### Course title
IFERENTIAL STATISTICS

<table>
<thead>
<tr>
<th>Lecturers</th>
<th>Assoc. Prof. Dr. Sc. Sonya Karabeliova and Chief Asst. Prof. Ph.D. Milen Milanov</th>
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<tbody>
<tr>
<td>Type of course</td>
<td>Core</td>
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<tr>
<td>Level of course</td>
<td>Master’s</td>
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<tr>
<td>Year of study</td>
<td>First</td>
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<td>Semester</td>
<td>1st</td>
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<tr>
<td>ECTS</td>
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<td>Workload</td>
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<tr>
<td>Type of education</td>
<td>Full-time</td>
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<td>Language of instruction</td>
<td>English</td>
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<tr>
<td>Assessment</td>
<td>theoretical, practical, and written assignments</td>
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**Prerequisites**
No.

**Course aims**
This is a core course designed to assist students in conducting psychological research. It includes research planning, implementation procedures, analyses of research data, and interpretation of relevant results. The main aim of the course is to teach theoretical knowledge and skills for processing and analyzing research data, as well as for interpreting the results from the qualitative and quantitative statistical methods used in psychology research. Students use the SPSS statistical analysis software. The course concludes with a written theoretical exam, a practical exam, and a written assignment that includes description, analysis, and interpretation of the results of one empirical study. Students wishing to improve their grade prepare a course paper.

**Lectures**

1. **STATISTICAL METHODS FOR HYPOTHESIS TESTING**
Basic concepts, terminology. The sequence of hypothesis testing steps. The Null hypothesis.

2. **TYPE I AND TYPE II ERRORS**
Statistical reliability of the results. Incorrect decisions about statistical reliability. Significance in research designs. Incorrect interpretations of significance.

3. **PARAMETRIC AND NON-PARAMETRIC METHODS FOR HYPOTHESIS TESTING**
Choosing an appropriate statistical criterion. Bivariate frequency distribution.

4. **CORRELATION ANALYSIS**
Significance, definition, types. Direction and strength of the relationship. Pearson’s coefficient — definition, calculation. Factors that affect the correlation. Interpreting the results.

5. **ALTERNATIVE CORRELATION TECHNIQUES**
Point-biserial and phi coefficients; biserial and tetrachoric correlation coefficients; contingency coefficient and Kendall’s coefficient.

6. **LINEAR REGRESSION**
Definition, regression coefficient, interpretation of results. Assessing the adequacy of the regression model.

7. PARAMETRIC STATISTICAL METHODS FOR HYPOTHESIS TESTING
One sample t-test. Comparing the mean and standard deviation of the sample and the population. Analysis and interpretation of the results.

8. INDEPENDENT VS. DEPENDENT SAMPLES

9. ANALYSIS OF VARIANCE

10. TWO-WAY ANALYSIS OF VARIANCE (TWO-WAY ANOVA)

11. ANALYSES OF VARIANCE AND COVARIANCE AS GENERAL LINEAR MODELS.

12. NON-PARAMETRIC STATISTICAL METHODS FOR HYPOTHESIS TESTING

13. VALIDITY

14. RELIABILITY
Systematic and random errors. Factors increasing or decreasing reliability. Significance of reliability. Item analysis — definition, application. Analysis and interpretation of the results.

Seminars and Practical Exercises

1. Correlation analysis — application, types of correlation coefficients.
2. Correlation analysis — identifying and interpreting results.
3. Linear Regression analysis — application, types.
4. Identifying the results of regression analysis. Interpretation.
10. General linear models.
11. Identifying, analyzing and interpreting the results from general linear models.

References

Standards of Academic Integrity
Generally, academic fraud and dishonesty include, but are not limited to the following categories:
cheating, fabrication, plagiarism, multiple submissions, etc.
- **Cheating**: Using unauthorized notes, aids or information on an examination; altering a graded work prior to its return to a faculty member, allowing another person to do one’s own work and submitting it for grading.
- **Fabrication**: Inventing or falsifying information, data or citation; presenting data gathered outside of acceptable professorial guidelines; failing to provide an accurate account of how information, data or citations were gathered; altering documents affecting academic records; forging signatures or authorizing false information on an official academic document, grade, letter, form or any other university document.
- **Plagiarism**: Submitting material that in part or whole is not one’s own work; submitting one’s own work without properly attributing the correct sources of its content.
- **Multiple Submissions**: Submitting identical papers or course work for credit in more than one course without prior permission of the instructor.

A breach of ethics or act of dishonesty can result in:
- failure of an entire course (blatant plagiarism, cheating on a test or quiz)
- academic suspension or expulsion from the university.