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| Home**National Technical University of Ukraine** **“Igor Sikorsky Kyiv Polytechnic Institute”** |  | **Department of Economic Cybernetics** |
| **METHODS OF DECISION-MAKING** **IN THE CONTEXT OF GLOBALIZATION****Work program of the discipline (Syllabus)** |

# Details of the discipline

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| Level of higher education | *Second (master's)* |
| Branch of knowledge | *05 Social and behavioral sciences* |
| Specialty | *051 Economy* |
| Educational program | *International Economics* |
| Discipline status | *Required* |
| Form of study | *full-time (day) / remote / mixed* |
| Year of study, semester | *I course, autumn semester* |
| Number of hours to study the discipline | *75* |
| Semester control / control measures | *Test* |
| Timetable |  |
| Language of instruction | *English* |
| Information about the course leader / teachers | Lecturer: *candidate of physical and mathematical sciences, Chernousova Zhanna,* *chernjant@ukr.net**, http://mses.kpi.ua/index.php?page=spiv*Practical: candidate of physical and mathematical sciences, Chernousova Zhanna, chernjant@ukr.net, http://mses.kpi.ua/index.php?page=spiv |
| Course placement |  |

# Curriculum

# Description of the discipline, its purpose, subject of study and learning outcomes

*Studying the discipline will give the student:*

* *knowledge of modern methods of forming sound decisions in different conditions in complex organizational systems;*
* *skills to justify economic decisions at the level of the market entity with the use of modern management principles, approaches, methods, techniques;*
* *application of the acquired theoretical knowledge to solve practical problems of the international economy and meaningfully interpret the results.*

*The purpose of the course is to provide students with knowledge of methods for solving complex management problems; methodology and tools for organizing the process of developing effective solutions taking into account the characteristics of the market and the consumer.*

*The credit module considers the main practical methods of decision-making taking into account the specifics of the enterprise and consumer behavior.*

*The methodological tools for describing the behavior of economic agents, in particular, methods for determining consumer preferences are considered.*

*The study of the credit module allows learn the means and methods of substantiation of proposals and management decisions by various economic agents (individuals, households, enterprises and public authorities).*

*The purpose of the credit module is to form students’ General competences*

*GC 8: The ability to conduct research at the appropriate level.*

*After mastering the credit module, students must demonstrate the following Program study results*

*TR 4: To develop socio-economic projects and a system of comprehensive actions for their implementation, considering their goals, expected socio-economic consequences, risks, legislative, resource and other constraints.*

*TR 7: To choose effective methods of the economic activity management, to substantiate the suggested decisions on the basis of relevant data and scientific and applied researches.*

# Prerequisites and postrequisites of the discipline (place in the structural and logical scheme of education according to the relevant educational program)

*Microeconomics, macroeconomics, higher mathematics for economists, statistics.*

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| *Learning outcomes* | *Teaching methods* | *Forms of evaluation* |
| *GC 8**TR 4,**TR 7* | *Lectures, practical classes, writing a modular test* | *Rating system of assessment, distribution of points according to reference representations, credit on results of studying of the module* |

# The content of the discipline

*Methods for determining the system of preferences of the Decision Maker. Utility function and loss function. Jensen's inequality. Alle's paradox and von Neumann-Morgenstern theorem. Parametric and non-parametric situations, schemes, models of decision-making in economics. Uncertainty in the decision-making system. Information about the unknown. Complete uncertainty. Wald's criterion. Savage's criterion. Hurwitz criterion. Laplace criterion. Statistical methods of decision-making. Observations and strategies in decision-making. Bayesian risk and Bayesian decision. Observation of an unknown parameter in decision-making systems. Construction of important functions. Neumann-Pearson lemma. Theoretical and methodological foundations of network planning: A method of evaluating and revising plans. Pareto principle for solving multicriteria problems. Algorithm for finding the Pareto set. Problems of unstructured solution: a method of analysis of hierarchies by Thomas L. Saaty. Method of convolution of criteria: determination of coefficients of importance of criteria by the method of hierarchical analysis.*

# Training materials and resources

*Basic literature:*

1. *Ivanenko V.I. Non-Stochastic Randomness and Decision Systems. – Springer, 2013. – 496 p.*
2. *SAATY R. W.* *THE ANALYTIC HIERARCHY PROCESS-WHAT IT IS AND HOW IT IS USED, Mathl Modelling, Vol. 9, No. 3-5, pp. 161-176, 1987.*
3. *Karibo Benaiah Bagshaw, PERT and CPM in Project Management with Practical Examples, American Journal of Operations Research, 11, pp. 215-226, 2021.*

*Additional literature:*

1. *Robert T. Clemen, Terence Reilly, Making Hard Decisions with Decision Tools. – Cengage Learning, 2013. – 816 p.*

# Educational content

# Methods of mastering the discipline (educational component)

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| *Training week* | *The topic being studied* | *Evaluation* |
| *1-2* | *Methods for determining the system of preferences of the Decision Maker. Utility function and loss function. Jensen's inequality* | *Analytical examples and case studies 1* |
| *3-4* | *Alle's paradox and von Neumann-Morgenstern theorem* | *Analytical examples and case studies 2* |
| *5-6* | *Parametric and non-parametric situations, schemes, models of decision-making in economics. Uncertainty in the decision-making system. Information about the unknown* | *Analytical examples and case studies 3* |
| *7-8* | *Complete uncertainty. Wald's criterion. Savage's criterion. Hurwitz criterion. Laplace criterion* | *Analytical examples and case studies 4* |
| *9-10* | *Statistical methods of decision-making. Observations and strategies in decision-making. Observation of an unknown parameter in decision-making systems. Bayesian risk and Bayesian decision. Construction of decisive functions by the normal method.* | *Analytical examples and case studies 5* |
| *11-12* | *Theoretical and methodological foundations of network planning. Method of evaluation and revision of plans. Features of estimation of duration of works on PERT. Possibilities of project completion.* | *Analytical examples and case studies 6* |
| *13-14* | *Pareto principle for solving multicriteria problems. Algorithm for finding the Pareto set* | *Analytical examples and case studies 7* |
| *15-16* | *Unstructured decision-making problems. Method of analysis of hierarchies of Thomas L. Saaty in solving international problems* | *Analytical examples and case studies 8* |
| *17-18* | *Method of convolution of criteria: determining the coefficients of importance of criteria by the method of hierarchy analysis* | *Analytical examples 9 and**modular test* |
|  | *Semester control (session on schedule)* | *Test* |

