

Engineering Academy

(faculty/institute/academy)

Recommended by the MSSN

WORKING PROGRAM OF THE DISCIPLINE

Name of the discipline is Intelligent systems and technologies

It is recommended for the direction of training/specialty

09.06.01 «Computer science and engineering»

Orientation of the program (profile)

System analysis, management and information systems

1. Goals and objectives of the discipline:

The purpose of studying the discipline "Intelligent Systems and Technologies" is to form students' competencies necessary for using artificial intelligence methods in solving problems of designing and managing organizational and technical objects and processes, as well as to obtain practical skills of working with intelligent systems, in particular, in business

2. The place of the discipline in the structure of the OP VO:

The discipline Modern problems of management theory belongs to the most *variable* part of the curriculum.

Table № 1 shows the previous and subsequent disciplines aimed at the formation of the discipline's competencies in accordance with the competence matrix of the OP VO.

Table № 1

Previous and subsequent disciplines aimed at the formation of competencies

№ p/p	The cipher and the name of the competence	Previous disciplines	Subsequent disciplines (groups of disciplines)
General cultural competencies			
	UK-2 The ability to design and carry out complex research, including interdisciplinary, based on a holistic systematic scientific worldview using knowledge in the field of history and philosophy of science	Methodology of scientific research	Scientific research (research activity)
General professional competencies			
	OPK-1 knowledge of the methodology of theoretical and experimental research in the field of professional activity	Methodology of scientific research	Scientific research (research activity)
Professional competencies (type of professional activity _____)			
	PK-3 The ability to independent (including managerial) research activities that require extensive fundamental training in modern areas of branch science, deep specialized training in the chosen direction, possession of skills of modern research methods	Methodology of scientific research	Scientific research (research activity)
Professional and specialized competencies of specialization _____			

3. Requirements for the results of mastering the discipline:

The process of studying the discipline is aimed at the formation of the following competencies: UK-2, OPK-1, PK-3

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

To know: classes of problems solved with the help of intelligent systems; the main types of intelligent systems; ways of representing knowledge in intelligent systems; algorithms for logical inference on

knowledge; the principle of operation of intelligent systems on neural networks; models for representing fuzzy knowledge; the concept and structure of expert systems; the concept and principles of artificial intelligence; the basics of the functioning of intelligent information search systems; basic information about artificial intelligence programming languages.

Be able to: describe and create a knowledge base on the required subject area; solve tasks in the conditions of fuzzy source information; write and build an expert and intelligent diagnostic system; organize an intelligent search information system.

Possess: terminology in the subject area of intelligent systems; skills in solving logical problems using the Prolog language; skills in solving problems with fuzzy numerical data; skills in using intellectualization tools in solving computer-aided design problems and creating technologies to support it

4. The scope of the discipline and types of academic work

The total labor intensity of the discipline is 3 credit units.

Type of educational work	Total hours	Semester
		3
Classroom classes (total)	40	40
Including:		
<i>Lectures (L)</i>	20	20
<i>Practical exercises (PE)</i>	20	20
<i>Seminars (S)</i>	-	-
<i>Laboratory work (LW)</i>	-	-
Self-education (total)	68	68
Control	-	-
Total labor intensity	hrs.	108
	credit units	3

5. Content of the discipline

5.1. The content of the discipline sections

№ p/p	Name of the discipline section	Content of the section (topics)
1	Introduction to Intelligent systems and technologies	Data and knowledge. Knowledge representation. Classification of knowledge representation models. Neural networks. Classification, tasks solved by neural networks. Single-layer artificial neural networks. Multilayer neural networks. Expert systems. A model of expert systems. Classification of expert systems and expert system shells. Tools for developing expert systems. Decision support systems. Classification, structure.
2	Basics of Logic programming	Basic constructs of logic programming. Facts and rules. Computational model of logical programs. Logic circuits. Managing the execution of a program in the Prolog language. Window interface. Database programming.
3	Artificial intelligence	Definition of artificial intelligence. Tasks of artificial intelligence. The history of the development of artificial intelligence as a science. The main approaches to the study of artificial intelligence. The

		main directions of research in the field of artificial intelligence.
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5.2. Sections of disciplines and types of classes

№ p/p	Name of the discipline section	L	S	PE	SRS	Total (hrs.)
1.	Introduction to Intelligent systems and technologies	3		3	12	18
2.	Basics of Logic programming	3		3	12	18
3.	Artificial intelligence	3		3	12	18
	In Total	20		20	68	108

6. Laboratory workshop *is not provided*

7. Practical classes (seminars) *(if available)*

№ п/п	№ of the discipline section	Topics of practical classes (seminars)	Labor intensity (hrs.)
1.	1	Introduction to Intelligent systems and technologies	7
2.	2	Basics of Logic programming	7
3.	3	Artificial intelligence	6
		In Total:	20

8. Material and technical support of the discipline:

Moscow, Ordzhonikidze str., 3, building 1, 5. Educational and Scientific Laboratory of Integrated Control Systems, office 350.

