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| **Study program** Master Studies Chemistry | | | | |
| **Course title** Chemometry (H215C) | | | | |
| **Name of lecturer/lecturers** Violeta D. Mitić | | | | |
| **Type of course** Obligatory | | | | |
| **Number of ECTS allocated**  4 | | | | |
| **Course objectives**  - Mastering the statistical methodology from the description of the calculated phenomenon to the application of analysis and drawing conclusions  - Training students to use the appropriate statistical packages. | | | | |
| **Course outcomes**  After successfully completing the Chemometry program and passing the exam, the student is qualified to:  -understand the sources of uncertainty of analytical measurements,  -evaluate the accuracy and precision of chemical analysis results,  -correctly group the results, graphical and tabular summarization of data,  -using parametric statistical methods  -compares the results of analytical measurements,  -regression and correlation analysis,  -uses personal computers for statistical processing and graphical presentation of analytical results,  -applies the latest data processing software,  -uses scientific and professional literature in the field of analytical chemistry. | | | | |
| **SYLLABUS**  *Lectures*  Introduction. Analytical problems. Methods for presenting analytical data, significant figures, rules for rounding approximate numbers. Grouping, sorting and displaying data. Measurement uncertainty. Types of errors: random and systematic errors, absolute error, relative error, detection, elimination, evaluation, and estimation of systematic errors are outlined. Statistics of repeated measurements. Basic measurement qualities: accuracy, precision, sensitivity, repeatability, reproducibility. Parameters of statistical sets. Calculated mean values (arithmetic mean, harmonic mean, geometric mean). Positional mean values (modus, median). Absolute/relative measure of dispersion (interval of variation, standard deviation, variance, coefficient of variation, mean absolute deviation, normalized deviation. Theory, distribution and probability density. Normal distribution. Binomial distribution. Poisson distribution. Calculation of limits and limits of detection. Statistical software. Elements of statistical inference: statistical evaluation. Testing statistical hypotheses. Type I and type II errors. Statistical significance. Statistical parametric tests: Dixon's Q-test, Grubbs' test, F-test, t-test, z-test, ANOVA. Linear correlation. The correlation coefficient. Regression. Statistical parameters of the quality of the regression model, analysis of residual values. Comparison of two methods by linear regression.  *Laboratory work*  Exercises, Other forms of teaching, Study research paper. Using concrete examples, students will be introduced to the technique of sample selection, the arrangement and display of data, as well as the application of appropriate parametric tests. | | | | |
| **References**  1. I. Gutman, Оbrada rezultata hemijskih merenja, Faculty of Science, Kragujevac, 2000.  2. A. Perić-Grujić, Osnovi hemometrije, TMF, Belgrade, 2012.  3. James N. Miller and Jane C. Miller, Statistics and Chemometrics for Analytical Chemistry, Ellis Horwood  imprint 1995. | | | | |
| **Active teaching classes** | **Lectures**  30 | | **Laboratory work**  15 | |
| **Teaching mode**  Interactive lectures, work with a statistical package, e-learning, consultations. | | | | |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** | | | | |
| **Pre exam duties** | **Points** | **Final exam** | | **Points** |
| Activity during lectures | 5 | Written examination | | 55 |
| Practical teaching | - | Oral examination | | - |
| Teaching colloquia | 40 |  | |  |