Introduction to Computer Science

Speciality
073 – Management

Institute
Institute of Education and Science in Economics, Management and International Business

Educational Program
Management of organizaiton and administration

Department
Management(204)

Level of education
Bachelor

Course type
Professional Training

Semester
6

Language of instruction
Ukrainian, English

Lecturers, course developers

Oksana Makovoz

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DSc in Economic Sciences, professor of Management department

Authored and co-authored over 200 scientific publications. Courses: Performance management, Leadership, Team Management Tools, Special Topics in Management
More about the lecturer on the department's website
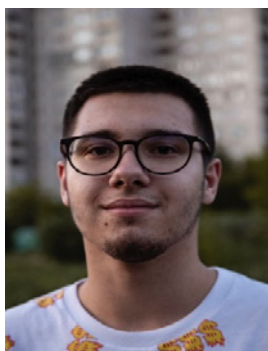
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Lecturer-Intern, PhD Student in Management Department of NTU"KhPi" (since 2021)
Lecturer in the courses: Introduction to computer science

General Information

Summary

The discipline "Introduction to Computer Science" introduces students to the world of computer technologies used in management. The course provides an overview of managerial practices in the field of IT projects and industry, and explores various outputs that help managers effectively manage a team. Students gain knowledge of key concepts and terms related to computer technologies in management and study various types of software and tools used to support project management and organization.

Course objectives and goals

- Familiarizing students with the core concepts and terminology related to computer technologies in management.
- Equipping students with knowledge of various types of software and tools used to support project management.
- Studying documents that managers can create on a project, such as mind maps, interface prototypes, UML/BPMN diagrams, etc., to effectively manage the team and achieve project goals.
- Developing students' skills in utilizing computer technologies to optimize project management processes and enhance team productivity.
- Understanding the importance of information technologies and their role in successful management of IT projects and industry, enabling students to make informed decisions and achieve results in their future managerial careers.

Format of classes

Lectures, practical workshops, consultations, self-study. Final control in the form of a differentiated grading.

Competencies

GC03. Ability for abstract thinking, analysis, and synthesis.
GC08. Skills in using information and communication technologies.
GC09. Ability to learn and acquire contemporary knowledge.
SC07. Ability to select and utilize modern management tools.
SC2.1. Ability to apply management principles through project and process approaches.

Learning outcomes

LO 06. Demonstrate skills in information search, collection, and analysis, as well as calculating indicators to justify managerial decisions.
LO 13. Communicate orally and in writing in both the native and foreign languages.
LO 16. Exhibit skills in independent work, flexible thinking, openness to new knowledge, and the ability to be critical and self-critical.
LO 17. Conduct research individually and/or in a group under the guidance of a leader.
LO 2.1. Demonstrate skills in the use of information technologies for data processing, storage, and transmission, as well as understanding the principles and lifecycle of software development.

Student Workload

The total volume of the course is 90 hours (3 ECTS credits): lectures – 12 hours, practical studies – 24 hours, self-study – 54 hours.

Course Prerequisites

Economic Informatics

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

Interactive lectures with presentations, discussions, practical case studies, individual and group assignments. Learning materials are available to students on Google Classroom.

Program of the course

Topics of the lectures

Topic 1. Overview of the IT industry and managerial positions in the IT field.
Students gain knowledge about various managerial positions in the IT industry, such as project manager, product manager, implementation manager, etc., and understand their role in achieving success in IT projects.
Topic 2. Requirements, business requirements, and user requirements, and methods of their documentation.
Students familiarize themselves with methods of documenting requirements, including business requirements and user requirements, which helps ensure clarity and understanding for all stakeholders.
Topic 3. Functional and non-functional requirements.

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Students acquire knowledge about methods of gathering, documenting, and categorizing these requirements to ensure the successful implementation of projects.

Topic 4. Documentation of Functional Requirements.

Students gain knowledge about the methods of documenting functional requirements through user stories or use cases, which helps ensure clarity and unambiguous specifications for developers.

Topic 5. Non-Functional Requirements and Methods of Requirement Gathering.

Students explore methods for gathering non-functional requirements, such as interviews, surveys, observations, etc., to ensure a comprehensive understanding of user needs and stakeholder expectations. Students will work on their first practical case study - developing a system for a university.

