



"I confirm"

Head of the Department: _____

Protocol No.

Date:

Syllabus

General Information	Department	Mechanics and mathematics
	Faculty	Business and Local Governance
	Major code	
	Group Number	
	Degree level	<input type="checkbox"/> Bachelor <input type="checkbox"/> Master
	Study format	Full - Time
	Academic year/Semester	/Spring
	Year of study	
	Academic semester	<input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Summer
Course Information	Course name, code	Econometrics
	Credit count	10
	Study load (hours)	105
	Teaching methods	<input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Laboratory
	Language of instruction	<input type="checkbox"/> Azerbaijani <input type="checkbox"/> English <input type="checkbox"/> Russian
	Course type	<input type="checkbox"/> Mandatory <input type="checkbox"/> Elective
	Prerequisite course/code	
Instructor Information	Instructor's academic degree, academic title, honorary title, last name, first name, patronymic	
	Instructor's email address	
	Instructor's contact number	
	Office hours	
Course Description	Econometrics is a scientific discipline that lies at the intersection of economics and mathematical sciences. It involves the analysis of statistical data using mathematical and statistical methods, based on qualitative relationships defined by economic theory. The aim is to construct econometric models that	

	<p>describe and explain the economic processes being studied.</p> <p>Econometrics enables the investigation of existing quantitative and qualitative interrelationships among economic indicators and processes through mathematical and statistical tools and models. As one of the essential subjects taught in economics-related programs, econometrics has developed and evolved through the integration of economic theory, mathematical economics, economic statistics, and mathematical statistics.</p> <p>Unlike economic theory, econometrics places particular emphasis on both the qualitative and quantitative aspects of economic processes by using empirical data and applying mathematical-statistical methods and models to analyze the interdependencies among economic indicators and to support the management of economic systems.</p> <p>Econometrics is not only an instrumental field for economic measurement but also provides methodologies for estimating the parameters of microeconomic and macroeconomic models. Furthermore, this scientific field is successfully used for forecasting economic processes both at the national level and across various sectors of the economy.</p>
Course Objectives	<p>The main objective of the course is to provide students with a general understanding of Econometrics, to facilitate their comprehension of the subject, and to teach the application of a range of econometric methods. Within this framework, students will gain the knowledge and skills necessary to identify the underlying patterns and regularities of socio-economic phenomena occurring both domestically and internationally, enabling them to make informed and effective decisions.</p>
Learning Outcomes	<p>Throughout the teaching of the Econometrics course, the following knowledge and skills are aimed to be imparted to students:</p> <ul style="list-style-type: none"> Developing the ability to collect and process data; Analyzing the statistical characteristics of data; Constructing econometric models and conducting tests to improve the quality of the models; Interpreting the results obtained from these models and forming concrete empirical insights regarding the modeled economic processes; Making forecasts based on the developed models.
Course Requirements	<p>Be able to understand:</p> <ul style="list-style-type: none"> • The conditions necessary for the effective use of econometric methods and models; • The selection and development of appropriate methods and models to improve forecasting accuracy; • The techniques for estimating model parameters when the basic assumptions of the Ordinary Least Squares (OLS) method are violated; • The applicability and limitations of econometric methods and models in various economic contexts; • The formulation and justification of point and interval forecasts for economic processes; • The necessary calculations for evaluating the quality of the econometric models used. <p>Be able to:</p>

