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**Federal State Autonomous Educational Institution for Higher Education  
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA NAMED AFTER PATRICE  
LUMUMBER  
(RUDN University)**

**Department of Economic and Mathematic Modeling**

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## **COURSE SYLLABUS**

**Econometrics (advanced course)**

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**Recommended by the Didactic Council for the Education Field of:**

**38.04.01 «Economy»**

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**The course instruction is implemented within the professional education programme  
of higher education**

**«International Business»**

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**2026 г.**

## 1. THE COURSE GOALS

**The goal of the course** Econometrics (advanced course) is to familiarize students with modern econometrics and its applications. Studied are the methods of analysis of spatial data, time series and panel data. The emphasis is given to modern research methods, illustrated by applications from micro- and macroeconomics, as well as from finance. A special feature of the course is the use of specialized software that allows to perform econometric modeling at a professional level.

### **The main objectives of the study subjects are:**

Mastering the modern methods of econometric analysis. To learn to apply various methods of econometric analysis to solve problems in the field of micro-and macroeconomics, and in the field of finance and to use special software for solving econometric problems. Acquiring methods for constructing forecasts for economic processes based on econometric models.

## 2. REQUIREMENTS FOR LEARNING OUTCOMES

*Table 2.1. The list of competencies formed by students in the course of mastering the discipline (the results of mastering the discipline)*

Competence code	Competence	Competence achievement indicators (within this course)
GC-7.	Able to search for the necessary sources of information and data, perceive, analyze, memorize and transmit information using digital means, as well as using algorithms when working with data obtained from	GC-7.1. Searches for the necessary sources of information and data, perceives, analyzes, remembers and transmits information using digital means, as well as using algorithms when working with data obtained from various sources in order to effectively use the information received to solve problems;
		GC-7.2. Evaluates information, its reliability, builds logical conclusions based on incoming information and data.
GPC-2.	Able to apply advanced instrumental methods of economic analysis in applied and/or fundamental research.	GPC- 2.1. Has knowledge of advanced instrumental methods of economic analysis.
		GPC- 2.2 Able to apply knowledge of advanced instrumental methods of economic and financial analysis when conducting applied and/or fundamental research.
GPC-5.	Able to use modern information technologies	GPC- 5.1 Knows modern information technologies and software tools used in solving professional tasks

Competence code	Competence	Competence achievement indicators (within this course)
	and software tools in solving professional tasks.	GP-C 5.2 Able to choose the most effective among modern information technologies and software tools for solving professional tasks.
		GPC- 5.3 Fully possesses the skills of solving standard tasks of professional activity with the use of information technologies and software.

### 3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

This theoretical course is a core course of the economic block for master students with specialization in International Business. There are no prerequisites for the course of "Econometrics" (advanced course). The discipline "Econometrics" refers to the mandatory part in the educational relations of block B1 of the EP HE.

*Table 3.1. The list of components of the Higher Education Program Structure that contribute to the achievement of the planned results of mastering the Course*

Competence code	Competence	Previous Disciplines (Modules) *	Subsequent Disciplines (Modules)*
GC-7.	Able to search for the necessary sources of information and data, perceive, analyze, memorize and transmit information using digital means, as well as using algorithms when working with data obtained from		Corporate finance Intellectual property management
GPC-2.	Able to apply advanced instrumental methods of economic analysis in applied and/or fundamental research.	International trade	Corporate finance
GPC-5.	Able to use modern information technologies and software tools in solving professional tasks.	International trade	Corporate finance

\* - filled in in accordance with the matrix of competencies

### 4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

Course Workload and Academic Activities 3credits.

Table 4.1. Types of academic activities during the period of the HE program(me) mastering

Type of school work	Total hours	Semester			
		1	2	3	4
	<b>51</b>	<b>51</b>			
Including:					
Lectures	17	17			
Seminars (C)	34	34			
Self-study (total)	<b>93</b>	<b>93</b>			
Including:					
Course project (individual project)					
<i>Other types of independent work:</i>					
Preparation of 2 creative projects					
Independent study of recommended literature	70	70			
Preparation for the final certification	23	23			
Type of interim assessment (test, exam)					
The overall credit hours	<b>144</b>	<b>144</b>			
	<b>4</b>	<b>4</b>			

## 5. COURSE CONTENTS

Table 5.1. The content of the course (module) by type of educational work

TOPIC	Description
Topic 1: Introduction to econometrics. Statistical inference and hypothesis testing.	Introduction to Econometrics and Eviews software, Data Types, Sources of Data, Descriptive Analysis.

Topic 2: The simple regression model.	The simple regression model. Ordinary least squares. Goodness of fit.
Topic 3: Multiple regression.	Ordinary least squares (OLS) estimator. Pairwise linear regression model. Multivariate linear regression model. Properties of OLS estimators under Gauss-Markov conditions. Asymptotic properties of OLS estimators.
Topic 4: Violation of the assumptions of the classical regression model.	Heteroskedasticity, autocorrelation, impact on OLS estimation, generalized least squares (GLS), heteroskedasticity tests, White standard errors. Endogeneity, instrumental variables. Instrumental variable estimation. Generalized instrumental variable estimation. Two-step least squares.
Topic 5: Univariate time series.	Stationarity. Autocorrelation function. Autoregression and moving average models. ARMA models. Unit roots. Unit root tests. Conditional heteroscedasticity. ARCH and GARCH models.
Topic 6: Multivariate time series.	Dynamic models with stationary variables. Models with non-stationary variables. Cointegration. Cointegration testing.
Topic 7: Panel data methods. Final test.	Fixed Effects and Random Effects Estimators, Dynamic Panel Data Models

**Topic 1: Introduction to econometrics. Statistical inference and hypothesis testing**

The nature of econometrics data. Statistical inference and hypothesis testing. The confidence-interval approach. The test-of-significance approach. Some practical aspects.

