BUNIN YELETS STATE UNIVERSITY

"APPROVED"
Director of the Institute of Culture, History
and Law _____ /I.A. Karpacheva/

THE WORK PROGRAMME OF THE DISCIPLINE
B1.C.02.03 BASICS OF ARTIFICIAL INTELLIGENCE

Direction of training: *44.03.01 Pedagogical Education*
Programme: *Fine Arts*

Qualification (degree): *bachelor*
Mode of study: *full-time*

Institute *of Culture, History and Law*
Department: *Mathematical modeling, computer technology and information security*

	full-time form	full-time and part-time form	part-time form
Study course	2		
Term	4		

Lectures	18		
Laboratory work	18		
Seminars (practical work)			
including practical training			
Form(s) of control	Credit test		
Control			
Other forms of work			
Independent work	108		

Total number of academic hours: 144
Labour intensity: 4 credits

Developer of the work programme:
Candidate of Pedagogical Sciences, Associate Professor Shchuchka T.A.

I. ORGANIZATIONAL AND METHODOLOGICAL SECTION

The purpose of studying the discipline:
- formation of elements of a scientific worldview based on the study of the commonality of the flow of information processes;
- formation of a basic understanding of the main directions of artificial intelligence, the tasks of artificial intelligence and ways to solve them.

Objectives of studying the discipline:
- study of basic concepts and definitions in the field of artificial intelligence;
- study of the main directions of artificial intelligence, principles of organization of modern intelligent systems;
- acquisition of skills in the application of artificial intelligence models in professional activities;
- acquisition of skills in computer modeling using intelligent systems.

The place of the discipline in the structure of the basic professional educational program: it is implemented within the framework of the basic (compulsory) part of block B1. Disciplines (modules).

Planned learning outcomes for the discipline:

Competence cod	Indicators of competence achievement	Planned learning outcomes for the discipline
GPC-9	**To know:** - principles of operation of modern information technologies and methods of their use to solve problems of professional activity.	**Knows:** - principles of operation of modern information technologies and methods of their use to solve problems of professional activity; - basic concepts, definitions and models of artificial intelligence.
	To be able to: - reasonably choose modern information technologies and use them to solve problems of professional activity.	**Is able to:** - conduct intelligent analysis of statistical data; - develop models using intelligent machine learning systems; - competently and reasonably evaluate information technologies for solving professionally-oriented tasks.
	To possess: - skills of working with modern information technologies, methods of their use to solve problems of professional activity.	**Possesses:** - skills in using modern information technologies for intelligent data analysis; - methods of imitation modeling of an intelligent system.

II. CONTENT AND SCOPE OF THE DISCIPLINE
indicating the number of hours allocated for contact work of students with the teacher (by type of class) and for independent work

Full-time education

№	Name of sections and topics	Total	Classroom lessons			Ind. work.
			Lec.	Sem. (pract.)	Lab.	
1	2	3	4	5	6	7
	Section 1. Artificial Intelligence as a Fundamental Science and Technology of Complex Techno-logical Solutions.	**48**	**6**		**2**	**40**
1.	Topic 1. Artificial intelligence: basic concepts and history of origin.	14	2		-	12
2.	Topic 2. The main theoretical tasks of artificial intelligence. Areas of application of artificial intelligence methods.	18	2		2	14
3.	Topic 3. National AI Strategy. Clas-sification of AI systems. Risks and benefits. AI ethics.	16	2		-	14
	Section 2. Fundamentals of Arti-ficial Intelligence.	**96**	**12**		**16**	**68**
4.	Topic 4. Expert systems.	16	2		2	12
5.	Topic 5. Models of knowledge rep-resentation in expert systems.	21	3		4	14
6.	Topic 6. Models of search for solu-tions in expert systems.	20	2		4	14
7.	Topic 7. Artificial intelligence sys-tems based on neural networks.	18	2		2	14
8.	Topic 8. Training a neural network	21	3		4	14
	Credit test					
	Total for 4 term	*144*	*18*		*18*	*108*
	Total number of academic hours:	**144**	**18**		**18**	**108**

Full-time and part-time education (not implemented)

Part-time education (not implemented)

III. EVALUATION MATERIALS FOR CONDUCTING CURRENT AND INTER-IM CERTIFICATION OF STUDENTS IN THE DISCIPLINE

Current certification is carried out in the form of a test, abstracts.

