Description of Discipline

Title of Discipline: ***Modeling and Forecasting the Development of Socio-Economic Systems***					
Semester	Duration	Type of Discipline	ECTS Credits	Academic Workload	Language of Instruction
4	90 hrs.	compulsory	3	30 hours of classroom training, 60 hours of self-study.	Ukrainian
Learning Outcomes		Teaching Methods		Evaluation Methods	
LO 3. Knowledge and understanding of the theory and methodology of systematic analysis, application of systematic approach in the study of economic processes, development of social-economic systems; the ability to use the methodology of systematic analysis in the field of economics; the ability and skills to use the principles of systematic analysis in the management of economic systems.		Lectures, presentation		Group evaluation, pass-fail test	
LO 5. Knowledge and understanding of methodological bases of functioning of the regulation mechanism of national economy; methods, forms and means for implementing the regulation of the national economy; features of state regulation of social-economic systems of different levels of hierarchy.		Lectures, explanation, observation		Combined evaluation, pass-fail test	
LO 7. Knowledge and understanding of models of social-economic development, identification of tendencies and key priority areas of economic development, formulation of economic policy's direction.		Explanation, observation		Combined evaluation, pass-fail test	
LO 8. Knowledge and understanding of general concepts and stages of mathematical modeling of social-economic systems and processes; basics of optimal (mathematical) programming; essence of methods of mathematical-statistical analysis and forecasting of economic dynamics; problem solving on the basis of formulated models both by analytical methods and using computers; mathematical apparatus for the study of a wide range of typical and applied problems of economic analysis and decision-making.		Lectures, illustration, presentation, online teaching		Reports, graphic methods, evaluation using a computer, pass-fail test	

Requirements for Participation	Type of examination (oral, written, term paper, etc.)	Methods of teaching and learning (lectures, seminars, etc.)	Discipline Coordinator
Master's degree	Pass-fail test	Lectures, practical classes	Dubyna M.

Learning Outcomes
GC 1. Research ability. Competence in conducting research at the level of Doctor of Philosophy, making informed decisions, solving problems and solving scientific and applied problems. Ability to abstract thinking, analysis and synthesis, substantiation and modeling of problems. Ability to search and analyze information from various sources. Ability to use modern information technologies, computer tools and programs.
GC 2. Creativity. The ability to generate new scientific-theoretical and practical ideas, to find their own ways to solve the problem. Ability to identify contradictions and previously unsolved problems, problems or parts of them, to formulate and experimentally test scientific hypotheses. Ability to apply knowledge in practice.
GC 4. Group and project work. Competence in the development, planning and implementation of research and innovation projects and programs. Ability to work in a scientific and professional group with ethical commitment. Ability to lead, evaluate and ensure the quality of work performed, initiate and implement projects.
SC 2. Technological capabilities. Competence in the use of modern methods of modeling and forecasting using the latest applications, computer systems and networks, software products in creating new knowledge, obtaining scientific and practical results in the field of economics.
SC 3. Ability to criticize and evaluate. Competence in conducting a critical analysis of various information sources on the topic of the dissertation. Competence in public presentation and defense of research results. Ability to engage in critical dialogue in the field of economic research, international scientific discussions, expressing and defending one's own position. Scientifically substantiated evaluation of the obtained results.
PLO 1. Knowledge and understanding of research methods, ability and skills to use research methods at the level of Doctor of Philosophy.
PLO 3. Knowledge and understanding of the theory and methodology of systems analysis, stages of application of the systems approach in the study of economic processes, development of socio-economic systems; ability and skills to use the methodology of systems analysis in the field of economics, skills and abilities to use the principles of systems analysis in the management of economic systems.
PLO 5. Knowledge and understanding of methodological bases of functioning of the mechanism of regulation of national economy; methods, forms and tools for implementing the regulation of the national economy; features of state regulation of socio-economic systems of different levels of the hierarchy.
PLO 7. Knowledge and understanding of models of social and economic development, definition of tendencies and priority directions of development of economy, formulation of directions of economic policy.
PLO 8. Knowledge and understanding of general concepts and stages of mathematical modeling of socio-economic systems and processes; basics of optimal (mathematical) programming; essence of methods of mathematical and statistical analysis and forecasting of economic dynamics; solving problems on the basis of formulated models both by analytical methods and with the use of computers; mathematical apparatus of research of a wide class of typical and applied problems of economic analysis and decision-making.
PLO 11. Ability and skills to use statistical methods of analysis to identify trends in the development of research objects.
PLO 15. Ability and skills to organize creative activities and the process of conducting scientific research, to use modern technologies of scientific work, to evaluate and ensure the quality of work performed.
PLO 17. Ability to develop and implement projects and programs of processes and systems, as well as their structural elements in the field of economics.

