"ЗАТВЕРДЖУЮ"

Заступник керівника
(проректор з науково-педагогічної роботи)

М.В. Афанасьєв

ДАННІ ТА ПРИЙНЯТТЯ РІШЕНЬ
робоча програма навчальної дисципліни

Галузь знань	**12 "ІНФОРМАЦІЙНІ ТЕХНОЛОГІЇ"**
Спеціальність	**122 "КОМП'ЮТЕРНІ НАУКИ"**
Освітній рівень	**другий (магістерський)**
Освітня програма	**"КОМП'ЮТЕРНІ НАУКИ"**

Вид дисципліни	**вибіркова**
Мова викладання, навчання та оцінювання	**англійська**

Завідувач кафедри *кібербезпеки та інформаційних технологій*

Євсеєв С.П.

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SIMON KUZNETS KHARKIV NATIONAL UNIVERSITY OF ECONOMICS

DATA AND DECISION MAKING

Syllabus of the academic discipline

Area of expertise   **All**
Speciality   **122 Information Systems**
Grade level   **First (Bachelor's level)**
Academic Program   **Information Systems**

Type of discipline   **selective**
Teaching, studying and evaluating language   **English**

Kharkiv
S. Kuznets KhNUE
2020

APPRUVED

At the session of the Cybersecurity and Information Technology Department
Protocol № 1 from 26.08. 2019.

Drafters:

Oleksander MILOV, Candidate of Sciences, Professor of Cybersecurity and Information Technology Department

**The list of renewal and re-approval
of academic discipline program**

Academic year	Data of the session of the Department – Drafter of SDAD	Protocol Number	Signature of Head of Department
2019/2020			

Introduction

Annotation for the academic discipline:

Ask. Analyze. Act. Big Data, Strategic Decisions: Analysis to Action gives you the frameworks, tools, and confidence to ask the right questions, interpret the analysis, and use both to transform your data into strategic decisions. No technical or statistical expertise is required, just a desire to use data more effectively to make an impact on your organization — from marketing and operations to HR, supply chain, and business models.

Data is everywhere and the implications are endless — it can help you determine who to hire, what prices to set, what supply source to focus on, and where to put your marketing dollars. Big Data, Strategic Decisions: Analysis to Action gives you the frameworks and tools, innovations and insights to make better decisions and compete in the age of big data. The curriculum focuses on five key areas to give you a more holistic, innovative, and actionable learning experience.

−	Data-driven, decision-making essentials from conceptual frameworks and tools to design thinking, Agile, and data visualization

−	Experiential, team-based data simulation projects, working with a Stanford data scientist to put learning into action

−	Practical applications of data analytics like marketing, business models, or HR to help you see connections to your own organization

−	Insights and implications into the latest developments and future of big data

−	Understanding of the risks, limitations, and ethics of using big data.

The Purpose of the academic discipline:

Learn and practice creative data-driven strategies to enhance decision making across every facet of your organization.

−	Use conceptual frameworks and tools to recognize the power and potential of data to implement strategic initiatives and drive competitive advantage

−	Apply design thinking and Agile methodologies to develop big data solutions that are usable and deliver Value

−	Explore the future of big data, machine learning, and artificial intelligence

−	Network with peers from diverse industries and functional areas to get fresh ideas about how data can be used effectively

Course	1	
Semester	2	
Number of ECTS credits	5	
Audit lessons	lectures	20
	laboratory	20
Independent work		110
Form of final control	Credit	

2. Competence and results of studying a discipline:

Competence	Learning outcomes
Ability for abstract thinking, analysis and synthesis, scientific generalizations.	Use professional argumentation to convey information, ideas, problems, and solutions to professionals and non-professionals in the field of economic activity. Apply appropriate economic and mathematical methods and models for solving economic problems. Be able to think abstractly, apply analysis and synthesis to identify key characteristics of economic systems of various levels, as well as the behavior of their subjects. To show self-work skills, to be critical and self-critical.
Ability to search, process and analyze information from various sources.	Demonstrate basic creative and critical thinking skills in research and professional communication. Perform an interdisciplinary analysis of socio-economic phenomena and problems in one or more professional fields, taking into account the risks and potential socio-economic consequences. Use information and communication technologies to solve socio-economic problems, prepare and submit analytical reports.
Ability to explain economic and social processes and phenomena on the basis of theoretical and applied models, to analyze and meaningfully interpret the results	Apply appropriate economic and mathematical methods and models for solving economic problems. Identify sources and understand the methodology for determining and methods of obtaining socio-economic data, collect and analyze relevant information, calculate economic and social indicators. Understand the content, structure and conclusions of scientific and analytical texts in economics.

Ability to analyze and solve tasks in the field of regulation of economic and social-labor relations.	Apply analytical and methodological tools to understand the logic of economic decision-making by various economic agents (individuals, households, enterprises and public authorities). Conduct an analysis of the functioning and development of economic entities, determine the functional areas, calculate appropriate indicators that characterize the effectiveness of their activities. Be able to think abstractly, apply analysis and synthesis to identify key characteristics of economic systems of various levels, as well as the behavior of their subjects.
Skills of using modern sources of economic, social, management, accounting information for drafting official documents and analytical reports.	Use professional argumentation to convey information, ideas, problems, and solutions to professionals and non-professionals in the field of economic activity. Conduct an analysis of the functioning and development of economic entities, determine the functional areas, calculate appropriate indicators that characterize the effectiveness of their activities. Identify sources and understand the methodology for determining and socio-economic data, collect and analyze relevant information, calculate economic and social indicators.

