



DATABASES. COURSEWORK

Working program of the training course disciplines (Syllabus)

Educational details disciplines

Level of higher education	<i>First (undergraduate)</i>
Branch of knowledge	<i>12 Information technologies</i>
Specialty	<i>121 Software engineering</i>
Educational program	<i>Computer Systems Software Engineering</i>
Discipline status	<i>Normative</i>
Form of education	<i>Daytime</i>
Year of training, semester	<i>2nd year of training, 3rd semester</i>
Scope of the discipline	<i>Independent work:30 hours</i>
Semester control/ control measures	<i>Test</i>
Lessons schedule	<i>Not provided</i>
Language of teaching	<i>English</i>
Information about the course leader/ teachers	<i>Commission from receiving KP protections: Ph.D., associate professor, SayapinaInnaOleksandrivna, saiapina@pzks.fpm.kpi.ua assistantDepartmentofSPiSKSRadchenkoKostiantynOleksandrovych, radchenko.kostiantyn@lll.kpi.ua</i>
Placement of the course	<i>Google classroom. Access is granted to registered students. https://classroom.google.com/c/NTI4MjlxOTMxMzI0?cjc=xstlot3</i>

Program of educational discipline

1. Description of the study disciplines, its purpose, subject of study and learning outcomes

the purpose study of the discipline "Databases. Course work" is the formation of students' ability to independently design, programmatically implement and administer databases for the optimization of information and search systems and applications built on their basis, systematization of acquired knowledge and consolidation of practical skills:

- conceptual, logical and physical design and development of relational databases of information systems;*
- analysis and the ability to choose the optimal database management system to solve the tasks;*
- software selection of the necessary information in the required form thanks to mastering the SQL language;*
- analysis and improvement of database performance due to optimization of SQL queries and use of indexes;*
- ensuring preservation database integrity through the quality application of constraints, triggers, stored procedures, and transaction validation.*

Subject disciplines "Databases. Coursework" are methods, models, hardware and software used for designing, developing and managing databases.

Studying the discipline "Databases. Coursework" contributes to the formation of students of general (SK) and professional competences (FC) necessary for solving practical tasks of professional activity related to development, optimization and operation of databases:

ZK02 Ability to apply knowledge in practical situations.

FK01 Ability to identify, categorize and formulate software requirements.

FK02 Ability to participate in the design of software, including modeling (formal description) of its structure, behavior and functioning processes.

FK03 Ability to develop architectures, modules and components of software systems.

FK04 Ability to formulate and ensure software quality requirements in accordance with customer requirements, specifications and standards.

FK07 Knowledge of data information models, ability to create software for data storage, extraction and processing.

FK08 Ability to apply fundamental and interdisciplinary knowledge to successfully solve software engineering tasks.

FC10 The ability to accumulate, process and systematize professional knowledge about creating and maintaining software and recognizing the importance of lifelong learning

FC12 Ability to carry out the system integration process, apply change management standards and procedures to maintain the integrity, overall functionality and reliability of the software.

FC13 The ability to reasonably choose and master software development and maintenance tools.

FC14 Ability to algorithmic and logical thinking.

FC15 Ability to apply fundamental and interdisciplinary knowledge to build advanced search algorithms.

FC17 Ability to develop software for information and search systems.

FC19 Ability to develop software for multimedia and multimedia systems.

Studying the discipline "Databases. Coursework" contributes to students' formation of the following program learning outcomes (PLP) according to the educational program:

PRN12- apply effective approaches to software design in practice.;

PRN13- know and apply methods of developing algorithms, designing software and data and knowledge structures;

PRN14- apply in practice instrumental software tools for domain analysis, design, testing, visualization, measurement and software documentation;

PRN18- to know and be able to apply information technologies for data processing, storage and transmission;

PRN23- be able to document and present the results of software development;

PRN38- to be able to apply programming technologies for the development of software for multimedia and information-search systems;

PRN44- to know the most common query languages used in the development of information and search systems.

2. Pre-requisites and post-requisites of the discipline (place in the structural and logical scheme of training according to the relevant educational program)

Successful study of the discipline "Databases. Course work" precedes the study of disciplines "Algorithms and data structures" of the training plan of bachelors in the specialty 121 Software engineering.

Received during the assimilation of the discipline "Databases. Coursework" theoretical knowledge and practical skills contribute to the assimilation of material from the disciplines "Databases" and ensure the successful completion of coursework and diploma projects in the specialty 121 Software Engineering.

3. A typical task for a term paper

Database development for the information system of the given subject area. Basic database requirements:

1. The presence of at least 4-5 entities at the stage of conceptual modeling.
2. The presence of various types of connections between entities.
3. Availability of restrictions, triggers, stored procedures to ensure the integrity of the database.

