

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ ЕКОНОМІЧНИЙ УНІВЕРСИТЕТ
ІМЕНІ СЕМЕНА КУЗНЕЦЯ



"ЗАТВЕРДЖУЮ"

Заступник керівника
(професор з науково-педагогічної роботи)

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МАТЕМАТИЧНІ МОДЕЛІ ТА МЕТОДИ ПРИЙНЯТТЯ РІШЕНЬ

робоча програма навчальної дисципліни

Галузь знань усі галузі
Спеціальність усі спеціальності
Освітній рівень перший (бакалаврський)
Освітня програма усі програми

Вид дисципліни
Мова викладання, навчання та оцінювання

вибіркова
іноземна (англійська)

Завідувач кафедри вищої математики та
економіко-математичних методів

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ЗАТВЕРДЖЕНО

на засіданні кафедри вищої математики та економіко-математичних методів
Протокол № 1 від 27.08.2018 р.

Розробник:

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**Лист оновлення та перезатвердження
робочої програми навчальної дисципліни**

Навчальний рік	Дата засідання кафедри – розробника РПНД	Номер протоколу	Підпис завідувача кафедри

1. Introduction

The academic discipline “Mathematical models and methods of decision-making” will be useful for future managers and economists who are going to be competent in modern researches and their significance in further solving professional problems.

This educational discipline presents a formulation and a characteristic of single- and multicriteria optimization problems; basis and application of single- and multicriteria optimization and methods of decision-making to solving economic problems.

Elements of Mathematical models and methods of decision-making are applied as instrument of investigation and solving optimization economic problems for forming models of economic processes and developments, acquiring the necessary theoretical and practical knowledge for solving specific problems, which are set in the process of forming economic and mathematical models, and the obtaining the required mathematical knowledge for the study of other disciplines.

The annotation of the academic discipline:

The main purpose of this educational discipline is forming future specialists' fundamental knowledge of single- and multi-criteria optimization and methods of decision-making for a construction of economic-mathematical models and solving of applied economic problems.

The main tasks that should be solved in the process of teaching the discipline are:

- giving students fundamental theoretical knowledge of single-criteria optimization;
- giving students fundamental theoretical knowledge of multi-criteria optimization;
- introduction to methods of decision-making;
- construction of mathematical models and using single-criteria optimization and methods of decision-making to investigate economic systems and processes;
- construction of mathematical models and using multi-criteria optimization and methods of decision-making to investigate economic systems and processes.

Learning this discipline gives the possibility for a student:

- to construct mathematical models of economic systems and processes;
- to analyze and solve economic problems using single- and multicriteria optimization;
- to analyze and solve economic problems using methods of decision-making;
- to investigate economic systems and processes;
- to minimize a risk of decision-making.

The purpose of the academic discipline:

Academic year	2nd	
Term	1st	
Number of credits	5	
The form of studies	lectures	32
	practical studies	16
	laboratory studies	16
Independent work	86	
Form of final control	test	

Structural and logical scheme of studying the academic discipline:

Previous academic disciplines	Next academic disciplines
Algebra (Mathematics)	Higher mathematics
Geometry (Mathematics)	Probability theory and mathematical statistics

2. Competences and result of mastering the academic discipline:

Competences	Results of mastering the academic discipline
In the process of learning this discipline a student receives analytic and investigatory <i>competences</i> (forming skills to use the instrument of mathematical programming, stochastic programming, single- and multi-criterion optimization and decision-making for solving economic problems and ability to form, solve and analyze the corresponding problems) which are necessary for a modern economist in any sphere of his activity	<ul style="list-style-type: none"> - knowing single- and multicriteria optimization; - knowing methods of decision-making; - mastering the fundamentals of the methodology of mathematical investigation of the applied economic problems; - mastering a construction of mathematical models and using single- and multicriteria optimization; - mastering methods of decision-making to investigate economic systems and processes; - independent broadening of knowledge; - development of logical and analytic thinking; - obtaining primary skills in independent-learning of mathematical and applied library sources

