



**Course Lecturer**

**Contact Information  
(e-mail)**

**Virtual Office Hours  
(eLearn)**

## **SYLLABUS OF THE ACADEMIC DISCIPLINE “Economic-Mathematical Methods and Models”**

Level of Higher Education - "Bachelor"  
Field of Knowledge: 07 “Management and Administration”  
Specialty: 072 “Finance, Banking and Insurance”  
Educational and professional program of Study “Corporate Finance”  
Year of Study: 3, Semester: 6  
The form of study: Full-time study  
The number of ECTS credits: 4  
Language of instruction: English

**Liudmyla Galaieva (Галаєва Людмила Валентинівна)**  
Associate Professor, Ph.D., Department of Economy Cybernetics

**Office Phone:** 527-85-67;                      mob. (+38) 098 - 905 - 63 - 95  
**e-mail:** lgalaeva@nubip.edu.ua

<https://elearn.nubip.edu.ua/course/view.php?id=0312>

### **DESCRIPTION OF THE COURSE**

The Academic Discipline “Economic-mathematical methods and models” belongs to series of disciplines that form the profile of the future specialist, equipping him with basic knowledge of the theory and practice in the application of economic and mathematical methods and models, because economic systems can’t be effectively studied without using the modern theoretical methods and practical experiment.

The purpose of studying this course is to form future specialists in modern thinking and give them a system of fundamental theoretical knowledge of economic-mathematical methods and models, and applied practical skills using information technology tools (including MS Excel, etc.); acquiring skills in research and analysis of economic, financial processes and phenomena to make efficient management decisions.

The task of studying the discipline is theoretical and practical training of students on the methodology and methods of researching the economic, financial processes and phenomena using the tools of economic and mathematical modeling.

#### **Acquisition of competencies:**

##### **Integrated competency (IC):**

Ability to solve complex specialized tasks and practical problems in the field of finance, banking and insurance in the course of professional activity or in the process training, which involves the use of certain methods and provisions of financial science and is characterized uncertainty of conditions and the need to take into account the complex requirements for professional and educational activities.

##### **General competencies (GC):**

GC2. Ability to apply knowledge in practical situation.

##### **Program learning outcomes (PLO):**

PLO01. Know and understand economic categories, laws, causal and functional relationships that exist between processes and phenomena at different economic levels systems

PLO02. Know and understand theoretical foundations and principles financial science, peculiarities of financial functioning systems

PLO04. Know the mechanism of functioning of state finances, including budgetary and tax systems, finances of entities management, household finances, financial markets, banking system and insurance.

PLO05. To have methodical tools of diagnosis the state of financial systems (state finances, including budgetary and tax systems, finances of subjects management, household finances, financial markets, banking system and insurance).

PLO06. Apply economic and mathematical methods and models to solve financial problems.

PLO07. Understand the principles, methods and tools state and market regulation of activities in the field of finance, banking and insurance.

PLO08. Apply specialized information systems, modern financial technologies and software products.

PLO09. Form and analyze financial statements and correctly interpret the information obtained.

PLO10. Identify sources and understand methodology of definition and methods of obtaining economic data, collect and analyze the necessary financial information, calculate indicators characterizing the state financial systems.

PLO11. To have methodical tools for implementation control functions in the field of finance, banking and insurance.

PLO12. Use professional reasoning for conveying information, ideas, problems and their methods solutions to specialists and non-specialists in the financial sphere of activity

PLO13. Possess general scientific and special methods of research of financial processes.

PLO14. Be able to think abstractly, apply analysis and synthesis to identify key financial characteristics systems, as well as behavioral characteristics of their subjects.

PLO16. Apply the acquired theoretical knowledge to solve practical problems and interpret the results meaningfully.

PLO17. Determine and plan personal opportunities of professional development.

PLO18. Demonstrate the basic skills of creative and critical thinking in research and professional communication.

PLO19. To demonstrate the skills of independent work, flexible thinking, openness to new knowledge.

PLO20. Perform functional duties in the group, to offer sound financial solutions.

PLO24. Know and be able to apply methods in practice and problem identification and resolution tools in the field of corporate finance.

PLO25. Identify reserves of efficiency improvement management of corporate finances of the enterprise.

## COURSE STRUCTURE

Topics	Hours (lectures / laboratory classes)	Learning outcomes	Tasks	Knowledge assessment
Semester # 6				
Module # 1. "Mathematical Programming"				
Topic 1. Bases of Mathematical Programming. The main concepts of Optimization Models and Methods.	2/2	To know the main concepts of Mathematical Programming: the modern theory; theorems, methods; essence and history of the academic discipline; studying the main methods	Performing practical tasks, self-study work using information	10

