MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Higher Education Institution
"Ural Federal University named after the first President of Russia B.N. Yeltsin"

APPROVED BY
Vice rector for science
A.V. Germanenko
2022

WORKING DISCIPLINE PROGRAM
STATISTICAL METHODS OF SCIENTIFIC RESEARCH

List of information about the discipline work program	**Accounting**
Educational Program **Economics** In focus Economy and Management of The People's Economy Finance, Cash And Credit	**OP code** 38.06.01
Training direction economics	**Direction and training code** 38.06.01
Training level Higher-skilled training	
The qualification awarded to the graduate researcher. Research teacher	
FGOS VO 38.06.01 Economy	**The order of the Ministry of Education and Science of the Russian Federation on the approval and implementation of the FSES HE[1] of 30.07.2014 No898**

Yekaterinburg, 2022

[1] FSES HE - Federal State Education Standards of Higher Education

The work program of the discipline is compiled by the author:

№	Name	Degree, academic title	Position	Department	signature
1	Shubat Oksana Mikhailovna	Ph.D., Associate Professor	assistant professor	Economics and Management on metallurgical and Engineering Enterprises	

Recommended by the UrFU Methodical Council

Deputy Director for Educational Activities
for the organization of admission
and pre-university education E.S. Avramenko

Agreed:

Head of the OPNPC E.A. Butrina

STATISTICAL METHODS OF SCIENTIFIC RESEARCH

1. GENERAL CHARACTERISTIC OF THE DISCIPLINE STATISTICAL METHODS OF SCIENTIFIC RESEARCH

The work program of the discipline is compiled in accordance with the requirements of the Federal State Educational Standard for Higher Professional Education.

Direction code	**Direction name**	**Requisites of the order of the Ministry of Education and Science of the Russian Federation on the approval and implementation of the FSES HE[2]**	
		Date	**Order number**
38.06.01	Economy	30.07.2014	898

1.1. Abstract of the discipline content

The discipline "Statistical Methods of Scientific Research" presupposes phased mastering the basic elements of statistics by post-graduate students, starting with the representations about the role of statistics in scientific research and management practice and ending with the evaluation of statistical results in the process of analysis for their reliability and suitability for substantiating economic patterns and making managerial solutions. The study of this discipline provides an opportunity for a deeper understanding of many other economic disciplines that use statistical methodology and methods of data analysis. The discipline "Statistical Methods of Scientific Research" contributes to the formation of a holistic, systematic view of the nature of socio-economic processes and algorithms for obtaining economic knowledge.

The purpose of the discipline is to develop the practical skills of statistical analysis of business processes at the enterprise.

The study of the discipline "Modern Statistical Methods of Scientific Research" is aimed at solving the following **tasks:**

- formation of students' ideas about the statistical methods and methods of research available and practical for application in managing practice;
- development of skills in selecting adequate statistical tools for researching specific situations in the practice of the enterprise;
- teaching methods and techniques of statistical analysis of data in packages Excel, SPSS.

In the course of studying the discipline, the post-graduate student must:

- have an idea of statistical methods and methods used in the process of researching business processes;
- independently implement one-dimensional, two-dimensional and multidimensional types of statistical analysis in packages Excel, SPSS;
- have theoretical and applied skills of research of dynamic processes in business sphere (packages Excel, SPSS);
- critically evaluate the results obtained for their reliability and suitability for planning and forecasting purposes.

[2] FSES HE - Federal State Education Standards of Higher Education

KNOW:

- the specifics and characteristics of various statistical methods used in scientific research in the field of economics and finance;

- necessary and sufficient conditions for the application of certain statistical methods for identifying economic patterns and justifying management decisions;
- the main stages of statistical data analysis.

BE ABLE TO:

- evaluate the primary statistical information and select an adequate statistical procedure for the analysis;
- apply relevant statistical methods to study the current situation, forecast and justify marketing decisions;
- interpret the results of the study;
- to substantiate the results of the conducted research in the field of economy and finance, supporting them with the appropriate statistical material.

HAVE:

- statistical data analysis methods;
- techniques of working with the main packages of applied programs for the processing and analysis of statistical information;
- skills for writing a report on the conducted research using elements of analytical infographics.

