

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ  
ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ ЕКОНОМІЧНИЙ УНІВЕРСИТЕТ  
ІМЕНІ СЕМЕНА КУЗНЕЦЯ

**ЗАТВЕРДЖЕНО**

на засіданні кафедри  
інформаційних систем.

Протокол № 1 від 27.08.2024 р.

**ПОГОДЖЕНО**

Проректор з навчально-методичної роботи

Каріна НЕМАШКАЛО



**РОЗРОБЛЕННЯ ТА ВПРОВАДЖЕННЯ ІС**

**робоча програма навчальної дисципліни**

Галузь знань  
Спеціальність  
Освітній рівень  
Освітня програма

12 "Інформаційні технології"  
126 "Інформаційні системи та технології"  
другий (магістерський)  
" Інформаційні системи та технології "

Статус дисципліни  
Мова викладання, навчання та оцінювання

обов'язкова  
англійська

Розробник:  
к.е.н., професор

Ірина УШАКОВА

Завідувач кафедри  
інформаційних систем

Дмитро БОНДАРЕНКО

Гарант програми

підписано КЕП

Олександр КОЛГАТІН

Харків  
2024



## INTRODUCTION

In today's world, information systems (IS) have become an integral part of companies' business. They are tools that allow you to collect process and analyze data to make effective management decisions. ICs have a diverse architecture with a high degree of integration of its components and a large number of connections between elements. They are characterized by flexibility and the possibility of continuous development and deployment. To develop and implement IS that meets today's needs, information systems and technologies specialists must use approaches based on the latest information technologies and flexible management methodologies.

The course "Development and implementation of information systems" is mandatory and is studied according to the training plan for specialists in specialty 126 "Information systems and technologies" of the second (master's) educational level. The discipline involves mastering modern approaches to business analysis in the development of IS, the use of modern approaches and methods of designing and ensuring the quality of information systems, and managing the development, deployment, and support of information systems.

The purpose of the course "Development and implementation of information systems" is to provide basic profiling training by profession, the formation of theoretical knowledge and practical skills necessary for the use of modern approaches to business analysis and development of information systems, their quality assurance, design management and implementation of IC.

The tasks of the course are:

- mastering the theoretical foundations of IS development and implementation;
- mastering the practical skills of applying business analysis methods to determine and manage IS requirements;
- mastering the practical skills of applying methods of quality assurance and testing of IS software;
- mastering practical skills in applying methods of flexible design management;
- mastering the practical skills of applying the methodology of automation of technological processes of assembling, configuring, and deploying software.

The subject of the course is the approaches, methods, and information technologies used for the development and implementation of information systems.

The object of study of the discipline is information systems enterprise management.

In the process of training, applicants acquire the necessary knowledge during lectures and performing laboratory work. The self-study of students is also of great importance in the process of studying and consolidating knowledge.

The learning outcomes and competencies formed by the course are defined in the table. 1.

Table 1

**Learning outcomes and competencies formed by the course**

<b>Learning outcomes</b>	<b>Competencies</b>
LO03	GC04, GC05, SC01, SC02, SC03, SC06
LO04	SC02
LO05	SC02
LO06	GC04, GC05, SC01, SC02, SC07, SC08
LO07	SC02, SC03
LO10	SC03
LO11	SC01
LO12	SC02

*Note.*

LO03 Making effective decisions on the problems of information infrastructure development, creation and application of IT;

LO04. Managing ICT development, implementation and operation processes that are complex, unpredictable and require new strategic and team approaches;

LO05. Determining the requirements for ICT on base of business processes and needs of interested parties' analysis, to develop technical tasks;

LO06. Justifying the choice of technical and software solutions, taking into account their interaction and potential impact on solving organizational problems, organize their implementation and use;

LO07. Making a grounded choice of project solutions and design a service-oriented information architecture of the enterprise (institution, organisation, etc.);

LO10. Providing high-quality cyber protection of ICT, to plan, organize, implement and monitor the functioning of information protection systems;

LO11. Solving the problems of digital transformation in new or unknown environments based on specialised conceptual knowledge, including modern scientific achievements in the field of information technology, researches and integration of knowledge from various fields;

