<table>
<tr><td>COURSE NAME</td><td colspan="5">STATISTICS IN COMPUTER SCIENCE</td></tr>
<tr><td>Code</td><td>PMM911</td><td>Year of study</td><td colspan="3">1st year of graduate study</td></tr>
<tr><td>Course teacher</td><td>Ana Perišić</td><td>Credits (ECTS)</td><td colspan="3">5</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></tr>
<tr><td>30</td><td></td><td>30</td></tr>
<tr><td>Status of the course</td><td>Compulsory</td><td>Percentage of application of e-learning</td><td colspan="3">30%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">An introduction to fundamental statistical concepts and classical methods of statistical analysis; preparing students for independent statistical analysis and the acquisition of basic skills of using statistical software packages.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Introduction to probability and statistics.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">Students will be able to:

- conduct descriptive statistical analysis
- select and apply statistical models for practical problems in a wide range of areas and assessing their suitability
- estimate statistical parameters and calculate the standard error
- construct confidence intervals
- understand concepts of statistical testing and to perform statistical tests
- perform a linear regression analysis and correctly interpret the parameters
- demonstrate and prove mathematical statements related to statistical theory covered by this college
- use computer tools for creating reports, graphical and tabular presentation of results, and generally to support statistical analysis
- critically analyze new literature for data analysis</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures/Exercises (2h/2h):

1. Introduction. Descriptive statistics: statistical data, classification, frequency distributions, discrete and continuous distributions, tabular and graphical representation.
2. Descriptive statistics: measures of central tendency, arithmetic mean, geometric mean, harmonic mean, median, mode, quantiles. Measures of dispersion: range, interquartile range, standard deviation. Box-plot, Chebyshev Inequality, moments, standardization, measures of symmetry and peakedness.
3. Bivariate frequency distribution, contingency table. Marginal distribution. Conditional distribution. Statistical independence.
4. Random variables, discrete and continuous random variables functions of random variables.
5. Joint distributions. Conditional distributions. Independance.
6. Expectation, variance and covariance.Conditional expectation.
7. Central limit theorem.
8. Sampling. Population , sample. Population parameter , statistic. Simple random sampling (with/without replacement, finite population, infinite population). Stratified sampling.
9. Parameter estimation. Method of moments. Standard error. Unbiasedness. Maximum likelihood method. Asymptotic distribution of maximum likelihood estimators.
10. Confidence intervals.
11. Testing statistical hypotheses. Statistical hypothesis. Statistical test. Statistical error. Classical statistical hypothesis testing. The Neyman-Pearson paradigm .</td></tr>
</table>

Significance level. The concept of p-value.

12. One sample statistical tests, two-sample tests.
13. χ^2-goodness of fit test, the Kolmogorov–Smirnov test,. χ^2-of homogeneity, χ^2-for independence, hypothesis testing for paired dana.
14. The Analysis of Variance. One-way ANOVA.
15. Correlation and regression. Correlational analysis. Regression analysis. Parameter estimation. Gauss - Markov theorem. ANOVA-table. Prediction.

Format of instruction

x lectures

X exercises

x individual work

Student responsibilities

Attending lectures, writing homework.

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)*

Attending lectures	0.1	Research		Practical	1
Experimental work		Report			
Essay		Seminar assignment			
Colloquium	3.5* (colloquium or written exam)	Oral exam	0.4		
Written exam	3.5* (colloquium or written exam)	Project			

Grading and evaluating student work in class and at the final exam

Attending lectures, writing homework, written and oral exam.
During the semester, students have the possibility to partially take written exams through colloquia (twice during the semester). Students who pass both colloquia don't need to take part in the written exam.

Required literature (available in the library and via other media)

Title	Items in library	Available through other resources
N. Sarapa, Teorija vjerojatnosti, Školska knjiga, Zagreb, 2002.		
John A. Rice, Mathematatical Statistics and Data Analysis, Second Edition, Duxbury Press, 1996.		
F. Daly, D. J. Hand, M. C. Jones, A. D. Lunn, K. J. McConway, Elements of Statistics, Addison Wesley, 1995.		

Optional literature (at the time of submission of study programme proposal)

1. G. K. Bhattacharyya, R. A. Johnson, *Statistical Concepts and Methods*, John Wiley & Sons, 1977.
2. Ž. Pauše, *Uvod u matematičku statistiku*, Školska knjiga, Zagreb, 1993.
3. R.V. Hogg, A.Craig, J.W. McKean, *Introduction to Mathematical Statistics*, 6th edition, Pearson Prentice Hall
4. D. Freedman, R. Pisani, R. Purves, A. Adhikari, *Statistics*, 2nd edition, W. W. Norton & Co, 1991.
5. D. J. Savile, G. R. Wood, *Statistical Methods. A Geometric Primer*, Springer Verlag, 1996.
6. D. Williams, *Weighing the Odds*, Cambridge University Press, 2001.
7. Manuals for R (W.N. Venables amnd D.M. Smith (M.Kumbatović, Kasum D.), Uvod u korištenje R-a)

Quality assurance

Summarizing test results and conducting an anonymous student survey at the end

methods that ensure the acquisition of exit competences	of the course. The survey is conducted according to the rules of the University of Split.
Other (as the proposer wishes to add)	