Course: Object-oriented Programming			**Course designation:** IS110
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
1	2 + 2 + 0	60	5
Course objective: Introduce the students to the concepts of object-oriented programming.			
Course contents: Definition of object-oriented programming. Difference between object and procedural programming. Presentation of program tools and platform. Classes and objects. Inheritance and encapsulation. Polymorphism. Abstract classes. Abstract and virtual methods. Overloading of methods, characteristics and operators. Definition and the use of delegates and events. Defining and implementing interfaces. Class diagrams and diagrams of objects. Diagrams of sequence and cooperation. Diagrams of activities and conditions.			

Course: Information Systems Infrastructure			**Course designation:** IS135
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
1	2 + 1 + 1	60	5
Course objective: Acquisition of knowledge and skills related to hardware and software components of information systems, designing organizational processes and software solutions which requires the knowledge of possibilities and limitations of information systems.			
Course contents: Basic concepts of computer system architecture. Basic structures of computer system organization. Basic technical components of computer-based systems. The role of information technology in modern organizations. Operating systems: basic functionalities, internal organization, multitasking, security and virtualization. Computer networks: types of basic networks, components, TCP/IP model, layers of the OSI model and security. Computer networks in an organization. Data centers. Security of the information technology infrastructure (security of individual components, firewalls and use of VPN). The role of software frameworks for the control and service management (COBIT, ITIL etc.) Grid computing. Cloud computing. Analysis and management of IS performance.			

Course: JAVA Programming			**Course designation:** IS210
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
2	1 + 3 + 0	60	5
Course objective: Presentation of Java programming language, basis of object-oriented programming and application development in Java.			
Course contents: History of Java programming language. Characteristics of Java virtual machine. Comparison of possibilities and syntax of Java with other object oriented languages. Presentation of program tools and a platform. Application development by instancing objects from the existing classes and development of own classes. Components and interfaces. Inheritance. Processing errors and exceptions. Dynamic data structure and standard Java packages. Generic programming. Multi-thread programming. Web applications programming. Java applets. Reflective program structures. Java templates. Design of program documentation for Java programs.			

Course: Information System Architectures			**Course designation:** IS225
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
2	2 + 1 + 1	60	5
Course objective: Acquisition of knowledge and skills related to the design, selection, implementation and maintenance of architecture of information systems in companies, with emphasis on applications and infrastructure.			
Course contents: Service oriented architecture. Software frameworks for IS architecture in companies. System integration. Software for managing resources of IS architecture in companies. Monitoring and metrics of business processes. Green computing. System virtualization. Role of open source software. Software as a service (SaaS). Data models in operation. Architecture and integrity of data and information. Content management. Revision of information systems and regulatory compliance. System administration. Software frameworks for controlling and managing information systems. New technologies in IS operation.			

Course: Project Management			**Course designation:** IS280
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
2	2 + 2 + 0	60	5
Course objective: Acquisition of knowledge on project management.			
Course contents:			

Project initiation. Defining and managing project volume. Project plan development. Risk analysis and success factors. Defining project team. Defining needed project resources. Costs management. Quality management. Project progress monitoring. Project closure. Managerial skills. Marketing.

Course: Analysis and Design of Information Systems			**Course designation:** IS310
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
3	2 + 2 + 0	60	5
Course objective: Acquisition of knowledge and skills related to processes, methods, techniques and tools used by organizations to make decisions on the mode of operation. Acquisition of knowledge and skills related to the methodology of analyzing business opportunities or problems, determining which role and technology can be used to solve problems, and specifying requirements for the implementation of solutions.			
Course contents: Identification of an opportunity to improve operation of an IS. Business process management. Analysis of business requirements (modeling business processes and requests for information). Structuring business opportunities into projects. Specifying and prioritizing projects. Project feasibility analysis. Fundamentals of managing information projects in a global context. Using globally distributed communication and collaboration platforms. Analysis and specification of system requirements. Different approaches to the implementation of IS for supporting business requirements. Specifying the implementation of alternative solutions for a specific information system. Impact of the implementation of alternative solutions on system specifications. Methods for comparing the approaches to the implementation of IS. Organizational implementation of a new information system. Different methods for system analysis and design: structured SLDC, RUP, UML and agile methods.			

Course: Business Processes Management			**Course designation:** IS320
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
3	2 + 2 + 0	60	5
Course objective: Acquisition of knowledge and skills for understanding, designing and improving business processes.			
Course contents: Challenges in the business process management. Ways of managing business processes and their improvement. Understanding of organizational processes (definition and classification of processes, identification of key processes and modeling and documentation of processes). Process performance measurement and benchmarking. Principles and guidelines for process improvement and managing changes in processes. Software support for modeling and improving processes. Tools for business process simulation.			

Course: Information Systems Management Strategies			**Course designation:** IS410
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
4	2 + 1 + 1	60	5
Course objective: Explore problems and approaches to the information systems management in organizations and the ways in which the IS can support, enable or be integrated into various types of organizational services. How senior management approaches the acquisition, development and implementation of plans and procedures to achieve useful and efficient IS. Definition of IS infrastructure at a high level and systems supporting operational, administrative and strategic needs of an organization. Organization managers need to know how to assess the existing IS and new technologies and the way in which they can influence organizational strategy. Ideas developed on this course should ensure long-term perspective which can help managers understand increasingly globalized and technologically intensive business environment.			
Course contents: The role of IS. Strategic adaptation of IS. Strategic information usage. The impact of IS on organizational processes and structures. Planning and economics of IS. The role of IS in defining and shaping the competition. IS management. Financing IS investments and evaluation of their operational performance. Adoption of information technology resources and their capabilities. Using systems for responsible IS/IT management. Risk management.			