LO12. Improving the information system on the base of business processes analysis;

GC04. Ability to develop and manage projects;

GC05. Ability to evaluate and provide the quality of the work performed;

SC01. Ability to develop and apply IST necessary for solving strategic and current tasks;

SC02. Ability to formulate requirements for life cycle stages of service-oriented information systems;

SC03. Ability to design information systems taking into account the specifics of their purpose, incomplete/insufficient information and conflicting requirements;

SC06. Ability to manage information risks based on the concept of information security;

SC07. Develop and implement innovative projects in the field of ICT;

SC08. Carry out reengineering of applied information systems and business processes.

# COURSE CONTENT

**Content module 1. Approaches to the analysis and design of information systems.**

**Topic 1. Purpose and principles of creating information systems.**

- 1.1. Purpose, tasks, and functions of information systems.
- 1.2. Decomposition of information systems.
- 1.3. Life cycle of information systems.

**Topic 2. Business analysis in the development of information systems.**

- 2.1. General information about business analysis.
- 2.2. Basic terms of business analysis.
- 2.3. Types of requirements for information systems.
- 2.4. Developing a product vision.
- 2.5. Product positioning.
- 2.6. Forms of the Vision document.

**Topic 3. Modern approaches to the design of information systems.**

- 3.1. Approaches to the development of information systems.
- 3.2. Approaches to data storage.
- 3.3. Approaches to the architecture of distributed systems.

**Content module 2. Approaches to quality assurance, deployment and support of information systems.**

**Topic 4. Flexible methodologies in the development and implementation of information systems.**

- 4.1. Basic concepts in project management.
- 4.2. Principles of flexible development methodologies.
- 4.3. Scrum.
- 4.4. Kanban.
- 4.5. Types of contracts and interaction patterns between the client and the development team.

**Topic 5. Ensuring the quality of information systems.**

- 5.1. Software quality: standards, models.
- 5.2. Quality assurance, quality control, and software testing.
- 5.3. Testing in the life cycle of information system development.
- 5.4. Test pyramid.
- 5.5. Modern approaches to development and testing.
- 5.6. Using the Gherkin language in BDD.

**Topic 6. Deployment and support of information systems.**

- 6.1. Software deployment.
- 6.2. Concept of DevOps.
- 6.3. DevOps Lifecycle.
- 6.4. DevOps implementation methods and tools.
- 6.5. DevOps Tools.

The list of laboratory studies in the course is given in table 2.

Table 2

### The list of laboratory studies

Name of the topic and/or task	Content
Topic 2 - 6. Laboratory work 1	Project management using cloud services
Topic 2. Laboratory work 2	Creating a product vision
Topic 3. Laboratory work 3	Modeling users using the character method
Topic 4. Laboratory work 4	Creating user stories
Topic 4. Laboratory work 5	Creating an application prototype
Topic 5 - 6. Laboratory work 6	Creation of acceptance criteria and acceptance tests. Application testing

The list of self-studies in the course is given in table 3.

Table 3

### List of self-study work

Name of the topic and / or task	Content
Topic 1 - 6	Study of theoretical material
Topic 1 - 6	Completing tasks for laboratory work

The number of hours of lecture and laboratory studies and hours of self-study is given in the technological card for the course.

## TEACHING METHODS

In the process of teaching an educational discipline, in order to acquire certain learning outcomes, to activate the educational process, it is envisaged to use such learning methods as:

Verbal (lecture (Topic 1 - 6, problem lecture (Topic 3, Topic 5), provocative lecture (Topic 4)).

In person (demonstration (Topic 1 -6).

Laboratory classes (Topic 2-6), case method (Topic 2-6).

## FORMS AND METHODS OF ASSESSMENT

The University uses a 100-point cumulative system for assessing the learning outcomes of students.

**Current control** is carried out during lectures and laboratory classes and is aimed at checking the level of readiness of the student of higher education to perform specific work and is evaluated by the sum of points scored:

- for courses with a form of semester control as an exam: the maximum amount is 60 points; minimum amount required is 35 points.

