Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
RUDN University

Faculty of Science

educational division (faculty/institute/academy) as higher education programme developer

COURSE SYLLABUS

The method of working with databases

course title

Recommended by the Didactic Council for the Education Field of:

04.04.01 «Chemistry»

field of studies / speciality code and title

The course instruction is implemented within the professional education programme of higher education:

«Bioenergies and Biorefineries»

higher education programme profile/specialisation title

2026

1. COURSE GOAL

The goal of the course “The method of working with databases” is to educate students to obtain the necessary information from available databases on the Internet

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course “The method of working with databases” is aimed at the development of the following competences:

Table 2.1. List of competences that students acquire through the course study

Competence code	**Competence descriptor**	**Competence formation indicators** (within this course)
GC-7	Ability to look for the necessary sources of information and data, perceive, analyse, memorize and transmit information using digital means, as well as using algorithms when working with data obtained from various sources in order to effectively use the information received to solve problems; evaluate information, its reliability, build logical conclusions based on incoming information and data.	GC-7.1. Ability to use digital technologies and methods of searching, processing, analysing, storing and presenting information in the field of chemistry.
		GC-7.2. Ability to develop the conception of digital technologies and methods of searching, processing, analysing, storing and presenting information within the framework of the designated problem: to be able to formulate the purpose, objectives, justify the relevance, significance, expected results and possible areas of their application in the digital economy and modern corporate information culture.
		GC-7.3. Ability to monitor the use of digital technologies and methods of search, processing, analysis, storage and presentation of information in the field of chemistry, corrects deviations, makes additional changes to the plan for the use of digital technologies.
PC-1	Ability to develop a work plan and to choose adequate methods for solving research problems in the chosen field of chemistry, chemical technology or sciences related to chemistry	PC-1.1. Ability to prepare a general plan of research and detailed plans for individual stages
		PC-1.2. Ability to select experimental and calculation-theoretical methods for solving the problems based on the available material and time resources

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The course “The method of working with databases” refers to the **elective** component of B1 block of the higher educational programme curriculum.

Within the higher education programme students also master other (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the course study.

Table 3.1. The list of the higher education programme components/disciplines that contribute to the achievement of the expected learning outcomes as the course study results

Compete	**Competence**	**Previous**	**Subsequent**

nce code	descriptor	courses/modules*	courses/modules*
GC-7	Ability to look for the necessary sources of information and data, perceive, analyse, memorize and transmit information using digital means, as well as using algorithms when working with data obtained from various sources in order to effectively use the information received to solve problems; evaluate information, its reliability, build logical conclusions based on incoming information and data.	Artificial intelligence and additive technologies in chemistry	Student Scientific-Research work Pre-graduation practical training
PC-1	Ability to develop a work plan and to choose adequate methods for solving research problems in the chosen field of chemistry, chemical technology or sciences related to chemistry	Modern organic synthesis and pharmacology Alternative / new tools for organic synthesis Advanced Organic Synthesis Catalyst (nanomaterials) design and applications Experimental lab 1: Flow + alternative technologies	Student Scientific-Research work Pre-graduation practical training

* To be filled in according to the competence matrix of the higher education programme.

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

1)The total workload of the course "The method of working with databases" is 2 credits (72 academic hours).

*Table 4.1. Types of academic activities during the periods of higher education programme mastering (**full-time training**)**

Type of academic activities		Total academic hours	Semesters/training modules			
			1	2	3	4
Contact academic hours		48				*48*
including:						
Lectures (LC)		32				32
Lab work (LW)		16				16
Seminars (workshops/tutorials) (S)						
Self-studies		*6*				*6*
Evaluation and assessment (exam/passing/failing grade)		*18*				*18*
Course workload	academic hours	**72**				**72**

Type of academic activities		Total academic	Semesters/training modules			
			1	2	3	4
	credits	2				2

