



## Syllabus Course Program



# Fundamentals of Prototyping

### Specialty

121 – Software Engineering  
122 - Computer Science

### Educational program

Software Engineering  
Computer Science and Intelligent Systems

### Level of education

Bachelor's level

### Semester

5

### Institute

Institute of Computer Science and Information  
Technology

### Department

Software Engineering and Management Intelligent  
Technologies (321)

### Course type

Special (professional), Elective

### Language of instruction

English, Ukrainian

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## Lecturers and course developers



### Mariia Bilova

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PhD, Candidate of Engineering Sciences, Associate Professor of Department of Software Engineering and Information Technology Management.

Number of scientific and educational publications more than 50 (Google Scholar <https://scholar.google.com/citations?user=b3YLGToAAAAJ>; ORCID ID - <https://orcid.org/0000-0001-7002-4698>; Scopus ID <https://www.scopus.com/authid/detail.uri?authorId=57190442390>  
[More about the lecturer on the department's website](#)

## General information

### Summary

The course is designed for students who dream of running their own successful startup, to learn the basics and gain practical skills in creating high-quality prototypes that will captivate the target audience. You will learn the technical aspects of prototyping, understand the importance of communicating with users, learn how to collect feedback, and adapt to changes that will be crucial for your startup. With the use of modern tools and technologies, as well as the basic principles of effective design, you will be able to quickly create prototypes, test your ideas, and start developing your product.

### Course objectives and goals

The course aims to provide students with the necessary knowledge and practical prototyping skills for the successful development of their startups. The course is aimed at teaching how to create effective prototypes that will help test ideas, get feedback from users, and prepare for the development of the final product.

### Format of classes

Lectures, laboratory classes, consultations, self-study. Final control in the form of an exam.

## Competencies

### 121 - Software Engineering

K02. Ability to apply knowledge in practical situations.

K05. Ability to learn and master modern knowledge.

K06. Ability to search, process and analyze information from various sources.

K14. Ability to participate in software design, including modeling (formal description) of its structure, behavior and processes of functioning.

K22. Ability to accumulate, process and systematize professional knowledge of software development and maintenance and recognize the importance of lifelong learning.

K23. Ability to implement phases and iterations of the life cycle of software systems and information technologies based on appropriate software development models and approaches.

### 122 - Computer Science and Intelligent Systems

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.

GC8. Ability to generate new ideas (creativity).

PC10. Ability to apply methodologies, technologies and tools to manage the life cycle processes of information and software systems, information technology products and services in accordance with customer requirements.

## Learning outcomes

### 121 - Software Engineering

PLO01. Analyze, purposefully search and select information and reference resources and knowledge necessary for solving professional problems, taking into account modern achievements of science and technology.

PLO08. Be able to develop a human-machine interface.

PLO11. Select input data for design, guided by formal methods of requirements description and modeling.

### 122 - Computer Science and Intelligent Systems

PLO11. Have the skills to manage the life cycle of software, products and services of information technology in accordance with the requirements and restrictions of the customer, be able to develop project documentation (feasibility study, terms of reference, business plan, agreement, contract).

## Student workload

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

## Course prerequisites

Business analysis methods for requirements management, Business modeling.

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

### Teaching and learning methods:

interactive lectures with presentations, discussions, laboratory classes, teamwork, case studies, student feedback, and problem-based learning.

### Forms of assessment:

written individual assignments for laboratory work (CAS), assessment of knowledge in laboratory classes (CAS), express surveys (CAS), final/semester control in the form of a semester exam, in accordance with the schedule of the educational process (FAS).

## Program of the course

### Topics of the lectures

#### Topic 1: Introduction to prototyping

The importance of prototyping in the context of a startup. The wireframe. Mocap. Prototype. Areas of use. Types. User interface (UI). User experience (UX). Application map. Storyboard. Navigation in the application.

### Topic 2. Rapid prototyping

Features of working with wireframes. Strategies for moving from idea to wireframe. Working with requirements. The main modern tools for implementation. Balsamiq. Wireframes in Figma.

### Topic 3: Design basics

The basics of typography. The basics of visual design. Color schemes. Images usage. Creating a mood board. Copyright in design.

### Topic 4. Figma

Features. Basic tools. The concept of a frame. The concept of autolayout. Organization of work. The concept of plugins.

### Topic 5. Development of interactive prototypes

Tools for creating interactivity in Figma. Prototyping of mobile applications. Features of Android, iOS platforms. Guides. UI kits.

### Topic 6: Results analysis

User experience. Figma Mirror. Collecting and analyzing feedback from users. Teamwork in Figma.

## Topics of the workshops

Workshops are not provided within the discipline.

## Topics of the laboratory classes

### Topic 1: Rapid prototyping

Application map and page wireframes development based on the requirements

### Topic 2. UI Kit

Creating a set of all elements on which the UI of the application will be built

### Topic 3. Interactive prototype

Developing an interactive prototype based on the tasks of the first two laboratory works

## 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

### Compulsory materials

1. Staiano F. Designing and Prototyping Interfaces with Figma. - 2022. - 382 p.
2. Fitzpatrick R. The Mom test: How to Talk to Customers and Learn If Your Business is a Good Idea when Everyone is Lying to You. - 2013. - 136 p.
3. Tidwell J., Brewer Ch. Designing Interfaces: Patterns for Effective Interaction Design 3rd Edition. / J. Tidwell, Ch. Brewer. - 2023 - 500 p.

### Web-sources

4. Figma Resource library <https://www.figma.com/resource-library/>

## Assessment and grading

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

#### Semester 1

The final grade consists of grades for 3 laboratory works with a total of 70 points (Laboratory works 1-2 - 20 points, Laboratory work 3 - 30 points), as well as a control work in the form of a test, which allows to get 30 points..

### 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

Guarantor of the educational program  
Andrii KOPP