[Medicinski fakultet u Rijeci]

Curriculum
2023/2024

[Za kolegij]

Biostatistics

Study program:	**Medical Studies in English (R)** [Sveučilišni integrirani prijediplomski i diplomski studij]
Department:	**[Katedra za medicinsku fiziku i biofiziku]**
Course coordinator:	**prof. dr. sc. Žauhar Gordana, prof. fizike i kemije**
Year of study:	**2**
ECTS:	**1.5**
Incentive ECTS:	**0 (0.00%)**
Foreign language:	**Possibility of teaching in a foreign language**

Course information:

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.

List of assigned reading:

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

List of optional reading:

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

Curriculum:

[Vježbe] list (with titles and explanation):

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

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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 result in the normal distribution with z-scores)

.

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

,

P8 Comparing the means of two dependent samples

,

P9 Analisis of Variance (ANOVA)

,

P10 Correlation and regression

,

P11 Comparison of Qualitative Data

,

P12 The Chi-squared Test

,

P13 Non-Parametric Methods

,

P14 Repeating and Testing of Knowledge

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P15 Repeating and Testing of Knowledge

,

[Predavanja] list (with titles and explanation):

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 Population and the sample. Inferences about the population based on sample-results. Confidence limits.

,

L7 Statistical significance of differences between the means of mutually independent samples.

,

L8 Correlation between variables.

,

L9 Regression analysis.

,

L10 Statistical significance of differences between the means of mutually dependent (correlated) samples.

,

L11 Analysis of Variance (ANOVA).

,

L12 Analysis and Comparison of Qualitative Data. Proportions. Inferences about Two Proportions: Independent Samples.

,

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

,

L14 Written Knowledge Assessment

,

L15 Final Lecture and Preparation for the Exam

,

Student obligations:

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

Exam (exam taking, description of the written/oral/practical part of the exam, point distribution, grading 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 notes (related to the course) important for students:

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 HOURS 2023/2024

Biostatistics

[Predavanja] (Place and time or group)	**[Vježbe]** (Place and time or group)
22.04.2024	

L1 Introduction to Statistics. Statistics in Medicine. Scales of Measurement.:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 10:15) [149]
  ○ BS
 	
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.:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 10:15) [149]
  ○ BS
 	
L3 Measures of central tendency - arithmetical mean, mode, median, geometrical mean and harmonic mean.:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 10:15) [149]
  ○ BS	

prof. dr. sc. Žauhar Gordana, prof. fizike i kemije [149]	
23.04.2024	
	P1-2 Preparing and Writing Data In The Data Processing Program.: • [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199] ○ BS P B
naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
25.04.2024	

	P1-2 Preparing and Writing Data In The Data Processing Program.:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ○ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 13:00) [199]
	  ○ BS P A

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
29.04.2024	

	P3 Visualising of Data. Histograms. Pie Charts. Time Series Graph.:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [199]
	  ○ BS P B
	
	P4 Descriptive Statistics. Calculation of Basic Measures of Centre and Variation of the Numerical Data. Graphic Representation of Empirical Distribution:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [199]
	  ○ BS P B

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
30.04.2024	

L4 Measures of Variation - range, mean deviation, variance, and standard deviation. Variability coefficient. Percentiles, deciles and quartiles.:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [149]
  ◦ BS
 	
L5 Normal Probability Distributions. The position of a result within the group (z-Scores).:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [149]
  ◦ BS	

prof. dr. sc. Žauhar Gordana, prof. fizike i kemije [149]	
02.05.2024	

	P3 Visualising of Data. Histograms. Pie Charts. Time Series Graph.:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 13:00) [199]
	  ◦ BS P A
	
	P4 Descriptive Statistics. Calculation of Basic Measures of Centre and Variation of the Numerical Data. Graphic Representation of Empirical Distribution:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 13:00) [199]
	  ◦ BS P A

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
06.05.2024	

L6 Population and the sample. Inferences about the population based on sample-results. Confidence limits.:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [149]
  ◦ BS
 	
L7 Statistical significance of differences between the means of mutually independent samples.:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [149]
  ◦ BS	

prof. dr. sc. Žauhar Gordana, prof. fizike i kemije [149]	
07.05.2024	

	P5 Testing of Data Distribution for Normality with Kolmogorov-Smirnov test:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P B
	
	P6 z-Scores (determination of the position for each result in the normal distribution with z-scores):
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P B

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
09.05.2024	

	P5 Testing of Data Distribution for Normality with Kolmogorov-Smirnov test:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 13:00) [199]
	  ◦ BS P A
	
	P6 z-Scores (determination of the position for each result in the normal distribution with z-scores):
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 13:00) [199]
	  ◦ BS P A

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
13.05.2024	

L8 Correlation between variables.:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [2300]
  ◦ BS
 	
L9 Regression analysis.:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [2300]
  ◦ BS	

prof. dr. sc. Žuvić Marta, prof. matematike i fizike [2300]	
14.05.2024	

	P7 Comparing the means of two independent samples with Student t-test:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P B
	
	P8 Comparing the means of two dependent samples:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P B

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
16.05.2024	

	P7 Comparing the means of two independent samples with Student t-test:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 13:00) [199]
	  ◦ BS P A
	
