**Statistics and econometric**

The scope of examination issues for second degree candidates for full-time studies

Issues from statistics:

Subject of statistics

1.1. Subject of statistics

1.2. Stages of the statistical survey

1.3. Statistical population

1.4. Statistical variable

1.5. The full sample and subsample analysis

1.6. Sampling

Organizing Qualitative Data

2.1 Raw data

2.2 Frequency Distributions

2.3 Single-Value Grouping

2.4 Limit Grouping

Descriptive Statistics

3.1 Measures of Centre

3.2 Measures of Variation

3.3 Measures of Asymmetry

3.4 Measures of Kurtosis

Inferential Methods in Regression and Correlation

4.1 Correlation coefficient

4.2 Linear regression model for pair of variables

4.3 Partial correlation coefficient

4.4 Multivariate correlation coefficient

4.5 Multiple regression model

Methods for examining the relationship between qualitative variables

5.1. Strength of agreement and disagreement of quality features

5.2 Inference methods for independence of qualitative variables

Methods of analysing dynamics of economic phenomena

6.1. Individual and aggregate indices

6.2. Average rate of change over time

6.3. Analysis of linear trend

Elements of probability theory

7.1. Probability of sum of events, conditional probability, total probability

7.2. The law of large numbers (weak and strong)

One-dimensional discrete random variable

8.1. Distribution of probability and distribution of the discrete random variable

8.2. Parameters of the distribution of discrete random variable

8.3. Binomial distribution

8.4. Poisson distribution

One-dimensional continuous random variable

9.1. Distribution and density function of the continuous random variable

9.2. Parameters of the distribution of continuous random variable 9.3. Uniform distribution

9.4. Normal distribution

Point estimation

10.1. Central limit theorem

10.2. Concept of point estimator

10.3. Properties of Point Estimators

10.4. Point estimation of mean, variance, population proportion

Confidence Intervals

11.1. Idea of confidence interval

11.2. Confidence interval for mean, variance, population proportion

11.3. Determining the minimum sample size

Hypothesis Testing

12.1. test statistics, hypothesis, significance level, type I and type II errors, power test

12.2. Parametric tests: testing a claim about: mean, two means, standard deviation, population proportion, two population proportions, linear correlation coefficient, parameters of linear regression coefficient.

12.3. Nonparametric tests: chi-squared test, independence Chi-square test, test of the randomness of the sample

Literature: Elementary statistics, Neil. A. Weiss

**Econometrics issues**

1.  Multiple linear regression with normal errors: assumptions, estimation of model parameters (point and interval), hypotheses testing.

2. Linear regression with random regressors (including the autoregression model) - properties of the OLS estimator and other inference procedures.

3. Multidimensional linear regression models:

types of models, classification and the identification problems,

consistent parameter estimation,

4. Applications of linear regression and linear multivariate regression models in the forecasting of economic phenomena.

Literature:

# Maddala G.S., Introduction to Econometrics, Wiley, 2001, 3 Edition or further

# Analysis of financial time series

# 1. Stochastic processes and time series - concepts, characteristics, properties.

# 2. Properties of financial markets time series.

# 3. ARMA models - property, estimation and forecast.

# 4. GARCH type models - properties, estimation, and variance forecast.

# 5. SV type models - definitions and properties.

# Literature: Hamilton J.D., *Time Series Analysis*, Princeton University Press, Princeton, New Jersey 1994.

# Qualitative data analysis

# 1. Type of models for qualitative variables.

# 2. Applications of in qualitative variables models in economics.

# 3. The probit and logit models, parameter estimation method.

# Literature:

# Maddala G.S., Introduction to Econometrics, Wiley, 2001, 3 Edition or further