Standard version of the test
1. Artificial intelligence is -
Answer options:
1) a direction that allows you to solve complex mathematical problems in programming languages;
2) a direction that allows you to solve intellectual problems in a subset of natural lan-guage;

3) a direction that allows you to solve statistical problems in programming languages;

4) a direction that allows you to solve complex mathematical problems in knowledge representation languages;

2. Who created the fundamental works in the field of artificial intelligence - cybernetics?

Answer options:

1) Raymond Lully

2) Norbert Wiener

3) Leibniz

4) Descartes

3. Name the main "thinking" device of the research direction in the field of artificial intelligence?

4. What approaches to defining the concept of "artificial intelligence" exist?

5. Which artificial intelligence systems (AI) are part of language-based systems?

Answer options:

1) expert systems

2) intelligent PPP

3) neural systems

4) robotic systems

5) communication systems

6) gaming systems

6. Which artificial intelligence systems (AI) are part of heuristic search systems?

Answer options:

1) neural systems

2) gaming systems

3) recognition systems

4) expert systems

7. Which artificial intelligence systems (AI) are part of language-based systems?

Answer options:

1) expert systems

2) neural systems

3) intelligent PPP

4) communication systems

5) gaming systems

6) recognition systems

8. What object of study are the terms "intelligence" and "computer science" closely related to?

Answer:

9. What are the characteristic features of artificial intelligence systems?

Answer options:

1) processing data in symbolic form

2) processing data in numerical format

3) the presence of a clear algorithm

4) the need to choose between many options

10. The scientific direction associated with attempts to formalize human thinking is called ...

Answer options:

1) knowledge representation

2) neural network

3) expert system

4) artificial intelligence

11. What is the name of the field of information technology that studies the methods of converting knowledge into an object of processing on a computer?

Answer options:

1) theory of automated control systems

2) theory of database management systems

3) knowledge engineering

12. What is the main purpose of knowledge engineering ...

Answer options:

1) development of methods for acquiring and using knowledge for implementation on a computer

2) study of human intellectual metaprocedures when solving problems

3) development of database management systems

13. What is the name of knowledge about a specific situation in the form of numerical, textual data or simple statements ...

Answer options:

1) facts

2) metaknowledge

3) rules

14. What are computer programs called that have competence, symbolic reasoning, depth and self-awareness ...

Answer options:

1) problem solvers

2) database management systems

3) expert systems

15. What is the name of an artificial system that imitates a person solving complex problems in the process of his life ...

Answer options:

1) the mechanism of logical output

2) database management system

3) artificial intelligence

16. Indicate the bit depth of the neural processor?

Answer options:

1) 32 bits

2) 64 bits

3) 16 bits

4) 128 bits

17. Indicate the main concepts of the development of artificial intelligence?

Answer options:

1) Intelligence is the ability to solve complex problems
2) Intelligence is the ability of systems to learn
3) Intelligence is the ability to interact with the outside world
4) Intelligence is the ability to solve complex problems and intelligence is the ability of systems to learn

Sample topics for abstracts

1. Development of research in the field of artificial intelligence (stages; areas of application; research directions; problems and prospects).
2. Expert systems are the main type of applied intelligent systems. Knowledge engineering. Characteristics of ES.
3. Pattern recognition using neural network algorithms.
4. Comparative analysis of modern expert system shells.
5. Intellectual games.
6. Knowledge and data in expert systems.
7. Evolution models and genetic algorithms.
8. Thinking and artificial intelligence.
9. Theory of artificial intelligence.
10. Philosophical problems of artificial intelligence and artificial life.

Interim assessment of students is carried out in the form of a credit test using the following assessment materials: a list of questions for a credit test.

List of questions for the credit test
(4 term, Full-time education)

1. The concept of artificial intelligence.
2. The main theoretical tasks of artificial intelligence.
3. Modern studies of artificial intelligence.
4. Artificial intelligence as interdisciplinary regional studies.
5. Traditional tasks of artificial intelligence.
6. The structure and classification of expert systems.
7. Knowledge bases and knowledge representation models.
8. The mechanism of work with accounting.
9. Classification of knowledge engineering methods.
10. Neural networks. Capabilities of artificial neural networks for information processing.
11. The main areas of research in the field of AI.
12. Modeling of heuristic methods.
13. Neurons and their modeling.
14. Active and passive methods of obtaining knowledge.
15. The Delphi method for studying a subject area.
16. Systemic knowledge. Knowledge representation models: logical models. Concepts of fuzzy logic.
17. Systemic knowledge. Knowledge representation models: framework and production.