3. The syllabus of the academic discipline

Thematic module 1. Fundamentals of decision making methodology

Theme 1. Basic definitions and concepts of decision making theory

Theme 2. General formulation of problems of decision-making

Theme 3. Axiomatic theories of rational behavior

Theme 4. Single-criterion problems of decision-making

Theme 5. Multi-criterion decision-making problems

Thematic module 2. Methods of decision making

Theme 6. Methods of solving single-criterion problems

Theme 7. Multi-criteria solutions of objective models

Theme 8. A statement of the multi-criteria problem of linear programming

Theme 9. Methods of estimation and comparison of multicriteria alternatives

Theme 10. The human system of information processing and its relationship with decision-making

Theme 11. Statistical methods of decision making

Theme 12. Problems of decision-making in conditions of uncertainty

Theme 13. Problems of decision-making in conditions of certainty

Theme 14. Decision-making problems at risk

Theme 15. Stochastic decision making problems

Theme 16. Game theory as a tool of decision making theory

4. The order of assessment of studying results

The system of assessment of competences which were formulated for a student during the learning of the academic discipline, takes into consideration the forms of studies which according to the syllabus of the academic discipline provide lectures, practical studies, laboratory works, fulfillment of students' independent work. The assessment of the formed competences of students is carried out on the accumulative 100-point system. According to the temporary provision "About the Order of Assessment of Students Academic performance on the Accumulative Point Rating System" of Simon Kuznets Kharkiv National University of Economics control ways include:

current control which is carried out within a term during lectures, practical studies and laboratory works and it is assessed as a sum of accumulative points (the maximum equals 100 points; the minimum which makes it possible for a student to pass a test, equals 60 points);

module control which is carried out in the form of a colloquium with taking into account the current control according to a corresponding thematic module, provides an integral assessment of student's results after learning the material of a logically completed part of the discipline (or a thematic module);

final/term control: the final mark on the academic discipline is calculated according to the points obtained during the current control on the accumulative system.

Current control on the given academic discipline is carried out in the following forms: active in-class work (lecture); active in-class work (practical study); active in-class work (laboratory study); homework; competence oriented tasks (defence of laboratory works); an independent test; a written test; independent creative work.

Assessment of student's knowledge during practical studies and carrying out laboratory works is conducted on the accumulative system according to the following criteria: understanding, the degree of the mastery of the theory and methodology of problems which are considered; the degree of the mastery of the factual material of the academic discipline; familiarizing with the recommended literary sources and modern literature on the questions which are considered; the ability to connect theory and practice in the consideration of particular examples, solving problems, carrying out laboratory works, carrying out calculations in the process of doing homework and tasks which are considered in class; the logic, structure, style of presenting the material in written works and in oral answers in class, the ability to ground one's position, carry out generalization of the information and draw conclusions.

The general criteria for the assessment of **independent work** of students are

profound and deep of knowledge, the level of thinking, skills in systematization knowledge on particular themes, skills in drawing conclusions, attainments and techniques of carrying out practical tasks, the ability to find necessary information, carry out its classification and processing, self-realization in practical and laboratory studies.

The criteria for assessment of independent creative work and independent tests are: the ability to carry out a critical and an independent estimation of the defined problem questions; skills in the explanation of alternative views and availability of a students' own point of view, position on the defined problem question; using the analytical approach; the quality and accuracy of expressing the thought; the logic, structure and explanation of conclusions about a particular problem; independence of carrying out of the work; grammatical correctness of the presentation of the material; using the methods of comparison, generalization of the concepts and facts; the design of the work; the quality of presentation.

The total result in points during the term is "60 and more points mean passed", "59 and less points mean failed" and it is entered into the "Mark sheet" on the academic discipline.

