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| **Title and Code** of the subject: **Resarch methods, Biometry, MTMAL7004A** | **ECTS Credit Points: 4** |
| **Type** of the subject: **compulsory** | |
| **Ratio of theory and practice: 2/2** (credit%) | |
| **Type and number of classes per semester**: 28 hour(s) lecture and 28 hour(s) practice per **semester**  Number of teaching hours / week : eg.:2+2 (lecture and practice) | |
| **Type of exam**: practical course mark | |
| **Subject in the curriculum:** semester 1. | |
| Preliminary requirements:- | |

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| **Summary of content - theory**: |
| Course objectives: the general aim of the course is to make students familiar with basic statistical methods used in animal breeding.   1. Design experiments, experimental units, treatments. Sampling, description of sample. Experimental designs. 2. Numerical description of data - Calculation of central and variance indicators. 3. Distribution and density functions - Rules for normal distribution. 4. Statistical description of populations. Standardization, confidence interval. 5. The logical process of the statistical decision - Acquiring the logical process of the hypothesis testing. 6. Comparison of means - Learn how to perform the t-test and the z-test. 7. Acquisition of variance testing - χ2 and F test. 8. One-way analysis of variance - Calculation of variance analysis, Significant difference. 9. Multi-factor variance analysis - Calculation of variance analysis, Significant difference. 10. Correlation and regression analysis. 11. Non-linear and multivariate regression analysis. 12. Practical applications of regression analysis. 13. Non-parametric tests - Fitting, Homogeneity, and Independence Test with χ2. 14. Principal component analysis. |
| **Summary of content - practice**: |
| Skills to be learnt: the main aim of the practical lectures is to make students familiar with the practical implementation of statistical methods using “R”-software environment.   1. Numerical description of data - Calculation of central and variance indicators 2. The logical process of the statistical decision - Acquiring the logical process of the hypothesis testing. 3. Comparison of means - Learn how to perform the t-test and the z-test. 4. Comparison of means - Learn how to perform the t-test and the z-test. 5. Acquisition of variance testing - χ2 and F test. 6. One-way analysis of variance - Calculation of variance analysis, significant difference. 7. One-way analysis of variance - Calculation of variance analysis, significant difference. 8. Multi-factor variance analysis - Calculation of variance analysis, significant difference. 9. Multi-factor variance analysis - Calculation of variance analysis, significant difference. 10. Correlation and regression analysis. 11. Non-linear and multivariate regression analysis. 12. Non-parametric tests - Fitting, Homogeneity, and Independence Test with χ2. 13. Non-parametric tests - Fitting, Homogeneity, and Independence Test with χ2. 14. Principal component analysis |
| **Literature, handbooks in English** |
| 1. Kuhnert, P. –Venables, B.: An Introduction to R: Software for Statistical Modelling & Computing. CSIRO, Australia, 2005. 2. Seefeld, L: Statistics Using R with Biological Examples, 2007. |
| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**  * Knows the basics of animal science.  1. **Skills:**  * Able to develop and implement new technologies and methods. * Able to carry out the tasks of animal husbandry, research development of animal husbandry and coordination of consulting. * Able to conduct independent research in the field of science and agriculture.  1. **Attitude:**  * Requires professional development and undertakes self-development within the framework of further training.  1. **Autonomy and responsibility:**  * Selects the applied technologies independently. |

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| **Responsible lecturer: Dr. Posta János, assistant professor** |

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| **Terms of course completion:** |
| Active attendance in the practical lectures |
| **Form of examination:** |
| Practical test |
| **Requirement(s) to get signature:** |
| Active attendance in the practical lectures during the semester |

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| **Exam questions:** |
| Not relevant |