Приложение 4

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION

Federal State Autonomous Educational Institution of Higher Education
«National Research Lobachevsky State University of Nizhny Novgorod»

Институт экономики

УТВЕРЖДЕНО
решением Ученого совета ННГУ

протокол № 10 от 02.12.2024 г.

Working programme of the discipline

Informational Systems in Management

Higher education level

Master degree

Area of study / speciality

38.04.02 - Management

Focus /specialization of the study programme

Finance and Business Administration

Mode of study

full-time

Nizhny Novgorod

Year of commencement of studies 2025

1. Место дисциплины в структуре ОПОП

Дисциплина Б1.В.03 Информационные системы в менеджменте относится к части, формируемой участниками образовательных отношений образовательной программы.

2. Планируемые результаты обучения по дисциплине, соотнесенные с планируемыми результатами освоения образовательной программы (компетенциями и индикаторами достижения компетенций)

Формируемые компетенции (код, содержание компетенции)	**Планируемые результаты обучения по дисциплине (модулю), в соответствии с индикатором достижения компетенции**		**Наименование оценочного средства**	
	Индикатор достижения компетенции (код, содержание индикатора)	**Результаты обучения по дисциплине**	**Для текущего контроля успеваемости**	**Для промежуточной аттестации**
ПК-1: Способность проводить самостоятельные исследования, связанные с решением вопросов методического обеспечения, поддержания и координации процесса управления	*ПК-1.1: Обосновывает актуальность, теоретическую и практическую значимость избранной темы научного исследования* *ПК-1.2: Проводит самостоятельные исследования, связанные с решением вопросов методического обеспечения, поддержания и координации процесса управления*	*ПК-1.1:* *Знать основные информационные системы организации* *Уметь обосновывать актуальность избранной темы научного исследования с использованием соответствующих информационных систем* *Владеть навыками обоснования теоретической и практической значимости избранной темы научного исследования с использованием соответствующих информационных систем* *ПК-1.2:* *Знать основные информационные системы организации* *Уметь проводить самостоятельные исследования, связанные с решением вопросов методического обеспечения процесса управления с использованием соответствующих информационных систем* *Владеть навыками проведения самостоятельных исследований, связанных с решением вопросов поддержания и координации*	*Практическое задание* *Тест*	*Зачёт:* *Контрольные вопросы*

		процесса управления с использованием соответствующих информационных систем		
ПК-4: Способность выбирать и использовать современные методы управления бизнес-процессами для обеспечения устойчивого развития предприятий и организаций	*ПК-4.1: Осуществляет выбор методов управления бизнеспроцессами для обеспечения устойчивого развития предприятий и организаций* *ПК-4.2: Применяет выбранные методы управления для целей обеспечения устойчивого развития предприятий и организаций*	*ПК-4.1:* *Знать основные методы выбора информационных систем организации* *Уметь выбирать методы управления бизнес-процессами для обеспечения устойчивой работы информационной системы менеджмента организации* *Владеть навыками выбора информационных систем для обеспечения устойчивого развития предприятий и организаций* *ПК-4.2:* *Знать основные способы применения выбранных информационных систем организации* *Уметь применять выбранные методы для целей обеспечения устойчивой работы информационной системы менеджмента организации* *Владеть навыками применения выбранных информационных систем для обеспечения устойчивого развития предприятий и организаций*	*Практическое задание* *Тест*	*Зачёт: Контрольные вопросы*

3. Структура и содержание дисциплины

3.1 Трудоемкость дисциплины

	очная
Общая трудоемкость, з.е.	**2**
Часов по учебному плану	**72**
в том числе	
аудиторные занятия (контактная работа):	
- занятия лекционного типа	**8**
- занятия семинарского типа (практические занятия / лабораторные работы)	**16**

- КСР	**1**
самостоятельная работа	**47**
Промежуточная аттестация	**0** **Зачёт**

3.2. Содержание дисциплины

(структурированное по темам (разделам) с указанием отведенного на них количества академических часов и виды учебных занятий)

