EDUCATIONAL ESTABLISHMENT
"BELARUS STATE ECONOMIC UNIVERSITY"

ECONOMETRICS

Syllabus for the magistrates for the specialty
1-25 81 01 "International Economics and Trade Policy"

2012

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RECOMMENDED FOR APPROVAL AS THE BASIC PROGRAM:

By the Department of the Economic Informatics of the Educational Establishment "Belarus State Economic University"

(minutes №___, date _____);

Scientific Advisory Board of the Educational Establishment "Belarus State Economic University"

(minutes №___, date _____).

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EXPLANATORY NOTE

The field of econometrics has developed rapidly. The use of up-to-date econometric techniques has become more and more standard practice in empirical work in many fields of economics.

The aim of the course "Econometrics" is to provide students with wide range of topics in modern econometrics, focusing on what is important for doing and understanding empirical work and to improve knowledge and skills in practical use of econometric models on real data using standard econometric software such as Eviews, Statistica and MS Excel.

Graduate students need **to know**:
– nature of econometrics and economic data;
– main concepts of linear regression models and its applications;
– main concepts of models with limited dependent variables and its applications;
– basic principles of modeling stationary time series and its applications;
– basic principles of modeling non-stationary time series and its applications;
– basic principles of construction and use of simultaneous equations and its applications.

Graduate students need **to be able to**:
– organize their work in accordance with the principles of the theoretical and practical work organization;
– apply different econometric models to the practical economic problems and forecasting;
– use corresponding software packages (MS Excel, Statistica, Eviews) to solve applied economic problems.

Control of knowledge is realized by means of tests using personal computers and necessary software.

Total hours on discipline – 164, hours of classroom – 62, where 50 hours – lectures, 12 hours – seminars. The form of control is an exam.

THE SAMPLE TOPICAL PLAN

№	Section Title	The number of hours	
		Lecture	Seminar
1	The nature of econometrics and economic data	2	
2	Simple linear regression models	4	1
3	Multiple linear regression	4	2
4	Nonlinear regression models	4	2
5	Econometric analysis under violation of the classical model assumptions. Heteroskedasticity. Autocorrelation	8	2
6	Models with dummy variables	4	1
7	Univariate time series models	4	
8	Multivariate time series models	4	
9	Models based on panel data	4	2
10	Simple panel data methods	4	
11	Advanced panel data methods	4	
12	Simultaneous equations models	4	2
	Total: 62	**50**	**12**

CONTENTS OF THE EDUCATIONAL MATERIAL

SECTION 1. THE NATURE OF ECONOMETRICS AND ECONOMIC DATA

About Econometrics. Sphere of the Econometrics Applications. Steps in Econometric Analysis. The Structure of Economic Data.

SECTION 2. SIMPLE LIMEAR REGRESSION MODELS

Simple Linear Regression. Economic Interpretation of the Regression Models. Ordinary Least Squares (OLS). Gauss-Markov Assumptions. Properties of the OLS-Estimation (Gauss-Markov theorem). Goodness-of-fit. Coefficient of Determination. Significance of Regression (F-test). Significance of Regression Parameters (A Simple t-test, Confidence Interval). The Application of Simple Linear Regression Models.

SECTION 3. MULTIPLE LINEAR REGRESSION

Multiple Linear Regression. The Model with k Independent Variables. Specification of Multiple Regression Model. Selection of Regressors. Multicollinearity. Matrix Form of the Multiple Regression Model. OLS-Estimates of the Multiple Linear Regression. Goodness-of-fit. Index of Determination. Significance of Multiple Regression. Significance of the Regression Parameters. The Application of Multiple Regression Models.

SECTION 4. NONLINEAR REGRESSION MODELS

Types of Nonlinear Regression Models. Specification of Nonlinear Models. Simple Nonlinear Regression Models. Multiple Nonlinear Regression Models. Nonlinear Models which can be made Linear. Production Functions. The Application of Nonlinear Regression Models.

SECTION 5. ECONOMETRIC ANALYSIS UNDER VIOLATION OF THE CLASSICAL MODEL ASSUMPTIONS. HETEROSKEDASTICITY. AUTOCORRELATION

The Influence of Heteroskedasticity on Regression Models. The Influence of Autocorrelation on Regression Models. Generalized Least Squares (GLS). The Applications of the GLS. Consequences for the OLS Estimator. Heteroskedasticity. Testing for Heteroskedasticity. Consequences for the OLS Estimator. Autocorrelation. Testing for first order autocorrelation. Alternative autocorrelation patterns.

SECTION 6. MODELS WITH DUMMY VARIABLES

Dummy Variable. Binary Response model. ANOVA models. The Application of Models With Dummy Variables.

SECTION 7. UNIVARIATE TIME SERIES MODELS

Introduction. Static Models. Finite Distributed Lag Models. OLS Estimation. The Applications of Univariate Time Series Models.

SECTION 8. MULTIVARIATE TIME SERIES MODELS

Trends and Seasonality. Stationary Stochastic Processes. Non-stationarity and Unit Roots. Serial Correlation and Heteroskedasticity. The Applications of Multivariate time series models.

SECTION 9. MODELS BASED ON PANEL DATA

Introduction. Basic Linear Panel Data Methods. Random/Fixed Effects. The Applications of Models based on panel data.

SECTION 10. SIMPLE PANEL DATA METHODS

Minimum Distance Methods. Instrumental Variables Estimation. Average Treatment Effect. The Applications of Simple Panel Data Methods.

SECTION 11. ADVANCED PANEL DATA METHODS

Advantages of Panel Data. Duration Analysis. Structural Estimation. Semi- and non-parametric estimation. The Applications of Advanced Panel Data Methods.

SECTION 12. SIMULTANEOUS EQUATIONS MODELS

The Nature of Simultaneous Equations Models. Endogeneity and Causality. The Problem of Identification. Methods of Estimation (Single Equation. Systems of Equations). The Applications of Simultaneous Equations Models.

REFERENCES

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4. Greene, W.H. Econometric Analysis / W.H. Greene. – 7nd Edition. – Prentice Hall, 2011. – 1232 p.

5. Berndt, E.R. The Practice of Econometrics: Classic and Contemporary / E.R. Berndt. – Addison-Wesley Publishing Company, 1996. – 702 p.

6. Wooldridge, J.M. Econometric Analysis of Cross Section and Panel Data / J.M. Wooldridge. – 2nd Edition. – MIT Press, 2010. – 1096 p.

7. Kennedy, P. A Guide to Econometrics / P. Kennedy. – 6nd Edition. – Willey-Blackwell, 2008. –600 p.

8. Enders, W. Applied econometrics times series / W. Enders. – 2nd Edition. – N.Y.: J. Wiley&Sons, 2004. – 472 p.

9. Ruud, P.A. An Introduction to Classical Econometric Theory / P.A. Ruud. – Oxford University Press, 2000. – 976 p.

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