Government of the Russian Federation

Federal State Autonomous Educational Institution for Higher Professional Education
National Research University-Higher School of Sociology

Faculty of Sociology

Discipline Program
Economic and Social Statistics

040100.62, Sociology Bachelor Program

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Moscow, 2013

1. Thematic plan for the academic discipline

№	Title of the topic	Total hours on discipline	Lecture Hours	Seminar and Practice sessions
	Third Module			
1	Introduction. Subject, methods and goals of economic and social statistics.	2	2	0
2	Topic 1. Statistical observation. Methods of organizing and summarizing information. The average values.	4	2	2
3	Topic 2. Design and analysis of variation series and its characteristics. Grouping.	4	2	2
4	Topic 3. The use of sampling techniques.	4	2	2
5	Topic 4. Indicators and methods of time series analysis.	4	2	2
6	Topic 5. Economic indexes and their use in the socio-economic research.	4	2	2
	Midterm Exam			
	Total hours in the third module	**24**	**12**	**12**
	Fourth Module			
7	Topic 6. Basis of preparation of statistical indicators. Statistical indicators.	4	2	2
8	Topic 7. System of National Accounts - the foundation of socio-economic statistics.	4	2	2
9	Topic 8. Demographic statistics in the study of information about resources of human capital and labor market	4	2	2

	statistics in the study of labor recruitment potential of society.			
10	Topic 9. Statistics of the political and social structure.	4	2	2
11	Topic 10. Statistical study of the level and quality of life.	4	2	2
12	A statistical study of population income and consumption. Specifics of statistical studies of families and households.	4	2	2
	Research paper			
	Total hours in the fourth module	**12**	**12**	**24**
	Total hours in the course	**24**	**24**	**48**

2. Grading

In-progress examination Each practical session will have a 5-7 minute written test on the previous lecture material.

Mid-term examination A classroom-based examination, submission of the research paper.

Final examination A written exam that includes solving statistical problems. Each student receives an individual set of test questions, in which the number of problems and test questions depends on problems' difficulty level. The exam is designed to take two hours for an average student.

It is recommended to score exams based on relative percentage of correctly answered examination questions. A "Pass" grade is assigned for correctly answering from 50% to 65% of exam questions, "Good" for up to 85%, and "Excellent" for over 85% of the exam questions.

The total score is calculated as weighted arithmetic mean derived from two 10-point scores: for the midterm, R, and the final exam (Qua):

Z = 0.4 * R + 0.6 * Qua

A student's individual semester rating R (on 10-point scale) is calculated as the simple arithmetic average of the intermediate 10-point scores for participation in each module. Intermediate ratings are measured in the form of a weighted arithmetic average of the scores for various types of student work within the module. Also, the score for daily classroom work is a fraction of the number of points the student receives for the subject examinations (based on current bonus points for classroom work) in the total amount of points. For example:

$$R1 = 0.6 * \frac{\Sigma_{ind}\ \textbf{\textit{Subject Examinations +Bonus Points}}}{\Sigma_{max}\ \textbf{\textit{Subject Examinations}}} * 10\ 0.4 * \textbf{\textit{Mid-term exam;}}$$

$$R1 = 0.4 * \frac{\Sigma_{ind}\ \textbf{\textit{Subject Examinations +Bonus Points}}}{\Sigma_{max}\ \textbf{\textit{Subject Examinations}}} * 10\ 0.6 * \textbf{\textit{Research Paper;}}$$

The maximum number of required points Σmax (denominator rating) is calculated as the sum of the maximum scores for the required subject exams for the relevant module.

The course subject examinations are non-blocking: an unsatisfactory final score (0-3) for the various types of self-study works is just a part of the intermediate ratings.

As the final grade is determined, the rounding of the weighted average grades for course Z is held to an integer value.

$Z < 4$	Equal to integer part of Z	Unsatisfactory
$4 \leq Z < 9.51$	According to mathematical rules of rounding Z	In accordance with the rules of conversion from 10-point score
$9.51 \leq Z$	10	Excellent

3. Discipline Contents

Introduction: subject, methodology and goals of economic and social statistics.