Наименование разделов и тем дисциплины	Всего (часы)	в том числе			
		Контактная работа (работа во взаимодействии с преподавателем), часы из них			Самостоятельная работа обучающегося, часы
		Занятия лекционного типа	Занятия семинарского типа (практические занятия/лабораторные работы), часы	Всего	
	ооо	ооо	ооо	ооо	ооо
Topic 1 Basic concepts, terminology, composition and classification of information technologies	9	1	1	2	7
Topic 2. Components and subsystems of information technology	12	2	2	4	8
Topic 3. Intelligent information technologies in management (intelligent databases, expert systems, neural networks, etc.)	16	2	4	6	10
Topic 4. Information technologies of production and non-production spheres of activity	16	2	4	6	10
Topic 5. Prospects, standardization and security of information technologies	18	1	5	6	12
Аттестация	0				
КСР	1			1	
Итого	72	8	16	25	47

Contents of sections and topics of the discipline

Topic 1. Basic concepts, terminology, composition and classification of information technologies.

Basic processes of information transformation. Information activity as an attribute of the main activity. Basic concepts of computer science. Information exchange. Information exchange system. Information exchange networks. Information, its properties and types. Systems, control systems, properties of systems and system-forming features, information systems, economic information systems. Basic processes of information processing. Information activity.

Topic 2. Components and subsystems of information technologies

Classes of information systems. The structure of single-user and multi-user, small and corporate information systems, local and distributed information systems, the composition and purpose of subsystems. Features of modern projects

IS.

Topic 3. Intelligent information technologies in management (intelligent databases, expert systems, neural networks, etc.)
Models of knowledge representation. Logical, production, semantic, frame models of knowledge representation. Expert systems, their purpose and structure. Stages of expert system development and development basics. Data mining technologies. Data warehouses. Classification of knowledge extraction methods. Communicative knowledge extraction methods. Textual knowledge extraction methods. Intelligent information systems. Neural network structure. Machine learning concept. Application of machine learning technologies for data extraction
Topic 4. Information technologies in production and non-production spheres of activity.
Evolution of information technologies; their role in the development of the economy and society; properties of information technologies; the concept of a platform. Itology and its place in the system of scientific knowledge. Basic provisions of itology. Problems of standardization of information technologies. Properties of information technologies. The concept of a software and hardware platform. Classification of information technologies, subject technology, functional technologies that provide information technologies, distributed functional information technologies. The most popular types of information technologies. Integrated technologies. Data processing technology and its types; technological process of data processing; graphic image of the technological process, menu, data schemes, program interaction schemes; application of information technologies at the user's workplace, automated workplace, electronic office. Data protection technologies. Methods of storing information in information systems. DBMS as a means of automating the storage, processing and management of data. Protecting data in DBMS from unauthorized access. Backup and recovery of information. Organizational aspects of information protection. Technological process of data processing. Workstation of a subject area specialist. Network information technologies. Classification of networks. Local networks: principles of construction and operation. Software and hardware of local networks. Client-server, file-server technologies. Models of client-server interaction. Centralized and distributed technologies for storing and processing information. Intranet networks as a tool for creating a corporate network of an enterprise. Graphic information technologies. Illustrative graphics: raster, vector, fractal. Representation of images in various types of graphics. Color representation. Graphic file formats. Information compression algorithms. Conversion of graphic images.
Topic 5. Prospect, standardization and security of information technologies
Current standards for information systems. The concept of information technology security. Analysis of system vulnerability. Classification of security threats. Assessment of system vulnerability. Basic models and methods of threat implementation. Construction of systems of protection against the threat of breach of confidentiality. Construction of systems of protection against the threat of breach of integrity of information and denial of access. Security policies. International standards in the field of information system security

4. Учебно-методическое обеспечение самостоятельной работы обучающихся

Самостоятельная работа обучающихся включает в себя подготовку к контрольным вопросам и заданиям для текущего контроля и промежуточной аттестации по итогам освоения дисциплины приведенным в п. 5.

Для обеспечения самостоятельной работы обучающихся используются:
Электронные курсы, созданные в системе электронного обучения ННГУ:

Информационные технологии, https://e-learning.unn.ru.

Иные учебно-методические материалы:
РПД и ФОС по дисциплине

5. Assessment tools for ongoing monitoring of learning progress and interim certification in the discipline (module)

5.1 Model assignments required for assessment of learning outcomes during the ongoing monitoring of learning progress with the criteria for their assessment:

5.1.1 Model assignments (assessment tool - Practical task) to assess the development of the competency ПК-1:

1. Find legal documents governing the activities of companies in the field of information technology.

2. Provide essential fragments of legal acts governing the use of information technology.

3. Describe the business processes of searching for and purchasing goods via the Internet, distribution channels and marketing communications.