**Topic 2: The Simple Regression Model**

Assumptions of the classical linear model. Ordinary Least Squares (OLS) as a minimization problem. Assumptions of OLS. Properties of OLS. Examples of OLS.

**Topic 3. Multiple Regression**

Goodness of Fit; Interpretation. Inference and estimation in the OLS model.

**Topic 4: Violation of the Assumptions of the Classical Regression Model**

Multicollinearity. Autocorrelation. Heteroskedasticity. Weighted least squares method. Instrumental variables. Maximal likelihood method.

**Topic 5: Univariate time series**

Stationary time series. Autocorrelation. Autoregressive-Moving average models. Unit roots. ARCH and GARCH models.

**Topic 6. Multivariate time series**

Dynamic models for stationary and not stationary time series. Cointegration.

**Topic 7: Panel data methods**

Fixed effect models and random effect models.

**6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS**

*Table 6.1. Classroom Equipment and Technology Support Requirements*

<b>Classroom for Academic Activity Type</b>	<b>Classroom equipment</b>	<b>Specialized educational / laboratory equipment, software and materials for mastering the discipline</b>
Lecture	Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, stable wireless Internet connection..	Laptop, projector, board, screen Software: Microsoft Windows, MS Office / Office 365, MS Teams, Chrome (latest stable release), Skype

<b>Classroom for Academic Activity Type</b>	<b>Classroom equipment</b>	<b>Specialized educational / laboratory equipment, software and materials for mastering the discipline</b>
Seminars	Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, stable wireless Internet connection.	Laptop, projector, board, screen Software: Microsoft Windows, MS Office / Office 365, MS Teams, Chrome (latest stable release), Skype
Self-studies	Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, stable wireless Internet connection.	Laptop, projector, board, screen Software: Microsoft Windows, MS Office / Office 365, MS Teams, Chrome (latest stable release), Skype

## **7. RESOURCES RECOMMENDED FOR COURSE STUDY**

### ***BASIC SOURCES:***

1. *Dougherty Christofer*. Introduction to Econometrics. 5<sup>th</sup> edition. Oxford University Press, 2016.
2. Green W.H. Econometric Analysis. 8<sup>th</sup> edition, 2018.
3. *Балашова С.А., Лазанюк И.В.* Эконометрика в задачах и решениях: учебное пособие для магистров. М.: РУДН, 2-е изд., 2017.

### ***ADDITIONAL SOURCES:***

1. *Berndt Ernst*. The Practice of Econometrics: Classic and Contemporary. Addison Wesley Publishing Company, 1991.
2. *Gujarati Damodar, Porter Dawn*. Basic Econometrics. 5<sup>th</sup> edition. McGraw-Hill Education, 2008
3. *Verbeek Marno*. A Guide to Modern Econometrics. 4<sup>th</sup> edition. Wiley, 2012.
4. *Елисеева И.И.* Эконометрика: учебник для магистров – М.: Юрайт, 2014.
5. *Матюшок В.М., Балашова С.А., Лазанюк И.В.* Основы эконометрического моделирования с использованием Eviews. – М.: изд-во РУДН, 2015.

### ***DATABASES, REFERENCE AND RETRIEVAL SYSTEMS:***

1. [www.gks.ru](http://www.gks.ru) - Federal State Statistics Service of the Russian Federation
2. [www.cbr.ru](http://www.cbr.ru) - Central Bank of the Russian Federation
3. <http://censtats.census.gov/> - U.S. Census Bureau
4. <http://www.bls.gov/> - U.S. Bureau of Labor Statistics
5. <http://data.worldbank.org/> - World Bank database
6. <http://pwt.econ.upenn.edu/> - database for cross-country comparisons

## 10. Software

MSoftware, Eviews 7.0, Eviews 10.0

### Logistical support discipline:

- classrooms (rooms) at the workplace for lectures (depends on the number of students) and for seminars (the number of students in separate groups);
- board;
- desktop PC with Microsoft Office 2010;
- multimedia projector;
- portable equipment - a laptop and a projector;
- screen (stationary or portable floor).

<b>№ aud.</b>	<b>Name-equipped classrooms</b>	<b>List of main equipment</b>
17	Classroom	Multimedia Projector - 2 pcs., Sound Tribune - 1 pc., Screen - 2 pcs.
19	Computer Class	Computers Pentium 4-1700/256MB/cd/audio - 21 pcs., Multimedia projector PanasonicPT-LC75 - 1 pc., The screen is 1 unit.
103	Classroom	Multimedia Projector - 1 pc.,
105	Classroom	Multimedia Projector - 1 pc.,
1	Classroom	Multimedia Projector - 1 pc.,
2	Classroom	Multimedia Projector - 1 pc.,
Conference hall	Classroom	Multimedia Projector - 1 pc., Sound equipment

Hall Library	4	Classroom	Multimedia Projector - 1 pc.,
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