PLO 22. Skills and abilities of application of methodical tools of economic diagnostics of social and economic development of national and regional economic systems;
PLO 23. Ability to assess the level of resilience of the socio-economic system to external and internal threats; choose appropriate methods and forms of monitoring the development of socio-economic systems of different levels; develop programs of high and sustainable economic growth.

Contents

MODULE 1. THEORETICAL PROVISIONS OF MODELING AND FORECASTING DEVELOPMENT OF SOCIAL-ECONOMIC SYSTEMS

Topic 1. Social-economic systems and features of modeling and forecasting their development

Systematic approach and its role in modeling and forecasting the development of social-economic systems. The essence of social-economic systems. Structure of social-economic systems. Principles and stages of using the systematic approach.

Topic 2. Features of modeling and forecasting the development of social-economic systems

Models and their types. The essence of modeling and stages of modeling social-economic systems. Macroeconomic modeling. The essence of forecasting. Types of forecasts. Methods of macroeconomic forecasting.

Topic 3. Information support for modeling social-economic systems

The essence of economic information. The main sources of economic information. Time series and features of their construction when modeling social-economic systems.

MODULE 2. ECONOMIC-MATHEMATICAL MODELING AND FORECASTING OF THE DEVELOPMENT OF SOCIAL-ECONOMIC SYSTEMS

Topic 4. The role of econometrics in modeling social-economic systems

Econometrics as a science. The essence of the econometric model. The main stages of econometric modeling. Linear regression model. The least squares method. Criteria for verification of econometric models for adequacy.

Topic 5. Multiple linear regression models

The essence of the multiple linear regression. The application of the least square method in multiple linear regression models.

Topic 6. Parametrization and investigation of multiple linear regression

The essence of multicollinearity. The definition of multicollinearity. Heteroscedasticity. Parametric multicollinearity test.

Topic 8. Heuristic methods for modeling the development of socio-economic systems

The essence of heuristic modeling methods and their types. Morphological method. Delphi Method. The "tree of goals" method. The goal tree method.

Exemplary Literature

Primary

1. Butko M.P. Systems and models: theory, methodology, practice. Teaching Manual. - Nizhyn: LLC "Publishing House" Aspect-Polygraph "", 2007. - 380 p.

2. Introduction to multiple regression and econometrics. Part 1. / J. Gruber. - K .: Vyshcha Shkola, 1996. - 319 p.

3. Bessalov A.V. Econometrics: [textbook. manual for universities] / A.V. Bessalov. - K .: Kondor, 2007. - 196 p.

4. Dolia V.T. Econometrics: textbook. manual / V.T. Dolia; Khark. nat. acad. city households. - Kh .: KNAMG, 2010. - 171 p.

5. Dougherty K. Introduction to Econometrics: Transl. from English / K. Dougherty. - M .: INFRA - M., 1997. - 402 p.

6. Econometrics: a textbook for students in the field of training "Economic Cybernetics" of all forms of education / L.S. Guryanova, T.S. Klebanova, O.A. Sergienko, S.V. Prokopovich. - Kh .: KhNEU them. S. Kuznets, 2015. - 384 p.

7. Kasyanenko V.O. Modeling and forecasting of economic processes: [textbook for universities] / V.O. Kasyanenko, L.V. Starchenko. - Sumy: University Book, 2006. - 185 p.

8. Kigel V.R. Mathematical methods of market economy: Textbook. - K .: Kondor, 2010. - 158 p.

Supplementary

1. Borodich S.A. Econometrics. Initial course: Textbook. - 6th ed., redone. and add. - M .: Delo, 2004. - 576 p.
2. Erina A.M. Statistical modeling and forecasting: Textbook. manual. - K .: KNEU, 2001. - 170 p.
3. Erina A.M., Palyan Z.O. Theory of statistics: a workshop. - K .: Знання, 2008. - 267 p.
4. Karaban L.A. Series of dynamics: ucheb.-prakt. Manual / L.A. Kaarban. - BSTU, 2009. - 167 p.
5. Karasev A.I., Kremer N.S., Savelieva T.I. Mathematical methods and models in planning. - M .: Economics, 1987.
6. Kihel I.S., Tkalenko N.V., Trunova O.V. Mathematical methods of management decision making. - Chernihiv: ChDINU, 2011. - 248 p.

Academic staff

Name	Academic degree	Position	Qualification / Academic Discipline	Full-time / Part-time	Area of Teaching
Dubyna Maksym Viktorovych	Doctor of Economic Sciences	Head of the Department of Finance, Banking and Insurance, Professor	Chernihiv National University of Technology (2007) Specialist in Finance; Doctor of Economic Sciences – 08.00.08 Money, Finance and Credit	Full-time	Modeling and Forecasting of Social-Economic Systems Development