of two dependent samples	1	LH9
P10	Analysis of Variance (ANOVA)	1	LH9
P11	Comparison of Qualitative Data	1	LH9
P12	The Chi-squared Test	1	LH9
P13	Non-Parametric Tests	1	LH9
P14	Repeating and Testing of Knowledge	1	LH9
P15	Repeating and Testing of Knowledge	1	LH9
TOTAL TEACHING HOURS		15	

FINAL EXAM DATES	
1.	17/06/2021
2.	02/07/2021
3.	13/09/2021