BIOSTATISTICS

(www.vfu.cz/statistics)

Syllabus - Lectures

1. Types of biostatistical data, population and sample in statistics. Frequency distribution, probability distribution, quantiles. Descriptive statistics – measures of central tendency (arithmetic mean, median, mode) and measures of dispersion and variability (range, variance, standard deviation, coefficient of variability).

2. Probability distributions for continuous data (populations): Gaussian normal, Standardized normal, Non-normal distr. Probability distributions for continuous data (sample data): Student's *t*, Pearson's Chi-Square χ^2, Fisher's F. Testing for statistical hypotheses - null and alternative hypothesis, test statistics, critical values, type I. and II. errors.

3. Parametric tests. Hypotheses concerning μ and σ parameters: F-test, Student's *t*-test (1 sample *t*-test, 2 samples t-test: paired and non-paired experiment).

4. Estimation of population parameters, confidence intervals for the mean value, standard deviation and for the median. Non-parametric tests: Mann-Whitney U-test, Wilcoxon Signed-Rank test.

5. Relations between two variables - functional and statistical relationship. Regression analysis – simple linear regression, estimation of line coefficients. Correlation analysis - estimation of correlation coefficient. Testing for the significance of correlation coefficient. Non-linear regression - Spearman's coefficient of rank correlation.

6. Categorical data, binomial probability distribution. Testing for difference between empirical and theoretical frequency, testing for difference between 2 empirical frequencies. Relationship between categorical data. Chi-Square analysis of the 2x2 and $r \times s$ contingency table.

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