

International Information Technology University JSC
Faculty of Information Technology

Department of Information Systems



16.03.2018

CATALOG OF ELECTIVE COURSES

by major

5B070300 «INFORMATION SYSTEMS»

Almaty, 2018

Code: CCED 3308

Course: Programming with Python

Author: Myrzakerimova (Ospan) Alua Bauyrzhankyzy, lecturer, MSc in Information Technology

Credits: 3

Hours: 135

Semester: 5,6

Prerequisites: Basics of Information Systems

Postrequisites: Object oriented programming, Project Management

Course Description: This course aims to teach one of the rapidly growing and popular Python programming languages. The basis covers such important concepts as object-oriented programming, functional programming, event-driven program (GUI-applications). Python is freely available for many platforms (such as Unix, Windows, Linux, RiscOS, MAC, Sun), and programs written on it is usually portable across platforms without any changes. This makes it possible to apply for the study of language, any available hardware platform.

Learning Outcomes: By the end of the course, the students will be able to:

- develop algorithms and models for applications in the Python programming language;
- develop informational, functional and software in the Python programming language; programming in an integrated environment object-oriented Python programming;
- apply the knowledge from the course for the development of its educational program in computer science;
- use the programming skills that allow you to create applications that can improve current activities and enable the emergence of new ideas.

Code: CCED 3308

Course: Game development

Author: Assistant professor, PhD Rakhmetulayeva S.B.

Credits: 3

Hours: 135

Semester: 5,6

Prerequisites: Алгоритмы и Структуры данных

Postrequisites: Diploma project

Course Description: This course introduces basic techniques used to design and implement computer games and/or simulation environments. Topics include a historic overview of computer games and simulators, development of a game with collaboration from the class, creation of team game documents, description and use of a game engine, practical modeling of objects and terrain, and use of audio. Physics and artificial intelligence in games are covered briefly. Programming is based on the Blueprint scripting language of Unreal Engine. The course topics will be assimilated through the design of a 3D game designed and implemented by each student team.

Learning outcomes: By the end of the course, the students will be able to:

- describe the history and evolution of video and computer games and game genres;
- develop Action Games;
- demonstrate Level Design in Game Programming;
- use C++ and GML to Code Game Programs.

Code: CCED 3308

Course: Cybersecurity

Credits: 3

Hours: 135

Semester: 5, 6

Prerequisites: Operation Systems, Web Technologies, C Programming Language.

Postrequisites: none

Course Description: This course is designed for students who are interested in the study of popular methods and mechanisms for the protection and hacking information. The course offers a lot of different practical tasks to strengthen the material studied. This course will also examine the latest encryption methods (cryptography).

Learning outcomes: By the end of the course, the students will be able to:

- hack web-sites and programs;
- protection against attacks.
- analyze the security code;
- improve security posed by Web sites;
- write secure code.

Code: CCED 3308

Course: 1-C programming

Author: Filko I.N, Msc in Technical Sciences

Credits: 3

Hours: 135

Semester: 6

Prerequisites: none

Postrequisites: none

Course Description: The course “1-C: programming” presents basic "1C" concepts equipment principles. Explains the usage rules and the program interface. Teaches you how to create programs in the development environment. Prepares for the exam.

Learning outcomes: By the end of the course, the students will be able to:

- use the software "1c" version 8.3.
- develop simple programs for solving current tasks
- explore the basic operations of cache and main memory, I/O operations

Code: CCED 3308

Course: Introduction to Information Retrieval Systems

Author: Ryskhan Zhakanovna Satybaldiyeva assoc. professor, candidate of technical sciences

Credits: 3

Hours: 135

Semester: 2

Prerequisites: Databases in information systems; Performance, Data Structures and Algorithms (SDP 4)

Postrequisites: diploma project

Course Description: Recent years have seen a dramatic growth of natural language text data, including web pages, news articles, scientific literature, emails, enterprise documents, and social media such as blog articles, forum posts, product reviews, and tweets. This course will cover search engine technologies, which play an important role in any data mining applications involving text data for two reasons. First, while the raw data may be large for any particular problem, it is often a relatively small subset of the data that are relevant, and a search engine is an essential tool for quickly discovering a small subset of relevant text data in a large text collection. Second, search engines are needed to help analysts interpret any patterns discovered in the data by allowing them to examine the relevant original text data to make sense of any discovered pattern. You will learn the basic concepts, principles, and the major techniques in text retrieval, which is the underlying science of search engines.

