



Syllabus Course Program



Analysis and management of business processes

Specialty

113 Applied mathematics

Institute

Institute of Computer Science and Information Technology

Educational program

Intelligent Data Analysis

Department

Computer mathematics and data analysis

Level of education

Bachelor's level

Course type

Special (professional), Selective

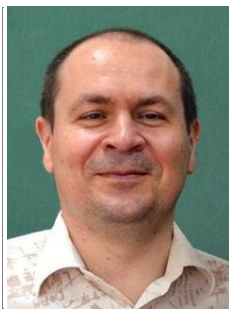
Semester

8

Language of instruction

Ukrainian

Lecturers and course developers



Dmytro Yelchaninov

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Candidate of Technical Sciences, Associate Professor, Associate Professor of the Department of Computer Mathematics and Data Analysis

He has 24 years of experience. Author of 150 scientific and educational works. Leading lecturer in the following disciplines: "Methods and tools of computational mathematics", "Principles and paradigms of Python", "Development of web services in Python", "Algorithmic languages", "Mathematical modeling of complex systems", "Design of consolidated information systems", "Fundamentals of business analytics", "Analysis of expert information".

[More about the lecturer on the department's website](#)

General information

Summary

The course is designed to familiarize students with the key concepts and tools needed to effectively analyze, optimize and manage business processes in modern organizations. This course will provide students with the opportunity to develop skills in strategic management, process modeling, change implementation, and the use of innovative technologies to improve the productivity and competitiveness of enterprises.

Course objectives and goals

The course is focused on providing students with a deep understanding of the concepts, methods and practical tools necessary to analyze, evaluate, optimize and manage business processes in organizations. The course helps students to understand the nature of business processes, their role in the functioning of organizations and their impact on their competitiveness. The main focus is on developing skills in identifying, analyzing and solving problems that arise in the business processes of organizations. To provide students with the opportunity to apply the acquired knowledge and skills in practice through case studies, group projects and practical tasks based on real-life business scenarios.

Format of classes

Lectures, laboratory classes, self-study, consultations. The final control is an exam. |

Competencies

GC 1. Ability to learn and master modern knowledge.

GC 2. Ability to apply knowledge in practical situations.

GC 4. Ability to be critical and self-critical.

GC 6. Ability to think abstractly, analyze and synthesize.

GC 7. Ability to search, process and analyze information from various sources.

GC 9. Ability to communicate with representatives of other professional groups of different levels (with experts from other fields of knowledge/ types of economic activity).

GC 10. Skills in the use of information and communication technologies.

SC 5. Ability to develop algorithms and data structures, software tools and program documentation.

SC 7. Ability to solve professional problems with the help of computer equipment, computer networks and the Internet, in the environment of modern operating systems, using standard office applications.

SC 8. Ability to operate and maintain software of automated and information systems for various purposes.

SC 18. Ability to select and apply mathematical models and methods for statistical and intellectual analysis of data under conditions of uncertainty. |

Learning outcomes

LO 6. To master the basic methods of developing discrete and continuous mathematical models of objects and processes, analytical study of these models for the existence and uniqueness of their solution.

LO 7. Be able to conduct practical research and find solutions to incorrect problems.

LO 10. Know how to choose rational methods and algorithms for solving mathematical problems of optimization, operations research, optimal management and decision-making, and data analysis.

LO 14. Demonstrate the ability to self-learn and continue professional development.

LO 22. Know and understand methods of solving mathematical problems of intellectual information search and knowledge extraction.

LO 24. Be able to apply existing and develop new algorithms and software tools for processing measurement and observation data, texts, signals and images. |

Student workload

The total volume of the course is 120 hours (4 ECTS credits): lectures – 20 hours, laboratory work – 20 hours, self-study - 80 hours. |

Course prerequisites

Successful completion of the course requires knowledge and skills in the following courses: "IT project management", "Analysis of requirements for software systems", "Fundamentals of business analytics", "Systems Development Life Cycle". |

Features of the course, teaching and learning methods, and technologies

Lectures are conducted interactively with the use of multimedia technologies. When teaching this discipline, we use such teaching and learning methods as gamification and peer-to-peer. |

Program of the course

Topics of the lectures

Topic 1. Introduction to business processes

Basic concepts of business processes. The importance of business process analysis and management for organizations.

Topic 2. Business process modeling

Business process modeling techniques: BPMN, UML, Flowcharts. Identification of activities, resources, and flows in business processes.

Topic 3. Analysis of business processes

Methods of business process analysis: SWOT, PESTLE, Value Stream Mapping. Identification of problems and opportunities in business processes.

Topic 4. Optimization of business processes

Goals and methods of business process optimization. Optimization tools: IDEF0, Lean, Six Sigma, Kaizen.

Topic 5. Business process management technologies

Business process management systems. Automation of business processes with the help of software.

Topic 6. Strategic management of business processes

The role of business processes in the strategic management of an organization. Implementation of strategic changes in business processes.

Topic 7. Monitoring and control of business processes

Systems for monitoring and tracking the performance of business processes. Implementation of business process performance metrics.

Topic 8. Support and management of changes in business processes

Change strategies in business processes. Managing change implementation and compliance with organizational requirements.