Definition of statistics. Economic and social statistics as the foundation of scientific analysis. Topics of statistical science. Statistics as a science. Main categories of statistics. Statistical regularity. The concept of law of large numbers. Necessity for combining of normative and empirical analysis. Approach to statistical studies. Concept of statistical population. Types of statistical aggregates. Properties of statistical aggregates. The statistical unit.

Properties of statistical units and their classification. Indicator as the main category of statistics. The concept of property variation in the population. The variant of property value. The concept of different types of relationships between properties in the population: functional, semantic and statistical relationships. The form of their presentation and the possibility of statistical accounting and analysis.

Statistical measurements. Scale of measurements of social and economic occurrences and processes. The nominal scale. Ordinal and interval scales. Difference and ratio scales. Absolute scale. Possibility of transition between measurement scales.

Topic 1. Statistical observation. Methods of organizing and summarizing information. The average values

General understanding of planning of statistical observation. Organization of state statistics and departmental statistics in Russian Federation. Government statistical agencies in Russia. International statistics. The concept of primary and secondary statistics. Statistical reporting. Types and forms of statistical reporting. Opportunities for using the state and departmental statistics databases in special socio-economic research.

Methods of organizing statistical observation. Classification of types and forms of statistical observation by organization, data periodicity, and reach. Concept of sampling. Population and sample. Sampling methods. The concept of observation errors and sampling errors; systematic and random errors.

The main stages of statistical observation. Designing tools of observation.

Methods of logical and content control of data received. Concept of statistical tabulation. Simple and complex tabulations.

The basics and significance of statistical indicators in socio-economic analysis. Indicator and its attributes. The concept of statistical indicator systems.

Absolute values, their main types and characteristics. Types of units of measurement. The difference between individual property value and absolute statistical indicator. Main methods of validating absolute values. Possibilities of carrying out a comparison on their base.

Relative values, their significance and the advantages of using them in analysis. General principles of building relative statistical indicators. Selection of the level for comparison and the comparison base. Nondimensional relative indicators and their classification by the type of value being characterized and possibilities of interpretation. Relative values of structure and coordination. Relative values of dynamics. Relative values of plan realization. The concept of index. Relative values of intensity and quality: their structure and possibilities of interpretation, units of measurement. The concept of statistical coefficient.

Average values. General principles of using average values. The basics and significance of average value. Main characteristic of average value. General view of statistical average value. Mean value. The majority property of mean value. Specifics of averaging relative values: average geometric value and average harmonic value.

Topic 2. Building and analysis of ordered samples variance and its characteristics. Grouping.

The concept of ordered series. Discrete and interval ordered series. Frequency and relative frequency. Methods of group interval selections. Indicators of average types: mean, mode, median. Quantiles of allocation. Variation indicators. Properties of arithmetic mean and dispersion. The rule of dispersion addition. Analysis of statistical relation based on the rule of dispersion addition.

Grouping methods – one of the most important methods in statistical data analysis. Methodological issues of building statistical groups, their significance in economic analysis and research. The concept of population homogeneity. The goals of statistical groups, types of statistical groups. Classification as a type of group. Principles and capabilities of selection of grouping and classification property. Forming groups.

Grouping by the property measured in absolute scale. Types of grouping intervals. Multiple groupings in statistics.

Forms and methods of presenting statistical information. Ordered (ranked) and unordered series of observations. The concept of the dynamic time series. The transition from series of observation to series of distribution. Discrete and interval series of distribution. The concept of the variation series. Statistical tables. The options for the development of the subject and predicate of statistical tables. Main principles of table creation. The value of the graphical method in statistics. The main types and possibilities of the graphical presentation of information.

Topic 3. The methods of using sampling techniques

The concept of the sampling method and its application in economic research. Forming the sample survey. The use of rotation and the change of sample plan. The main types of samples. The concept of sampling errors and the assessment of their value. Using the sampling error limit formulas. The concept of selection methods: random, serial, and typical selection. The combined sample. Small sample size. Assessment of deviation significance between two sample means. Extension of the sample results to general population.

Topic 4. Indicators and methods of time series analysis

The concept of the series. Interval and momentary time series. Average chronological value. Elementary dynamics indicators - the absolute incremental growth, growth rate, incremental growth rate - in the chain and the base form. The averaging of the dynamics indicators. Trend

identifying techniques: the increasing of intervals, moving average, forming trends. Methods of decomposition of the time series.