4. Describe the marketing activities of the company that were carried out in order to support the business processes of searching for and purchasing goods via the Internet.

5. Based on a given report or fragment of a web analytics report for a certain period of time, calculate the values of specific indicators of the behavior of visitors to a business site.

6. For two given companies, conduct a comparative statistical analysis of the effectiveness of information technology application strategies.

7. Conduct an analysis of the achievement of goals by potential and actual buyers on the company's business website.

8. Register on the "Gosuslugi" portal and determine the services that are of interest to a given company, individual.

9. Analyze real situations of fraud - withdrawal of funds from company accounts via the Internet. Develop measures to protect funds from virtual thieves.

10. Conduct an analysis of real situations related to the purchase of goods from suppliers. Assess business risks and make the right decisions.

5.1.2 Model assignments (assessment tool - Practical task) to assess the development of the competency ПК-4:

11. Provide essential excerpts from regulatory acts governing the use of the Yandex Money Internet service.

12. Describe the tactics of using electronic wallets by the company.

13. Conduct a comparative analysis of the specified electronic payment systems.

14. An organization has developed an advertising campaign with the placement of contextual advertising ads in four search engines (sites). Sales are carried out by the organization via the Internet. In order to monitor the behavior of potential and actual buyers, develop an appropriate report form for the subsequent determination of the effectiveness of advertising sites.

15. An organization has implemented the first stage of an advertising campaign with the placement of contextual advertising ads in four search engines (sites) with four specified budgets. Based on the results of this stage, a report was obtained containing the following indicators for each advertising site: number of ad impressions, number of clicks, cost per click, number of sales, sales revenue. In order to subsequently use the advertising campaign budgets most effectively, develop tactics related to decreasing or increasing each of the four budgets.

16. List the main components of any modern information technology.

17. Name the main functional systems that are part of information technologies in the production sphere of activity.

18. List the main elements that are part of expert systems.

19. Name the main methods of knowledge representation in expert systems.

20. Name the areas of application of neural networks.

21. Formulate the law of learning in neural networks.

22. Formulate the algorithm for the functioning of a neural network.

23. Formulate the algorithm for the functioning of a Bayesian expert system.

24. Describe the MRP and MRP II standards.

25. Describe the ERP and ERP II standards.

Assessment criteria (assessment tool — Practical task)

Grade	Assessment criteria
pass	All competencies (parts of competencies), the formation of which the discipline is aimed at, are formed at a level not lower than "satisfactory". Many minor errors were made. Basic skills were demonstrated. Typical problems with minor errors were solved. All tasks were completed, but not in full. There is a minimum set of skills for solving standard problems with some shortcomings
fail	At least one competence is formed at the level of "unsatisfactory" or "poor"

5.1.3 Model assignments (assessment tool - Test) to assess the development of the competency ПК-1:

1. What is an information society - ...

A human society;

B Russian society

C society in which the majority of workers are engaged in the transformation of information.

2 Informatization of Russian society is understood as - ...

A modernization of the information and telecommunications infrastructure in Russia;

B organizational process of creating optimal conditions for satisfying the information needs of individuals and legal entities based on the formation and use of information resources;

C training and preparation for life and work

3. An information crisis is ...

A contradiction between the limited capabilities of a person to perceive and process information and its increasing flows;

B growth in the absolute number of management personnel with the impossibility of promptly processing the emerging volume of accounting data;

C increase in information flows with low quality of the educational process in schools

4. What is an information resource - ...

A information sources for creating information products and providing information services;

B the result of human intellectual activity;

B. raw materials for the activities of the information industry

5. What is an information product - ...

A. information service provided to the user;

B. result of intellectual activity

C. dissemination of information to the user

6. The information market is ...

A. a system of economic, legal and organizational relations for the trade in information industry products on a commercial basis;

B. production, sale and purchase of computers and computer devices with active government regulation;

C. provision of paid network services, primarily via the Internet.

7. The components of the information market are - ...

A. technical, software and information technology;

B. reference tools on suppliers of information products and services, as well as information and legal documents on information;