Main equipment: Kontar software and hardware complex-12 pcs.; computers (workstation) – 13 pcs.; Xerox Phaser 3125 printer – 1 pc.; EPSON PERFECTION V10 scanner – 1 pc.; Toshiba TLP – XC3000 projector-1 pc.; Polyvision TSL 610 interactive whiteboard – 1 pc.; floor cabinet DG – Rack 26U 600 x 800 x 1390-1 pc.; fan module for floor cabinets DG – Rack-1 pc.; Cisco Catalyst switch 2960 24 10/100 + 2T/SFP LAN Base Image + CWDM 1590 NM SFP Gigabit Ethernet and 1G/2G FC – 2 pcs.; HP DL380G5 – 2XeonE5410 server – 2 pcs.; APC Smart-UPS RT 5000VA RM 230V uninterruptible power supply unit - 2 pcs.; HP Proliant DL785G5 8356 server-1 pc.; Software: ABBYY Finereader 9 Corporate Edition; ABBYY Lingvo 12 European version; Adobe Acrobat 8 Professional; Matlab 2008a; Mathcad 14.

9. Information support of the discipline

(the list of information technologies used in the implementation of the educational process in the discipline (module) is indicated, including a list of software and information reference systems (if necessary))

a) the software is used only licensed, installed in the RUDN. The Microsoft Office software package and specialized software Dev-C++, Scilab.

b) databases, information and reference and search engines _____

RSL Electronic Library <http://www.rsl.ru/>

Website of the RUDN Library <http://lib.rudn.ru/>

Science Direct <http://www.sciencedirect.com> Description: The resource contains a collection of scientific, technical full-text and bibliographic information. The database of a multidisciplinary nature includes scientific journals on exact and technical sciences.

EBSCO <http://search.ebscohost.com>, Academic Search Premier (a database of complex topics, contains information on the humanities and natural fields of knowledge).

Oxford University Press <http://www3.oup.co.uk/jnls>. Journals on exact and technical sciences
Oxford University Press presented in the HSS collection

Sage Publications <http://online.sagepub.com>. The Sage publication database includes journals in various branches of knowledge: Sage_STM – more than 100 journals in the field of natural sciences, technology.

Springer/Kluwer <http://www.springerlink.com>. Journals and books published by Springer / Kluwer cover various fields of knowledge and are divided into subject categories.

Taylor & Francis <http://www.informaworld.com>. The collection of journals includes more than 1000 titles in all fields of knowledge.

American Mathematical Society <http://www.ams.org/> Resource of the American Mathematical Society.

European Mathematical Society <http://www.euro-math-soc.eu/> Resource of the European Mathematical Society.

Portal to Mathematics Publications <http://www.emis.de/projects/EULER/>

Catalog of mathematical Internet resources <http://www.mathtree.ru/>

Zentralblatt MATH (zbMATH) <https://zbmath.org>

All-Russian Mathematical portal mathnet.ru

Web of Science <http://www.isiknowledge.com>

Resources of the Institute of Scientific Information on Social Sciences of the Russian Academy of Sciences (INION RAS) <http://elibrary.ru>.

University Information System RUSSIA. <http://www.cir.ru/index.jsp>.

GOST standards system of standards for information, library and publishing <http://www.ifap.ru/library/gost/sibid.htm>.

