



SYLLABUS OF THE COURSE

"DATABASES AND INFORMATION SYSTEMS"

Component of the educational program – mandatory (5 credits)

Educational and professional program	Information technology and project management
Specialty	122 – Computer science
Discipline	12 – Information technology
Level of higher education	first (bachelor's)
Language of instruction	English
Teacher(s) profile	Piddubna Larysa Andriivna, Candidate of Physical and Mathematical Sciences, Associate Professor https://mathmod.chnu.edu.ua/pro-nas/spivrobitnyky/piddubna-larysa-andriivna/
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Course page in Moodle	https://moodle.chnu.edu.ua/course/view.php?id=3405
Consultations	By arrangement

SUMMARY OF THE COURSE

Organization of data storage and exploitation is an extremely important task for the development of modern software. The volume of data is usually quite large, therefore, to ensure the speed of software, it is necessary to structure information, ensuring its storage by a relational data model. The purpose of the discipline "Databases and Information Systems" is to study the basics of the theory of relational databases, mastering the principles of designing such databases and methods of their operation.

To develop the following competencies in students

ZK04. Knowledge and understanding of the subject area and understanding of professional activity

ZK07. Ability to search, process and analyze information from various sources

FK2. Ability to formalize problems described in natural language, including using mathematical methods, to apply general approaches to mathematical modeling of specific processes.

FK4. The ability to determine the main factors that influence the development of physical, economic, and social processes, to identify stochastic and uncertain indicators in them, to formulate them in the form of random or fuzzy quantities, vectors, processes, and to investigate the dependencies between them.

FC7. The ability to use modern information technologies for computer implementation of mathematical models and prediction of the behavior of specific systems, namely: an object-oriented approach in the design of complex systems of various nature, applied mathematical packages, the use of databases and knowledge.

FC8. The ability to organize work on the analysis and design of complex systems, the creation of appropriate information technologies and software.

LEARNING OUTCOMES:

Discipline objectives. The knowledge and experience acquired in studying this discipline will be useful in the future practical activities of students in the design and operation of structured databases.

As a result of studying the academic discipline, the student must know:

- the basic theoretical and practical principles of information structuring, methods of normalization of a relational database;

be able to:

- apply practical approaches to the design of relational databases and operate them using the SQL structured query language.

The given learning outcomes for the relevant discipline correlate with the following program learning outcomes:

PR8. Possess modern methods of developing programs and software complexes and making optimal decisions regarding the composition of software, algorithms of procedures and operations.

PR11. Know and be able to apply database and knowledge management systems and information systems in practice.

Be able to use tools for developing client-server applications, design conceptual, logical and physical database models, develop and optimize queries for them, create distributed databases, data warehouses and showcases, knowledge bases, including on cloud services, using web programming languages.

Be able to apply knowledge of the methodology and tools for designing complex systems, methods of structural analysis of systems, object-oriented design methodology in development and research.

EDUCATIONAL CONTENT OF THE EDUCATIONAL COMPONENT

MODULE 1. ELEMENTS OF DATABASE AND INFORMATION SYSTEMS THEORY	
Topic 1	Concepts of information systems and databases.
Topic 2	Architecture of database systems.
MODULE 2. INFORMATION SELECTION TOOLS IN DATABASES	
Topic 3	Relational algebra.
Topic 4	SQL language. Data structure constructs. Data manipulation constructs. Access rights and transaction constructs. Advanced features: views, cursors, indexes.
MODULE 3. TECHNOLOGY OF USING THE MY SQL ENVIRONMENT	
Topic 5	Technical characteristics and features of the MySQL database
Topic 6	Working with databases, tables in MySQL.
Topic 7	Implementing queries in MySQL.
Topic 8	Additional database objects
Topic 9	Triggers. Transactions, stored procedures
Topic 10	Client-server application architecture. Overview of non-relational databases.