3. Program of the discipline
Content module 1. Subject and method of decision-making theory
Topic 1. Decision making in management systems. A meaningful model for the decision-making problem.
Topic 2. Decision making as a task of choice. Multicriteria tasks.
Topic 3. Methods for solving multicriteria problems.
Topic 4. Binary decision description language. Binary relationships.
Topic 5. Description of decision making in the language of choice function theory.

Content module 2. Group decision making
Topic 6. Condorce and Bordeaux Group Choice Methods.

Topic 7. The paradoxes of group choice.
Topic 8. The Arrow Inability Theorem.
Topic 9. Expert Decision Making Systems.
Topic 10. Decision support systems.

Laboratory Workshop
1. Search for the solution of multicriteria problem by the convolution method.
2. Finding a solution to the multicriteria conditional minimization problem.
3. Search for the Pareto multicriteria problem set.
4. Search for a group decision-making profile using the Condorcet method.
5. Search for a group decision-making profile using the Board method.

4. The procedure of evaluation of the learning results

The system of evaluation of the developed competencies of students considers the types of occupations, which according to the curriculum program include lectures, seminars, classes, as well as independent work. Assessment of the developed competencies in students is carried out using a 100-point accumulation system. In accordance with the Provisional Regulations "On the Procedure for Assessing the Results of Students' Learning Based on the Accumulated Bulletin-Rating System" S. Kuznets KhNEU, control measures include:

−   current control over the semester during lectures and laboratory classes and is estimated by the sum of the points scored (the maximum amount is 60 points; the minimum amount that allows the student to take the exam - 35 points);

−   modular control as an intermediate testing on the initiative of the teacher, considering the current control over the relevant content module and aims to integrate the evaluation of the student's learning outcomes after studying the material from the logically completed part of the discipline - content module;

−   final / semester control, conducted in the form of a credit, according to the schedule of the educational process.

The procedure for carrying out the current assessment of students' knowledge. Assessment of students' knowledge during lecture and laboratory classes and fulfillment of individual tasks is carried out according to the following criteria: understanding the decision-making procedures for different application sphere and using the newest instrumental toolset. Students should be guided in the best practices of decision-making process and using well-known patterns. Modular control tests and credit questions contain practical issues that require knowledge and understanding of the fundamentals of data science and decision-making procedures. Relevant theoretical questions are related to understanding and applying the best recommendations for decision-making practice.

The general criteria for evaluating independent work of students are: the depth and strength of knowledge, the level of thinking, the ability to systematize knowledge on specific topics, the ability to make conclusions, the ability to find a solution of problems in uncertain situations using a modern software tools for the development of complex decision-making systems.

The final control of the knowledge and competences of students in the discipline is based on a score that is considered to be successful if the student scored 60 points or more during the semester.

A student should be **considered certified** if the sum of the points obtained on the basis of the results of the final / semester test of success is equal to or exceeds 60.

Distribution of points by weeks

Topics of the content module			Lecture classes	Laboratory classes	Testing	Total
Content module 1.	**Topic 1**	1 Week	2	5		7
	Topic 2	2 Week	2	5		7
	Topic 3	3 Week	2	5		7
	Topic 4	4 Week	2	5		7
	Topic 5	5 Week	2	5	10	17
Content module 2.	**Topic 6**	6 Week	2	5		7
	Topic 7	7 Week	2	5		7
	Topic 8	8 Week	2	5		7
	Topic 9	9 Week	2	5		7
	Topic 10	10 Week	2	5	10	17
	Credit					10
Total			20	50		100

Grading: national and ECTS

The amount of points for all types of educational activities	Rating ECTS	Score on a national scale	
		for exam, course project (work), practice	for the offset
90 – 100	A	perfectly	Accepted
82 – 89	B	well	
74 – 81	C		
64 – 73	D	satisfactorily	
60 – 63	E		
35 – 59	FX	unsatisfactorily	not accepted
1 – 34	F		

5. Recommended Books
5.1 Basic

1. Groebner, D.F., Shannon, P.W., Fry, P.C., and Smith, K.D. 2011, 'Business Statistics: A decision-making approach' (8th edition), Pearson Education, Prentice Hall, NJ.
2. Lu, J., Zhang, G., Ruan, D. and Wu, F. (2007), Multi-objective group decision-making: methods, software and applications, Imperial College Press, London.
3. Efraim Turban, Jay Aronson (2007), Decision support systems and intelligent systems, sixth edition, Prentice Hall

5.2 Additional

4. Black, Ken. Business Statistics: For Contemporary Decision Making, Sixth Edition.
5. S. Christian Albright, Wayne L. Winston, Christopher J. Zappe. Data Analysis and Decision Making, Fourth Edition, 2011, 2009 South-Western, Cengage Learning
6. Russo, I. E., Schoemaker P. J. H. (1990): Decision Traps; Ten barriers to brilliant Decision-Maiking and how to overcome them, New York etc.

7. Saaty, Th.L. (1980): The Analytic Hierarchy Process, New York etc.
8. Drucker, P.F. (2001): The effective decision, Harvard Business School Pressl (Hrsg.) Harvard Business Review on Decision Making, Boston
9. Arrow, K. J. (1963): Social choice and individual values, New York etc.

5.3. Internet information resources

10. Personal learning system site S. Kuznets KhNUE. Course "Data and Decision making" https://pns.hneu.edu.ua/enrol/index.php?id=4770