Learning outcomes: By the end of the course, the students will be able to:

- demonstrate basics theories of information retrieval and in particular the essence of search engines;

- define the tasks of information retrieval, web search and classification, and the differences between them;
 - describe the main concepts, challenges and strategies used in IR, in particular the retrieval models currently used;
 - define manner in which documents are preprocessed before indexing;
 - identify techniques for compressing dictionaries and inverted indexes;
 - describe the architecture and requirements of a basic web crawler;
- also be able to demonstrate the following skills, generally assessed through programming assignments:
- process simple Boolean queries and queries that have spelling errors and other imprecise matches to the vocabulary;
 - apply various indexing, matching, organizing, and evaluating methods to IR problems;

Code: CCED 3308

Course: Innovation Management

Author: Zhanerke Gabidenkyzy, MsC in Innovation Management

Credits: 3

Hours: 135

Semester: 6

Prerequisites: none

Postrequisites: none

Course Description: The course will examine the rewards (and challenges) of innovation. Think about how to understand innovation and thus better equip ourselves to survive and prosper in a world of ‘creative destruction’ . Also look at some case studies of innovation. Additionally, Consider various tools and approaches for innovation management.

Learning outcomes: By the end of the course, the students will be able to:

- assess the importance of innovation and its effective management
- explain some contemporary models of innovation and link these to current practice
- illustrate the practice of innovation management by reference to one or more case studies
- describe the innovation process and critique a variety of tools and approaches to manage this process
- identify the effects of institutions and national systems of innovation on the innovation management process
- evaluate a set of enabling mechanisms and structures to encourage innovative behavior
- identify best practice in managing innovation across multiple sectors, such as benchmarking.

Code: ADM 3303

Course: Application development on MS .NET Framework platform (MS prog 1)

Author: Filko I., senior-lecturer

Credits: 3

Hours: 135

Semester: 5

Prerequisites: Object-Oriented Programming

Postrequisites: MS Programming 2 (MS.NET Framework 3.5–ASP.NET Forms Application Development)

Course Description: The major goal of the course is to develop console or windows .NET applications using C# programming language using object-oriented programming concepts. Topics of the course include the .NET paradigm, C# programming, FCL, CLR, file processing, serialization, exceptions, structures, collections, object-oriented programming concepts, drawing, threading, application domain and services, configuring applications.

All laboratory and home works will be performed on Microsoft Visual Studio 2010 or newer.

Learning Outcomes: By the end of the course, the students will be able to:

- create console/windows applications in the Visual Studio.NET;
- create and use classes and objects in C# application;
- use the encapsulation, inheritance and polymorphism concepts in console/windows applications;
- process error exceptions;
- create graphics and threads;
- to explain the constituted program documentation.

Code: DWC 3303

Course: Development of Web components on the Java EE platform (Java 1)

Author: Mukatayev T., senior-lecturer

Credits: 3

Hours: 135

Semester: 5

Prerequisites: Application Design Choices

Postrequisites: Development of the business components on the Java EE Platform (Java 2)

Course Description: This course prepares students for the OCPJWCD certification (Oracle Certified Professional Level Professional), which provides basic knowledge of the development of Java components (servlets and JSPs) used in web applications.

Learning outcomes: By the end of the course, the students will be able to:

- identify the main ideas of Java-components;
- development of Java-components;
- implement servlets;
- implement JSP-Pages;
- understand web applications using servlets and JSP-pages.

Code: OSB 3303

Course: Oracle SQL Basics (Oracle 1)

Author: Karlygash Mukhitova Yerdauletkyzy, senior-lecturer

Credits: 3

Hours: 135

Semester: 5

Prerequisites: Database in Information Systems

Postrequisites: Programming with PL / SQL (Oracle2)

Course Description: The course provides the students with the complete skills needed to create, implement and manage robust database applications using the Oracle database tools. Most of the topics covered are – understanding of the Basic Procedural Language/Structured Query Language, subprogram, section and syntax query, DML, advanced DML and scripting. Starting with the basic outline of what PL/SQL is, students will set the ground work for their knowledge expansion by learning about data types, flow control, errors, and more. You will explore strings, numbers, booleans, and arrays.

