Syllabus
Course Program

Project2

Specialty
113 Applied mathematics

Institute
Computer science and information technology

Educational program
Intelligent data analysis

Department
Computer math and data analysis

Level of education
Bachelor's level

Course type
Special (professional), Mandatory

Semester
4

Language of instruction
Ukrainian

Lecturers and course developers

Protsai Nataliia
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PhD, Associate Associate Professor, Ph.D., Associate Professor of the Department of CMAD NTU "KhPI". Author and co-author of more than 20 scientific and scientific-methodological works. Leading lecturer in the course "Innovative Entrepreneurship and Startup Project Management", “Project”, “Methods and technologies of working with Big Data”, “ Mathematical models and methods of knowledge representation”

More about the lecturer on the department's website

General information

Summary.

The Project2 course is aimed at teaching students the skills and processes necessary for successful project execution and management. The main goal of the course is to prepare students to work on real projects by developing their ability to think creatively, communicate effectively and manage processes. During this course, in addition to developing concepts/MVPs for software applications, students will also solve specific problems and learn the basic principles of project management, such as planning, goal setting, risk, and resource allocation. They will be introduced to tools and techniques that facilitate project management in achieving their goals. In addition, students will learn and apply the latest IT product development methods. They will learn how to prepare and present their ideas, as well as how to communicate effectively in a team environment.

Course objectives and goals

The Project2 course is designed to provide students with the knowledge and skills necessary to successfully implement projects in the field of applied mathematics and information technology. The course combines theoretical concepts with examples of modern frameworks used in the development of IT products.

Format of classes

Practical classes, independent work, and a course project. The final control is a test.

Competencies

GC 1. Ability to learn and master modern knowledge.
GC 2. Ability to apply knowledge in practical situations.
GC 3. Ability to generate new ideas (creativity).
GC 4. Ability to be critical and self-critical.
GC 5. Ability to conduct research at the appropriate level.
GC 6. Capability of abstract thinking, analysis and synthesis.
GC 7. Ability to search, process and analyse information from various sources.
GC 8. Knowledge and understanding of the subject area and understanding of professional activities.
GC 10. Skills in the use of information and communication technologies.
GC 12. Determination and perseverance in relation to tasks and responsibilities.
GC 13. Skills of interpersonal interaction.
GC 15. The ability to preserve and enhance moral, cultural, scientific values and achievements of society based on an understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technique and technology, to use various types and forms of physical activity for active recreation and healthy lifestyle.SC6: Ability to organize the work of a team of performers to conduct research and project development, make reasonable and economically justified organizational and managerial decisions.
SC 2. Ability to perform tasks formulated in mathematical form.
SC 3. Ability to choose and apply mathematical methods for solving applied problems, modelling, analysis, design, management, forecasting, decision-making.
SC 4. Ability to select and apply numerical methods to solve optimization problems
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 9. Ability to use modern technologies for programming and testing software.
SC 10. Ability to conduct mathematical and computer modelling, data analysis and processing, computational experiment, solving formalized problems using specialized software.
SC 11. Ability to create documents of established reporting, use of regulatory documents.
GC 12. Ability to organize the work of a team of executives, make appropriate and economically sound organizational and managerial decisions, and ensure safe working conditions.
SC 13. Ability to search, systematically study and analyse scientific and technical information, domestic and foreign experience related to the use of mathematical methods to study various processes, phenomena and systems.
SC 14. Ability to understand the task statement formulated in the language of a particular subject area, to search and collect the necessary initial data.
SC 15. Ability to formulate a mathematical statement of a problem, based on the statement in the language of the subject area, and choose a method of solving it that ensures the required accuracy and reliability of the result.
SC 17. Ability to communicate effectively in Ukrainian and one of the official languages of the EU in a professional manner in written and oral form.

Learning outcomes

LO 1. Demonstrate knowledge and understanding of basic concepts, principles, theories of applied mathematics and use them on practice.
LO 3. Formalize tasks formulated in the language of a particular subject fields; formulate their mathematical formulation and choose rational method of solution; solve the resulting problems with analytical and numerical methods, evaluate the accuracy and reliability of the results obtained.
LO 4. Perform mathematical description, analysis and synthesis of discrete objects and systems, using the concepts and methods of discrete mathematics and algorithm theory.
LO 7. Be able to conduct practical research and find a solution of incorrect tasks.
LO 9. Build algorithms that are effective in terms of calculation accuracy, stability, speed, and system resource consumption for numerical research of mathematical models and solving practical problems

LO 11. Be able to apply modern programming technologies and software development, software implementation numerical and symbolic algorithms.
LO 12. Solve individual engineering problems and/or tasks that arise in at least one subject area: sociology, economy, ecology, and medicine.
LO 13. To use specialized software programs in practical work products and software systems for computer mathematics.
LO 14. Demonstrate the ability to self-learn and continue professional development.
LO 15. Be able to organize your own activities and get results within a limited time frame.
LO 16. Demonstrate skills of interaction with other people, ability to work in a team.
LO 17. To be able to collect, process, analyse, systematize scientific and technical information, while avoiding academic dishonesty.
LO 18. Communicate effectively on issues of information, ideas, problems and solutions with professionals and society at large.
LO 19. Gather and interpret relevant data and analyse complexities within their area of specialization to make judgments that reflect relevant social and ethical issues.
LO 20. Demonstrate professional communication skills, including oral and written communication in Ukrainian and at least one of the official EU languages.