Topic 6. UML Notation: Class Diagram and Use Case Diagram.

Students learn the basic elements of UML notation and their application in class diagrams, which allows them to visualize the system's structure and interactions between classes. Additionally, students familiarize themselves with the use case diagram, which helps model the sequence of actions between users and the system in various scenarios.

Topic 7. Visualization of Business Processes using BPMN and UML Activity Diagram.

In this topic, students explore BPMN (Business Process Model and Notation) and its use for modeling business processes. Students also study the activity diagram within UML, which allows visualizing the sequence of actions and decisions during process execution.

Topic 8. Client-Server Architecture, Databases, Software Interfaces.

Students gain knowledge about client-server architecture and its role in software development. Within this topic, students study the fundamentals of databases and software interfaces, enabling them to understand how data is stored and exchanged between system components.

Topic 9. Interface Prototyping.

Students acquire knowledge about prototyping software (such as mockflow) and techniques that aid in creating interface prototypes for web and mobile applications. The purpose of prototyping is to obtain feedback and improve design.

Topic 10. Agile Project Management Methodologies.

Within this topic, students study the concepts and principles of agile project management methodologies, such as Scrum and Kanban.

Topic 11. Project Management and Product Backlog in JIRA.

Students learn about the processes of planning, tracking, and reporting within project management and the use of the product backlog in JIRA for effective software product development management.

Topics of the workshop

Topic 1. Overview of the IT industry and managerial positions in the IT field.
Topic 2. Requirements, business requirements, and user requirements, and methods of their documentation.
Topic 3. Functional and non-functional requirements.
Topic 4. Documentation of Functional Requirements.
Topic 5. Non-Functional Requirements and Methods of Requirement Gathering.
Topic 6. UML Notation: Class Diagram and Use Case Diagram.
Topic 7. Visualization of Business Processes using BPMN and UML Activity Diagram.
Topic 8. Client-Server Architecture, Databases, Software Interfaces.
Topic 9. Interface Prototyping.
Topic 10. Agile Project Management Methodologies.
Topic 11. Project Management and Product Backlog in JIRA.

Topics of the laboratory classes

No laboratory classes

Self-study

The course includes the preparation of individual assignments based on the topic and selected application. Additional materials such as videos and articles are recommended for students to independently analyze and study.

As part of the course, there is a group project available. There are 3 practical cases to choose from, and students form teams of 3-4 members. Together, they are required to develop documents related to the topics covered in #2, 4, 5, 6, 7, 9, and 11. The instructor plays the role of the client and answers students' questions.

Course materials and recommended reading

1. "Software Requirements" by Karl E. Wiegers and Joy Beatty
https://www.processimpact.com/karls_books/SR3E/Software%20Requirements%20Third%20Edition%20Sample%20Chapters.pdf
2. SCRUM Approach for Project Management: Introduction to Scrum (CollabNet)
http://www.youtube.com/watch?v=D8vT7G0WATM&list=UURttfRo2G_Vp8pPFGqDKVwQ&index=1&feature=plcp
3. "Writing Effective Use Cases" by Alistair Cockburn https://www-public.imtbs-tsp.eu/~gibson/Teaching/Teaching-ReadingMaterial/Cockburn00.pdf
4. "BPMN Notation" https://www.omg.org/spec/BPMN/2.0/
5. "UML Notation": https://www.omg.org/spec/UML/2.5.1/About-UML
6. Scrum Guide https://scrumguides.org/docs/scrumguide/v2020/2020-Scrum-Guide-US.pdf#zoom=100

Assessment and grading

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

The course assessment consists of a final test (30%) and ongoing evaluation (70%).

The final group assignment carries 30% weightage, where students are required to present their solutions to the selected case based on the knowledge acquired.

The ongoing evaluation contributes to 70% of the final grade and is broken down as follows:

15% for interim assessments through online tests
50% for evaluating practical session assignments
5% for other types of activities or participation.

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 additional learning)	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/

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1885

Approval

Approved by   Date, signature   Head of department
Olena PROKHORENKO

Date, signature   Guarantor of the educational program
OLENA LINKOVA

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