Course syllabus

Statistical methods in psychological research

Level of higher education – the third level (Doctor of Philosophy)
Educational and scientific program of the specialty 053 “Psychology”

Class days: Wed 14.20 – 15.40
Consultations: Thu. 12.45 – 14.05

Year of study: II, **Semester**: III
Number of credits: 5 **Language of instruction**: Ukrainian

Course leader

Candidate of Psychological Sciences, Associate Professor Andriichuk Ivanna Petrivna

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Description of the discipline

A psychologist who has a comprehensive knowledge of psychological reality has ample opportunity to effectively influence it. The ability to use statistical methods and information technology is needed to get an objective picture of the acquired knowledge using the methodology and methods of the humanities. The course "Statistical Methods in Psychological Research" is aimed at forming in third-level higher education students the ability to think abstractly, analyze and synthesize, generate new ideas, the ability to search, analyze information from various sources. The study of the discipline forms the knowledge, skills and abilities of applicants to collect, process and critically assess scientific psychological sources, to master the methods of quantitative and qualitative processing of psychological research data.

Course structure

Hours (LEC/ SEM/ LAB)	Topic	Learning outcomes	Task
2/2/-	1. Stages of mathematization of psychological science. The concept of measurement	To analyze statistical methods in basic and applied psychological research. To reveal the importance of statistical methods in the system of methods of psychology. To understand the features of descriptive, inductive and correlation statistics. To reveal the essence of the concept of measurement. To analyze qualitative and quantitative measurements, types of measuring scales: nominal scale (scale of names), ordinal (rank, ordinary) scale, interval scale, ratio scale.	Question Reports Essay
2/2/-	2. The concept of sampling. Complete and sample study	To analyze the concept of sampling in psychology. To carry out a comparative analysis of general and statistical populations. To determine the sample size. To understand the nature of representative samples that represent the general population from which they are selected. To describe the complete and sample study, their features. To demonstrate the ability to identify dependent and independent	Question Tests Tasks

		samples. To know the requirements for sampling.	
2/2/-	3. Forms of presentation of research results	To justify the internal logic in the sampling procedure. To know the main stages of the psychologist's work with the sample, methods that ensure the representativeness of the sample. To analyze the dependence of the sample size on the statistical methods used. To know the features of experimental and control groups in psychological research. To be able to group the signs, taking into account the results of the study: simple and complex tables, other forms of presentation of the obtained diagnostic data, graphical ways of depicting variation series.	Question Reports Individual tasks
2/2/-	4. Mode and median as numerical characteristics of distribution	To analyze numerical representation as the most common form of experimental data representation. To be able to determine the numerical characteristics of the distribution. To know the rules of finding it. To understand the informative significance of mean, shortcomings of the mean as a statistical indicator.	Question Tasks Cases
2/2/4	5. Dispersion as a measure of scattering of a random variable. The concept of normal distribution	To analyze the dispersion as a measure of the scattering of a random variable (around its average). To know the general algorithm for calculating the variance for one sample, the number of degrees of freedom and its specifics. To calculate the number of degrees of freedom for the experimental data table. To investigate the importance of the normal distribution in mathematical statistics. To consider asymmetric distributions and their characteristics.	Question Work in the STATISTICA package with an individual task
2/2/-	6. Chi-square criterion and features of its application	To demonstrate the ability to substantiate the general principles of testing statistical hypotheses. To classify the psychological problems which are solved by means of statistical methods. To analyze the effectiveness of the chi-square criterion and the features of its application: as a calculation of the coincidence of the empirical distribution and the assumed theoretical; as a calculation of the homogeneity of two independent experimental samples. To compare the empirical distribution with the theoretical.	Question Cases

