<table>
<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Statistics in biomedicine</td></tr>
<tr><td>Code</td><td>PMM504</td><td>Year of study</td><td colspan="4">2nd year graduate study</td></tr>
<tr><td>Course teacher</td><td>Antonela Matana, PhD</td><td>Credits (ECTS)</td><td colspan="4"></td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Elected course</td><td>Percentage of application of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Theoretically and practically prepare students to implement statistical methods that are common in biomedicine.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">Passed course Introduction to Probability.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">Upon completion of the course, students will be able to:
- Express and prove mathematical statements related to the statistical theory covered by this course
- Select and apply appropriate statistical methods for real problems in biomedicine
- Perform statistical procedures in the programming environment R
- Present the results of statistical analysis
- Interpret the results of statistical analysis
- Critically study and apply new literature in the field of statistics in biomedicine.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Experimental design: The role of statistics in biological research. Types of studies. Sources of bias and how to minimize them.
2. Descriptive statistics.
3. Contingency tables. Diagnostic tests: sensitivity and specificity, positive and negative predictive values. ROC curves and their application.
4. Nonparametric tests: Sign test, Mann-Whitney test and Fisher's exact test.
5. Correlation and regression: correlation coefficient, linear regression. Residual analysis.
6. Survival analysis: survival function and hazard function for continuous variables. Parametric methods.
7. Survival function and hazard function for discrete variables. Nonparametric methods. Kaplan-Meier assessment of the survival function. Residuals.
8. Log rank and Wilcoxon tests.
9. Cox regression model.
10. Generalized linear models.
11. Logistic regression. Theoretical basics and application.
12. Poisson regression. Theoretical basics and application.
13. Multiple testing. Meta-analysis.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☒ independent assignments
☐ multimedia
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Class attendance, active participation in the teaching process, tests, exams. Based on the real data, make a project with an explanation of the choice of statistical methods and interpretation of the results.</td></tr>
</table>

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.5	Research		Practical training	
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests	2.0	Oral exam	2.0	(Other)	
	Written exam		Project	0.5	(Other)	

Grading and evaluating student work in class and at the final exam	Written exam (40%), oral exam (40%), project (20%). Two tests will be held. Students who pass both tests are exempt from taking the written exam.		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Bernard Rosner. Fundamentals of Biostatistics, 8.izdanje, 2015.		
	Marc M. Triola, Mario F. Triola, Jason Roy. Biostatistics for the Biological and Health Sciences, 2. izdanje, 2017.		
	R. R. Sokal, F. J. Rohlf, Biometry, Freeman & CO, 1995.		
Optional literature (at the time of submission of study programme proposal)	J. P. Klein, M. L. Moeschberger, Survival Analysis, Springer Verlag, 2003. Papers in the field of statistics in biomedicine.		
Quality assurance methods that ensure the acquisition of exit competences	Interview with students, student evaluation using an anonymous survey, student achievement on the exam, self-assessment.		
Other (as the proposer wishes to add)	/		