C. all of the above.

5.1.4 Model assignments (assessment tool - Test) to assess the development of the competency ПК-4:

8. What management functions are implemented in corporate management systems - ...

A. accounting, control and regulation;

B. planning, analysis and accounting;

C. planning, accounting, analysis, control and regulation.

9. What is the broadest concept - ...

A. data;

B. knowledge;

C. information.

10. Can your grade book be considered an information resource - ...

A. yes;

B. no;

C. under certain conditions.

11. Information technologies for data processing - ...

A. related to solving optimization problems;

B. related to solving repetitive problems with simple algorithms;

C. related to solving problem situations.

12. Information technologies for decision support - ...

A. related to solving optimization problems;

B. related to solving repetitive problems with simple algorithms;

B. are related to solving problem situations.

13. Information technology of the automated office - ...

A. involves organizing communication processes both within the company and with the external environment based on computer networks and other modern means of transmitting and working with information;

B. involves the presence of computer networks and other modern means of transmitting and working with information within the organization;

B. involves the presence of computer networks and other modern means of transmitting and working with information within the organization and with external users.

14. Systems for preparing decision-making - ...

A. are related to solving optimization problems;

B. are related to solving repetitive problems with simple algorithms;

B. are related to solving problem situations.

15. The main feature of corporate information systems - ...

A. use of a single information environment for geographically remote divisions;

B. use of a single software environment for geographically remote divisions and performers;

B. use of a single information and software environment for geographically remote divisions and performers.

16. Cloud technologies are possible - ...

A. in a local network;

B. in a global network;

C. on the company's server computer.

17. What is the fundamental basis of a CIS - ...

A. a single information space for geographically remote divisions united by a common business process;

B. a single information space for geographically remote divisions;

C. a common business process for geographically remote divisions.

18. Which CIS appeared first - ...

A. CIS focused on material flow management;

B. CIS focused on production;

C. universal CIS.

19. In ERP systems, business processes from which areas of activity are considered - ...

A. production, supply, sales;

B. supply;

C. sales and supply.

20. The SAP R/3 system is - ...

A. A corporate information system focused on material flow management;

B. A corporate information system focused on production;

C. A universal corporate information system.

21. The Galaxy corporate information system is - ...

A. A corporate information system focused on material flow management;

B. A corporate information system focused on production;

C. A universal corporate information system.

22. Modern corporate information systems use - ...

A. Built-in information security training tools;

B. Methods that allow calculating the long-term economic security of an organization;

C. Software tools for calculating the economic viability of an organization.

Assessment criteria (assessment tool — Test)

Grade	Assessment criteria
pass	All competencies (parts of competencies), the formation of which the discipline is aimed at, are formed at a level not lower than "satisfactory". Many minor errors were made. Basic skills were demonstrated. Typical problems with minor errors were solved. All tasks were completed, but not in full. There is a minimum set of skills for solving standard problems with some shortcomings
fail	At least one competence is formed at the level of "unsatisfactory" or "poor"

5.2. Description of scales for assessing learning outcomes in the discipline during interim certification

Шкала оценивания сформированности компетенций

Уровень сформированности компетенций (индикатора достижения компетенций)	**плохо**	**неудовлетворительно**	**удовлетворительно**	**хорошо**	**очень хорошо**	**отлично**	**превосходно**
	не зачтено		**зачтено**				
Знания	Отсутствие знаний теоретического материала. Невозможность оценить полноту знаний вследствие отказа обучающегося от ответа	Уровень знаний ниже минимальных требований. Имели место грубые ошибки	Минимально допустимый уровень знаний. Допущено много негрубых ошибок	Уровень знаний в объеме, соответствующем программе подготовки. Допущено несколько негрубых ошибок	Уровень знаний в объеме, соответствующем программе подготовки. Допущено несколько несущественных ошибок	Уровень знаний в объеме, соответствующем программе подготовки. Ошибок нет.	Уровень знаний в объеме, превышающем программу подготовки.
Умения	Отсутствие минимальных умений. Невозможность оценить наличие умений вследствие отказа обучающегося от ответа	При решении стандартных задач не продемонстрированы основные умения. Имели место грубые ошибки	Продемонстрированы основные умения. Решены типовые задачи с негрубыми ошибками. Выполнены все задания, но не в полном	Продемонстрированы все основные умения. Решены все основные задачи с негрубыми ошибками. Выполнены все задания в полном объеме, но	Продемонстрированы все основные умения. Решены все основные задачи. Выполнены все задания в полном объеме, но некоторые с	Продемонстрированы все основные умения. Решены все основные задачи с отдельными несущественными недочетам	Продемонстрированы все основные умения. Решены все основные задачи. Выполнены все задания, в полном объеме без недочетов