Topic 2. Methods for solving Linear Programming Problems.	4/8	for solving the problems of the course; realization of formal research received by the solver.	technology tools in elearn.	20
Topic 3. Special Methods and Models.	2/4			20
Topic 4. Nonlinear Programming Problems.	1/1			20
Test and task to Module # 1				30
Total (on the content of module # 1)	9/15			100
<b>Module # 2. "Mathematical Modelling"</b>				
Topic 5. Bases of Economic Mathematical Modelling	2/5	To know the main concepts of Mathematical Modelling: the modern theory, studying the main types of models for solving the problems of the course; realization of formal research received by the solver; performance of the analysis of the solution.	Performing practical tasks, self-study work using information technology tools in elearn.	20
Topic 6. The System of Models in Agriculture.	2/5			20
Topic 7. Some sections of modeling (Financial, Risk etc.)	2/5			30
Test to Module # 2				<b>30</b>
Total (on the content of module # 2)	6/15			<b>100</b>
<b>Total, hours</b>	<b>15/30</b>			
Total for educational work	<b>0,7 · (R<sub>MOD 1</sub> + R<sub>MOD 2</sub>)</b> <b>R<sub>EW</sub> = -----</b> <b>2</b>			<b>70</b>
Certification ( <b>Exam</b> )				<b>30</b>
<b>Total</b>	<b>R<sub>DIC</sub> = R<sub>EW</sub> + R<sub>CER</sub></b>			<b>100</b>

### ASSESSMENT POLICY

Deadline and reassembly policy:	Works that are submitted in violation of deadlines without good reason are evaluated at a lower grade. Relocation of modules takes place with the permission of the teachers who provide the course, if there are serious reasons (for example, hospital).
Academic Integrity Policy:	Copying of the text during written tests and exams is prohibited. The use of mobile devices is allowed only with the permission of the teacher during online testing and preparation of practical tasks. Self-Study works in the form of abstracts, reports, presentations must have correct text links to the information sources used.
Attendance Policy:	Attendance is mandatory. For objective reasons (for example, illness, international internship) training can take place individually at a distance (online form in agreement with the dean of the faculty and the lecturer of the course).

## STUDENT EVALUATION SCALE

Student rating, points	National grade based on exam results	
	exams	credits
90-100	excellent	passed
74-89	good	
60-73	satisfactory	
0-59	unsatisfactory	not passed

### RECOMMENDED SOURCES OF INFORMATION

1. Carl P. Simon, Lawrence Blume. Mathematics for economists. New York, London: W.W.Norton & Company, 1994. 930p.
2. Cox D., Cox M. The Mathematics of Banking and Finance. The Atrium, Southern Gate, Chichester, John Wiley & Sons Ltd, 2006. 312 p.
3. Dantzig, G.B. Linear Programming and Extensions. Princeton, NJ: Princeton University Press, 1998. 656 p.
4. Drury C. Management and cost accounting. C&C Offset, China, 2008. 775p.
5. Galaieva L, Shulga N, Lipska V. Optimization Methods and Models. Kyiv: Printed Centre CP «Компринт», 2016. 259 p.
6. Kravchenko V.M., Galaieva L.V., Shulga N.G. Applied modeling: Economic and mathematical modeling. Kyiv: NULESU, 2023. 363 p.
7. Market outlook report URL: [http://www.agr.gc.ca/pol/mad-dam/index\\_e.php?s1=pubs&s2=rmar&s3=php&page=rmar\\_01\\_01\\_2009-04-17](http://www.agr.gc.ca/pol/mad-dam/index_e.php?s1=pubs&s2=rmar&s3=php&page=rmar_01_01_2009-04-17)
8. Peter B.R. Hazell, Roger Norton. Mathematical programming for economic analysis in agriculture. Macmillan Publishing Company, 1986. 400p.
9. Ruric E. Wheller, W.D. Peeples, Jr. Modern Mathematics with Applications to Business and the Social Sciences. Fourth Edition. Monterey, California: Brooks/Cole Publishing Company, 1986. 707p.
10. Taha Hamdy A. Operations Research. An sntroduction/ Tenth Edition. Pearson Education Limited; 2017. 849 p.
11. Tan S.T. Calculus for the Managerial, Life, and Social Sciences. Tenth Edition. Brooks. **Cengage Learning**, 2014. 720p.
12. Waters D. Supply Chain Management: An Introduction to Logistics. 2nd Edition. Bloomsbury Publishing, 2019. 384 p.
13. Галаєва Л.В., Рогоза Н.А., Шульга Н.Г. Математичні моделі аграрного сектору: навч.посібн. Київ: ЦП "Компринт", 2020. 484с.
14. Галаєва Л.В., Рогоза Н.А., Шульга Н.Г. Дослідження операцій Ч.1: навч. посібн. К.: ЦП «Компринт», 2018. 290 с.
15. Жадлун З.О., Галаєва Л.В., Шульга Н.Г. Економіко-математичне моделювання з основами математичного програмування: навч.посібн. Київ: ТОВ «Agrar Media Group», 2016. 266с.
16. Офіційний сайт Державного Комітету статистики України. URL: <http://ukrstat.gov.ua/>
17. Офіційний сайт Євростату. URL: <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home>
18. Офіційний сайт Кабінету Міністрів України. URL: <http://www.kmu.gov.ua/control/>
19. Офіційний сайт Міністерства економічного розвитку і торгівлі України. URL: <http://www.kmu.gov.ua>

20. Офіційний сайт Продовольчої та сільськогосподарської організації ООН (ФАО). URL: <http://www.fao.org/>
21. Офіційний сайт Світового банку. URL: <http://www.worldbank.org/>
22. Підгорний А. З., Погорелова Т. В. Фінансова статистика: навчальний посібник. Київ: ФОП Гуляєва В.М., 2020. 204 с.
23. Провост Ф., Фоусет Т. Data Science для бізнесу. Як збирати, аналізувати і використовувати дані. Видавництво: Наш формат, 2019. 400 с.