The distribution of points by weeks

Themes of the thematic module			Lectures	Practical study	Laboratory study	Homework	Competence oriented task	Independent test	Written test	Independent creative work	Colloquium	Total
Thematic module 1	Theme 1	Week 1	1	1	-	0.5	-	-	-	-	-	2.5
	Theme 2	Week 2	1	-	1	0.5	-	-	-	-	-	2.5
	Theme 3	Week 3	1	1	-	0.5	-	-	-	-	-	2.5
	Theme 4	Week 4	1	-	1	0.5				-	-	2.5
	Theme 5	Week 5	1	1	-	0.5	-	5	-	-	-	7.5
Thematic module 2	Theme 6	Week 6	1	-	1	0.5	6	-	-	-	-	8.5
	Theme 7	Week 7	1	1	-	0.5	-	-	7	-	-	9.5
	Theme 8	Week 8	1	-	1	0.5	-	-	-	-	8	10.5
	Theme 9	Week 9	1	1	-	0.5	-	-	-	-	-	2.5
	Theme 10	Week 10	1	-	1	0.5	-	-	-	-	-	2.5
	Theme 11	Week 11	1	1	-	0.5	-	-	-	-	-	2.5
	Theme 12	Week 12	1	-	1	0.5	-	-	-	-	-	2.5
	Theme 13	Week 13	1	1	-	0.5	-	5	-	-	-	7.5
	Theme 14	Week 14	1	-	1	0.5	6	-		-	-	8.5
	Theme 15	Week 15	1	1	-	0.5	-	-	7	-	-	9.5
	Theme 16	Week 16	1	-	1	0.5	-	-	-	8	8	18.5
Total			16	8	8	8	12	10	14	8	16	100

The scales of assessment: national and ECTS

Sum of points including all forms of study	Mark on the ECTS scale	Mark on the national scale	
		for an exam, a term paper, practice	for a test
90 – 100	A	excellent	passed
82 – 89	B	very good	
74 – 81	C	good	
64 – 73	D	satisfactory	
60 – 63	E		
35 – 59	FX	unsatisfactory	failed
1 – 34	F		

5. Recommended reading

5.1. Main

1. Гевко І. Б. Методи прийняття управлінських рішень : [підручник для вузів] / Іван Богданович Гевко. – К.: Кондор, 2009 . – 186 с.
2. Катренко А. В. Теорія прийняття рішень : підручник з грифом МОН / А. В. Катренко, В. В. Пасічник, В. П. Пасько — К. : Видавнича група ВНУ, 2009. — 448 с.
3. Моделі та методи прийняття рішень : навч. посіб. для студ. вищ. навч. закл. / О. Ф. Волошин, С. О. Мащенко. – 2-ге вид., перероб. та допов. – К. : Видавничо-поліграфічний центр "Київський університет", 2010. – 336 с.
4. Эддоус М., Стенсфилд Р. Методы принятия решений [Пер. с англ. под ред Член.-корр. РАН Елисейевой] / М. Эддоус, Р. Стенсфилд. – М. : Аудит, ЮНИТИ, 1997. – 590 с

5.2. Additional

5. Ларичев О.И. Теория и методы принятия решений, а также Хроника событий в Волшебных странах: учебник для студ. вузов / О. И. Ларичев. - 3-е изд., перераб. и доп. - М.: Универ. книга : Логос, 2006. - 392 с.
6. Моклянчук М.П. Лекції з теорії вибору та прийняття рішень / – К. 2007. – 258 с.
- Юдин Д. Б. Вычислительные методы теории принятия решений / Д. Б. Юдин – М.: Наука Гл. ред. физ.-мат. лит., 1989. – 320 с.
7. Нейман Дж. Теория игр и экономическое поведение. / Дж. Нейман, О. Morgenstern – М.: Наука, 1970 – 708 с. Оуэн Г. Теория игр. / Г. Оуэн – М.: Мир, 1971. – 230 с.

5.3. Methodical support

8. Орлов А.И. Организационно-экономическое моделирование: теория принятия решений
<http://www.book.ru/book/900580>
9. Орлов А.И. Теория принятия решений
http://lib.maupfib.kg/wp-content/uploads/2015/12/kn_teor_prin_uprav_resn_.pdf
10. Орлов А.И. Принятие решений. Теория и методы разработки управленческих решений
<https://scholar.google.com/scholar?cluster=2850232540631923971&hl=en&oi=scholar>
11. Орлов А.И. Организационно-экономическое моделирование: теория принятия решений
<https://elibrary.ru/item.asp?id=19940648>