	<ul style="list-style-type: none"> • Evaluate the development patterns of socio-economic phenomena at both macro and micro levels; • Analyze quantitative and qualitative relationships in socio-economic processes; • Formulate well-grounded conclusions and practical recommendations based on analytical results.
Academic Integrity	<p>Academic integrity involves ensuring the originality of one's work and properly acknowledging the ideas or findings of others by citing sources. Violations of Academic Integrity include:</p> <ol style="list-style-type: none"> 1. Plagiarism, 2. Cheating, 3. Submitting the same or part of a previously completed assignment or project in another course without proper citation, 4. Citing non-existent sources or fabricating a database, 5. Completing coursework or assignments on behalf of other students, 6. Engaging in dishonest behavior to gain unfair advantage (e.g., presenting a false medical report without being genuinely ill, providing false excuses to extend deadlines or gain benefits), 7. Taking an exam on behalf of another student or having someone else take an exam for oneself.
Ethical Conduct	
Primary Reading List	<ol style="list-style-type: none"> 1. Damodar, G. Basic Econometrics. 5th Edition, The McGraw–Hill Press, 2009. 2. Həsənli Y. H. Ekonometrikaya giriş. Bakı 2008, 237s. 3. Borodiç.S.A. Ekonometrika. Praktikum.(Rus dilindən tərcümə).Tərcümə edən A.N.Əliyev Bakı. 2019. 430 səh. 4. Şixəliyev N.Ş. İqtisadi – riyazi proqnozlaşdırma metodları. Bakı, 2014 5. Bruce Hansen “Econometrics” Princeton University Press 2022 6. Эконометрика: метод. указания и материалы к самостоятельной работе для студентов факультета «Бизнес-управление», обучающихся по направлению подготовки 6.030504 «Экономика предприятия» / Нар. укр. акад. [каф. информ. технологий и математики ; авт.-сост. С. Б. Данилевич, О. В. Дьячкова]. – Харьков : Изд-во НУА, 2017. –76 с 7. Эконометрика: учебник для вузов/ И.И.Елисеева [и др.] ; под редакцией И.И.Елисеевой.— Москва: Издательство Юрайт, 2023.— 449 с.
Supplementary Reading List	<ol style="list-style-type: none"> 1. Хайруллина, О.И. Эконометрика: базовый курс : учебник / О.И. Хайруллина, О.В. Баянова; Министерство сельского хозяйства Российской Федерации, федеральное государственное бюджетное образовательное учреждение высшего образования «Пермский аграрно-технологический университет имени академика Д.Н. Прянишникова». – Пермь : ИПЦ «Прокрость», 2019 – 176 с 2. Christopher Dougherty Introduction to Econometrics 4th Edition - 2019. – 573p.
Online Resources	
	The final grade is the sum of the scores given for continuous assessment—seminars and colloquia (0–30 points), independent work (0–10 points),

Grading: 100-Point System	attendance (0–10 points)—and the midterm assessment, which includes the end-of-semester exams (0–50 points). If practical and lab sessions are included for the same course, an additional 0–10 points are allocated for their evaluation.	
Seminars and Colloquiums	Colloquiums are held three times per semester in accordance with the academic calendar. Each colloquium is graded on a 0–10 point scale. Participation in colloquiums is mandatory. A student who does not attend a colloquium receives 0 points for that session.	0-30
Individual works	Font and Size: Arial, 12 pt Line Spacing: 1.5 Minimum Length: 3 pages Submission Deadline: No later than 2 weeks before the end of the semester Topics for Individual works: <ol style="list-style-type: none"> 1. Types of Data and Measurement Scales. Data Collection and Processing 2. Some Elements of Statistics and Probability Theory Used in Econometrics 3. Review of Basic Statistical and Probabilistic Concepts Used in Econometrics 4. Regression Analysis 5. Estimation of Regression Equation Parameters. Ordinary Least Squares (OLS) Method 6. Ordinary Least Squares (OLS) Method 7. Multiple Regression Analysis: Estimation 8. Multiple Regression Analysis: Generalization and Interpretation of Results 9. Use of Qualitative Variables in Multiple Regression Models 10. Seasonality in Time Series. Methods for Eliminating Seasonal Effects in Applied Problems 11. Stationarity Problems in Time Series 12. Cobb-Douglas Production Function and Construction of Its Econometric Model 	0-10
Attendance	For each 10% of missed class hours during the semester, 1 point will be deducted from the student's total score. A student who misses more than 25% of the total course hours will not be allowed to take the final exam.	0-10
Examination		0-50

Assessment of student knowledge based on the total accumulated semester points is conducted as follows:

Grading Scale:

Points	Letter-Grade Assessment	Performance Level
100 – 91	A	“excellent”
90 – 81	B	“very good”

80 – 71	C	“good”
70 – 61	D	“sufficient”
60 – 51	E	“satisfactory”
Less than 51 points	F	“unsatisfactory”