Topic 5. Economic indexes and their application

The concept of economic indexes. Individual and general indexes. The principle of factor transitivity. The system of interconnected indexes. Laspeyres index, Paasche index, and Fisher index. Calculation of the general index as average index from the individual indexes. Indexes of average values. Factor analysis of absolute and relative changes on the basis of the index method.

Topic 6. The principles of preparation of statistical indicator systems.

The concept of the systems of statistical indicators and the principles of their construction. Generalizing statistic indicator as summary quantitative characteristic of socio-economic events and processes. Classification of statistical indicators. Indicators of quantitative and qualitative properties, individual and shared. Main requirements for the statistical indicators. The problems of comparability between indicators.

Topic 7 System of National Accounts - the basis of socio-economic statistics.

SNA as a tool of macroeconomic accounting and analysis. The concept of the main categories of the system. The structure of the Russian system of national accounts and its specifics. The basic principles of the system of national accounts. Statistical definition of the main elements of the turnover. Classification of economic agents by sector. Selecting the main classification attribute with the statistical description of the different phases of the economic turnover. Consolidated accounts and the accounts for industries and sectors of the economy. "Rest of the World" as a sector of the economy. Evaluation of gross output and intermediate consumption of industries and sectors of the economy on the basis of data in business statistics. Gross value added and gross domestic product (GDP). The problem of valuing natural-material flows. Methods of calculating GDP and their relationship with the accounts system. Primary factor income and current transfers with the "rest of the world." Gross balance of primary incomes and gross national disposable income: the concept of accounting. Evaluation of final consumption by economics sector. Specifics of arranging accounting of the household sector end expenses. Gross national savings and accounting issues with its natural-material and cost structure. Statistics of national wealth as a source of information on gross fixed capital formation and changes in inventories. A concept of the relationship of the capital account and the financial account. The balance of funding. Relationships between SNA indicators.

Topic 8. Demographic statistics in the study of information about resources of human capital and labor market statistics in the study of labor recruitment potential of society.

The importance of studying population in social statistics. Absolute and relative indicators of population size, population composition and location. The main groups of population. Sources of

information about the size and composition of the population. Specifics of the census, micro-census, and one-time sample surveys. The study of how population is differentiated by demographic and social factors based on the analysis of variation series. Indicators of demographic pressure. Indicators of natural population migration. The concept of mortality tables. The fertility coefficient, reproduction coefficient. A statistical study of the of population growth from migration: indicators system, sources of information. Assessment of forecast significance using statistical methods.

Labor statistics as a branch of socio-economic statistics. The concept of labor market and its characteristics. International standards and approaches to definition of labor market indicators are communicated by the International Labor Organization (ILO). Objectives of Labor Statistics.

Information system and specifics of labor statistics observation. The concept of labor statistics indicator system. Communicating statistical information on labor. Concept and methods of calculating the labor force. Indicators of natural movement and migration of the labor force. The measurement of economic stratification.

The concept and structure of the economically inactive population. The composition of the labor force. The concept of employment and unemployment. Types of unemployment. Forms of statistical monitoring and information base for the calculation and analysis of employment and unemployment.

Topic 9. Statistics of the political and social structure of society.

Statistics sections of the political and social life. The indicator system structure of the political statistics. Sources of information about the political and social life of the population: the decentralization of statistics, micro-census, involvement of the international statistical organizations and bodies. Statistical study of the electoral system and characteristics of the structure and dynamics of the electorate preferences using analysis tools such as variance analysis, index analysis, contingency tables, entropy, and the concordance coefficient. Distribution analysis of political activity levels by regional, social, ethnic breakdown. Typology of regions by the character and problems of social development. Regional difference factors in socio-economic development.

Social structure as subject of statistical studies. Indicators of the social structure of society. Sources of information about the social structure of society. The concept of social mobility and the measurement of social movements. Statistical indicators of individual social groups. Statistics of social relations.

Characteristics of public opinion. Statistical methods for public opinion research (Gateva and Salai coefficients of the structural differences).

Topic 10. Statistical study of the level and quality of life.

The concept of living standards and the importance of studying it. Goals of statistical level and quality of life studies. Social standards of living. Sources of information. The standard of living indicator system.