The student may, if he wishes, propose his own variant of the individual task for the development of the database, if he meets the requirements. At the same time, he agrees with the manager.

4. Organization of defense and completion of course work

- Course work is performed by each student individually according to the option agreed with the supervisor.
- The coursework consists of a software system and its documentation.
- The course work is defended in the form of a presentation with a demonstration of the developed software product.

5. Coursework schedule

- Specification and coordination of the individual task - by October 17.
- Development of an infologic and data logic model - by October 28.
- Development of a physical model of the database- until November 28.
- Implementation of the database in the selected database management system - by December 12.
- Defense of the course work - until December 30.

6. Educational materials and resources

Basic literature:

1. Educational materials for the discipline "Databases. Coursework". Use to master practical skills in the discipline. The materials are in Google classroom. Access is granted to registered students.

To write a term paper, the student needs the following resources: Open source PostgreSQL package, which is distributed under a free license.

Policy and control

7. Policy of academic discipline (educational component)

- Adherence to the policy of academic integrity.
- The rules for assigning incentive and penalty points are as follows.

Incentive points are awarded for:

- a creative approach in course work. Maximum number of points: 9 points. Penalty points are calculated for:

- plagiarism The program code does not correspond to the task variant, the identity of the program code among different works (number of points: 10 points).

8. Types of control and rating system for evaluating learning outcomes (RSO)

The maximum number of points for the course work: 100 points. Points are awarded for:

- software product quality, 0-25 points;*
- database modeling quality, 0-25 points;*
- correctness of application of sequences, restrictions, representations, triggers, stored procedures, 0-25 points;*
- quality and completeness of documentation, 0-10 points*
- quality and completeness of the presentation and demonstration of the software product, 0-10 points*
- timeliness of presentation of work for defense, 0-5 points.*

Criteria software product quality assessment:

24-25 points – the development is done qualitatively, in full;

20-23 points – the development is done qualitatively, in full, but has minor flaws; 6-

19 points – the development is carried out to a sufficient extent, but contains shortcomings;

0-5 points - robotic development and is not completed in full or contains significant shortcomings.

Criteria for evaluating the quality of database modeling:

24-25 points – the modeling of the database is performed qualitatively, there is a creative approach; 20-23 points – the database modeling is performed

qualitatively, all requirements are met; 6-19 points – database modeling is performed qualitatively, there are minor remarks;

0-5 points – the database modeling is incomplete or contains significant deficiencies.

Criteria for evaluating the correctness of the application of sequences, restrictions, representations, triggers, stored procedures:

24-25 points – sequences, constraints, representations, triggers, stored procedures are selected and applied correctly;

20-23 points – sequences, constraints, representations, triggers, stored procedures are selected and applied with minor flaws;

6-19 points – sequences, constraints, representations, triggers, stored procedures are selected and applied with errors;

0-5 points – sequences, constraints, representations, triggers, stored procedures are not applied or there are significant deficiencies.

Criteria for evaluating the quality and completeness of documentation:

10 points – the documentation is done at a high level, there are no comments; 6-9 points – the documentation is done qualitatively, but has shortcomings;

1-5 points – the documentation is completed at an acceptable level, but has significant shortcomings; 0 points - the documentation is done poorly.

Criteria for evaluating the quality and completeness of the presentation and demonstration of the software product: 10 points - the presentation and demonstration are performed at a high level, there are no comments;

6-9 points – the presentation and demonstration are done well, but there are shortcomings;

1-5 points – the presentation and demonstration are performed at an acceptable level, but there are significant shortcomings; 0 points – the presentation and demonstration were performed poorly.

Criteria for evaluating the timeliness of the submission of the work to the defense: 5 points – the work is submitted to the defense no later than the specified deadline; 0 points – the work is submitted for defense later than the specified deadline.

The maximum number of points for completing and defending the coursework: 25 points + 25 points + 25 points + 10 points + 10 points + 5 points = 100 points.

Semester control: assessment

Table of correspondence of rating points to grades on the university scale:

Scores	Rating
100-95	Perfectly
94-85	Very good
84-75	Fine
74-65	Satisfactoril
64-60	Enough
Less than 60	Unsatisfactorily
Admission conditions not met	Not allowed

Working program academic discipline (syllabus):

Designed by assistant Radchenko K.O.

Approved by the Computer Engineering department (protocol No. 13 dated 22.06.22)

Agreed Methodical Commission of the Faculty of Informatics and Computer Engineering (protocol No. 9 dated 24.06.2022)