Learning Outcomes: By the end of the course, the students will be able to:

- design, build and manage database applications in Oracle 11g;
- write PL/SQL codes for developing stored procedures, triggers and packages;
- manage and create database sequence, synonym and tables;
- improve data security, performance and integrity;
- use SQL developer for manipulation and retrieval of data efficiently;
- work with various PL/SQL sections like Declaration, Execution, and Exception Handling

Code: DMA 3303

Course: Development of mobile applications for IOS (mobile 1)

Author:

Credits: 3

Hours: 135

Semester: 5

Prerequisites: Algorithms, data structures and programming

Postrequisites: Development of mobile applications for Android (Mobile 2)

Course Description:

The course explores the basics of the basics of Mac OS X, its capabilities, and basic settings. Acquainted with the interface Mac OS X Mountain Lion. Dock - with him begins work on Mac OS X. Starting and closing programs. Settings Dock. Stacks in the Dock.

Sorting and convenient representation of files. Top panel programs in Mac OS X. How to understand what you are currently working. Standards menu. Modifier keys, keyboard shortcuts and their designations. Opportunity to accelerate its work in Mac OS X. Windows programs. What is Mission Control, how to handle a multi-system. Gestures on the touchpad and active corners.

Learning outcomes: By the end of the course, the students will be able to:

- devise moderate-sized applications using Object-Oriented principles derived from informal specifications and designs.
- produce moderate to large standalone Object-Oriented applications from correct UML specifications.
- create graphical User Interface applications using the standard Swing components and simple animations.
- produce well-structured implementations appropriate for team development, maintenance and reuse with careful attention to external and internal documentation.
- successfully create JavaDoc documentation complete with pre and post conditions
- develop internal documentation that justifies assertion of correctness by means of useful loop invariants and other basic proof of correctness tools.
- use UML-based designs to write moderate to large applications and basic design patterns.

Code: ISE 3303

Course: Introduction to SAP ERP (SAP 1)

Credits: 3

Hours: 135

Semester: 5

Prerequisites: Fundamentals of information system

Postrequisites: Integration of business processes (SAP 2)

Course Description: A brief history of ERP. What is ERP-sistema. Rol ERP-system. The concept of resource planning systems across the enterprise. The concept of next generation ERP-II. What can you do ERP-system. Functions of the ERP-system. The main purpose of the ERP-system. Scope of application. Characteristics of ERP-systems. Selection of ERP-system. Architecture ERP. Classification of ERP-systems. Market Analysis of ERP-systems. Introduction. New trends: rent ERP-systems. Overview of SAP R / 3.

Learning outcomes: By the end of the course, the students will be able to:

- work with a client program;
- customize the GUI;
- navigate the system;
- perform simple operations.

Code: IR 3303

Course: Introduction to Robotics (Robotics 1)

Author: Md. Mahmud Hasan, Professor, Ph.D

Credits: 3

Hours: 135

Semester: 5

Prerequisites: Physics

Postrequisites: Robotics (Robotics 2).

Course Description: The subject of the study are the principles and methods of development, design and programming of the control electronics based computing platform (controller) Arduino or her clone. The purpose of teaching the course "Robotics" are : to improve knowledge in the field of robotics; to acquaint students with the principles and methods of design, construction and programming of the control electronics based computing platform Arduino programming skills to develop in a modern programming environment; deepen their knowledge, increase motivation to learn through practical application of integrated knowledge gained in various educational areas (mathematics, physics, computer science); develop an interest in scientific and technical, engineering and design creativity.

Learning outcomes: By the end of the course, the students will be able to:

- Understand the concept of degree of uncertainty in well-structured environments such assembly lines environments. Student will interact with the environments with the actuators and sensors.
- Utilize various types of sensors with the Arduino controller. In addition, multiple sensor fusion will be in the practice.
- Apply the mathematics and controlling part of the robotics in practice.
- Construct the modeling of the overall Environment, sensor and robotics
- Understand the real-time control and task handling using mathematical model.

Code: DAA 3304

Course: Developing ASP .NET applications (MS prog 2)

Author: Altaibek A., ass.-proff., PhD

Credits: 3

Hours: 135

Semester: 6

Prerequisites: Developing applications on the platform MS .NET Framework (MS prog 1)

Postrequisites: Developing ADO.NET applications (MS prog 3)

Course Description: This course is directed to study of ASP.NET technology for developing web applications. Topics of the course include the base principles of ASP.NET for creating web projects, web forms architecture, ASP.NET controls, Validation and user controls, data access in ASP.NET, MVC in ASP.NET, configuration and deploying the ASP.NET web applications. All laboratory and home works will be performed on MicrosoftVisualStudio 2010 or newer.

Learning outcomes: By the end of the course, the students will be able to:

- develop ASP.NET web applications using C# language;
- work with ASP.NET server, validation and user controls;
- configure and deploy web application using the ASP.NET and ADO.NET technologies;
- manage web site security and access permission.

