Пермский филиал федерального государственного автономного образовательного учреждения высшего образования "Национальный исследовательский университет "Высшая школа экономики"

Программа учебной дисциплины «Введение в базы данных» (“Introduction to databases”)

Утверждена
Академическим советом
образовательных программ «Экономика» по направлениям подготовки 38.03.01 Экономика и образовательной программы «Финансы» по направлению подготовки 38.04.08 Финансы и кредит
Протокол № 8.2.2.1-32-09/04 от 30 августа 2019
Академический руководитель ОП
_____ Белых Светлана Александровна

Разработчик	Ожегов Евгений Максимович, к.э.н., доцент департамента экономики и финансов
Число кредитов	5
Контактная работа (час.)	4
Самостоятельная работа (час.)	186
Образовательная программа, курс	Экономика, 4 курс
Формат изучения дисциплины	С использованием онлайн курса

Syllabus
Introduction to databases
(5 ECTS)

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Department of Economics and Finance
Meeting Minute #8.2.2.1-32-09/04 dated 30 August 2019

1. Course Description

a) Pre-requisites

There is no prerequisites for the course.

b) Abstract

The purpose of mastering the discipline "Introduction to Databases" is to familiarize students with the theoretical foundations of modern relational databases and the principles of using the SQL query language to manipulate data stored in relational tables.
This discipline belongs to the cycle "Variable part of the profile", specialization "Business analytics and applied economics". Type of a course: with online course.

2. Learning Objectives

As a result of mastering the discipline, students should possess the following knowledge and skills:

- Know the basics of relational algebra.
- Be able to use the SQL language to write queries.
- To have skills in building relationships between relational tables.

3. Learning Outcomes

As a result of mastering the discipline "Introduction to databases", students form the following competencies:

Code	Competency statement
UK-3	Able to solve problems in professional activities based on analysis and synthesis
UK-5	Able to work with information: find, evaluate and use information from various sources necessary for solving scientific and professional problems (including on the basis of a systematic approach)
PK-7	Able to collect and analyze the source data necessary for calculating economic and socio-economic indicators characterizing the activities of business entities
PK-11	It is capable of collecting, analyzing and processing statistical data, information, scientific and analytical materials necessary to solve economic problems

PK-12	Able to choose tools for processing economic data in accordance with the task, analyze the results of calculations and substantiate the findings
PK-17	Able to use modern technical means and information technologies to solve analytical and research problems
PK-20	It is capable of processing, storing project and professional data, distributing information in accordance with the assigned professional tasks and disseminating it

4. Course Plan

Topics, hours and planned learning outcomes are presented in the table.

Sections / topics of a course	Hours		Planned learning outcomes to be measured	Forms of control
Section 1. Relational algebra	lec	2	Able to check the normalization of tables, bring the database to normal form Able to formulate the result of query execution in the language of relational algebra	Written assignments
	sem	0		
	sefl	28		
	onl	30		
Section 2. SQL	lec	2	Able to form relationships between tables Able to select the required fields in the final report Able to use filters, sorting, aggregation and window functions Selects a time-efficient way to write a query	
	sem	0		
	sefl	62		
	onl	66		
Hours for each type of classes:	lec	**4**		
	sem	**0**		
	sefl	**90**		
	onl	**96**		
Total hours:	**190**			

Forms of studies:
lec - lectures in the audience;
sem - seminars / workshops / laboratory work in the classroom;
onl - lectures or other types of student work using an online course;
self - student independent work.

The content of the sections of the discipline:
Section 1. Relational Algebra
Theme 1. Data types. The keys. The integrity of tables and data.
Theme 2. Normalization of tables.
Theme 3. Relations between tables.

Section 2. SQL
Theme 4. Basic SQL syntax.
Theme 5. Data aggregation and aggregation functions.
Theme 6. Window functions.
Theme 7. Subqueries and submissions.

5. Reading List

a) Required

Batra, L. (2018). SQL Primer: An Accelerated Introduction to SQL Basics. APress. (https://link.springer.com/book/10.1007/978-1-4842-3576-8)
Rockoff, L. (2017). Language of SQL: Second Edition. Addison-Wesley. (http://dbmanagement.info/IT_Books/The_Language_of_SQL,_2nd_Edition_from_dbmanagement.info.pdf)

b) Optional

Harrison, G. (2015). *Next Generation Databases: NoSQLand Big Data*. Apress. (https://link.springer.com/book/10.1007/978-1-4842-1329-2)

6. Grading System

The current control in the discipline "Introduction to databases" includes the following elements:
Accomplishment of practical tasks on the online platform.
Performing independent written homework.

Intermediate evaluation in the discipline is carried out in the form of an exam. The exam is in written form.

Grade on course(O_{course}) is determined by the following formula:

$$O_{course} = 0.3*O_{OC} + 0.19*O_{HW} + 0.51*O_{exam}$$

where O_{OC} – assessment for the implementation of practical tasks on the online platform (online course);
O_{HW} – assessment for completing homework;
O_{exam} – grade for the exam.

The rounding method is arithmetic.

Evaluation Criteria:
Practical assignments on the online platform are evaluated as a percentage of the maximum possible assessment for the parts of the online course assigned by the teacher on the

datacamp.com platform, performed within the deadline set by the teacher, divided by 10. The assessment for completed assignments after the deadline is considered to be 0.
Homework is the consolidation of material passed on the online platform, performed on the data for the final project, are part of the preparation for the final control. Assignments are handed in written (electronic) form to the teacher by e-mail or at the classroom during class in the form of a Jupiter Notebook file no later than the deadline set by the teacher. The work evaluates the independence of implementation, the completeness of answers to questions.

7. Examination Type

The written exam consists in self-designing a database of the selected subject area, writing a code of queries for compiling a dashboard for business analytics using the approaches studied in the course. The paper assesses: Originality and validity of the formulation of the task of business analytics, reports for a dashboard; correctness and efficiency of writing queries; accuracy and quality of the results.

8. Methods of Instruction

Features of the organization of classes for students with disabilities.
If necessary, for students from among persons with disabilities (at the request of the student), and for persons with disabilities also in accordance with the individual rehabilitation program for the disabled person, the following options for perceiving educational information may be offered taking into account their individual psychophysical characteristics, including using electronic training and distance technology:
for persons with visual impairments: in print in large print; in the form of an electronic document; in the form of an audio file (translation of training materials into audio format); individual consultations with the involvement of a tiflos sign language interpreter; individual tasks and consultations.
for persons with hearing impairment: in print; in the form of an electronic document; video materials with subtitles; individual consultations involving an interpreter; individual tasks and consultations.
for persons with disorders of the musculoskeletal system: in printed form; in the form of an electronic document; in the form of an audio file; individual tasks and consultations.

9. Special Equipment and Software Support

#	Name	Access conditions
1	Python 3	From the internal network of the university (free license agreement)