5. COURSE MODULES AND CONTENTS

Table 5.1. Course contents and academic activities types

Course module title	Course module contents (topics)	Academic activities types
Module 1. “Classical” sources of chemical information – abstract journals of Russian Chemical, Chemical Abstracts, Beilshtein.	Topic 1.1. Familiarization of students with the main sources of chemical information search in the presented abstract journals, methods of searching for information of interest, possibilities of presenting and searching for chemical information on the Internet.	LC
	Topic 1.2. Features provided by the electronic version of Chemical Abstracts.	LC, LW
	Topic 1.3. Familiarization with the features of the presentation and search of patent information.	LC, LW
	Topic 1.4. Familiarization with the specifics of the presentation and search of patent information.	LC, LW
Module 2. Search for the necessary synthetic techniques on the “Orgsyn” server	Topic 2.1. Familiarization of students with other electronic free sources of scientific information.	LC
	Topic 2.2. Working with the server http://www.orgsyn.org / and the possibility of searching for methods of synthesis of compounds of interest.	LW
Module 3. Free electronic versions of organic chemistry journals.	Topic 3.1. Working with full-text free electronic journals on the web, features of searching for articles of interest in this publication.	LW
	Topic 3.2. Working with full-text journals of the American Chemical Society	кLW
	Topic 3.3. Ways to search for information on the ACS website.	LC, LW
Module 4. Patent information	Topic 4.1. Search for patents on the website of the American Patent Office USPTO	LW
	Topic 4.2. Search for patents on the website of the European Patent Office	LW
Module 5. Chemical information search capabilities provided by paid services.	Topic 5.1. Sci-Finder	LC, LW
	Topic 5.2. Reaxys	LC, LW
Module 6. Searching system SCOPUS.	Topic 6.1. Working in the search system SCOPUS.	LW

* - to be filled in only for **full** -time training: *LC - lectures; LW - lab work; S - seminars.*

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom equipment and technology support requirements

Type of academic activities	**Classroom equipment**	**Specialised educational / laboratory equipment, software, and materials for course study** (if necessary)
Lecture	A lecture hall for lecture-type classes, equipped with a set of specialised furniture; board (screen) and a set of devices for multimedia presentations.	Projector, motorized screen for projectors, wi-fi
Computer Lab	A classroom for conducting classes, group and individual consultations, current and mid-term assessment, equipped with personal computers (in the amount of 15 pcs), a board (screen) and technical means of multimedia presentations.	List of specialised software installed on computers for mastering the discipline: (Microsoft Subscription) Enrollment for Education Solutions. FireFox and Opera, ISIS Draw.
Self-studies	A classroom for self-studies (can be used for seminars and consultations), equipped with a set of specialised furniture and computers with access to the electronic information and educational environment.	**Faculty of Science Reading Room** Ordzhonikidze D.3. Coworking area Monday - Friday 10.00 – 22.00 **Reading room of the main building of the RUDN** Coworking area Monday - Saturday 9.00 - 23.00 Hall No. 2 Monday - Thursday 10.00 - 17.45 Friday 10.00 - 16.45 Hall No. 6 Monday - Thursday 10.00 - 17.45 Friday 10.00 - 16.45

* The premises for students' self-studies are subject to **MANDATORY** mention

7. RECOMMENDED RESOURCES FOR COURSE STUDY

Main literature:

1. Electronic database REAXYS https://www.reaxys.com
2. Abstract database SCOPUS http://www.elsevierscience.ru/products/scopus/
3. Patent database USPTO https://patft.uspto.gov/netahtml/PTO/search-bool.html
4. Electronic database Sci-Finder-n https://sso.cas.org/

Additional literature:

1. Website of the American Chemical Society ACS Publications: Chemistry journals, books, and references https://pubs.acs.org/

2. Server with the ability to search for methods for synthesizing compounds http://www.orgsyn.org/

Internet sources

1. Electronic libraries with access for RUDN students:

- RUDN Electronic Library System (RUDN ELS) http://lib.rudn.ru/MegaPro/Web
- EL "University Library Online" http://www.biblioclub.ru
- EL "Yurayt" http://www.biblio-online.ru
- EL "Student Consultant" www.studentlibrary.ru
- EL "Lan" http://e.lanbook.com/
- EL "Trinity Bridge"
- …….

Databases and search engines:

- electronic foundation of legal and normative-technical documentation http://docs.cntd.ru/
- Yandex search engine https:// www .yandex.ru/
- Google search engine https://www.google.ru/
- Scopus abstract database http://www.elsevierscience.ru/products/scopus/

*Training toolkit for self- studies to master the course *:*

1. The laboratory workshop

* The training toolkit for self- studies to master the course is placed on the course page in the university telecommunication training and information system under the set procedure.

DEVELOPERS:

Head of Organic Chemistry Department		**Voskressensky L.G.**
position, department	signature	name and surname

HEAD OF EDUCATIONAL DEPARTMENT:

Organic Chemistry Department		**Voskressensky L.G**
name of department	signature	name and surname

HEAD OF HIGHER EDUCATION PROGRAMME:

Dean of Faculty of Science, Head of Organic Chemistry Department		**Voskressensky L.G**
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