# Independent work of a student / graduate student

*Preparation for classroom classes, problem-solving, preparation for modular test.*

# Policy and control

# Policy of academic discipline (educational component)

***Violation of deadlines and incentive points:***

*The key measures in teaching the discipline are those that form the semester rating of the student. Therefore, students must timely complete tasks in practical classes, write a modular test in the middle of the course.*

*Penalty points for the discipline are provided for violation of the terms of delivery of settlement works.*

*Incentive points a student can receive for in-depth study of certain topics of the course, which can be presented in the form of a report, scientific theses and more.*

***Class attendance:***

*Attendance is free, points for attending lectures are not added. However, a certain part of the student's rating is formed through active participation in activities in lectures and practical classes, namely in solving problems, group and individual work. Therefore, skipping lectures and practical classes may not give the student the opportunity to get points in the semester rating.*

***Missed control measures:***

*If the control measures are missed for good reasons (illness or serious life circumstances), the student is given the opportunity to make an additional control task within the next week. In case of violation of deadlines and non-fulfillment of the task for disrespectful reasons, the student may not be allowed to take the test in the main session.*

# Types of control and rating system for assessing learning outcomes (RSA)

*Assessment is based on the application of a rating system, which provides for the systematic work of students during the semester and consists of the following activities:*

*1. The student's rating of the credit module is calculated from 100 points and consists of points that the student receives for:*

* *execution of cases and tasks in lectures and practical classes (5 works);*
* *performance of modular control work;*
* *eight current controls on topics.*

*2. Scoring criteria:*

*2.1. Execution of cases and tasks in lectures and practical classes (total - 10 points):*

* *active creative work – 2 points;*
* *fruitful work – 1 point;*
* *passive work – 0 points.*

*2.2. Execution of modular control work (MCW):*

* *creative work, complete answer to all questions – 10 points;*
* *the work was performed with minor shortcomings – 9-8 points;*
* *the work was performed with certain errors – 7-6 points;*
* *the work is not credited (task not completed or there are gross errors) – 0 points.*

*2.3. The current control over the topic is evaluated from 10 points according to the following criteria:*

* *creative work – 10 points;*
* *the work was performed with minor shortcomings – 9-8 points;*
* *the work was performed with certain errors – 7-6 points;*
* *the work is not credited (task not completed or there are gross errors) – 0 points.*

*The penalty -1 point is accrued for each week of delay with the submission of work on the current control for inspection (total not more than -1 point).*

*The condition of admission to the test is the number of points scored at least 48 and all current controls on topics are credited.*

*2.4. The test is evaluated with 21 points. The control task of this work consists of three questions from the list provided in the appendix to the work program of the CM.*

*Each question is evaluated with 7 points according to the following criteria:*

* + - *«perfectly» – full answer (not less than 90% of the required information), provided appropriate justifications and personal opinion – 7 points;*
		- *«good» – sufficiently complete answer (not less than 75% of the required information), performed in accordance with the requirements for the level of "skills", or minor inaccuracies – 6-5 points;*
		- *«satisfactorily» – incomplete answer (at least 60% of the required information. which is performed in accordance with the requirements for the "stereotypical" level and some errors – 4 points;*

*– «unsatisfactorily» – unsatisfactory answer – 0 points.*

*3. The condition for a positive first certification (8th week) is to receive at least 18 points for work in practical classes (at least 2 points), and for performing 40% of the tasks of the current control on topics (at the time of certification) (at least 16 points). The condition of a positive second attestation (14th week) - receiving at least 34 points for: work in practical classes (not less than 4 points), and for performing 75% of the tasks of the current control on topics (at the time of attestation) (not less than 30 points)).*

*4. The sum of rating points received by the student during the semester, subject to enrollment of all current controls on topics, is transferred to the final grade in accordance with the table (paragraph 6). If the sum of points is less than 60, but all current controls on topics are credited, the student performs a test. In this case, the sum of points for the implementation of all current controls on topics and test control work is transferred to the final assessment in accordance with the table of paragraph 6.*

*5. A student who received more than 60 points in the semester, but wants to improve his score, can take part in the test, subject to enrollment in all current tests on topics. In this case, the final result consists of points obtained on the test and points for all current tests on topics.*

*6. Table of translation of rating points to grades:*

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| *Points:**case works and tasks + MCW* | *Rating* |
| *100…95* | *Perfectly* |
| *94…85* | *Very good* |
| *84…75* | *Good* |
| *74…65* | *Satisfactorily* |
| *64…60* | *Enough* |
| *Less than 60 points* | *Unsatisfactorily* |
| *There is not some current control credited as well as**Semester rating < 40 points* | *Not allowed* |

**Work program of the discipline (syllabus):**

**Compiled:** Associate Professor, candidate of physical and mathematical sciences, Chernousova Zhanna

**Approved** by the Department of Economic Cybernetics (protocol № \_1\_ dated 30.08.2021)

**Agreed** by the Methodical Commission of the Faculty of Management and Marketing (protocol № 1 dated 14.09.2021)