			объеме	некоторые с недочетами	недочетами.	и, выполнены все задания в полном объеме	
Навыки	Отсутствие базовых навыков. Невозможность оценить наличие навыков вследствие отказа обучающегося от ответа	При решении стандартных задач не продемонстрированы базовые навыки. Имели место грубые ошибки	Имеется минимальный набор навыков для решения стандартных задач с некоторыми недочетами	Продемонстрированы базовые навыки при решении стандартных задач с некоторыми недочетами	Продемонстрированы базовые навыки при решении стандартных задач без ошибок и недочетов	Продемонстрированы навыки при решении нестандартных задач без ошибок и недочетов	Продемонстрирован творческий подход к решению нестандартных задач

Scale of assessment for interim certification

Grade		Assessment criteria
pass	**outstanding**	All the competencies (parts of competencies) to be developed within the discipline have been developed at a level no lower than "outstanding", the knowledge and skills for the relevant competencies have been demonstrated at a level higher than the one set out in the programme.
	excellent	All the competencies (parts of competencies) to be developed within the discipline have been developed at a level no lower than "excellent",
	very good	All the competencies (parts of competencies) to be developed within the discipline have been developed at a level no lower than "very good",
	good	All the competencies (parts of competencies) to be developed within the discipline have been developed at a level no lower than "good",
	satisfactory	All the competencies (parts of competencies) to be developed within the discipline have been developed at a level no lower than "satisfactory", with at least one competency developed at the "satisfactory" level.
fail	**unsatisfactory**	At least one competency has been developed at the "unsatisfactory" level.
	poor	At least one competency has been developed at the "poor" level.

5.3 Model control assignments or other materials required to assess learning outcomes during the interim certification with the criteria for their assessment:

5.3.1 Model assignments (assessment tool - Control questions) to assess the development of the competency ПК-1

1. Subject and content of the course. Classification of information technologies (IT).

2. The role of IT in the third production revolution.

3. Classes of automated tasks and problems.

4. History of IT and economics development.

5. Constituent components and subsystems of IT in management and economics.

6. Characteristics of supporting components and subsystems of IT.

7. Characteristics of functional components and subsystems of IT.

8. The concept of IT using concepts without data and data warehouses.

9. Functions of database management systems.

10. Advantages of IT using databases.

11. Basic concepts of databases (data models, YOD, YMD, DB scheme).

12. Distributed DB and client-server architecture.

5.3.2 Model assignments (assessment tool - Control questions) to assess the development of the competency ПК-4

13. Definition of corporate information systems (CIS) in economics and CIS features.

14. Main tasks solved by CIS at different management levels.

15. Qualification and development of CIS.

16. Material requirements planning -MRP I.

17. Capacity requirements planning CRP.

18. Closed cycle material requirements planning CL MRP/.

19. Production resource planning MRP II.

20. World-class manufacturing WCM.

21. Enterprise resource planning ERP I.

22. Optimization of enterprise resource management ERP II.

23. Management as a collaboration MBC.

24. Supply chain management SCM.

25. Resource planning depending on market needs CSRP.

26. General integration scheme of CIS.

27. Business performance management system BPM.

28. IT support of strategic management standards aimed at continuous improvement of business processes BPI.

29. IT implementation of enterprise organizational development models

30. IT implementation of balanced performance indicator systems BSC.

31. General properties of general-purpose CIS.

32. Typical composition of functional modules of general-purpose CIS.

33. Market of software products of general-purpose CIS.

34. General-purpose CIS SAP R/3.

35. General-purpose CIS "Galaktika".

36. Corporate Internet network in CIS.

37. Characteristics and properties of IT using expert systems.

38. Architecture of expert systems and main components of the architecture.

39. The essence of the Bayesian approach to building a logical inference machine.

40. Composition and structure of the knowledge base on hypotheses and evidence.

41 . Using threshold values to assess the probabilities of hypotheses.