2/2/4	7. Parametric criteria of differences. Student's t-test and features of its application	To analyze the features of parametric criteria of differences. To justify the features of the use of Student's t-test, calculation formulas, differences in the application of the Student's method for dependent and independent samples. To solve common tasks. To know the conditions that must be met when applying Student's t-test, Fisher's F-test.	Cases Work in the STATISTICA package with an individual task Essay
2/2/4	8. Correlation analysis. Pearson and Spearman correlation coefficient	To analyze the use of the concept of function to describe the relationship between variables in mathematics, the statistical nature of the relationships between psychological characteristics. To know the meaning of the concepts of correlation analysis, correlation, types of correlations: linear, nonlinear, positive, negative. To substantiate the peculiarities of the use of Pearson's correlation coefficient and Spearman's rank correlation coefficient, conditions of their application. To calculate correlation coefficients using the Excel spreadsheet editor in the STATISTICA package.	Question Tests Work in the STATISTICA package with an individual task
2/-/4	9. Factor analysis as a statistical method	To give a general description of factor analysis as a statistical method used in the processing of large arrays of experimental data. To analyze the basic concepts of factor analysis: factor, "factor loads", matrix of intercorrelation, etc., conditions of application of factor analysis, representation of factors in the table. To analyze the effectiveness of the use of factor analysis in psychology, the commonality of the variable and its features, examples of the use of methods of mathematical statistics in scientific work.	Question Work in the STATISTICA package with an individual task Group discussions

Literary sources

1. Андрійчук І.П. Математична статистика для психологів. Навчально-методичний посібник. Тернопіль: ТНПУ ім.В.Гнатюка, 2011. 132с.
2. Вуколов Э.А. Основы статистического анализа. Практикум по статистическим методам и исследованию операций с использованием пакетов STATISTICA и EXCEL: учеб. пособ. Москва, 2008. 464 с.
3. Ермолаев О.Ю. Математическая статистика для психологов. М.: Флинта, 2002. 336с.
4. Жлуктенко В.І., Наконечний С.І., Савіна С.С. Теорія ймовірностей і математична статистика. К., КНЕУ, 2001. 216с.
5. Основи науково-психологічних досліджень. Навчально-методичний посібник / ред. Г.К. Радчук. – Тернопіль, ТНПУ ім. В. Гнатюка, 2020. 208 с.
6. Руденко В.М., Руденко Н.М. Математичні методи в психології: підручник. К.: Академ-видав, 2009. 384 с.
7. Сергієнко Л.П. Основи наукових досліджень у психології: кваліфікаційні та дипломні роботи. К.: Професіонал, 2009. 240 с.
8. Сидоренко Е.В. Методы математической обработки в психологии. Санк-Питербург, 2000. 350с.

9. Халафян А.А. STATISTICA 6. Статистический анализ данных. Москва, 2007. 512 с.
10. Howitt D., Cramer. D. Introduction to Statistics in Psychology. N.-Y.: FT, 2010

Evaluation policy

- **Deadline and rescheduling policy:** papers that fail to meet deadlines without good reason are rated lower. Re-assembly of modules takes place with the permission of the dean's office if there are good reasons (for example, sick leave).
- **Academic Integrity Policy:** all written works are checked for plagiarism and are allowed to be defended with correct textual borrowings of no more than 20%. Cheating at the time control works and exams are forbidden (in including with the use of mobile devices). Mobile devices may only be used during online testing.
- **Attendance Policy:** attendance is a mandatory component of the assessment for which points are awarded. For objective reasons (for example, illness, international internship) class can take place in an online form for the approval of the head of the course.

Evaluation

The final grade for the course is calculated as follows:

Types of evaluation	% of the final assessment
Module 1 (topics 1-3) - discussion of cases, testing, oral examinations.	20
Module 2 (topics 4-6) - discussion of cases, work in the STATISTICA, testing, individual tasks	26
Module 3 (topics 7-9) - work in the STATISTICA, oral examinations, testing.	24
INDZ (educational project)	15
Final control (topics 1-9) - test	15

Student assessment scale:

ECTS	Rating in scores	Explanation
A	90 – 100	perfectly
B	85-89	very good
C	75-84	good
D	65-74	satisfactorily
E	60-64	enough
FX	35-59	unsatisfactorily (with the possibility of re-assembly)
F	1-34	unsatisfactorily (with the obligatory repeated course)