The calculation and use of integrated indicators: the Human Development Index (HDI), the Gender-related Development Index (GDI), the Human Poverty Index (HPI-1, HPI-2), etc.

Statistical study of material inequality. The indicators describing the level of inequality (Gini coefficient, Atnikson index, Thiel index). Factors of income inequality.

Topic 11. A statistical study of population income and consumption. Specifics of statistical studies of families and households.

A statistical study of volume, composition and dynamics of income formation. Indicators of income in the SNA. Household statistics, balance between revenue and expenditure. Indicators of income inequality, the Gini coefficient. Real income. Indicators of cost of living. The consumer basket.

Consumption of goods and services indicators. Volume and pattern of consumption, the factors determining the amount of per capita consumption of individual products, goods and services.

Income and household consumption, its volumes, and the structure of the various socio-economic categories.

Elasticities of income, prices, and other factors.

Indicators of volume, structure and dynamics of merchant services, consumer, housing and communal services of the population, passenger transport services and communications. Indicators of quality of service.

Consumer market price statistics, the study of inflation. The index method in the study of inflation.

4. Sample Questions and Assignments

Sample questions for the written exam.

Problem 1.

You have the following data on the per capita income of families (in Euros): 1370, 880, 1390, 510, 929, 850, 960, 1320, 1200, 1410, 900, 850, 1460, 1230, 1040. 680, 740, 450, 430, 880. Build a distribution series and graph distribution series of families by per capita income. Group the families by per capita income.

Problem 2.

Using the correlation of dynamics indicators, determine the missing series and their changes (dummy numbers):

Years	Number of students (in thousands)

		Absolute growth increase (in thousands)	Growth rate (%)	Growth increase rate (%)
1996	58.4		100.0	
1997		3.2		
1998			112.5	
1999				10.1
2000			122.0	
2001		16.0		
2002			125.1	
2003		18.0		
2004				24.0

Problem 3:

According to the grouping of families by number of family members and volume of per capita income, determine the existence and indicators of the correlation strength:

# of family members (persons) Income per capita, per month (in roubles)

# of family members (persons)	Income per capita, per month (in roubles)
1	1480
2	1250
3	1310
4	1030
5	1020
6	980

Problem 4:

You have the following data of prices and products on the city markets.

Base Day   **Chosen Day**

Types of products	Mode price (rub)	Units sold	Mode unit price (rub)	Units sold
А	65	110	78	95
Б	12.2	500	14.8	423
В	16.0	200	17.5	200

Determine the general indexes of prices, physical volume, and turnover. Relationship of indexes and increase in turnover due to certain factors.

Make conclusions.

Problem 5:

You have the following data about region population for year 2000.

Indicators	Population (thousands persons)
1. Population as of beginning of year 2000	600
2. Changes during the year:	
-Born	6
-Deceased	8
-Arrived for permanent residence from other regions	4
-Departed for permanent residence to other regions	2
3. Number of women from 15 to 49 years old:	
-Beginning of the year	
-End of the year	

4. Number of children as of September 1, 2000, aged from 4 to 7 years old and the probability of them living to their next birthday:

Age	Number of children	Probability of living to next

		birthday
4	8000	0.9946
5	7000	0.9951
6	6500	0.9956
7	-	0.9960
8	-	0.9962

Determine:
1 The population at the end of the year.
1. Midyear population and women of childbearing age.
2. Rates of birth, mortality, life expectancy, natural growth increase and fertility.
3. The possible number of students in grades 1-4 as of September 1, 2003 (not taking migration into account).

Sample questions for the written exam.

1. Subject and methods of social statistics
2. Goals of statistics in the modern world.
3. The organization of statistics in the Russian Federation.
4. The main stages of statistical research.
5. Grouping – the basics and types.
6. Group construction techniques.
7. The use of groups in the socio-economic research.
8. The rules for constructing statistical tables.
9. Charts - the basics and types. Using graphs in the socio-economic research.
10. Methods of graphic representation of socio-economic processes dynamics, structure and interactions.
11. The absolute values, their types, units of measurement.
12. Relative values - the basics, types, systems evaluation.
13. Using relative values in the socio-economic research.
14. Mean values - the basics, types, the use in socio-economic research.
15. Arithmetic mean types: simple, weighted. Their use in socio-economic research.
16. Mode - the basics, methods of calculation, and its use in socio-economic research.
17. Median - the basics, methods of calculation and its use in socio-economic research.
18. Indicators of variation - the basics, types and their use in socio-economic research.
19. Absolute and relative variation indicators and their use in socio-economic research.
20. Time series, the basics, types and their use in the socio-economic research.
21. The main analytical indicators calculated for time series.
22. Methods of time series analysis.
23. Interpolation and extrapolation, the use in socio-economic research.
24. Indexes - the basics, types and their use in the socio-economic research.