Course’s thematic plan					
N	Date	Subject Topics	Lecture	Seminar	Textbook/Assignments
1		<p>Subject, Object, and Purpose of the Course</p> <p>The theoretical foundations of econometrics. Object and subject of study, main goals of the course. Concept of a model; classification of models. Stages of the modeling process: Specification, Parametrization Identification, Verification</p>	2	2	
2		<p>Basic Concepts of Probability Theory</p> <p>Experiment, event, probability of an event. General formula of probability. Random variables and their basic characteristics. Discrete and continuous random variables. Distribution laws of random variables. Mathematical expectation and its properties. Variance and its properties. Standard deviation. Correlation and properties of the correlation coefficient.</p>	6	4	
3		<p>Probability Distributions of Random Variables</p> <p>Normal distribution. Chi-square distribution. Fisher distribution. Solving problems and examples related to distribution laws.</p>	4	3	
4		<p>Processing Statistical Data</p> <p>Concepts of mathematical statistics.</p>	6	4	

		Population, sample, and empirical distribution function. Calculation of sample characteristics: Population mean (mathematical expectation). Population variance and standard deviation. Sample variance, sample standard deviation, sample coefficient of variation. Solving problems and examples related to the topic.			
5		Statistical Estimation and Hypothesis Testing Types and properties of estimators. Calculation and properties of: Mathematical expectation. Variance. Standard deviation. Statistical hypothesis testing. Statistical criterion. Critical region. General scheme of hypothesis testing	6	3	
6		Hypothesis Testing with Known and Unknown Variance. Hypothesis testing for the mean of a random variable with known variance. Use of Laplace distribution tables. Hypothesis testing for the mean of a normally distributed variable with unknown variance. Testing variance assumptions of normally distributed variables. Hypothesis testing of the means of two normal variables with known and unknown variances.	6	4	
7		Comparison of Economic Indicators Comparison of average incomes and expenditures. Calculation of small and large variances. Identifying relationships among different indicators. Linear and nonlinear dependencies. Student's t-distribution and related calculations. Problem-solving based on course topics.	4	4	
8		Simple Linear Correlation Dependencies and relationships. Dependent and independent variables.. Meaning of the regression equation. Regression function. Explanatory and	6	3	

	<p>dependent variables. Multiple regression and empirical regression equations. Concept of trend. Estimation of theoretical stochastic trends. Ordinary Least Squares (OLS) method. Regression coefficients. Covariance and correlation coefficients</p>			
9	<p>Assessment of the quality of the regression equation</p> <p>Classical linear regression model. Assumptions of the ordinary least squares method. Analysis of the estimation accuracy of regression coefficients. Standard error of the regression. Standard error of the regression coefficients</p>	4	3	
10	<p>Study of the Coefficients of the Linear Regression Equation</p> <p>Hypothesis testing concerning the coefficients of the linear regression equation; statistical significance of a regression coefficient.</p> <p>Interval estimation of the coefficients of the linear regression equation.</p> <p>Forecasting the values of the dependent variable in econometric modeling.</p>	4	4	
11	<p>Evaluation of the Overall Quality of the Regression Equation and the R-squared Coefficient of Determination.</p> <p>Conceptual interpretation of the overall quality assessment of the regression equation.</p> <p>Total sum of squares, explained sum of squares, and residual sum of squares.</p> <p>Calculation of the R-squared coefficient of determination for a simple linear regression equation.</p> <p>Solving topic-related problems and exercises.</p>	4	4	

12	<p>Application of Excel Software in Solving Simple Econometric Problems</p> <p>Basic concepts of the Excel package. Tabs. Interface. Menus in Excel.</p> <p>Tables and their characteristics. Working with tables.</p> <p>Sorting by icons in Excel. Sorting data by custom lists in Excel.</p> <p>Theme formatting in Excel.</p>	4	3	
13	<p>Main Functions and Formulas in Excel</p> <p>Selecting dependent and independent cells in Excel.</p> <p>Using copy, cut, paste, and format painter functions in Excel.</p> <p>Using the AND and OR logical functions in Excel.</p> <p>Using the IF and IFERROR functions in Excel.</p>	2	2	
14	<p>Graphical Representation and Methods for Economic Indicators</p> <p>Solving problems related to economic indicators using graphical methods.</p> <p>Building appropriate graphical models for relevant problems.</p> <p>Solving topic-related practical problems and exercises.</p>	2	2	
	Total:	60	45	

Lecturer: