

6B06102- Information Systems
Catalog of elective subjects

2 COMPONENT FOR CHOOSING A CYCLE OF BASIC DISCIPLINES

Component of choice 1

Discipline: **Introduction to the SQL Database Language**

Intensity of the Course: 6 academic credits

Module code: **PLT 203/1**

Module Name: Programming technologies

Prerequisites: C/C++ programming technologies

Purpose: To develop the theoretical foundations of SQL database modeling, practical skills in designing and maintaining database systems (DBMS)

Short description: In this course, students learn the basics of relational algebra, master the SQL language, get acquainted with the general structure of a DBMS, learn how to design database schemas for solving an application problem, learn the principles of the query optimizer, and learn how to ensure fault tolerance and achieve proper competition.

Learning outcomes for EP (LOP):

LOP 3 - Demonstrate knowledge and compliance with ethical and legal norms in research and the use of digital technologies. Apply security measures when working with digital information and data protection, promote active, safe and ethical use of digital resources.

LOP 7 - Develops information educational systems using modern methods of system and visual programming.

LOP 9- Uses digital literacy and interdisciplinary knowledge in solving professional tasks and determines the cause-and-effect relationships of natural science processes and phenomena.

Discipline learning outcomes (LOC):

LOC 1 -Basic principles of database construction and management methods, relational algebra and the use of relational computing methods

LOC 2- Principles of relational database design; knowledge of the structural SQL query language features

LOC 3 - Working with DBMSs in various relational database programming languages

Post-requirements: Object-oriented programming

Component of choice 1

Discipline: **Databases in IP**

Intensity of the Course: 6 academic credits

Module code: **PLT 203/2**

Module Name: Programming technologies

Prerequisites: Programming languages and technologies

Purpose: To develop database design skills in information systems.

Short description: The purpose of the discipline is for students to study the theoretical foundations of database design and programming in the SQL language, the principles of database design, tools for designing database structures, and the study of the query language.

Learning outcomes for EP (LOP):

LOP 3 - Demonstrate knowledge and compliance with ethical and legal norms in research and the use of digital technologies. Apply security measures when working with digital information and data protection, promote active, safe and ethical use of digital resources.

LOP 7 - Develops information educational systems using modern methods of system and visual programming.

LOP 9- Uses digital literacy and interdisciplinary knowledge in solving professional tasks and determines the cause-and-effect relationships of natural science processes and phenomena.

Discipline learning outcomes (LOC):

LOC 1 –Be able to create application programs used in information systems

LOC 2- Designing and maintaining the theoretical foundations of data modeling, database systems (DBMS)

LOC 3-Review ofDBMS application methods for creating and operating complex software systems

Post-requirements: Aboutobject-oriented programming

Component of choice 2

Discipline: **Computer Graphics**

Intensity of the Course: 5 academic credits

Module code: **DTAF 201/1**

Module Name: Digital Technologies and IP Applications

Prerequisites: Information and communication technologies

Purpose: To develop practical skills in designing tools and methods for creating graphic images using modern graphic devices in computer graphics

Short description: This course teaches you the basic concepts, principles, and techniques of computer graphics. This includes working with two-dimensional and three-dimensional objects, coordinate systems, color models, lighting, shadows, etc. as well as learning popular graphic tools and software such as Adobe Photoshop, Illustrator, Blender, AutoCAD, Maya. Masters programming languages such as OpenGL, DirectX, or WebGLto create your own graphics applications and effects.

Learning outcomes for EP (LOP):

LOP 3 - Demonstrate knowledge and compliance with ethical and legal norms in research and the use of digital technologies. Apply security measures when working with digital information and data protection, promote active, safe and ethical use of digital resources.

LOP 7 - Develops information educational systems using modern methods of system and visual programming.

LOP 9- Uses digital literacy and interdisciplinary knowledge in solving professional tasks and determines the cause-and-effect relationships of natural science processes and phenomena.

Discipline learning outcomes (LOC):

LOC 1-Knowledge of the basic functionality of modern graphics systems

LOC 2 - Working with raster and vector graphics software

LOC 3- Programming graphical representations in space and on a plane, creating graphical programs.

Post-requests: Multimedia technologies and media systems

Component of choice 2

Discipline: **3D modeling**

Labor intensity: 5 academic credits

Module code: **DTAF 201/2**

Module Name: Digital Technologies and IP Applications

Prerequisites: Information and communication technologies

Purpose: This subject provides students with the skills and knowledge needed to design and visualize three-dimensional objects and scenes.

Short description: This course explores 3D modeling skills using state-of-the-art software and the basics of a 3D printer. Entry-level graphics systems teach you how to build complex models that can be clearly applied in a variety of areas

Learning outcomes for EP (LOP):

LOP 3 - Demonstrate knowledge and compliance with ethical and legal norms in research and the use of digital technologies. Apply security measures when working with digital information and data protection, promote active, safe and ethical use of digital resources.

LOP 7 - Develops information educational systems using modern methods of system and visual programming.

LOP 9- Uses digital literacy and interdisciplinary knowledge in solving professional tasks and determines the cause-and-effect relationships of natural science processes and phenomena.

LOC 1-knowledge of the basic functionality of modern engineering graphics systems

LOC 2-Working with Engineering Graphics software

LOC 3-Programming graphical representations in space and plane, creating an interface for engineering graphics programs

Post-requests: multimedia technologies and media systems

Component of choice 3

Discipline: **Information Systems Architecture**

Labor intensity: 6 academic credits

Module code: **ISMB-205/1**

Module Title: Information Systems and Management Fundamentals

Prerequisites: Information and communication technologies

Purpose: The device and composition of personal computers to put in order the formation of repair and operation skills.

Short description: Formation of theoretical knowledge in the discipline teaches information systems web architecture in terms of classification of future specialists practical skills in terms of development and architecture of modern information systems. Forms students' understanding of basic information systems, new trends in information technologies, as well as the organizational structure of computing resources.

Learning outcomes for EP (LOP):

LOP 4 - Uses artificial intelligence approaches, methods of big data analysis and processing to solve professional tasks of cloud technologies.

LOP 7 - Develops information educational systems using modern methods of system and visual programming

LOP 8 - Manages IT projects, computing and information systems in the course of professional activity, applies methods of information data protection;

Discipline learning outcomes (LOC):

LOC 1-Designing work with the architecture of a personal computer

LOC 2-Analysis of the composition and methods of effective use of PC tools

Postrequisite: Computer Network

Component of choice 3

Discipline: **Computer Systems Architecture**

Labor intensity: 6 academic credits

Module code: **ISMB -205 / 2**

Module Title: Information Systems and Management Fundamentals

Prerequisites: Information and communication technologies

Purpose: The device and composition of personal computers to put in order the formation of repair and operation skills.

Short Description: In this course, students are taught to study modern architectures of information systems, the laws of their functioning and the features of the implementation of information systems in various subject areas. As well as computer system parameters training in connecting additional equipment, adjusting connections between computer system elements, and installing and configuring computer system software.

Learning outcomes for EP (LOP):

LOP 4 - Uses artificial intelligence approaches, methods of big data analysis and processing to solve professional tasks of cloud technologies.

LOP 7 - Develops information educational systems using modern methods of system and visual programming

LOP 8 - Manages IT projects, computing and information systems in the course of professional activity, applies methods of information data protection;

Discipline learning outcomes (LOC):

LOC 1-Designing work with the architecture of a personal computer

LOC 2 - Analysis of the composition and methods of effectiveness of PC tools

Postrequisites: Computer Network

Component of choice 4

*Discipline: **Internet Application Development***

Intensity of the Course: 5 academic credits

Module code: **DTAF 303/1**

Module Name: Digital Technologies and IP Applications

Prerequisites: Information and communication technologies

Purpose: To develop skills in using the capabilities of the PHP language for programming websites and web interfaces, programming languages on the Internet

Short description: Allows you to learn architecture design and integration techniques in this course. Students get acquainted with the principles of building a web service architecture, a variety of integrations using APIs and through message brokers, and master extensive material with all the concepts of designing integration through message brokers.

Learning outcomes for EP (LOP):

LOP 5 - Design web applications and educational systems with ergonomic user interface based on flexible methodology and principles of network security.

LOP 6 – Designs and analyzes software using modern algorithmic and mathematical methods.