Code: DBC 3304

Course: Development of the business components on the Java EE Platform (Java 2)

Author: Mukatayev T., senior-lecturer

Credits: 3

Hours: 135

Semester: 6

Prerequisites: Development of Web components on the Java EE platform (Java 1)

Postrequisites: Development of web- services in the Java EE Platform (Java 3)

Course Description: This course prepares students for OCPJBCD certification (Oracle Certified Professional Level: Business Component Developer for Java EE 5 platform), which assumes knowledge of the basics of developing Java components for distributed enterprise applications. Particular attention is paid to the development of EJB components.

Learning Outcomes: By the end of the course, the students will be able to have a basic understanding of the following;

- practice EJB and MDB API
- deploy and manage Application Server (Glassfish)
- use EJB containers, Hibernate, JPA and JavaMail API
- identify Object-relational-mapping (ORM)
- practice JAVA Persistence API (JPA)

Code: PPS 3304

Course: Programming with PL / SQL (Oracle 2)

Author: Imasheva Baktagul Kalamzhankyzy, senior-lecturer

Credits: 3

Hours: 135

Semester: 6

Prerequisites: Oracle SQL Basics (Oracle 1)

Postrequisites: Development web applications based on the Oracle (Oracle 3)

Course Description: This Oracle Database: Program with PL/SQL training starts with an introduction to PL/SQL and then explores the benefits of this powerful programming language. Students will learn to develop stored procedures, functions, packages and more.

Learning Outcomes: By the end of the course, the students will be able to:

- design, build and manage database applications in Oracle 11g;
- write PL/SQL codes for developing stored procedures, triggers and packages;
- manage and create database sequence, synonym and tables;
- improve data security, performance and integrity;
- work with various PL/SQL sections like Declaration, Execution, and Exception Handling;
- create and debug stored procedures and functions;
- optimize the performance of the system.

Code: DMA 3304

Course: Development of mobile applications for Android (Mobile 2)

Author: Karimzhan NB, Senior Lecturer, Master IS

Credits: 3

Hours: 135

Semester: 6

Prerequisites: SDP-1, SDP-2, SDP-3

Postrequisites: SDP-5, SDP-6

Course Description: The course is an introduction to programming mobile applications using the latest the Android. Topics include the activity lifecycle, resources, layouts, intents for multiple activities, menus, fragments and dialogs, Action bar, adapters, data persistence via shared preferences, SQLite, and content providers. Emphasis is on hands-on use of these components in applications. Includes a substantial team project.

Learning Outcomes: By the end of the course, the students will be able to:

- demonstrate the basic concepts and technique of developing applications for the Android phone.

- practice the SDK and other development tools.
- demonstrate the basic concepts of Android phone features and capabilities.
- demonstrate how to acquire additional resources and security information needed for various different types of Android applications features and services (maps, SMS, Email, etc).
- demonstrate how to work with the SQLite database features.

Code: IBP 3304

Course: Integration of business processes (ERP 2)

Credits: 3

Hours: 135

Semester: 6

Prerequisites: Introduction to SAP ERP (SAP 1).

Postrequisites: Production planning (SAP 3).

Course Description: The course covers the theory and practice of ERP. The course contents include the evolution of ERP systems, business process reengineering, charting, in the ERP lifecycle functionality ERP and accounting and risk issues. There is also a significant component of this Class technology. IITU is a member of the University Alliance SAP, and you as a student have the opportunity to study SAP, is the market leader in ERP software. The knowledge obtained in this course will give you a competitive advantage in the market, as SAP is used by thousands of companies worldwide and practical training are highly valued recruiters. As well, it is the only ERP course in the country, for the students, where there are as many as four courses in SAP and the opportunity to obtain a certificate from TERP10 SAP.

Learning outcomes: By the end of the course, the students will be able to:

- identify the types of items.
- solve problem of calculation salary of workers.
- work in SAP ERP GUI
- explain work as SAP user in role of accountant
- compare and contrast the different ways of creating item profiles in SAP ERP

Code: Rob 3304

Course: Robotics (Robotics 2)

Author: Md. Mahmud Hasan, Professor, Ph.D

Credits: 3

Hours: 135

Semester: 6

Prerequisites: Introduction robotics (Robotics 1)

Postrequisites: Robotics 3

Course Description: Robotics-2 course will provide a platform to program the single board computer with various sensor and robot. This will focus over the comprehensive coverage of the robotic science and technology from design to application. The course will provide the opportunities for hands-on practical experience with the Raspberry-pi and various sensors with robotics manipulator. Finally, this course will develop the essential skills to control and modeling and application aspects in the various real world applications.