1. SCOPE OF DISCIPLINE AND KINDS OF ACADEMIC WORK

2.1. Distribution of hours of study sessions by terms

Type of study sessions	Number of hours per term (third term)	Labor intensity	
		Hours	Credit unit
Lectures	4	4	0,12
Individual work	104	104	2,88
TOTAL	108	108	3

2. CONTENTS OF THE DISCIPLINE

3.1. The name of topics, their content, scope of lecture classes in hours

№	Section, topic of the training course, content	Labor intensity	
		Hours	Credit unit
1	**Section 1. One-dimensional methods of statistical analysis in the study of business processes: implementation in packages Excel, SPSS.** Topic 1.1. Tools and techniques for calculating generalized indicators, variation indicators and deciles of distribution. Topic 1.2. Analytical infographics. Topic 1.3. The practice of drawing up an analytical report on the results of a one-dimensional statistical analysis.	1	0,03
2	**Section 2. Two-dimensional statistical methods and models in the analysis and business processes forecasting: implementation in packages Excel, SPSS.**	1	0,03

	Topic 2.1. Tools and techniques for calculating correlation coefficients, estimating their statistical significance. Topic 2.2. Conducting t-tests comparing average values; technique of conducting one-way analysis of variance; regression models construction. Topic 2.3. The practice of drawing up an analytical report on the results of two-dimensional statistical analysis.		
3	Section 3. Multidimensional methods of statistical analysis: implementation in packages Excel, SPSS. Topic 3.1. The technique of performing multivariate regression analysis, selecting predictors for the model, evaluating the quality of the resulting equation. Topic 3.2. Discriminant analysis and logistic regression: features of construction and interpretation. Topic 3.3. Implementation of various algorithms for cluster analysis (hierarchical clustering, k-means method), specificity of the profiling of clutches. Topic 3.4. Techniques for performing factor analysis and assessing the suitability of its application to a data set.	1	0,03
4	**Section 4. Investigation of dynamic processes in business analytics: basic and generalized indicators in packages Excel, SPSS.** Topic 4.1. Calculation of chain and base absolute growths, coefficients and growth rates, increment rates, absolute value of 1% increment. Topic 4.2. Calculation of the average indicators in the series of dynamics. Topic 4.3. The practice of drawing up an analytical report on the results of a study of basic and generalizing indicators of dynamics. Topic 4.4. Analytical infographics for the dynamics series.	1	0,03
TOTAL		4	0,12

3.2. Postgraduate students' individual work

Sections and topics for self-study	The list of tasks for individual work (abstracts, reports, translations, calculations, etc.)	Labor intensity	
		Hours	Credit units
Section 1. One-Dimensional Methods of Statistical Analysis in the Study of Business Processes: Theoretical and Applied Questions. Topic 1.1. Analytical possibilities of generalizing statistical indicators. Topic 1.2. Scope and types of indicators of variation. Topic 1.3. Percentages and deciles of distribution as sources of useful economic and statistical information.	Abstract on the topic "Scope and types of indicators of variation." Translation of foreign articles on the topic of classes Report on the topic "Analytical opportunities of generalizing statistical indicators."	35	0,97

Section 2. Two-dimensional statistical methods and models in the analysis and forecasting of business processes: general theoretical and methodological issues of application Topic 2.1. Features and scope of the correlation analysis. Topic 2.2. Methods for comparing average values as a tool for testing statistical hypotheses. one-way analysis of variance. Topic 2.3. Pairwise linear and nonlinear regression as data description methods and prediction tools.	Report on "Pairwise linear and nonlinear regression as data description methods and prediction tools" Translation of foreign articles on the topic of classes Abstract on the topic "Features and Scope of Correlation Analysis"	15	0,42
Section 3. Multidimensional methods of statistical analysis in the study of business processes: general principles, scope, analytical capabilities. Topic 3.1. Multiple regression analysis is a concept and scope. Topic 3.2. Specificity of cluster analysis as a tool for reducing dimensionality. Topic 3.3. Analytical possibilities and limitations. Topic 3.4. Factor analysis (main components method) in the study of latent factors in business processes.	Abstract on the topic "Factor analysis (main components method) in the study of latent factors in business processes" Report on "The Specificity of Cluster Analysis as an Instrument of Diminishing" Translation of foreign articles on the topic of classes	35	97
Section 4. Investigation of the structure of a number of dynamics: theoretical approaches. Topic 4.1. The main elements of a number of dynamics. Topic 4.2. Structural decomposition of time series. Topic 4.3. Accounting for the seasonal component in forecasting practice.	Abstract on the theme "The main elements of a number of dynamics" Report on "Accounting for seasonal components in forecasting practice" Translation of foreign articles on the topic of classes	19	0,53
TOTAL		104	2,88