**The final control** includes current control and an exam.

**Semester control** is carried out in the form of a semester exam or grading.

***The final grade in the course*** is determined:

- for disciplines with a form of exam, the final grade is the amount of all points received during the current control and the exam grade.

During the teaching of the course, the following control measures are used:

Current control: laboratory works (48 points), theoretical test (12 points).

Semester control: Grading including Exam (40 points).

More detailed information about the assessment system is provided in technological card of the course.

An example of an exam card paper and assessment criteria

### **An example of an examination paper**

Simon Kuznets Kharkiv National University of Economics

Second (master's) level of higher education

"Information systems and technologies" specialty

Educational program "Information systems and technologies".

Educational discipline "Development and implementation of information systems"

Complete the following tasks for this subject area.

**Task 1.** Create a vision of the product in the form Product Vision Board.

**Task 2.** Create a user story with a description of acceptance criteria in the form of a summary of rules.

**Task 3.** Create a user story describing acceptance criteria in Gherkin.

Approved at the meeting of the Information system department

No. \_\_\_\_ dated "\_\_\_\_" \_\_\_\_\_20\_\_\_\_.

Examiner Prof. Iryna USHAKOVA

Chief of Department Ass. prof. Olexander BONDARENKO

### **Assessment criteria**

The examination ticket includes a project stakeholder analysis task and consists of three tasks. The final grade for the exam is the sum of the marks for each task. In general, the completed examination work is evaluated on a 40-point scale. Answers to questions must be clear, and reasoned, with unambiguous interpretation. Ambiguously interpreted answers are not counted as correct.

Task 1 is tested competencies in creating a product vision task 2, 3 - competences in defining requirements for a software system in the form of user stories and creating acceptance criteria for them.

**Task 1** is evaluated from 0 to 15 points. For each of these tasks, the applicant receives an assessment according to the following criteria:

Grade	The name of the task element is assessment
15 points	for a completely correctly completed task
12 - 14 points	for a task performed with minor inaccuracies and minor errors
9 - 11 points	if the task is completed correctly in general, but not completely
1-8 points	for a task performed with significant errors
0 points	if the task is not completed at all

**Task 2** is graded from 0 to 10 points. For each of these tasks, the applicant receives an assessment according to the following criteria:

Grade	The name of the task element is assessment
10 points	for a completely correctly completed task
8-9 points	for a task performed with minor inaccuracies and minor errors
5 - 7 points	if the task is completed correctly in general, but not completely
1-4 points	for a task performed with significant errors
0 points	if the task is not completed at all

**Task 3** is evaluated from 0 to 15 points. For each of these tasks, the applicant receives an assessment according to the following criteria:

Grade	The name of the task element is assessment
15 points	for a completely correctly completed task
12 - 14 points	for a task performed with minor inaccuracies and minor errors
9 - 11 points	if the task is completed correctly in general, but not completely
1-8 points	for a task performed with significant errors
0 points	if the task is not completed at all

More detailed information about the assessment system is given in the technological card for the course.

## RECOMMENDED LITERATURE

### Main

1. Коваленко О. С. Проектування інформаційних систем : Загальні питання теорії проектування ІС [Електронний ресурс]: навч. посіб. для студ. спеціальності 122 «Комп'ютерні науки» / О. С. Коваленко, Л. М. Добровська. – Київ : КПІ ім. Ігоря Сікорського, 2020. – 192 с. – Режим доступу : <https://ela.kpi.ua/items/12865b1b-feef-4fc3-962b-f8caab3a3d4f>.

2. Ситнік Б. Т. Основи інформаційних систем і технологій [Електронний ресурс] : навч. посібник. – Харків: УкрДУЗТ, 2019. – 175 с. – Режим доступу : <http://lib.kart.edu.ua/handle/123456789/2174>.

3. Ушакова І. О. Лабораторний практикум з системного аналізу та проектування інформаційних систем [Електронний ресурс] : навчальний посібник / І. О. Ушакова, І. Б. Медведєва. – Харків : ХНЕУ ім. С. Кузнеця, 2022. – 251 с. - Режим доступу : <http://repository.hneu.edu.ua/handle/123456789/27815>.