Discipline learning outcomes (LOC):

LOC 1-Ways to effectively implement Web interfaces, information exchange protocols, Web Servers, and client browsers

LOC 2-Application of WEB programming in the development of information systems for various applications

LOC 3-creating modern applications for programs over the Internet.

Post-requests: BigData technologies and cloud computing

Component of choice 4

*Discipline: **Web Application Programming***

Intensity of the Course: 5 academic credits

Module code: **DTAF 303/2**

Module Name: Digital Technologies and IP Applications

Prerequisites: Information and communication technologies

Purpose: To master the skills of applying W-technologies in the design of information systems.

Short description: In the course, students will master the basics of web programming, including CSS, plug-ins, scripting, basic data access, and application hosting. In this course, students will learn how to work with HTML5, CSS, the JavaScript programming language, and the popular jQuery framework. As a result, students will prepare their own individual digital projects — a full-fledged website hosted on a hosting service, and a web application with adaptive layout.

Learning outcomes for EP (LOP):

LOP 5 - Design web applications and educational systems with ergonomic user interface based on flexible methodology and principles of network security.

LOP 6 – Designs and analyzes software using modern algorithmic and mathematical methods.

Discipline learning outcomes (LOC):

LOC 1 - The concept of WAN technologies and design of distributed information systems

LOC 2-Knowledge of the logical structure of WEB pages, HTML (DHTML) - document programming, JAVA and VBS scripts, multimedia WEB pages, design processing

LOC 3 - Creating WEB-based systems. TCP/IP protocols and models. Learn how to use the basic services and services of WAN systems

Post-requests: BigData technologies and cloud computing

Component of choice 5

Discipline: **BigData Technologies and Cloud Computing**

Intensity of the Course: 5 academic credits

Module code: **ISMB 307/1**

Module Name: Information systems and Management fundamentals

Prerequisites: Object-oriented Programming II

Goal: To master the skills of using cloud platforms with the principles of data processing in the BIG DATA paradigm

Short description: The discipline provides an in-depth understanding of big data technologies, features and prospects for their use in practice. The course consists of interconnected blocks, which will present both technological and economic features of using big data technologies, options for building the necessary infrastructure for a specific use. Practical application of big data technologies by examples, using various tools.

Learning outcomes for EP (LOP):

LOP 4 - Uses artificial intelligence approaches, methods of big data analysis and processing to solve professional tasks of cloud technologies.

LOP 8 - Manages IT projects, computing and information systems in the course of professional activity, applies methods of information data protection.

Discipline learning outcomes (LOC):

LOC 1-Knowledge of the advantages and disadvantages of big data and cloud computing

LOC 2-knowledge of the basics of working with bigdata and the principles of high-performance computing

LOC 3-Consideration of data processing methods in the BIG DATA paradigm

Post-requirements: Developing business applications in IP

Component of choice 5

Discipline: **Software engineering in Information systems**

Intensity of the Course: 5 academic credits

Module code: **ISMB 307/2**

Module Name: Information systems and Management fundamentals

Prerequisites: Object-oriented Programming II

Purpose: To give an idea of the software life cycle and methods of designing software complexes

Short description: This course teaches object-oriented software development methodology, software architecture, and modern software development techniques

Learning outcomes for EP (LOP):

LOP 7 - Develops information educational systems using modern methods of system and visual programming

LOP 8 - Manages IT projects, computing and information systems in the course of professional activity, applies methods of information data protection.

LOP 9 - Uses digital literacy and interdisciplinary knowledge in solving professional tasks and determines the cause-and-effect relationships of natural science processes and phenomena.

LOP 11 - use modern models, methods of computer design, Webtechnologies, object-oriented programming, database design, as well as cloud and mobile technologies for searching, storing, processing, protecting and distributing information in management organizations and business structures, in computing and computer centers;

Discipline learning outcomes (LOC):

LOC 1-knowledge of the capabilities of modern and promising software development tools, technical tools

LOC 2-Software System Testing

LOC3-Performing software requirements analysis

Post-requirements: Developing business applications in IP

3 COMPONENT FOR CHOOSING A CYCLE OF PROFILE DISCIPLINES

Component of choice 1

Discipline: **Design of information systems**

Intensity of the Course: 5 academic credits

Module code: **ISMB 306/1**

Module name: Information systems and management fundamentals

Prerequisites: Computer networks

Purpose: Practical application of information system design methods, training in practical skills of organizing the collection, processing and management of data and information for conducting the process of designing a software project using specialized application software packages and systems. Development of basic practical skills in applying organizational design process management tools.