FORMS, METHODS AND EDUCATIONAL TECHNOLOGIES OF TEACHING

(description of forms, methods and technologies of teaching, which are used in the process of studying the academic discipline)

By the source of transmission and perception of educational information by students:

- o verbal (lecture, explanation, conversation, instruction);
- o visual (illustration, demonstration);
- o practical (projects).

By the logic of transmission and perception of educational information by students:

- o informational-receptive;
- o reproductive;
- o problem-based;
- o partially-search (heuristic).

By stimulation of educational and cognitive activity:

- o methods of stimulating cognitive needs and interests;
- o methods of stimulating duty and responsibility.

FORMS AND METHODS OF CONTROL AND ASSESSMENT

Current control: The forms of current control are laboratory work.

Final control - The form of final control is a test.

LEARNING OUTCOMES ASSESSMENT CRITERIA

The system of assessing the level of educational achievements is based on the principles of ECTS and is cumulative. Knowledge assessment is carried out on a 100-point scale. The results of work during the academic semester are assessed during current and modular

control in the range from 0 to 70 points in total, and the results of final control (test) - from 0 to 40 points.

During the semester, students perform 5 laboratory works, each of which is a continuation of the previous one. Laboratory works are assessed with points: 15, 15, 10, 15, 15 for the full completion of tasks.

Performing laboratory tasks involves independent processing of additional information sources and home completion of tasks started in the classroom. In case of insignificant errors in completing tasks, 1-2 points are deducted, and significant ones, unsubstantiated application of methods or failure to complete tasks - 3-5 points. In case of completing certified courses on educational platforms and timely submission of certificates, it is possible to transfer a certificate instead of laboratory work on the relevant topic. Additionally, you can get up to 14 points for completing additional tasks.

The final control in the discipline is a test in the form of a test in the moodle system. The test option contains 20 questions with one correct answer, each of which is estimated at 1 point.

The final grade is given based on the results of the sum of points scored on substantive modules during the semester and the final module (exam).

ACADEMIC INTEGRITY POLICY

Adherence to the academic integrity policy by participants in the educational process when studying an academic discipline is regulated by the following documents:

- ✓ “Code of Ethics of Yuriy Fedkovych Chernivtsi National University”
https://www.chnu.edu.ua/media/jxdfs0zb/etychnyi-kodeks-chernivets_koho-natsionalnoho-universytetu.pdf
- ✓ "Regulations on the detection and prevention of academic plagiarism at Yuriy Fedkovych Chernivtsi National University"
https://www.chnu.edu.ua/media/n5nbzwgb/polozhennia-chnu-pro-plahi_at-2023plusdodatky-31102023.pdf

The applicant is obliged to complete all received tasks in a timely and high-quality manner; if necessary, in order to clarify all unclear issues during independent and individual work, to attend consultations with the teacher. Students are also obliged to adhere to the rules of academic integrity in accordance with the "Code of Ethics of the ChNU". The policy of observing academic integrity (in accordance with the Law of Ukraine "On Education") is that teaching an academic discipline is based on the principles of academic integrity - a set of ethical principles and rules defined by law, which should be guided by participants in the educational process during training, teaching and conducting scientific (creative) activities in order to ensure trust in the results of training and/or scientific (creative) achievements. The presence of academic plagiarism in student works is grounds for assigning a negative grade. Cheating by students during testing is grounds for early termination of its completion and assigning a negative grade

INFORMATION RESOURCES

1. <https://moodle.chnu.edu.ua/course/view.php?id=3405>
2. <https://dev.mysql.com/doc/refman/8.0/en/what-is-mysql.html>
3. <https://www.digitalocean.com/community/tutorials/what-is-mysql>
4. <https://www.simplilearn.com/tutorials/sql-tutorial/difference-between-sql-and-mysql>
5. <https://www.softwaretestinghelp.com/what-is-mysql/>
6. <https://www.edureka.co/blog/what-is-mysql/>