4. Крепич С. Я. Якість програмного забезпечення та тестування : базовий



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### **Additional**

5. Розроблення та впровадження ІС. Методичні рекомендації до виконання лабораторних робіт для студентів спеціальності 126 "Інформаційні системи та технології" другого (магістерського) рівня [Електронний ресурс] / укл. І. О. Ушакова. – Харків : ХНЕУ ім. С. Кузнеця, 2020. - 77 с. – Режим доступу : <http://repository.hneu.edu.ua/handle/123456789/23853>.

6. Agile Extension to the BABOK(R) Guide: Version 2. - International Institute of Business Analysis and Agile Alliance, 2017. - 140 p.

7. BABOK. A Guide to the Business Analysis Body of Knowledge : Version 3; ed. K. Brennan. – International Institute of Business Analysis, 2015. – 512 p.

8. Bourgeois David T. Information Systems for Business and Beyond [Electronic resource] / David T. Bourgeois. – Washington, DC : Saylor Academy, 2019. – 167 p. – Access mode : <https://resources.saylor.org/wwwresources/archived/site/textbooks/Information%20Systems%20for%20Business%20and%20Beyond.pdf>.

9. Cohn M. User Stories Applied: For Agile Software Development / M.Cohn. – Addison-Wesley, 2020. – 256 с.

10. Pichler R. Strategize: Product Strategy and Product Roadmap Practices for the Digital Age / R. Pichler. – Pichler Consulting, 2022. – 242 p.

11. Ushakova I. Approaches to Web Application Performance Testing And Real-Time Visualization of Results [Electronic resource] / I. Ushakova , O. Plokhа , Yu. Skorin // Bulletin of KhNAHU. – 2022. – Issue 96. – P.71–80. - Access mode: <http://repository.hneu.edu.ua/handle/123456789/27384>.

12. Ushakova I. Methodology for developing an information site with Workflow support for publishing articles [Electronic resource] / I. Ushakova , Ye. Hrabovskyi // Development Management. - 2022. - 20(3). - P. 20-28. - Access mode: <http://repository.hneu.edu.ua/handle/123456789/29384>.

13. Ushakova I. Methods of quality assurance of software development based on systems approach [Electronic resource] / I. Ushakova, Yu. Skorin, A. Shcherbakov // Proc. of the 3rd International Conference on Information Security and Information Technologies (ISecIT 2021) co-located with 1st International Forum "Digital Reality" (DRForum 2021), Odesa, Ukraine, September 13–19, 2021. – CEUR Workshop Proceedings (CEUR-WS.org).– 2021.– Vol. 3200. – P. 158-168. – Access mode : <http://repository.hneu.edu.ua/handle/123456789/28596>.

14. Wiegers K. Software Requirements Essentials: Core Practices for Successful Business Analysis; 1st Edition / K. Wiegers , C. Hokanson . - Addison-Wesley Professional, 2022. - 208 p.

### **Information resources**

15. Development and implementation of information systems: methodical

support of the course [Electronic resource] // Site of PNS S. Kuznets KhNUE. – Access mode: <https://pns.hneu.edu.ua/course/view.php?id=10188>.

16. Community of developers [Electronic resource] // Dou.ua. – Access mode: <https://dou.ua/>.

17. Agile User Story Mapping [Electronic resources] // Devsamurai.com. – Access mode: <https://www.userstorymap.io/>.

18. DevNet Associate [Electronic resource] // Cisco Networking Academy. – Access mode : <https://www.netacad.com/courses/devnet-associate?courseLang=en-US>.

19. Docker : Accelerated Container Application Development [Electronic resource] // Docker . – Access mode : <https://www.docker.com/>.

20. Manage your Team's Projects from Anywhere [Electronic resource] // Atlassian trello . – Access mode : <https://trello.com/>.

21. The most-comprehensive AI-powered DevSecOps platform [Electronic resource] // GitLab . – Access mode : <https://gitlab.com/>.