Short description: This course provides basic concepts of information systems design technology. Teaches processes and models of the life cycle of information systems. Research of project organizations of information systems. At the end of the course, they will master the skills of designing information systems.

Learning outcomes for EP (LOP):

LOP 4-Uses artificial intelligence approaches, methods of big data analysis and processing to solve professional tasks of cloud technologies.

LOP 7-Develops information educational systems using modern methods of system and visual programming

LOP 8-Manages IT projects, computing and information systems in the course of professional activity, applies methods of information data protection

Discipline learning outcomes (LOC):

LOC 1 -knows the composition and structure of various classes of ICS as objects of analysis and design

LOC 2-can analyze the subject area.

LOC 3-can model application and information processes.

LOC 4-has skills in working with tools for modeling the subject area, applied and information processes;

Has skills in using functional and technological standards

LOC 5-IP has skills in using functional and technological standards;

LOC 6-has skills in working with databases and knowledge design tools.

Post-requirements: Production practice

Component of choice 1

Discipline: **Intelligent Information Systems**

Intensity of the Course: 5 academic credits

Module code: **ISMB 306/2**

Module name: Information systems and management fundamentals

Prerequisites: Computer networks

Purpose: Wide application in modern intelligent control systems (IBS) to improve the information content of the transfer of technological data to an experienced technologist.

Short description: The course introduces students to the problems and areas of application of intelligent information systems and technologies, develops practical skills in covering theoretical and organizational and methodological problems of creating and functioning knowledge processing systems, designing knowledge bases, acquires theoretical and practical knowledge and skills in using neural network technologies for information processing.

Learning outcomes for EP (LOP):

LOP 4-Uses artificial intelligence approaches, methods of big data analysis and processing to solve professional tasks of cloud technologies.

LOP 7-Develops information educational systems using modern methods of system and visual programming

LOP 8-Manages IT projects, computing and information systems in the course of professional activity, applies methods of information data protection

Discipline learning outcomes (LOC):

LOC 1-knows the composition and structure of various classes of ICS as objects of analysis and design

LOC 2-can analyze the subject area.

LOC 3-can model application and information processes.

LOC 4-has skills in working with tools for modeling the subject area, applied and information processes;

Has skills in using functional and technological standards

LOC5-IP has skills in using functional and technological standards;

LOC 6-has skills in working with databases and knowledge design tools.

Post-requirements: Production practice

Component of choice 2

Discipline: **Multimedia technologies and media systems**

Intensity of the Course: 5 academic credits

Module code: **DTAF 304/1**

Module Name: Digital Technologies and IP Applications

Prerequisites: Computer Graphics

Purpose: To have the skills to present sufficient information about knowledge and methods in the means of modern multimedia technologies

Short description: Students study the functions of modern multimedia systems and technologies, as well as their place and role in information and technological systems. The course also provides practical skills in the effective use of multimedia technologies to solve specific practical problems, including the configuration of multimedia technology tools and how to implement static and dynamic processes in multimedia tools.

Learning outcomes:

Learning outcomes for EP (LOP):

LOP 3- Demonstrate knowledge and compliance with ethical and legal norms in research and the use of digital technologies. Apply security measures when working with digital information and data protection, promote active, safe and ethical use of digital resources.

LOP 5 – Design web applications and educational systems with ergonomic user interface based on flexible methodology and principles of network security.

