

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

ЗАТВЕРДЖЕНО

на засіданні кафедри
інформаційних систем.
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ПОГОДЖЕНО

Проректор з навчально-методичної роботи



Каріна НЕМАШКАЛО

СИСТЕМНИЙ ТА БІЗНЕС АНАЛІЗ В ІТ ГАЛУЗІ

робоча програма навчальної дисципліни (РПНД)

Галузь знань
Спеціальність
Освітній рівень
Освітня програма

12 "Інформаційні технології"
121 "Інженерія програмного забезпечення"
перший (бакалаврський)
"Інженерія програмного забезпечення"

Статус дисципліни
Мова викладання, навчання та оцінювання

обов'язкова
англійська

Розробник:
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Гарант програми

Олег ФРОЛОВ

Харків
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INTRODUCTION

System analysis arose and is directly related to the era of computer technology in business. The success of its application in solving complex tasks, to a large extent, determines the possibilities of modern information technologies. Under modern conditions, the complexity of modern business problems and their IT solutions is increasing exponent.

Given this, an important professional competence of software engineering specialists is the skills of system and business analysis of the subject area, detection, analysis, specification, documentation and management of requirements for software systems throughout the entire software creation cycle. High-quality software development involves the use of the skills of system and business analysis of the subject area, software specification and modeling, the development of communication skills in the process of identifying requirements, the ability to formulate proposals and conclusions, as well as knowledge and use of international requirements engineering standards for software systems.

The course "System and business analysis in IT industry" is mandatory and is studied according to the training plan for specialists in specialty 121 "Software engineering" of the first (bachelor's) educational level.

The purpose of the course is to provide basic profiling training by profession, the formation of theoretical knowledge and practical skills necessary for the use of the system approach, its principles and methods during the analysis and management of requirements for software systems.

The tasks of the course are:

- research of the essence and varieties of systematicity and the main directions of systematic research;
- determination of the composition, structure and classification of systems in the IT industry;
- research of principles, approaches and methods of system analysis;
- study of IT management issues of the company as a complex system;
- study the place of business analysis in the company's management system and the functional duties of a business analyst.
- research of standards and methodologies of modeling business processes in the IT industry;
- determination of the structure of information, properties and updating of data in the IT company;
- mastering the structure, functions and classification of IS.
- study of the rules and principles of decision-making in IT companies in conditions of uncertainty and risk.

The course involves studying the basics of system analysis of the subject area and using its principles during the identification, analysis, specification, documentation and management of requirements.

The object of the course is the process of system and business analysis in the IT field.

The subject of the course is principles, approaches, methodologies and system and business analysis in the IT field.

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

Table 1

Learning outcomes and competencies formed by the course

| Learning outcomes | Competencies |
|--------------------------|---|
| LO 01 | GC 01, GC 02, GC 03, GC 06, SC 01, SC 10, SC 13 |
| LO 03 | SC 02, SC 05, SC 11, SC 12 |
| LO 04 | SC 01, SC02, SC 05, SC 11, SC 12 |
| LO 05 | GC 01 |
| LO 06 | SC 02, SC 05, SC 11 |
| LO 09 | SC 01 |
| LO 10 | SC 01, SC 02 |
| LO 11 | SC 01 |
| LO 14 | SC 13 |
| LO 16 | GC 07 |
| LO 23 | SC 01 |

where, GC01. Ability to abstract thinking, analysis and synthesis.

G02. Ability to apply knowledge in practical situations.

GC03. Ability to communicate in the national language both orally and in writing.

GC04. Ability to communicate in a foreign language both orally and in writing.

GC06. Ability to search, process and analyze information from various sources.

GC07. Ability to work in a team.

SC01. Ability to identify, categorize and formulate software requirements.

SC02. Ability to participate in the design of software, including modeling (formal description) of its structure, behavior and functioning processes.

SC05. Ability to adhere to specifications, standards, rules and recommendations in the professional field when implementing life cycle processes.

SC10. The ability to accumulate, process and systematize professional knowledge about creating and maintaining software and recognizing the importance of lifelong learning.

SC11. The ability to implement phases and iterations of the life cycle of software systems and information technologies based on appropriate software development models and approaches.

SC12. Ability to carry out the system integration process, apply change management standards and procedures to maintain the integrity, overall functionality and reliability of the software.

SC13. The ability to reasonably choose and master software development and maintenance tools;

LO 01. Analyze, purposefully search for and select the information and reference resources and knowledge necessary for solving professional tasks, taking into account modern achievements of science and technology.

LO 03. Know the main processes, phases and iterations of the software life cycle.

LO 04. Know and apply professional standards and other regulatory documents in the field of software engineering.

LO 05. Know and apply relevant mathematical concepts, methods of domain, system and object-oriented analysis and mathematical modeling for software development.

LO 06. The ability to choose and use a software development methodology appropriate to the task.

LO 09. Know and be able to use methods and tools for gathering, formulating and analyzing software requirements.

LO 10. Conduct a pre-project survey of the subject area, system analysis of the design object.

LO 11. Select input data for design, guided by formal requirements description and modeling methods.

LO 14. Apply in practice instrumental software tools for domain analysis, design, testing, visualization, measurement and documentation of software.

LO 16. Have skills in team development, approval, design and release of all types of software documentation.

LO 23. Be able to document and present the results of software development.