Student workload

The total volume of the discipline is 90hours (3 ECTS credits): practical classes - 32 hours, independent work - 58 hours.

Course prerequisites

To successfully complete the course, you must have knowledge and practical skills in the courses Mathematical analysis (all parts), Probability theory, Mathematical statistics, Project 1, Physics. Part 1 and Part 2, Algorithmisation and programming, Computer discrete mathematics, Numerical methods

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

In practical classes and during independent work, a project approach and teamwork, peer-to-peer learning, gamification of the educational process, case analysis, and appropriate reflection are used. Training work and brainstorming sessions, self-assessment and mutual reflection during project work are constantly conducted.

Program of the course

Topics of the lectures

Lectures are not provided within the discipline

Topics of the workshops

Topic 1. IT Product vs. IT outsource. Product mindset.
Introduction to the concept of what a product mindset is.
Where and when it is applied in practice when working in an IT outsource company and an IT product company.
Topic 2. IT Product management vs. IT outsource. Product mindset. Working with hypotheses
What is a hypothesis?
Hypothesis life cycle
Topic 3. Product development life cycle
SDLC of IT Products
Topic 4. Team management and communication
Conducting effective meetings
Communication within the team and with the project customer
Conflict resolution
Topic 5. POC - MVP - Product
Testing product hypotheses

Topic 6. Product business model and how to choose it correctly
Presentation of the concept of what a business model is.
How one product can combine several different business models
Topic 7. Project presentation and defence
Preparing a project presentation
Speaking in front of the commission
Defending the project and answering questions

Topics of the laboratory classes

Laboratory work within the discipline is not provided

Self-study

The course provides for the study of additional topics within the course. The results of the work are formalized in the relevant documentation with all the necessary references. Students are also recommended additional materials (videos and articles) for independent study and analysis

Non-formal education

In the framework of non-formal education, according to the relevant Regulation, the educational component or its individual topics may be taken into account in case of independent completion of professional courses/trainings, civic education, online education, professional internships, etc.
In particular, certain topics of this component may be taken into account in case of successful completion of courses that contain practical training topics and are agreed with the lecturer

Basic literature

1. "Project Management: A Systems Approach to Planning, Scheduling, and Controlling" by Harold Kerzner, March 2022, 880 Pages. https://www.wiley.com/en-us/Project+Management%3A+A+Systems+Approach+to+Planning%2C+Scheduling%2C+and+Controlling%2C+13th+Edition-p-9781119805373
2. "The Fast Forward MBA in Project Management: The Comprehensive, Easy-to-Read Handbook for Beginners and Pros, 6th Edition" by Eric Verzuh, January 2021, 544 Pages, https://www.wiley.com/en-us/The+Fast+Forward+MBA+in+Project+Management:+The+Comprehensive,+Easy+to+Read+Handbook+for+Beginners+and+Pros,+6th+Edition-p-9781119700760
3. "A Project Manager's Book of Templates" by Cynthia Snyder Dionisio, November 2022, 256 Pages. https://www.wiley.com/en-us/A+Project+Manager%27s+Book+of+Templates-p-9781119864516
4. "Project Management for the Unofficial Project Manager" by Kory Kogon, Suzette Blakemore, and James Wood, 2019, 240 Pages, https://booklion.lviv.ua/en/keruvannia-proektamy-dlia-neofitsiinykh-proekt-menedzheriv
5. "The Project Manager's Guide to Mastering Agile: Principles and Practices for an Adaptive Approach" by Charles G. Cobb, March 2023, 608 Pages, https://www.wiley.com/en-br/The+Project+Manager's+Guide+to+Mastering+Agile:+Principles+and+Practices+for+an+Adaptive+Approach,+2nd+Edition-p-9781119931355
6. "Effective Project Management: Traditional, Agile, Extreme" by Robert K. Wysocki
7. "Project Management in Practice" by Samuel J. Mantel Jr. Meredith, Scott M. Shafer, and Margaret M. Sutton 2016 https://www.perlego.com/book/1646054/project-management-in-practice-pdf?
8. "The Project Management Tool Kit: 100 Tips and Techniques for Getting the Job Done Right" by Tom Kendrick,2017
9. Intercom on Product Management" by Intecom 2017, Intercom on Product Management
10. "The Grow Handbook" Adam Risman and Geoffrey Keating 2018, https://www.intercom.com/blog/announcing-our-latest-book-the-growth-handbook

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 evaluation in the form of a project defense (55%) and ongoing evaluation (45%).
The current evaluation consists of mutual evaluation of students among themselves, self-evaluation and evaluation of the head of the CP

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 AKHIIEZER

Date, signature
29.08.2024 Guarantor of the Educational Program
Olena AKHIIEZER