COURSE SYLLABUS
ECONOMIC AND MATHEMATICAL METHODS AND MODELS

Level of higher education - Bachelor
Specialization 051 "Economics"
Education programme "International Economics"
Academic year 3, семестр 6
Form of study full-time (full-time, extramural)
Number of ECTS credits 4
Language of instruction English (Ukrainian, English, German)

Course lecturer	**Makarchuk O.G.**
Lecturer contact information (e-mail)	**makarchuk.o.g@nubip.edu.ua**
Course page in eLearn	**https://elearn.nubip.edu.ua/course/view.php?id=5109**

COURSE DESCRIPTION

(up to 1000 printed characters)

The course "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 processes and phenomena to make adequate management decisions.

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

Competencies of the educational programme:

Acquision of competencies:

Integrated competencies (IC): The ability to solve complex specialized problems and practical problems in the economic sphere, which are characterized the complexity and uncertainty of the conditions it implies application of theories and methods of economic science.

General competencies (GC):

GC 3. Ability to abstract thinking, analysis and synthesis
GC 4. Ability to apply knowledge in practical situations
GC 6. Ability to communicate in a foreign language.
GC 7. Information and communication skills technologies.
GC8. Ability to search, process and analyze information from various sources.
GC 11. Ability to make informed decisions.

Professional (special) competencies (PC):

PC 1. Ability to demonstrate knowledge and understanding of issues the subject area, the foundations of the functioning of the modern economy at the micro-, MSSO-, macro- international levels.
PC 4. Ability to explain economic and social processes and phenomena based on theoretical models, analyze and meaningfully interpret the obtained results.
PC 6. Ability to apply economic and mathematical methods and models for solving economic problems.
PC 7. Ability to use computer technologies and data processing software to solve
economic tasks, information analysis and preparation
analytical reports.
PC 8. Ability to analyze and solve tasks in the field economic and social-labour relations.
PC 9. Ability to predict based on standard theoretical and econometric models of socio-economic trends.
PC 12. The ability to identify problems independently is economical character when analyzing specific situations, to propose

methods of solving them.

Program learning outcomes (PLO):
PLO 3. Know and use economic terminology, explain the basic concepts of micro- and macroeconomics.
PLO 4. Understand the principles of economic science, features functioning of economic systems.
PLO 5. Apply analytical and methodical tools for the justification of proposals and acceptance of managerial ones decisions by various economic agents (individuals,
households, enterprises and bodies state authorities).
PLO 7. Explain the models of socio-economic phenomena from the point of view
fundamental principles and knowledge based on understanding the main directions of the development of economic science.
PLO 8. Apply appropriate economic and mathematical methods and models for solving economic problems.
PLO 12. Apply acquired theoretical knowledge for solving practical tasks and meaningfully interpret the received the results
PLO 13. Identify sources and understand methodology definitions and methods of obtaining socio-economic data, collect and analyse the necessary information, calculate economic and social indicators.
PLO 16. Be able to use data, provide arguments, critically evaluate logic and form scientific conclusions and analytical texts on economics.
PLO 21. Be able to think abstractly, apply analysis and synthesis to identify key characteristics of economic systems of different levels, as well as the characteristics of the behaviour of their subjects.

COURSE STRUCTURE

Topic	**Hours** (lectures/labs, practical classes, seminars)	**Learning outcomes**	**Tasks**	**Assessment**
Semester 6				
Module 1				
Topic 1. Theoretical foundations of mathematical modeling and classification of models	1/2	To know the main concepts of Mathematical Programming: the modern theory; theorems, methods; essence and history of the academic discipline;	Students will enhance their understanding and acquire practical skills by working through the	Execution and delivery of practical works - credited.

Topic 2. Principles and stages of construction Economic mathematical models Topic 3. Basic methods of formalizing economic conditions Topic 4. The general problem of linear programming and its canonical figures Topic 5. Geometric interpretation of linear programming problems Topic 6. The solution of simplex Topic 7. Theory of duality and duality of linear optimization estimates tasks	1/4 2/4 2/4 1/4 1/4 2/4	studying the main methods for solving the problems of the course; realization of formal research received by the solver.	exercises, which are of three types. Theory exercises on derivations and model extensions. Simulation exercises illustrating statistical properties of econometric models and methods. Empirical exercises on applications with business and economic data sets to solve questions of practical interest.	Module: descriptive part 100; test part 30 * 0.1; Independent work - according to the evaluation journal in eLearn**.**
Module 2				
Topic 8. Transport problems of linear programming Topic 9. Analysis of optimization solutions tasks Topic10. Mathematical modeling of the agricultural industry Topic 11. Applied financial models. Production models Topic 12. Applied financial models	1/4 1/4 1/4 1/3 1/4	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	Tasks of practical work. Writing tests, essays. Doing independent work (including in elearn) Problem solving, presentations etc.	Execution and delivery of laboratory works - credited. Module: descriptive part 100; test part 30 * 0.1; Independent work - according to the evaluation journal in eLearn**.**
Total for 6 Semester				**70**
Exam				**30**
Total for course				**100**

ASSESSMENT POLICY

Policy regarding deadlines and resits:	Assignments submitted after the deadline without valid reasons will be graded lower. Resitting of modules will be allowed with the permission from the lecturer and in the presence of valid reasons (e.g. medical reasons).
Academic honesty policy:	Cheating during tests and exams is strictly prohibited (including the use of mobile devices). Coursework and research papers must contain correct citations for all sources used.
Attendance policy:	Class attendance is mandatory. In case of objective reasons (such as illness or international internships), individual learning may be allowed (in online format by the approval of the dean of the faculty).

