Syllabus
Course Program

Business Modeling

Specialty
121 – Software Engineering
122 – Computer Science

Institute
Institute of Computer Science and Information Technology

Educational program
Software Engineering
Computer Science and Intelligent Systems

Department
Software Engineering and Management Intelligent Technologies (321)

Level of education
Bachelor's level

Course type
Special (professional), Elective

Semester
4

Language of instruction
English, Ukrainian

Lecturers and course developers

Andrii Kopp

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Doctor of Philosophy (Ph.D.), Associate Professor, Associate Professor of Software Engineering and Management Intelligent Technologies Department

Google Scholar: https://scholar.google.com/citations?user=B8fggLEAAAAJ
ORCID: https://orcid.org/0000-0002-3189-5623
Scopus: https://www2.scopus.com/authid/detail.uri?authorId=57202887287
Web of Science: https://www.webofscience.com/wos/author/record/T-4283-2018).
More about the lecturer on the department's website

General information

Summary

This course covers essential topics in Business Modeling, including DFD, EPC, and BPMN. Through laboratory works, students gain hands-on experience in creating BPMN diagrams, mapping DFDs to BPMN, converting EPCs to BPMN, and modeling complex business processes. By the end of the course, students acquire a solid foundation in business modeling techniques using BPMN.

Course objectives and goals

To provide students with practical skills in business modeling, specifically focusing on DFD, EPC, and BPMN, enabling them to effectively analyze, design, and optimize business processes.

Format of classes

Lectures, laboratory classes, consultations, self-study. Final control in the form of a credit.

Competencies

121 - Software Engineering
К01. Ability to abstract thinking, analysis and synthesis.
К02. Ability to apply knowledge in practical situations.
К05. Ability to learn and master modern knowledge.

К06. Ability to search, process and analyze information from various sources.
К07. Ability to work in a team.
К14. Ability to participate in the design of software, including modeling (formal description) of its structure, behavior and processes of functioning.
К23. Ability to implement phases and iterations of the life cycle of software systems and information technology based on appropriate models and approaches to software development.
122 - Computer Science and Intelligent Systems
GC1. Ability to abstract thinking, analysis and synthesis.
GC2. Ability to apply knowledge in practical situations.
GC3. Knowledge and understanding of the subject area and understanding of professional activities.
GC6. Ability to learn and master modern knowledge.
GC7. Ability to search, process and analyze information from various sources.
GC8. Ability to generate new ideas (creativity).
GC9. Ability to work in a team.
PC8. Ability to design and develop software using various programming paradigms: generalized, object-oriented, functional, logical, with appropriate models, methods and algorithms of computation, data structures and control mechanisms.
PC15. Ability to analyze and functional modeling of business processes, construction and practical application of functional models of organizational, economic, production and technical systems, methods of risk assessment of their design.

Learning outcomes

121 - Software Engineering
PLO 14. Apply in practice software tools for domain analysis, design, testing, visualization, measurement and documentation of software.
PLO23. Be able to document and present the results of software development.
122 - Computer Science and Intelligent Systems
PLO8. To use the methodology of system analysis of objects, processes and systems for the tasks of analysis, forecasting, management and design of dynamic processes in macroeconomic, technical, technological and financial objects.
PLO 14. Apply knowledge of the methodology and CASE tools for designing complex systems, methods of structural analysis of systems, object-oriented design methodology in the development and study of functional models of organizational, economic, production and technical systems.

Student workload

The total volume of the course is 120 hours (4 ECTS credits): lectures - 16 hours, laboratory classes - 32 hours, self-study - 72 hours.

Course prerequisites

Fundamentals of entrepreneurship

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

Teaching and learning methods:
interactive lectures with presentations, discussions, laboratory classes, teamwork, case method, student feedback, problem-based learning.
Forms of assessment:
written individual assignments for laboratory work (CAS), assessment of knowledge in laboratory classes (CAS), express surveys (CAS), online tests (CAS), final/semester control in the form of a semester exam, according to the schedule of the educational process (FAS).