Learning Outcomes: By the end of the course, the students will be able to:

- understand the single board computer, mechanical engineering and mathematics.
- utilize the popular Raspberry-pi device programing.
- construct the programs applying Python programing language.
- define the methods of computer-science materials.

- combine the Raspberry PI B+ and Arduino.

Code: DAA 4305

Course: Developing ADO.NET applications (MS Prog3)

Author: Altaibek Aizhan, assistant professor, PhD in Computer Science

Credits: 3

Hours: 135

Semester: 7

Prerequisites: Microsoft .NET Framework 3.5, The development of applications based on ASP.NET (MS Programming 2)

Postrequisites: Diploma Project

Course Description: This course is directed to study of objects and classes of the ADO.NET technology for working with different data source through .NET applications. Topics of the course include the ADO.NET providers and objects, Entity Framework of ADO.NET, LINQ to DataSet/Entity/SQL , WCF Data Services.

All laboratory and home works will be performed on Microsoft Visual Studio 2010 or newer

Learning Outcomes: By the end of the course, the students will be able to:

- apply objects and services of ADO.NET for connecting, retrieving, creating, designing, updating, binding, querying and storing databases;
- access the right data values and bring related data together in ADO.NET;
- establish external connections to Databases via SQL Server, OLE DB and ODBC connections string;
- present data in windows forms, wpf and asp.net applications;
- manage entity data through objects in ADO.NET;

Code: DWS 4305

Course: Development of web- services in the Java EE Platform (Java 3)

Author: Mukatayev T., senior-lecturer

Credits: 3

Hours: 135

Semester: 7

Prerequisites: Development of the business components on the Java EE Platform (Java 2)

Postrequisites: Diploma Project

Course Description: This course prepares students for the OCPJWSD certification (OCPJWSD: Oracle Certified Professional Level: Web services developer for the Java EE 5 platform), which involves the ability to develop Web services using Java technologies such as Java Web Services Developer Pack, JAX-WS And JAXB. In addition, this course covers XML, JSON, REST, and the basics of security.

Learning Outcomes: By the end of the course, the students will be able to:

- practice JAX-RS and JAX-WS
- demonstrate REST web services
- examine SOAP web service
- sparse JSON and XML
- integrate with Amazon SES, Google Maps

Code: DWA 4305

Course: Development of web applications based on the Oracle (Oracle 3)

Author: Imasheva Baktagul Kalamzhankyzy, senior-lecturer

Credits: 3

Hours: 135

Semester: 7**Prerequisites:** Programming on PL/SQL (Oracle 2).**Postrequisites:** Diploma Project**Course Description:** Using a database in Data Guard standby mode to perform functions such as building reports, queries, testing and implementation of backup. Create and manage physical and logical database in standby mode. Using Enterprise Manager Grid Control and Command Line Interface Data Guard (DGMGRL) to accompany the Data Guard configuration. Using the Data Guard for high availability databases Oracle.**Learning outcomes:** By the end of the course, the students will be able to:

- use database in Data Guard mode;
- perform several functions;
- build reports, queries;
- test and implement backups;
- create, control database (physical and logical).

Code: CPA 4305**Course:** Cross-platform Applications Development (Mobile 3)**Credits: 3****Hours: 135****Semester: 6****Prerequisites:** Development of mobile applications for IOS » (Mobile1)**Postrequisites:** Diploma Project**Course Description:** Mobile application development is a process in application development for small portable devices such as PDAs, smart phones or cell phones. These applications can be pre-installed on the device during the manufacturing process and might be loaded through various platforms to spread or it might be a Web application that is processed on the client side (JavaScript) and server side.**Learning outcomes:** By the end of the course, the students will be able to:

- familiarize themselves with available tools to develop their own applications;
- create graphical user Interface applications using the standard components and simple animations;
- produce well-structured implementations appropriate for team development, maintenance and reuse with careful attention to external and internal documentation;
- create architecture for mobile applications;
- develop mob applications;
- implement several functions for apps.

Code: PP 4305**Course:** Production Planning (ERP 3)**Credits: 3****Hours: 135****Semester: 7****Prerequisites:** Integration of business processes (ERP 2).**Postrequisites:** Diploma Project**Course Description:** The AFS system can transfer the data to the lower level of the material. The materials are characterized by these data in accordance with certain characteristic values such as size, color and quality, which affect the entire logistics process.