Discipline learning outcomes (LOC):

LOC1-knowledge of the composition and structure of multimedia technologies

LOC 2 - Use of raster and vector graphics based on modern tools

LOC 3-Classification of the use of multimedia applications with multimedia products in various fields

Postrequisite: Mobile app development

Component of choice 2

Discipline: Computer Game Programming

Intensity of the Course: 5 academic credits

Module code: **DTAF 304/2**

Module Name: Digital Technologies and IP Applications

Prerequisites: Computer Graphics

Goal: Oproficiency in creating a game programming environment

Short description: In this course, students learn an advanced environment for developing computer games for PCs, mobile devices (Android, iOS) and browsers. They are introduced to the Unity3D engine and the MonoDevelop game scenario development environment MonoDevelop. They learn how to create a two-dimensional scene, program the game logic, and develop its concept. Also, students independently compose elements, test, debug and refine the final version of the game, as well as add audio accompaniment.

Learning outcomes for EP (LOP):

LOP 3- Demonstrate knowledge and compliance with ethical and legal norms in research and the use of digital technologies. Apply security measures when working with digital information and data protection, promote active, safe and ethical use of digital resources.

LOP 5 – Design web applications and educational systems with ergonomic user interface based on flexible methodology and principles of network security.

Discipline learning outcomes (LOC):

LOC 1 is a comprehensive tool that contains everything you need to create a Unity 3D game. Review of DirectX and Open GL capabilities for Unity 3D

LOC 2-development and implementation of a programming scenario in a game environment

LOC 3-Creating animations for objects and events

Post Requests: Tools for creating mobile apps

Component of choice 3

Discipline: Operating Systems

Labor intensity: 5 academic credits

Module code: **FSCI 202/1**

Module Name: Fundamental Sciences

Prerequisites: AArchitecture of information systems

Purpose: ITo learn the basic principles, functions and mechanisms of operating systems that are the main component of computer systems.

Short description: BThis course examines the structure of operating systems, their role and tasks performed within the framework of the functioning of modern information systems; methods of using modern operating systems, environments and shells in professionally oriented information systems to implement information technologies in various fields of activity.

Results of training on OP (LOP)

LOP 6-Designs and analyzes software using modern algorithmic and mathematical methods.

LOP 9 - Uses digital literacy and interdisciplinary knowledge in solving professional tasks and determines the cause-and-effect relationships of natural science processes and phenomena

Discipline learning outcomes (LOC):

LOC 1-development of the principles of applying effective algorithms, new research methods and the theory of complex algorithms

LOC 2-Assembly of software and information systems
LOC 3-Use of development methods and algorithms for solving practical problems,
ability to work with a computer as an information management tool
Post-requirements: object-oriented programming

Component of choice 3

Discipline: **Fundamentals Of organizing Microsoft Windows operating systems**

Labor intensity: 5 academic credits

Module code: **FSCI 202/2**

Module Name: Fundamental Sciences

Prerequisites: AArchitecture of information systems

Purpose: ITo learn the basic principles, structure, and functions of Microsoft Windows operating systems.

Short description: This course covers the 32-bit, 64-bit version of the Windows (OS) operating system (Windows NT, 2000, XP, Vista) developed by Microsoft. This training, rather than a guide to system programming in Windows, will teach you how to better understand operating systems and develop more efficient applications.

Results of training in the OP(LOC):

LOP 6-Designs and analyzes software using modern algorithmic and mathematical methods.

LOP 9 - Uses digital literacy and interdisciplinary knowledge in solving professional tasks and determines the cause-and-effect relationships of natural science processes and phenomena

Discipline learning outcomes (LOC):

LOC 1-development of the principles of applying effective algorithms, new research methods and the theory of complex algorithms

LOC 2 - Assembly of spacecraft for software and information systems

LOC 3-Using development methods and algorithms for solving practical problems, computer skills as an information management tool
Post-requirements: object-oriented programming

Optional component 4

Discipline: **Robotic systems and complexes**

Intensity of the Course: 5 academic credits

Module code: **DTAF 305/1**

Module Name: Digital Technologies and IP Applications

Prerequisites: Software tools in information systems

Purpose: To master practical skills in developing robot control systems, programming techniques for their creation and construction of robots

Short description: Students study technological processes and control systems of robots and robotic complexes, design technological equipment necessary for creating high-performance robotic complexes and develop requirements for the control system, study problems of interaction of technological equipment, learn how to control industrial robots and manipulators

Learning outcomes for EP (LOP):

LOP 8 – Manages IT projects, computing and information systems in the course of professional activity, applies methods of information data protection.