Electronic Library of the RUDN <http://www.rsl.ru/>

10. Educational and methodological support of the discipline:

a) main literature

1. Andreychikov, A.V. Intelligent information systems : a textbook for students. universities, training. According to spec. "Applied informatics in economics" / Andreychikov A.V., Andreychikova O. N.-M.: Finance and Statistics, 2004. - 424 p.
2. Voronov, A. E. Technology of using expert systems / A. E. Voronov. - M.: Laboratory books, 2011. - 109 p.: ill. - ISBN 978-5-504-00525-6 ; The same [Electronic resource]. - URL: <http://biblioclub.ru/index.php?page=book&id=142527>
3. Intellectual systems: textbook / A. Semenov, N. Solovyov, E. Chernoprudova, A. Tsygankov; Ministry of Education and Science of the Russian Federation, Federal State Budgetary Educational Institution of Higher Professional Education "Orenburg State University". - Orenburg : OSU, 2013. - 236 p.; The same [Electronic resource]. - URL: <http://biblioclub.ru/index.php?page=book&id=259148>
4. Kukharenko, B. G. Intelligent systems and technologies : a textbook / B. G. Kukharenko; Ministry of Transport of the Russian Federation, Moscow State Academy of Water Transport. - Moscow: Altair : MGAVT, 2015. - 115 p.: table., graph., ill. - Bibliogr. in the book ; The same [Electronic resource]. - URL: <http://biblioclub.ru/index.php?page=book&id=429758>

b) additional literature

1. Alekseev V. M., Galeev E. M., Tikhomirov V. M. Collection of optimization problems. - Moscow: FIZMATLIT, 2005 – - 256 p.
2. Evmenov V. P. Intelligent control systems. - M.: LIBROKOM, 2009 – - 304 p..
3. Esipov B. A. Methods of operations research-St. Petersburg: Lan, 2010.
4. Kornienko V. P. Optimization methods. Approved by the UMS in Applied Mathematics and Computer Science of the UMO as a textbook for university students in the specialty "Applied Mathematics and Computer Science". - Moscow: HIGHER SCHOOL, 2007. - 664 p.
5. Miroshnik I. V. Theory of automatic control. Linear systems. Peter, 2005.
6. Panteleev A.V., Bortakovskiy A. S. Control theory in examples and problems. - M., Higher School, 2003.

7. Sukharev A. G., Timokhov A.V., Fedorov V. V. Course of optimization methods. - Moscow: Moscow, FIZMATLIT, 2005.

11. Methodological guidelines for students on the development of the discipline (module)

The course implementation includes interactive lectures, practical classes (seminars) using multimedia equipment, preparation of independent creative works and their subsequent presentations, testing, conducting group discussions on the subject of the course, modern knowledge control technologies.

While studying the discipline, the student must attend a course of lectures, pass the number of seminars provided for by the work program, independently study some topics of the course and confirm their knowledge during control events.

The student's work at the lecture consists in understanding the basics of the discipline, briefly taking notes of the material, clarifying issues that cause difficulties. The lecture notes are the basic educational material along with the textbooks recommended in the main list of references.

The main part of the lecture material is taught using multimedia tools that facilitate the perception and memorization of the material. The presentations are available for download from the RUDN website and can be freely used by students for educational purposes.

The student is obliged to master all the topics provided for by the educational and thematic plan of the discipline. Individual topics and training issues are submitted for independent study. The student studies the recommended literature and briefly outlines the material, and clarifies the most difficult questions that require clarification during consultations. The same should be done with the sections of the course that were skipped due to various circumstances.

For an in-depth study of the issue, the student should familiarize himself with the literature from the additional list and specialized websites on the Internet. It is also recommended that students communicate on the forums of professional communities.

Students independently study educational, scientific and periodical literature. They have the opportunity to discuss what they have read with the teachers of the discipline during scheduled consultations, with other students at seminars, as well as at lectures, asking clarifying questions to the lecturer.

The control of the independent work of the masters is carried out by the leading teacher. Depending on the teaching methodology, the following forms of current control can be used: a short oral or written survey before the start of classes, written homework, essays, etc..

12. Fund of evaluation funds for conducting intermediate certification of students in the discipline (module)

Materials for assessing the level of mastering the educational material of the discipline "Intelligent Systems and Technologies" (evaluation materials), including a list of competencies indicating the stages of their formation, a description of indicators and criteria for evaluating competencies at various stages of their formation, a description of assessment scales, standard control tasks or other materials necessary for evaluating knowledge, skills, skills and (or) experience of activity that characterize the stages of competence formation in the process of mastering the educational program, methodological materials, the defining procedures for assessing knowledge, skills, skills and (or) experience of activity that characterize the stages of competence formation are fully developed and are available to students on the discipline page in the TUIS RUDN.

The program is compiled in accordance with the requirements of the OS VO RUDN.

Developers:

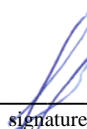
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