Program of the course

Topics of the lectures

Topic 1: Introduction to Business Modeling

Overview of business modeling and its importance in analyzing, designing, and improving business processes.
Topic 2: Understanding Data Flow Diagrams (DFD)
How to create DFDs to visually represent the flow of data within a system and understand its components.
Topic 3: Introduction to EPC
EPC (Event-driven Process Chains) as a business process modeling technique that focuses on events and the relationships between them.
Topic 4: Fundamentals of BPMN
Basics of Business Process Model and Notation (BPMN), including its symbols and elements used for modeling business processes.
Topic 5: Modeling Business Processes with BPMN
How to model and analyze business processes using the BPMN notation's various constructs.
Topic 6: BPMN Collaboration Diagrams
How to create collaboration diagrams in BPMN, which illustrate the interactions and exchanges of messages between different participants in a business process.
Topic 7: BPMN Choreography Diagrams
How to depict the interactions and responsibilities between multiple participants involved in a business process.
Topic 8: Advanced BPMN Techniques and Best Practices
Best practices in BPMN modeling, including subprocesses, error handling, exception flows, and process optimization.

Topics of the workshops

Workshops are not provided within the discipline.

Topics of the laboratory classes

Topic 1: Building a BPMN model. Control flow objects. Connecting objects. Pools. Data.
Topic 2. Building a BPMN model. Business process decomposition. Pools and lanes. Logical operators. Messages.
Topic 3. Working with the Simulation View tool in Bizagi Modeler. Modeling levels. What-If analysis.
Topic 4. BPMN model analysis and redesign. Event management. Data model development.

Self-study

Individual assignments are not provided in the curriculum.
Students are recommended with additional materials (videos, articles) for self-study and processing.

Course materials and recommended reading

Key literature

1. M. Kirchmer, M. Scarsig, R. Saxena, T. Benedict, BPM CBOK Version 4.0 Guide to the Business Process Management Common Body Of Knowledge, Amazon Digital Services LLC, 2020, 462 p.
2. J. Jeston, Business Process Management: Practical Guidelines to Successful Implementations, Routledge, Taylor & Francis Group, 2022, 596 p.
3. N. Slack, A. Brandon-Jones, Operations and Process Management: Principles and Practice for Strategic Impact, Pearson Education Limited, 2018, 600 p.
4. M. Dumas, M. La Rosa, J. Mendling, H. A. Reijers, Fundamentals of Business Process Management, Springer Berlin Heidelberg, 2018, 527 p.
5. M. Weske, Business Process Management: Concepts, Languages, Architectures, Springer Berlin Heidelberg, 2019, 417 p.

Additional literature

1. A. Kopp, D. Orlovskyi, A method for business process model analysis and improvement, CEUR Workshop Proceedings, 2019, 2403, pp. 1-10.

2. A. Kopp, D. Orlovskyi, Towards the generalized criterion for evaluation of business process model quality, CEUR Workshop Proceedings, 2020, 2791, pp. 19-30.
3. Business Process Model and Notation. (BPMN). Version 2.0. OMG Document Number: formal/2011-01-03. URL: http://www.omg.org/spec/BPMN/2.0
4. A. Dennis, B. H. Wixom, R. M. Roth, Systems Analysis and Design, Wiley, 2019, 444 p.
5. ARIS Express tutorials. URL: https://www.ariscommunity.com/aris-express/tutorials

Assessment and grading

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

100% Final assessment as a result of Final test (30%) and Continuous assessment (70%).
40% Final test
60% Continuous assessment:
Test №1 (10%)
Test №2 (10%)
Laboratory works (40%)
Laboratory work №1 (10%)
Laboratory work №2 (10%)
Laboratory work №3 (10%)
Laboratory work №4 (10%)

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 08.06.2023 Head of the department
Ihor HAMAIUN

08.06.2023 Guarantors of the educational programs
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