SCALE OF ASSESSMENT OF STUDENT KNOWLEDGE

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

12. Recommended sources of information

Main

Tutorials

1. Econometric Analysis 8th edition by William H. Greene, Prentice Hall, 2017. 1176 pp.
2. Introduction to Econometrics**.** 4th edition by James H. Stock and Mark W. Watson, Addison-Wesley, 2018. 800 pp.
3. Introductory Econometrics: A Modern Approach**.** 7th edition by Jeffrey M. Wooldridge, South-Western College Publishers, 2018. 816 pp.

4. Білоусова С.В., Ковальчук Т.В. Економіко-математичне моделювання: компендіум і практикум: навч. посіб. К.: Київ. нац. торг.-екон. ун-т, 2018. 524 с.

5. Волошин О. Р., Галайко Н. В. Економетрія. Ч. 1: навч. посібник. Львів: ЛДУВС, 2019. 192 с.

6. Диха М. В., Мороз В. С. Економетрія :навчальний посібник. Київ : Центр учбової літератури, 2019. 206 с.

7. Економіко-математичні методи і моделі в галузі управління персоналом: навч. посіб. /За заг. редакцією Л.В. Мазник. К. : Кафедра, 2019. 290 с.

8. Економіко-математичні методи та моделі у науково-дослідних роботах: навч. посіб. / за заг. ред. д-ра екон. наук, проф. О. Є. Кузьміна. Львів : Видавництво Львівської політехніки, 2021. 284 с.

9. Економіко-математичні методи та моделі: навч. посіб./ Заг. редакцією В.М. Мацкул . Одеса: ОНЕУ, 2018. 404 с.

10. Карімов Г. І. Моделювання та прогнозування в управлінні : навч. посіб. Кам'янське : ДДТУ, 2018. 163 с.

11. Козьменко О.В. Економіко-математичні методи та моделі (економетрика): навчальний посібник. Суми: Університетська книга, 2019. 406.

12. Кузьмичов А. І. Економетрія. Моделювання засобами MS Excel: навчальний посібник. К. : ЦУЛ, 2019. 214 с.

13. Лещинський О. Л., Рязанцева В. В., Юнькова О. О. Економетрія: навч. посібник для студ. вищ. навч. закладів. К.: МАУП, 2018. 205 с.

14. Назаренко А. М. Економетрика: навч. посібник. Суми: Вд-во СумГУ, 2020. 404 с.

15. Наконечний С. І., Терещенко Т. О., Романюк Т. П. Економетрія: підручник. К.: КНЕУ, 2018. 352с.

16. Присенко Г. В., Равікович Є.І. Прогнозування соціально-економічних процесів: навч. посібник. К.: КНЕУ, 2020. 378 с.

17. Руська Р. В. Економетрика: навч. посібник. Тернопіль: Тайп, 2021. 248 с.

Supplementary

18. Quirk T. Excel 2010 for Business Statistics. A Guide to Solving Practical. Business Problems, School of Business and Technology Webster University, 2018, 264 p.

19. Гур'янова С. Прикладна економетрика : навч. посіб. : у двох частинах. Частина1. Харків : ХНЕУ ім. С. Кузнеця, 2019. 235 с.

20. Молчанюк І.В., Плотніков А.В., Єжов М.Б. Розгорнутий план лекцій з дисципліни «Економіко-математичні методи та моделі» для студентів першого (бакалаврського) рівня галузі знань 07 «Управління та адміністрування». 2020. 25с.

21. Оптимізаційні методи та моделі в підприємницькій діяльності : Навч. посіб. / Л.О. Волонтир, Н.А. Потапова, І.М. Ушкаленко, І.А. Чіков, Вінницький національний аграрний університет. Вінниця : ВНАУ, 2020. 404 с.

22. Теоретичні основи кількісних методів моделювання та прогнозування економічних процесів. URL: http://bookss.co.ua/book_medoti-ekonomyko-statestichnih-doslidzhen_ 806/3_1.-teoretichn-osnovi-klksnih-metodv-modelyuvannya-taprognozuvannya-ekonomchnih-procesv.

23. Якимова Л. П. Оптимізаційні методи та моделі : практикум в MS Excel : навч.- метод. посіб. Чернівці : Чернівец. нац. ун-т ім. Ю. Федьковича, 2022. 272 с.

Information Resources

1. Верховна Рада України. URL: http://zakon.rada.gov.ua/
2. Державний Комітет статистики України. URL: http://ukrstat.gov.ua/
3. Євростат. URL: http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home
4. Кабінет Міністрів України. URL: http://www.kmu.gov.ua/control/
5. Міністерство фінансів України http://www.minfin.gov.ua
6. Нормативні акти України - законодавство для практиків http://www.nau.kiev.ua
7. Офіційний вісник України http://www.gdo.kiev.ua
8. Продовольча та сільськогосподарська організація ООН (ФАО). URL: http://www.fao.org/
9. Світовий банк. URL: http://www.worldbank.org/
10. Положення про екзамени та заліки у Національному університеті біоресурсів і природокористування України, затверджене Вченою радою НУБіП України від 26.04.2023 р. протокол № 10. URL: https://nubip.edu.ua/sites/default/files/u284/polozh_ekzameni_zaliki_z_dopovnennyam_2023_na_sayt.pdf