

Course: Programming			Course designation: ORS105
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
1	2 + 3 + 0	75	6
Course objective: Understanding, acquiring and applying basic programming principles, as well as developing the ability to systematically approach the issues of program development using structured programming settings.			
Course contents: Introduction to computer data processing. Programming languages. Algorithms. Basic program structure. Data types. Assigning values to variables. Expressions. Value output. Value input. IF instruction. For loop. While loop. Lists. Subprograms. Files. Functions. Modules. Error processing.			

Course: Algorithms and Data Structures			Course designation: ORS109
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
1	2 + 3 + 0	75	5
Course objective: Gaining basic knowledge of simple and dynamic data structures, mastering basic algorithms and training for the application of acquired knowledge in solving algorithmic problems.			
Course contents: 1) Introduction 2) Primitive data types 3) Fundamentals of data structures 4) Sorting 5) Searching 6) Recursive algorithms 7) Lists and rows 8) Stack 9) Tree 10) Graphs 11) Translating tables 12) Objects.			

Course: Computers and Processes			Course designation: ORS116
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
3	2 + 2 + 0	60	5
Course objective: Acquiring the knowledge and skills on managing computer-aided manufacturing processes.			
Course contents: Signals, systems and process control: types of signals and systems, current and dynamic systems. Basic processing unit: data processing, processing unit equipment, standard processing inputs and outputs. Executive and measuring equipment. Task assignment in facility management: review of computer equipment, process communication and protocols, channel capacity. Role of software in process control: data processing, data processing software, relative correlation between hardware and software processing components. System software: structures, functions and system programs. User software and process databases: user software tasks, structure and time response, real-time data processing, priorities, program chains. Structure of process database, distributed process database, programs of extended real time.			

Course: Quality Assurance and Control			Course designation: ZAJ118
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
3	2 + 0 + 0	30	3
Course objective: Acquiring knowledge on quality, methods, techniques, procedures and tools used in a quality control and assurance system.			
Course contents: Quality system: definitions of quality and a quality system, aspects of quality and its historical development, quality control, quality assurance, quality management and monitoring. Principles, methods, techniques and tools used for establishing a quality system, process approach. Integrated management systems. Most influential factors in the quality system: staff, equipment, technology. Destructive and non-destructive tests and methods of detecting faults in the function of motor vehicle quality control. Basic requirements, directives/guidelines, compliance with basic requirements, compliance assessment system: authorizing, verifying (accreditation, license). Standardization: the Standardization Act, standardization system, promulgation and application of norms. Norms relevant to motor vehicle maintenance, norms relevant to aircraft maintenance. Education in quality and knowledge, time and change management.			

Course: Office Applications			Course designation: ORS119
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
4	2 + 1 + 0	45	4
Course objective: Acquiring fundamental knowledge in the domain of office applications and learning about their specificities on a specific example of developing applications by using MS Office (focus on MS Access and MS Excel).			
Course contents: Fundamentals of office procedures. Types of office applications. Office procedures in the private and public sector. Business			

communication. Processing business documents. Developing office (administrative) information systems. Computer equipment for office applications. Integrated business applications for office procedures – text processing programs, table calculators, transparent electronics. MS Office (MS Access in detail, MS Word, MS Excel, MS Powerpoint). Interaction of specific tools. LANs for office procedures. Office function analysis from the aspect of work forms and data content in the function. Analyzing and preparing the data needed for an office application. Shaping the conceptual and relational office application model. Developing the actual application by using MS Access. Updating data and preparing reports from the developed application.

Course: Computer Control of Processes			Course designation: ORS121
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
4	2 + 2 + 0	60	5

Course objective:
Acquiring the knowledge and skills on designing computer-aided manufacturing processes.

Course contents:
Man-machine interface: data and procedures reduction and display. Process handling and managing: process conditions, operator-process interaction, process protection and automatic actions. The operator's role in process management systems: operator's work control and their reaction, intelligent management procedures. Management system realization, suitability study (data quantity and flows, process management specification, conceptual design of the system). Profit/loss analysis. Operating costs. Designing a computer management system: communication project, project of remote stations and management centers. Management system implementation: supplying and testing process equipment, software testing and upgrading (at the level of software module, subsystems and systems, testing and download). Human factor in system development. Program team. System installation, testing, handover and maintenance. Operating safety. Staff training.

Course: Computer Networks			Course designation: ORS120
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
4	2 + 2 + 0	60	5

Course objective:
Acquiring basic knowledge on the purpose, construction and maintenance of computer networks.

Course contents:
Basic communication protocols and network topologies. Local networks. Physical level. Data level (HDLC, Ethernet...). Requirements for network construction regarding distance and permeability. Internet. Frame Relay. ATM and MPLS. Remote access to computer networks. Remote monitoring and control of public network usage.

Course: Communicology			Course designation: ORS123
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
4	2 + 2 + 0	60	4

Course objective:
Gaining insights into the communication process, types of communication and successful communication. Enhancing communication skills.

