

Elective Technical Subjects and Monographic Lectures: number of teaching hours/full-time studies: 30 hours of lectures, 30 hours of classes (x 3)

1. Data Warehouses

The aim of the course is to familiarize students with the full cycle of building a data warehouse, starting from designing a data warehouse with defined business requirements, through preparation of extraction, transformation and loading procedures, building a cube and refining it, to creating a set of required reports.

Classes include the following topics:

- Introduction to the subject of data warehouses and their practical uses,
- Data warehouse architecture,
- Multidimensional data models,
- Data warehouse design,
- ETL - extraction, transformation, loading,
- Problems with data refreshing,
- Problems related to the changing values of attributes over time,
- Loading data using SQL Server Integration Services,
- Building and customizing cubes for business needs in SQL Server Analysis Services,
- Creating reports in SQL Server Reporting Services.
- Interactive data analysis in Power Bi.

2. Production Management

The aim of the course is to familiarize students with the problems of modern production management, including methods and techniques of organizing, optimizing and controlling the production process, the role of integrated ERP management information systems in the planning and production control processes - i.e. in technical preparation, planning of production capacity and material requirements, processing production orders, monitoring the production process, determining costs, reporting and analyzing. Tasks within the scope of conducted research and development activities are available to users of business applications all around the world.

3. Programming Workshops

During Programming Workshops students have the opportunity to familiarize themselves with the currently most popular way of programming - event programming. This is a great opportunity to practice and expand your algorithmic thinking skills. Classes will cover practical use of complex data structures in JAVA language and creation of "full-length" applications containing a graphical interface.

The aim of the course is for the students to master the basic elements of Java programming language: variables, literals, operators, instructions, iterations, arrays, expressions, character strings. The course will focus on issues related to operations on text files, text analysis and various methods for sorting and searching tables. Classes are aimed at developing abilities of abstract thinking and solving simple programming problems.

4. Advanced Information Systems Design

The course is devoted to advanced conceptual problem domain modeling. Particular emphasis will be placed on the implementation of the strategic phase with the possible use of reusable elements and requirements management (including the formulation and incorporation into non-functional requirements modeling). The analysis of user requirements regarding the functionality of the designed system is also considered in the context of UX (user experience). The detailing of the analysis phase (e.g. analysis of derivative values, constant values) and its impact on the conceptual model are discussed. After performing the dynamic analysis, results should be included in the class diagram. During the course, students are required to carry out an advanced strategic phase for a given project (including analysis of similar solutions existing on the market). After completing the analysis phase and dynamic analysis, students should present the results on a class diagram.

Students are required to specify requirements and static analysis that were earlier covered during the Information Systems Design (PRI) course.

5. Artificial Intelligence

The course focuses on providing students with information about the basic terms, concepts and problems pertaining to artificial intelligence (intelligent computation methods). The terms intelligence, wisdom, creativity will serve as a starting point for the introduction of tools of artificial intelligence, a historical outline of the concept of AI, development of intelligent methods and applications. On completion of the course, students will be able to use tools of artificial intelligence and choose the proper tool in order to solve a given problem.

6. Internet Technologies

The goal of the course is to familiarize students with standards, tools and practices related to web application development. Students will acquire practical skills allowing to develop web applications that support business processes and theoretical knowledge on selecting appropriate IT architecture for businesses. Topics covered: active WWW documents, mainly JavaScript, issues regarding content management systems (CMS), creating websites using the AJAX architectural solution and technologies that enrich the client layer of web applications. Software integration will be discussed in accordance with the Service Oriented Architecture (SOA) paradigm. The workshop part of the course covers the construction of WWW, with emphasis on given dynamic documents technology.

7. Development, Integration and Testing of IT Systems.

The aim of the course is to familiarize students with the basic problems of software engineering, including the various phases of software development and methods of improving software quality. On completion of the course the student should be able to choose the appropriate methods and tools of software engineering for a given project and be able to use them in practice in a team-based IT project.

8. Cloud Computing

The aim of the course is to familiarize students with IaaS, PaaS and SaaS services offered by cloud service providers. During the classes we focus on the Microsoft Azure and Amazon AWS solutions. The basic services offered by both services, working with them, estimating costs and the ability to tailor services to specific needs will be discussed.