LOP 9 – Uses digital literacy and interdisciplinary knowledge in solving professional tasks and determines the cause-and-effect relationships of natural science processes and phenomena

Discipline learning outcomes (LOC):

LOC 1-explain the basics of robotics, introduce the concept of "robot"

LOC 2 - Introduction to LEGO ® Digital Designer 3D, Robot Educator and its purpose, drawing up a basic model

Post-requirements: Development of business applications in IP

Optional component 4

*Discipline: **Fundamentals of Robotics***

Intensity of the Course: 5 academic credits

*Module code: **DTAF 305/2***

Module Name: Digital Technologies and IP Applications

Prerequisites: BigData technologies and cloud computing

Purpose: To have practical skills in developing robot models for solving various tasks, programming techniques for creating them and designing robots

Short description: Students will be introduced to the basic principles and components of robotics, including mechanics, electronics, and programming. They will learn how to create and program simple robots, develop control algorithms, solve problems, and apply robotic solutions in various fields such as industry, medicine, research, and education. The course will allow students to expand their knowledge and skills in the field of robotics and prepare them to solve complex problems in this exciting field.

Learning outcomes for EP (LOP):

LOP 8 – Manages IT projects, computing and information systems in the course of professional activity, applies methods of information data protection.

LOP 9 – Uses digital literacy and interdisciplinary knowledge in solving professional tasks and determines the cause-and-effect relationships of natural science processes and phenomena

Discipline learning outcomes (LOC):

LOC 1-explain the basics of robotics, introduce the concept of "robot", explore the types and areas of use of robots.

LOC 2-Introduction to Robot Educator and its purpose, drawing up a basic model.

LOC 3 - Introduction to the LEGO ® Digital Designer 3D Modeling program Designer

LOC 4-3D modeling, assembling a prototype of a robot model.

Post-requirements: Developing business applications in IP

Optional component 5

*Discipline: **Mobile Application Development***

Intensity of the Course: 5 academic credits

*Module code: **DTAF 408/1***

Module Name: Digital Technologies and IP Applications

Prerequisites: BigData technologies and cloud computing

Purpose: To prepare students for designing programs for mobile devices using modern programming technologies.

Short description: As part of the course, students will learn how to develop mobile applications for the iOS operating system. They will be able to work with development tools thanks to their hands-on experience with basic mobile app development tools for the iOS

operating system. Students will also learn the practical use of basic tools for developing mobile applications for the iOS operating system.

Learning outcomes for EP (LOP):

LOP 3 – Demonstrate knowledge and compliance with ethical and legal norms in research and the use of digital technologies. Apply security measures when working with digital information and data protection, promote active, safe and ethical use of digital resources.

LOP 5- Design web applications and educational systems with ergonomic user interface based on flexible methodology and principles of network security.

Discipline learning outcomes (LOC):

LOC 1-Main types of mobile devices, principles of mobile application development; knowledge of the mobile application life cycle

LOC 2-Use of basic programming language constructs used for developing mobile applications

LOC 3-Designing the user interface for mobile applications

LOC 4-Performing mobile app testing

Post-requirements: Developing business applications in IP

Optional component 5

*Discipline: **Tools for creating mobile apps***

Intensity of the Course: 5 academic credits

*Module code: **DTAF 408/2***

Module Name: Digital Technologies and IP Applications

Prerequisites: Software tools in information systems

Goal: Master the basics of mobile app development, debugging, and testing

Short description: The course covers the basics of mobile app development. The main issues of designing and programming for common mobile platforms are considered. Students will learn how mobile apps work. They will learn how to use software development and design tools for mobile devices.

Results of training on OP(LOP):

LOP 3 – Demonstrate knowledge and compliance with ethical and legal norms in research and the use of digital technologies. Apply security measures when working with digital information and data protection, promote active, safe and ethical use of digital resources.

LOP 5- Design web applications and educational systems with ergonomic user interface based on flexible methodology and principles of network security.

Discipline learning outcomes (LOC):

LOC 1-knowledge of application design and interface development for mobile devices

LOC 2-Installing and configuring additional tools according to the prepared instructions, preparing the computer for program development

LOC 3-Development of software applications for mobile devices

Post-requirements: Developing business applications based on IP