Course: PHP Web Programming			**Course designation:** IS180
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
1	1 + 3 + 0	60	5
Course objective: Acquisition of knowledge and practical experience in PHP web programming.			
Course contents: Introduction into web programming. Programming languages for web programming. PHP: types of data, variables, operators and commands for controlling the flow of program, basic functions, sign, field and object sequences, interaction with databases, generating dynamic pictures and PDF files and the use of XML files, design of safe scripts, error processing.			

Course: Human-Computer Interaction			**Course designation:** IS265
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
3	2 + 2 + 0	60	5
Course objective: Acquisition of knowledge and skills necessary to design, implement and evaluate graphical interfaces of applications, so they would be adapted to human use.			
Course contents: Concepts and ways of data usage by humans. Principles of designing graphical application interfaces. Presenting information. Visual and audible display. Human-computer communication using speech and data entry. Human factors in computer programming. Designing work environment.			

Course: Information Systems Performances			**Course designation:** IS360
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
3	2 + 2 + 0	60	5
Course objective: Product quality is defined as the degree to which the product meets the customer's needs and covers both functional and non-functional requirements. To meet non-functional requirements, it is necessary to know how to assess and/or measure the possibilities and limitations of information systems in the fulfillment of those requirements, among other things. Besides, information systems must maintain a specified performance level under normal circumstances and continue to function despite the errors. Information systems are complex since they consist of many components. Therefore, the acquisition of knowledge and skills related to the performance of information systems and their components, as well as software libraries and applications is necessary.			
Course contents: Evolution of computer systems. Fundamental structure of information systems' organization. Basic concepts and performance measurements. General principles of measurement. Probability and stochastic processes. Queuing theory. Simulation analysis. Petri nets. Testing hardware, instrumentation, measurement and analysis of data collected. Selection, evaluation and use of performance measurement tools. Analysis of computer architecture, components, operating systems, database performance, as well as computer networks and their components.			

Course: Unconventional Computer Procedures			**Course designation:** IS370
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
3	2 + 2 + 0	60	5
Course objective: Acquisition of knowledge and skills related to the use of computer procedures that differ from the usual ways of solving problems, such as the use of genetic algorithms, neural networks and fuzzy systems.			
Course contents: Introduction into unconventional computer procedures. Genetic algorithms. Java implementation of genetic algorithms. Neural networks. Methods of learning neural networks. Encog framework for neural networks. Image recognition using neural networks. Fuzzy logic. Implementation of fuzzy systems. Tuning of fuzzy systems using genetic algorithm.			

Course: WEB Security			**Course designation:** IS380
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
4	2 + 1 + 1	60	5
Course objective: Introducing students to the issues of WEB security, especially in terms of business systems' dependence on communication. Acquisition of knowledge about dangers that threaten the Internet and how to protect oneself from them. Introduction to practical methods, measures and resources that can be applied in the construction and development of WWW security system.			
Course contents: Legislation. ISO 17799 standard in Internet security. Internet security policy. Methods of data content protection. Program protection measures. Technical protection measures. Security of Internet applications. Password and how to choose a good password. Methods of breaking passwords. Public key infrastructure (PKI). Internet security analysis. Designing Internet protection.			

Course: Mobile Applications			**Course designation:** IS460
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
4	1 + 3 + 0	60	5
Course objective: Acquisition of knowledge and skills for the development of applications for various mobile platforms, as well as distinguishing these types of applications with respect to desktop and web applications.			
Course contents:			

Architecture of mobile platforms and differences regarding the other types of applications. Operating systems on mobile platforms. Development tools for mobile platforms. Basic components of applications for mobile platforms. Specific features of graphical interfaces for mobile platforms. Communication and connectivity of mobile devices to other mobile devices and networks. Databases on mobile devices. Managing calls, SMS messages, camera and multimedia contents. Using information on geolocations. Security of mobile devices. Emulators of mobile devices. Life cycle of applications for mobile platforms.

Course: Web Applications in Java			**Course designation:** IS475
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
4	1 + 3 + 0	60	5

Course objective:
Introduction to web applications in Java, introduction to modes of development of three-tier applications, mastering the development of applications using software frameworks (Spring framework) and the use of advanced techniques of application development in general.

Course contents:
Architecture of Java web applications. Model-View-Controller architecture. Java servlets and Apache Tomcat server. JSP pages and JSTL library. Javascript. Connecting Java web applications to a database. Multilingualism in Java web applications. Introduction to Spring Framework. Spring MVC. Spring and Hibernate framework. Spring and web applications security. Spring and the use of remote services. JUnit and application testing. Spring and REST. Life cycle of Java web applications development.

Course: Distributed Databases			**Course designation:** IS140
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
1	2 + 1 + 0	45	5

Course objective:
To inform the students about the architecture and principles of work of distributed databases.

Course contents:
Definition of distributed system for database management. DDBMS classification. Architecture of distributed system. Data fragmentation and allocation. Chris Dates rules. Distributed processing of queries and distributed updating. Catalogs. Distributed transactions (coherency, two phases' situation, time indication, recuperation). Transaction protocols. Data synchronization. Heterogeneous distributed systems. Decomposition and query processing. Optimizing distributed queries. Competitiveness check. Reliability and security of distributed databases system.