	P8 Comparing the means of two dependent samples:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 13:00) [199]
	  ◦ BS P A

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
20.05.2024	

L10 Statistical significance of differences between the means of mutually dependent (correlated) samples.:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [2300]
  ◦ BS
 	
L11 Analysis of Variance (ANOVA).:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [2300]
  ◦ BS	

prof. dr. sc. Žuvić Marta, prof. matematike i fizike [2300]	
21.05.2024	

	P9 Analisis of Variance (ANOVA):
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P B
	
	P10 Correlation and regression:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P B

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
23.05.2024	

	P9 Analisis of Variance (ANOVA):
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 13:00) [199]
	  ◦ BS P A
	
	P10 Correlation and regression:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 13:00) [199]
	  ◦ BS P A

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	

27.05.2024	

L12 Analysis and Comparison of Qualitative Data. Proportions. Inferences about Two Proportions: Independent Samples.:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [2300]
  ◦ BS
 	
L13 Chi-Square Test. Mc-Nemar test (Chi-Square Test for Dependent Samples).:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [2300]
  ◦ BS	

prof. dr. sc. Žuvić Marta, prof. matematike i fizike [2300]	
28.05.2024	

	P11 Comparison of Qualitative Data:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P B
	
	P12 The Chi-squared Test:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:00 - 11:00) [199]
	  ◦ BS P B

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
03.06.2024	

L14 Written Knowledge Assessment:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [149]
  ◦ BS
 	
L15 Final Lecture and Preparation for the Exam:
• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (13:00 - 15:00) [149]
  ◦ BS	

prof. dr. sc. Žauhar Gordana, prof. fizike i kemije [149]	
04.06.2024	

	P13 Non-Parametric Methods:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 11:00) [199]
	  ◦ BS P B
	
	P14 Repeating and Testing of Knowledge:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 11:00) [199]
	  ◦ BS P B
	
	P15 Repeating and Testing of Knowledge:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 11:00) [199]
	  ◦ BS P B

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
05.06.2024	

	P11 Comparison of Qualitative Data:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 09:30) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:30 - 11:00) [199]
	  ◦ BS P A
	
	P12 The Chi-squared Test:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 09:30) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (09:30 - 11:00) [199]
	  ◦ BS P A

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	
06.06.2024	

	P13 Non-Parametric Methods:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 14:00) [199]
	  ◦ BS P A
	
	P14 Repeating and Testing of Knowledge:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 14:00) [199]
	  ◦ BS P A
	
	P15 Repeating and Testing of Knowledge:
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (08:00 - 11:00) [199]
	  ◦ BS P C
	• [P09 - NASTAVA NA ENGLESKOM JEZIKU] (11:00 - 14:00) [199]
	  ◦ BS P A

naslovna asistentica Šegota Ritoša Doris, prof. fiz. i info. [199]	

List of lectures, seminars and practicals:

[PREDAVANJA] (TOPIC)	Number of hours	Location
L1 Introduction to Statistics. Statistics in Medicine. Scales of Measurement.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
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.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L3 Measures of central tendency - arithmetical mean, mode, median, geometrical mean and harmonic mean.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L4 Measures of Variation - range, mean deviation, variance, and standard deviation. Variability coefficient. Percentiles, deciles and quartiles.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L5 Normal Probability Distributions. The position of a result within the group (z-Scores).	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]

L6 Population and the sample. Inferences about the population based on sample-results. Confidence limits.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L7 Statistical significance of differences between the means of mutually independent samples.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L8 Correlation between variables.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L9 Regression analysis.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L10 Statistical significance of differences between the means of mutually dependent (correlated) samples.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L11 Analysis of Variance (ANOVA).	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L12 Analysis and Comparison of Qualitative Data. Proportions. Inferences about Two Proportions: Independent Samples.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L13 Chi-Square Test. Mc-Nemar test (Chi-Square Test for Dependent Samples).	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L14 Written Knowledge Assessment	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
L15 Final Lecture and Preparation for the Exam	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]

[VJEŽBE] (TOPIC)	Number of hours	Location
P1-2 Preparing and Writing Data In The Data Processing Program.	2	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P3 Visualising of Data. Histograms. Pie Charts. Time Series Graph.	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P4 Descriptive Statistics. Calculation of Basic Measures of Centre and Variation of the Numerical Data. Graphic Representation of Empirical Distribution	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P5 Testing of Data Distribution for Normality with Kolmogorov-Smirnov test	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P6 z-Scores (determination of the position for each result in the normal distribution with z-scores)	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P7 Comparing the means of two independent samples with Student t-test	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P8 Comparing the means of two dependent samples	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P9 Analisis of Variance (ANOVA)	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P10 Correlation and regression	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P11 Comparison of Qualitative Data	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P12 The Chi-squared Test	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P13 Non-Parametric Methods	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]

P14 Repeating and Testing of Knowledge	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
P15 Repeating and Testing of Knowledge	1	[P09 - NASTAVA NA ENGLESKOM JEZIKU]

EXAM DATES (final exam):

1.	25.06.2024.
2.	09.07.2024.
3.	11.09.2024.