Course syllabus:

DECISION SUPPORT SYSTEMS

Degree of higher education:	Master's
Specialty:	122 «Computer Science»
Year of education:	2
Teaching semester:	Autumn
Number of ECTS credits:	6
Language of teaching:	English
Type of semester control:	Exam

Course author and lecturer:

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Summary of the training course

Course learning objectives: The discipline "Decision support systems" is a basic component of the educational and professional program "Computer science", which contributes to the preparation of masters in computer science.

Learning outcomes: Students receive theoretical knowledge and practical skills, on the basis of which the necessary competences in the field of information technologies are formed: theoretical knowledge and practical skills necessary for the creation and use of modern information technologies and systems;

skills of automated solution of applied tasks, creation of new competitive information technologies and systems; the ability to provide information for applied processes; the ability for interdisciplinary scientific research to solve tasks related to the processes of analysis, forecasting, modeling and creation of information processes, technologies within the framework of decision support systems.

Prerequisites for studying: The study of this course is based on the materials of the disciplines "Theory of decision-making", "Automated information systems", "System analysis" of bachelor's training in the specialty 122 "Computer science.

Course objective (acquired competencies)

The goal of the course «Decision support systems» (DSS) is the acquisition of theoretical and practical knowledge, skills and abilities focused on the effective professional use of modern information technologies.

The practical course of the discipline is built according to the method of project-based learning. The projects are designed to solve the problems of creating decision support systems and require joint implementation in groups of 3-4 performers. The group design strategy contains elements of creative and research work.

As a result of studying this educational course, the student of higher education will acquire the following competencies:DSS

1. Professional knowledge of modern computer and information technologies.
2. Knowledge of modern theoretical, methodological and algorithmic foundations of software development for its use when solving applied and scientific tasks in the field of information systems and technologies.
3. The ability to systematically analyze the researched problem and perform task setting.
4. Ability to work in a team.
5. The ability to independently perform tasks, solve tasks and problems, and be responsible for the results of one's activities.

Course structure

№	Topic	Hours (L/ LB) by forms of education	Brief content	Tools and tasks
1.	Basics of DSS. General issues of development.	2/0	Definition. Peculiarities of implementation of strategic decisions. Characteristics and purpose of IT DSS. The general architecture and principles of construction of the DSS. Structural components of DSS.	Participation in the discussion Tests
2.	Classification DSS.	2/0	Necessity of classification of DSS. Classification of the DSS based on the instrumental approach. Classification of DSS according to the degree of dependence of the decision-maker in the decision-making process. Classification of DSS by frequency of use.	Participation in the discussion Tests
3.	Automation of analysis in the process of information preparation for management decision-making using modern information technologies.	2/0	Aspects of the analysis problem and their implementation in software products Elements of the structure of the information space Data extraction, transformation and loading technologies The concept of data storage organization Data models of information storage	Participation in the discussion Tests
4.	Methods of intelligence analysis of data.	2/4	The main goals of intelligence analysis Basic methods of intelligence analysis Factor analysis.Multidimensional scaling; MDS.	Participation in the discussion Individual tasks
5.	Information technology Big Data.	2/4	Big Data. Classification of Big Data analysis methods.. Data Mining. Knowledge extraction methods. Affinity analysis.	Participation in the discussion Individual tasks
6.	Use of visualization techniques in the decision-making process.	2/4	What does data visualization trends provide? Visualization tasks. Visualization techniques. Presentation of data in the form of charts. Types of visualization. Tools.	Participation in the discussion Individual tasks
7.	Methods of classification and data clustering.	2/4	Classification task. Classification process. Methods used to solve classification problems. Classification accuracy: estimation of the error rate. Evaluation of classification methods. Task of clustering. Comparison of classification and clustering. A brief description of approaches to clustering. Evaluation of clustering quality. Clustering process. Application of cluster analysis.	Participation in the discussion Individual tasks
8.	Information technology forecasting in DSS.	2/2	What is forecasting? Comparison of prediction and classification problems. The role of forecasting in the decision-making process. Forecasting methods. Forecasting problems.	Participation in the discussion Individual tasks
9.	Forecasting and time series.	2/2	Trend, seasonality and cycle. Types of errors and forecasts.	Participation in the discussion Individual tasks
10.	Performance evaluations of classification models and regression models.	2/0	Popular metrics used to evaluate the effectiveness of classification and regression models. Confusion Matrix. Actual metrics. Metrics related to regression.	Participation in the discussion Tests

Methodological support:

1. Handbook of decision making / Nutt P. C., Wilson D. C. (eds.). – Wiley, 2010. − 722 p.
2. Saed Sayad An Introduction to Data Mining [Електронний ресурс] – Режим доступу www. URL: http://www.saedsayad.com/data_mining_map.htm - 19.10.2022 p
3. Vercellis C. Business Intelligence: Data Mining and Optimization for Decision Making / C. Vercellis ; John Wiley & Sons, 2009. – 417 p.

Course evaluation

A student can receive a certain number of points for fully completed assignments:

Tools and tasks	Maximum assessment
Participation in discussion	20
Tests	25
Individual tasks	25
Final Test	30
Total s	**100**

Student grading scale

The sum of points for all types of educational activities	Assessment ECTS
90 – 100	A
82-89	B
74-81	C
64-73	D
60-63	E
35-59	FX
0-34	F

Course policy.

Plagiarism and academic integrity:

A student must adhere to the academic integrity policy while completing assignments. Borrowings must be issued with appropriate references. Write-off is prohibited.

Observance of academic integrity by students provides:

- independent performance of educational tasks, tasks of current and final control of learning results (for persons with special educational needs, this requirement is applied taking into account their individual needs and capabilities);

- references to sources of information in case of use of ideas, developments, statements, information;

- compliance with the legislation on copyright and related rights;

- providing reliable information about the results of one's own educational (scientific, creative) activities, used research methods and sources of information.

Violation of academic integrity is considered:

academic plagiarism - publicizing (in part or in full) scientific (creative) results obtained by other persons as the results of one's own research (creativity) and/or reproduction of published texts (publicized works of art) of other authors without indicating authorship;

self-plagiarism - publicizing (partially or completely) own previously published scientific results as new scientific results;

fabrication - fabrication of data or facts used in the educational process or scientific research;

falsification - deliberate change or modification of already existing data related to the educational process or scientific research;

cribbing - performance of written works with the involvement of external sources of information other than those permitted for use, in particular during the evaluation of learning outcomes.

For violations of academic integrity, students may be held to such academic responsibility:

- retaking the assessment (test, exam, credit, etc.);

- repeating the corresponding educational component of the educational program.

Tasks and classes:

All tasks provided by the course program must be completed in a timely manner and evaluated in the manner indicated above. Auditory classes must be attended regularly. Missed classes (for any reason) must be completed with a corresponding grade no later than the last week of the current semester. For objective reasons (for example, illness), training can take place online upon agreement with the head of the course. In case of a valid reason (illness, academic mobility, etc.), the terms can be extended with the written permission of the dean.