42. Determining the maximum and minimum thresholds of hypothesis probabilities.

43. Taking into account uncertainties in user responses.

44. Establishing prices of evidence.

45. Approaches to constructing chains of reasoning (direct, reverse and mixed strategy) and developing conclusions.

46. General algorithm for the operation of expert systems.

47. Using the PROLOG language to build expert systems.

48. An example of expert systems in PROLOG.

49. Processing the knowledge base with PROLOG.

50. ES type PROSPEKTOR (facts, evidence, intermediate and final hypotheses, probabilities).

51. Processing the knowledge base in the PROSPEKTOR system.

52. Development of AI and neural technologies.

53. Features of neurocomputers. Their application in economics and classification.

54. Structure and model of a neural network. Dynamics of a neural network (activation law, learning law and interaction law).

55. Neural-like element and activation law.

56. Learning law of a neural-like network.

57. Law of interaction of neural networks.

58. Network functioning diagram.

59. Systems with fuzzy logic.

60. Genetic algorithms and their use in economics.

61. A system with nonlinear dynamics based on chaos theory and their use in economics.

Assessment criteria (assessment tool — Control questions)

Grade	Assessment criteria
pass	All competencies (parts of competencies), the formation of which the discipline is aimed at, are formed at a level not lower than "satisfactory". Many minor errors were made. Basic skills were demonstrated. Typical problems with minor errors were solved. All tasks were completed, but not in full. There is a minimum set of skills for solving standard problems with some shortcomings
fail	At least one competence is formed at the level of "unsatisfactory" or "poor"

6. Учебно-методическое и информационное обеспечение дисциплины (модуля)

Основная литература:

1. Microsoft Internet Information Services 5.0 : Resource guide / Microsoft Corporation. - Washington : Microsoft Press, 2000. - XXI, 707 p. - (IT Professional). - ISBN 1-57231-805-8 : 70-00., 1 экз.
2. Chuvilova O. N. Automated processing of financial and credit information : student workbook / Chuvilova O. N. - Ставрополь : СКФУ, 2023. - 116 с. - Книга из коллекции СКФУ - Экономика и менеджмент., https://e-lib.unn.ru/MegaPro/UserEntry?Action=FindDocs&ids=893674&idb=0.
3. Knowledge Engineering for Modern Information Systems : Methods, Models and Tools. - De Gruyter, 2022. - 1 online resource. - ISBN 9783110713633. - ISBN 9783110713169. - Текст : электронный., https://e-lib.unn.ru/MegaPro/UserEntry?Action=FindDocs&ids=854183&idb=0.

Дополнительная литература:

1. Технические средства защиты информации. Лабораторный практикум. Technical means of information protection. Laboratory practicals : учебное пособие для вузов / Лохов В. И.,Петренко В. И.,Мандрица И. В.,Максименко Ю. К.; Лохов В. И., Петренко В. И., Максименко Ю. К. - Санкт-Петербург : Лань, 2024. - 480 с. - Книга из коллекции Лань - Информатика. - ISBN 978-5-507-49871-0., https://e-lib.unn.ru/MegaPro/UserEntry?Action=FindDocs&ids=927837&idb=0.

Программное обеспечение и Интернет-ресурсы (в соответствии с содержанием дисциплины):

1. www.gks.ru / Федеральная служба государственной статистики.
2.Операционная система Microsoft Windows
3.Прикладное программное обеспечение Microsoft Office или его аналоги
4.Справочно-правовая система «КонсультантПлюс»
5. Программное обеспечение CPython и Anaconda
6. Программное обеспечение Oracle Virtual Box

7. Материально-техническое обеспечение дисциплины (модуля)

Учебные аудитории для проведения учебных занятий, предусмотренных образовательной программой, оснащены мультимедийным оборудованием (проектор, экран), техническими средствами обучения, компьютерами.

Помещения для самостоятельной работы обучающихся оснащены компьютерной техникой с возможностью подключения к сети "Интернет" и обеспечены доступом в электронную информационно-образовательную среду.

Программа составлена в соответствии с требованиями ОС ННГУ по направлению подготовки/специальности 38.04.02 - Management.

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