COURSE CONTENT

Content module 1. Fundamentals of system and business analysis

Topic 1. Introduction to system analysis

1.1. Systematicity as a general property of the world.

1.2. Development of a system approach.

1.3. System analysis as a methodology for researching complex problems.

Topic 2. Concepts and regularities of system analysis

2.1. Concept of system and its components.

2.2. System description.

2.3. System structure.

2.4. Functioning and development of the system.

Topic 3. Types of systems

3.1. Classification of systems.

3.2. Features of complex systems.

3.3. Types of complex systems.

Topic 4. System analysis methodology

4.1. Principles of system analysis.

4.2. Basic approaches and methods in system analysis.

4.3. Analysis and synthesis as methods of systematic research.

4.4. Decomposition - essence and principles.

4.5. Aggregation and main types of aggregates.

4.6. A general approach to solving problems.

Topic 5. Business - analysis as a direction of work in the IT industry.

5.1. Business analysis, its place in the company management system.

5.2. Methods and models of business analysis in the IT industry.

5.3. Duties of a business analyst.

Content module 2. System analysis of management of complex systems of the IT industry

Topic 6. Fundamentals of managing complex systems

6.1. Management of complex systems.

6.2. Concepts and types of organizations.

6.3. The structure of the organization.

- 6.4. Management functions.
- 6.5. Management tasks. Levels of organization management.
- 6.6. Formalization of the organization's activities.
- Topic 7. System analysis of business process management**
- 7.1. Functional approach to organization management.
- 7.2. Process approach to organization management.
- 7.3. Business process modeling standards and methodologies.

Topic 8. Information aspects of management

- 8.1. Information in the management of complex systems.
- 8.2. Structure of information.
- 8.3. Properties of data, information, knowledge.
- 8.4. Data update processes.

Topic 9. Information systems

- 9.1. Purpose, tasks, functions of IS.
- 9.2. IS structure.
- 9.3. IS classification.
- 9.4. Corporate IS.

Topic 10. Approaches to decision-making in conditions of uncertainty.

- 10.1. Rules and principles of decision-making.
- 10.2. Decision-making in conditions of certainty.
- 10.3. Decision-making in conditions of uncertainty.
- 10.4. Decision-making in conditions of risk.

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

Table 2

The list of laboratory studies

| Name of the topic and / or task | Content |
|---------------------------------|--|
| Topic 1-2. Task 1. | Creating an intelligent map |
| Topic 3-4. Task 2. | Creating a model of the organizational structure in the ARIS tool system |
| Topic 5-7. Task 3. | Modeling of functions and business processes in ARIS tool system |
| Topic 8. Task 4. | Creation of reference information |
| Topic 9. Task 5. | Creating a database model using Visual Paradigm Database Designer |
| Topic 10. Task 6. | Creation of document forms |

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

Table 3

List of independent work

| Name of the topic and / or task | Content |
|---------------------------------|------------------------------------|
| Topic 1 - 10 | Studying lecture material |
| Topic 1 - 10 | Preparation for laboratory classes |
| Topic 1 - 10 | Preparation for the test |

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

TEACHING METHODS

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

Verbal (lecture (Topic 1-9), problematic lecture (Topic 10)).

Visual (demonstration (Topic 1-10)).

Laboratory work (Topic 1 - 10), case method (Topic 1-10)).

Laboratory works are built according to the design principle. Winners are divided into small teams (up to 3 winners in a team). Each laboratory team performs a separate end-to-end project. Laboratory tasks consist of a common part that the team performs together, and individual tasks for each student.

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 lecture and laboratory classes and aims to check the level of preparedness of the higher education applicant to perform a specific job and is evaluated by the sum of points scored, the maximum sum is 100 points; the minimum amount is 60 points.

The final control includes current control and assessment of the student.

The final grade in the course is determined:

– for disciplines with a form of grading, the final grade is the amount of all points received during the current control.

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

Current control: protection of laboratory works (90 points), current control works (10 points).

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

RECOMMENDED LITERATURE

Main

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

2. Шабельник Т. В. Математичне моделювання соціально-економічних систем [Електронний ресурс] : навч. посібник / Т. В. Шабельник. – Маріуполь : МДУ, 2019. – 135 с.

3. Сучасні інформаційні технології і системи [Електронний ресурс]: монографія / В. П. Бурдаєв, Н. Г. Аксак, М. В. Кушнар'єв та ін.; за заг. ред. В. С. Пономаренка. - Харків : Вид. «Стиль-іздат», 2021. - 182 с. <http://repository.hneu.edu.ua/handle/123456789/25920>

Additional

4. Катренко А.В. Системний аналіз / А.В. Катренко. – Львів: Новий Світ 2020. – 2023. – 396 с.

5. Зарембо К. Писати аналітику може кожен. Мистецтво переконливого тексту К. Зарембо, І. Лапшина, І. Сологуб, Т. Доронюк, А. Юнген Київ: Віхола. – 202. – 224 с.

6. Сидорова А. В. Бізнес-аналітика: навчально-методичний посібник / А. В. Сидорова, Д. В. Біленко, Н. В. Буркіна. – Вінниця: ДонНУ імені Василя Стуса. 2019. 104 с.

Information resources

7. Сайт ПНС ХНЕУ ім. С. Кузнеця : навчальна дисципліна «Системний та бізнес аналіз в ІТ галузі» [Електронний ресурс]. – Режим доступу : <https://pns.hneu.edu.ua/course/view.php?id=10332>.

8. Кібернетика та системний аналіз. Міжнародний науково-теоретичний журнал [Електронний ресурс]. – Режим доступу: <http://www.kibernetika.org/>