For example, using the categories can be defined as the differences between the different materials. Characteristic values of materials for production are already contained in the BOMs and routings.

Data obtained from the forecast of consolidated or Sales and Operations Planning in the standard SAP-system, can be transferred to the AFS system and use them for production

planning, taking into account specific features of the materials AFS. These data are used in MRP to meet the needs, such as customer orders, at the expense of existing stocks / inventory plan.

Learning outcomes: By the end of the course, the students will be able to:

- Modern, evolutionary-style work breakdown structures (WBS).
- Effort allocations and schedule estimates using COCOMO.
- Planning and management artifacts for controlling projects.
- Important management principles in the context of software project management.
- Existing artifacts to understand a project and its context and to make critical management decisions.
- Project control and process instrumentation metrics.
- Workflow models.
- Standards for documentation, risk assessment, and quality assurance.

Code: Rob 4305

Course: Robotics (Robotics 3)

Author: Md. Mahmud Hasan, Professor, Ph.D

Credits: 3

Hours: 135

Semester: 7

Prerequisites: Robotics 2

Postrequisites: Diploma Project

Course Description: The difference between sensor-controlled behavior and what computers usually do is that the input from a sensor is ambiguous. Design sensor solutions for industrial companies that allow for complete digitalization of manual measurements and comprehensive sensor data tracking and analytics. The combination of intelligent sensors and analytical capability allows continuous monitoring of measurement data, but can also be configured to trigger automatic process adjustments in real time. The result is reduced down times and increased precision and reliability. This course will deliver the concepts and ideas towards smart factories. This course will highlight the process of sensor technology and AI as an supporting algorithms for the: assembly, biosensors, robotics, computer vision and sensor networks.

Learning Outcomes: By the end of the course, the students will be able to:

- explore the AI techniques.
- provide clear mathematical knowledge over the Neural Networks and cognitive based learning.
- understand the Fuzzy logics of rule based learning.
- develop applications of AI.
- define the potential applications of machine learning in practice.

Code: DM 3306

Course: Data Mining (DM 1)

Author: Alibek Maratuly Mamyrbekov, Master of Technical Sciences

Credits: 3

Hours: 135

Semester: 6

Prerequisites: College Algebra

Postrequisites: Data Management

Course Description: This course emphasizes deep thinking about data analysis concepts underlying the C# language. During the course, we will be on statistical principles that will allow us to see statistics in a new light. As we explore simulation-based analysis methods, in particular the bootstrap method, we will come to a fuller understanding of statistical inference. We will also gain access to very general principles that allow us to

produce statistical inference for most data analysis situations you may encounter in the future.

Learning Outcomes: By the end of the course, the students will be able to:

- define the main tendencies in the field of data mining and analysis using information technologies;
- identify information resources for search and information storage;
- practice with electronic spreadsheets, to execute consolidation of data, to visualize results of work with databases;
- apply methods and means of information searching and presentation;
- design and create simple applications.

Code: DM 4307

Course: Data Management (DM 2)

Author: Alibek Maratuly Mamyrbekov, Master of Technical Sciences

Credits: 3

Hours: 135

Semester: 7

Prerequisites: Data Mining

Postrequisites: none

Course Description This course emphasizes deep thinking about data analysis concepts underlying the C# language. We will ask: How does the data analysis work? What are its objects? What is the effect of executing data analysis and mining functions? To this end you will need to understand some seemingly arcane aspects of any computer language. This class builds up slowly but steadily. In the second half of the semester you will start seeing some surprising powers of computation.

Another emphasis, later in the course, will be on statistical principles that will allow us to see statistics in a new light. As we explore simulation-based analysis methods, in particular the bootstrap method, we will come to a fuller understanding of statistical inference. We will also gain access to very general principles that allow us to produce statistical inference for most data analysis situations you may encounter in the future.

Learning Outcomes: By the end of the course, the students will be able to:

- Define the data in computer systems;
- Understand the concept of spreadsheets and data visualization techniques;
- Define the concept of database architecture, the SQL language basics, directions of development of the database;
- Apply the practical knowledge in mathematical models used in data analysis and Basis of programming language C#;
- Practice the graphical Instruments, the presentation of information processing, the concept of business process;
- Define the main tendencies in the field of data mining and analysis using information technologies; use information resources for search and information storage;
- Execute consolidation of data, to visualize results of work with databases; apply methods and means of information searching and presentation; to design and create simple applications.