Topic 9. Human factor in business processes

The role of organization culture in managing business processes. The impact of communication and teamwork on the efficiency of business processes.

Topic 10. Development and implementation of RPA (Robotic Process Automation)

Overview of the RPA concept and its benefits for business process automation. Stages of development and implementation of robots for automation of routine operations. Practical aspects of RPA implementation in organizations and advanced scenarios. |

Topics of the workshops

|There are no workshops in the curriculum. |

Topics of the laboratory classes

|Topic 1. Identification of the main stages of a business process in a particular area of activity and creation of its description.

Topic 2. Development of a business process diagram for a specific scenario using BPMN.

Topic 3. SWOT or PESTLE analysis to identify internal and external factors that affect a particular business process. Use Value Stream Mapping to visualize the current state of the business process.

Topic 4. Use of process modeling methods in IDEF0 notation.

Topic 5. Analyze the advantages and disadvantages of different BPMSs for a particular business process.

Topic 6. Developing a strategic plan for optimizing and improving the business process.

Topic 7. Development of a monitoring and data collection system to assess the performance of the business process.

Topic 8. Developing a strategy for implementing business process changes and a stakeholder communication plan to minimize negative impact on productivity and efficiency.

Topic 9. Analyzing organizational culture and developing strategies to engage staff in improving business processes.

Topic 10. Business process analysis to identify potential areas of automation. Choosing an RPA tool for robot development. Development of scripts, testing, and debugging of the robot. |

Self-study

|The course involves individual assignments, the results of which are checked, monitored and evaluated by the teachers. Students are also recommended additional materials (videos, articles) for self-study. |

Non-formal education

|Business Analysis & Process Management

<https://www.coursera.org/projects/business-analysis-process-management> |

Course materials and recommended reading

1. С.В. Козир, В.В. Слесарев, С.А. Ус, Т.В. Хом'як Моделювання та реінжиніринг бізнес-процесів. Підручник – М-во освіти і науки України; Нац. техн. ун-т «Дніпровська політехніка». – Дніпро: НТУ «ДП», 2022. – 163 с. – ISBN978-966-350-771-2
2. Еліягу Ґолдратт, Джефф Кокс Мета. Процес безперервного вдосконалення. – Наш Формат, 2023. – 448 с. – ISBN 978-617-8120-63-4
3. Marlon Dumas, Marcello La Rosa, Jan Mendling, Hajo A. Reijers Fundamentals of Business Process Management. - Springer, 2019. - 559 с. ISBN 978-366-258-585-6
4. Victoria J. Carvalho Master the Art of Business Process Management: Streamline Your Business and Maximize Efficiency with Proven Process Management Techniques – Independently published, 2023. – 229 с. ISBN 979-8869837257
5. Mathias Weske Business Process Management: Concepts, Languages, Architectures. – Springer, 2019. – 434 с. ISBN 978-366-259-431-5
6. John Jeston Business Process Management: Practical Guidelines to Successful Implementations. – Routledge, 2022. – 596 с. – ISBN 978-036-777-160-7
7. Megan O'Brien Business Process Mapping: A Simple Guide to Process Improvement. – Independently published, 2023. – 24с. – ISBN 979-885-301-107-6
8. Gerardus Blokdyk Business Process Management Tools A Complete Guide – 5STARCOOKS, 2021. – 306 с. ISBN 978-065-592-169-1
9. BPMN Viewer and Editor – <https://bpmn.io/>
10. Навчальні матеріали онлайн: Маркетинг. SWOT-аналіз. <https://pidruchniki.com/1577111551903/marketing/swot-analiz>
11. Побудування діаграми декомпозиції в нотації IDEF3 <http://khpriip.mipk.kharkiv.edu/library/technpgm/labs/lab05.html> |

Assessment and grading

Criteria for assessment of student performance, and the final score structure

100% of the final grade consists of the results of the examination (40%) and the current assessment (60%).

Examination: written assignments (2 theoretical and a problem) and an oral report.

Current assessment: grades for laboratory work, 2 tests and individual assignments. |

Grading scale

| Total points | National | ECTS |
|--------------|--|------|
| 90–100 | Excellent | A |
| 82–89 | Good | B |
| 75–81 | Good | C |
| 64–74 | Satisfactory | D |
| 60–63 | Satisfactory | E |
| 35–59 | Unsatisfactory (requires additional learning) | FX |
| 1–34 | Unsatisfactory (requires repetition of the course) | F |

Norms of academic integrity and course policy

The student must adhere to the Code of Ethics of Academic Relations and Integrity of NTU «KhPI»: to demonstrate discipline, good manners, kindness, honesty, and responsibility. Conflict situations should be openly discussed in academic groups with a lecturer, and if it is impossible to resolve the conflict, they should be brought to the attention of the Institute's management.

Regulatory and legal documents related to the implementation of the principles of academic integrity at NTU «KhPI» are available on the website: <http://blogs.kpi.kharkov.ua/v2/nv/akademichna-dobrochesnist/> |

Approval

Approved by

Date, signature
29.08.2024



Head of the Department
Olena AKHIEZER

Date, signature
29.08.2024



Guarantor of the Educational Program
Olena AKHIEZER