25. Individual and general indexes, their use in the socio-economic research.
26. Basic and chain indexes, and their use in the socio-economic research.
27. Price and production volume indexes.
28. Relationship of indexes, the use of indexes of socio-economic research.
29. Statistics of standards of living - the basics, system of indicators.
30. Working conditions and their evaluation.
31. Household income and its use.
32. Differentiation of population income.
33. Statistics in service industries (trade, consumer, housing and transport services).
34. Health and physical education statistics.
35. Education, culture and art statistics.
36. Environmental statistics and indicator system.
37. Statistics of free time - the basics, indicators used.
38. The theoretical foundations for construction of the SNA.
39. The classification of the SNA.
40. Methods for determining GDP.

Sample essay topics.

1. Statistical analysis of gross domestic product (GDP) growth factors.
2. The standard of living of population and the problem of free time.
3. Principles and methods of comparing the Gross Domestic Product (GDP) with other countries.
4. Statistical analysis of the productivity of labor by the index method
5. Statistics of migration and specifics of migration accounting.
6. Statistical study of unemployment.
7. Statistical study of population composition and dynamics.
8. Statistical methods for analysis of population income.
9. Analysis of income differentiation by social group.
10. Statistical methods for analysis of volume and structure of consumption of goods and services by population.
11. Statistical methods for the analysis of population health indicators.
12. Statistical study of the social welfare of population.
13. Statistical methods for analysis of volume and structure of social support services of various social groups.
14. Economic and statistical analysis of employment and unemployment in the regions of Russia
15. Methods of analysis and comparison of unemployment and labor conflicts.
16. A statistical study of labor migration.
17. A statistical study of poverty.
18. Analysis of the use of work time (in the industries).
19. A statistical study of part time employment.
20. Labor market model in world applications and their reflection in statistical data.
21. Economy statistics analysis of labor productivity (on the enterprise and industries)
22. Analysis of the productivity increasing factors.
23. Statistical study of the working conditions.

24. A statistical study of workplace conflicts in international practice.
25. Comparative characteristics of the methods of study and analysis of labor costs and wages of workers.
26. A statistical study of secondary employment.
27. A statistical study of poverty.
28. The standard of living of the population and the problem of free time.
29. Working conditions and injuries in the workplace.
30. Comparative characteristics of labor dynamics, movement and turnover.
31. Statistical analysis of wage increase factors.
32. Using the recommendations of the ILO in labor statistics.
33. A statistical study of credit.
34. Statistics of bank deposits.
35. System of the securities statistics indicators.
36. Statistics personal insurance.
37. Statistics of property insurance.
38. Statistical study of the population health.
39. Statistical analysis of prices using the index method.
40. Statistical study of the housing market.
41. Statistical study of the supply of housing.
42. A statistical study of the housing and communal services.
43. A statistical study of science and innovation.
44. A statistical study of education.
45. A statistical study of the social structure of the population.
46. Statistical analysis and study of the problems of unemployment.
47. A statistical study of wages.
48. Statistical study of composition and movement of the labor force.
49. Statistical study of the work time use.
50. A statistical study of housing construction in the regions of Russia based on the city information.
51. A statistical study of supply and demand for labor in the regions of Russia.
52. Statistical study of the use of labor resources.
53. The use of classifiers in statistical practice.
54. The use of sampling in the study of household budgets.
55. The use of sampling in study and analysis of the labor market in the regions.
56. Arithmetic mean (simple and weighted), and its use in social statistics.
57. The use of Geographic Information Systems (GIS) in political statistics.
58. Household consumption and its analysis of the SNA.
59. Common characteristics in the analysis of social processes.
60. Methods of study of variation series in the analysis of regional development differentiation in Russia