18. System knowledge. Knowledge representation models: semantic networks. Thesaurus and its use in AI.

19. Machine knowledge representation.

20. The problem of finding images in AI. Linguistic and geometric approach 21. The problem of finding images in AI. Classification methods.

22. The problem of finding images in AI. Clustering methods.

23. Representation of knowledge about the subject area in the form of facts and rules of the Prolog knowledge base.

24. Training a neural network.

25. Expert systems. General characteristics, basic structure and elements of expert systems.

26. Intelligent information of ES. Proposal for IAD.

27. Classification of ES by purpose. Main areas of ES applications. Classification of ES by construction methods.

28. Knowledge engineering. Methodical brainstorming.

29. Classification of computer tools for developing AI systems. The role of programming in the development of knowledge representation methods.

IV. LIST OF REFERENCES REQUIRED FOR MASTERING THE DISCIPLINE

4.1. Main literature

1. Voronov, M. V. Artificial Intelligence Systems: a textbook and practical training for universities / M. V. Voronov, V. I. Pimenov, I. A. Nebaev. - 2nd ed., revised. and additional. - Moscow: Publishing house Yurait, 2024. - 268 p. - (Higher education). - ISBN 978-5-534-17032-0. - Text: electronic // Educational platform Yurait [website]. - URL: https://urait.ru/bcode/544161 (date of access: 04 April 2025).

4.2. Additional literature

1. Bayuk, D. A. Legal and Ethical Problems of Artificial Intelligence: a textbook for master's degree students: [16+] / D. A. Bayuk, A. V. Popova; Financial University under the Government of the Russian Federation. - Moscow: Prometheus, 2022. - 300 p.: table. - (Higher education: master's degree). - Access mode: by subscription. - URL: https://biblioclub.ru/index.php?page=book&id=701038 (date of access: 04 April 2025). - Bibliography in the book. - ISBN 978-5-00172-253-3.

2. Furman, Ya. A. Artificial Intelligence Technologies in Biotechnical Systems: [16+] / Ya. A. Furman, V. V. Sevastyanov, K. O. Ivanov; Volga State Technological University. - Yoshkar-Ola: Volga State Technological University, 2020. - 65 p.: [Electronic resource]. - URL: https://biblioclub.ru/index.php?page=book&id=612626 (date of access: 04 April 2025).

V. LIST OF RESOURCES OF THE INFORMATION AND TELECOMMUNICATION NETWORK "INTERNET" REQUIRED FOR MASTERING THE DISCIPLINE

№	Link to information resource	Name of the development in electronic form	Availability
1.	http://edu.ru/	**Russian Education: Federal Portal.** Includes links to portals and websites of educational institutions; state educational standards; regulatory documents; catalog of excursions and educational programs.	Free access

VI. MODERN PROFESSIONAL DATABASES AND INFORMATION REFERENCE SYSTEMS

1.	http://www.biblioclub.ru	Electronic library system (ELS) University library online	Registration via the university computer. In the future, unlimited individual access is provided from any point where there is access to the Internet.
2.	https://e.lanbook.com/	Electronic library system (ELS) Lan	Registration via the university computer. In the future, unlimited individual access is provided from any point where there is access to the Internet.
3.	https://urait.ru/	Educational platform Yurait	Registration via the university computer. In the future, unlimited individual access is provided from any point where there is access to the Internet.

VII. LICENSED AND FREELY DISTRIBUTABLE SOFTWARE

The following licensed and freely distributed software is used in the implementation of the academic discipline:
– Microsoft Windows;
– Microsoft Office;
– LibreOffice and others.

VIII. EQUIPMENT AND TECHNICAL TEACHING AIDS REQUIRED FOR THE IMPLEMENTATION OF THE EDUCATIONAL PROCESS IN THE DISCIPLINE

Classes are held in classrooms equipped with specialized furniture, including stationary or portable technical teaching aids (projector, screen, computer/laptop).

Laboratory classes, group and individual consultations, current and midterm assessments are conducted in specialized classrooms equipped with automated workstations with computers.

Independent work is carried out in rooms equipped with computers with the ability to connect to the Internet and provide access to the electronic information and educational environment of the university.