Course contents:
Introduction to communicology. Definition of concepts, basic features of communication and communication process models. Basic principles and prejudices on communication. Types of communication. Verbal and non-verbal communication. Sources of difficulties in communication. Communication competences and communication skills. Communication skills: assertiveness; I-messages. Communication skills: active listening. Communication skills: questioning skills; managing the conversation. Communication skills: speaking skills. Non-violent conflict settlement. Negotiating and mediation. Business communication. Debate.

Course: Computer Maintenance			Course designation: ORS126
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
5	2 + 2 + 0	60	4

Course objective:
Acquiring basic knowledge on the types and causes of faults on electronic components and equipment, adverse environmental effects on proper equipment functioning and the importance of preventive maintenance. Acquiring specific knowledge needed for successful computer diagnostics and maintenance.

Course contents:
1) Basic knowledge on maintenance. Efficiency and effectiveness of electronic equipment. Definitions of reliability and the relationship between equipment quality and reliability. Causes and types of faults on electronic components. Basic definitions of equipment faults. Reliability of electronic components. Equipment reliability and availability. Planning repair working time. Functionality and electromagnetic compatibility. Preventive and corrective equipment maintenance. Approaching equipment repair. Maintenance tasks and levels. Determining the quantity and assortment of maintenance spare parts. Basic maintenance structure and organization.
2) Computer diagnostics and maintenance. Typical faults of analog and digital components. Direct voltage sources. Protection



against electrostatic discharge. PC standards. Components of a minimum PC configuration. Scheduled PC maintenance. PC software basis. Operating system and computer circuit compatibility. BIOS. PC compatibility and compatibility problems in practice. PC diagnostics programs. Problems in memory, processor, hard disk and power supply unit functioning. Introduction to the fault finding practice and proper function verifying. Working with programs for testing PC functioning. Methodology of replacing faulty components.

Course: Fundamentals of Ecology			Course designation: ZAJ131
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
1	2 + 0 + 0	30	3

Course objective:

Acquiring the knowledge on human-inflicted natural disorders and measures to be taken for the reinstatement of ecological balance.

Course contents:

Ecology definitions, boundaries and divisions; ecological entity; population and its parameters; population growth; geographical and ecological area; ecological niche and valence; habitat, biological community and ecosystems. Industry and society. Trends of industrial development and its impact on the environment. Natural resources and the position of social sciences. Life cycle of an industrial product (origin of raw materials, processing, product's service life and its life after disposal). Maintaining the balance between industrial development and the natural ecosystem. Industrial society and climate changes. Water, soil and air as ecological factors. Possibilities of purifying waste air and water. Possibilities of waste and hazardous waste management. Sustainable development and environmental ethics. Education on the elimination of unexpected environmental pollution. Traffic and the environment. Renewable energy sources and legislature.

Course: Computer System Devices			Course designation: ORS130
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
2	2 + 1 + 0	45	4

Course objective:

Acquiring the knowledge on the operating principles, installation and usage of specific computer system devices.

Course contents:

Historical development of digital computers and computer systems. Structural organization of computers. Computer device classification according to purpose. Numerical systems. Data recording in the computer. Introduction to digital logic and Boolean algebra. Digital computer basic components and operation method. Processors (CPU organization, operating principle, performing instructions, RISC, CISC). The internal bus (structure, operating principle, PCI). Characteristics and hierarchies of data storage (memory). The cache structure and operation. Internal memory (ROM, SRAM, DRAM): organization, operating principle and types. External memory: magnetic disks (types, operating principles, data management, performance, RAID), optical disks (CD, DVD), magnetic strip. External device operating and access principles (monitors, keyboards, mouse, printers, network devices, digital cameras, ...). Input/output system of a computer. Input/output operations (programmed, switching, DMA). External interfaces (serial, parallel, RS232C, USB, FireWire, Infiniband). Operating systems. Mobility and connectivity of computer systems. Digital computer performance. High availability of computer systems (redundancy, UPS).

Course: C Programming			Course designation: ORS139
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
2	2 + 2 + 0	60	4

Course objective:

Acquiring the knowledge on programming in the C programming language.

Course contents:

Getting acquainted with programming tools, writing the first C program and getting acquainted with various types of data. Expressions, operators, mathematical and logical operations. Instructions and constructs for flow control. Program loops. Single-dimensional fields. Functions. Pointers. Two-dimensional fields and dynamic memory allocation. Strings. Textual files. Structures and binary files.

Course: Databases			Course designation: ORS114
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
3	3 + 2 + 0	75	6

Course objective:

Gaining the knowledge on the database concept and possible use of relational databases in the information system.

Course contents:

Basic terms. Database management system. Relational bases. Fundamentals of SQL language. Entity-relationship model. Database normalization. Advanced SQL queries.



Introduction to database programming. Fundamentals of PL/SQL language. Advanced database programming techniques. Database security.

Course: Database Programming			Course designation: ORS136
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
4	2 + 2 + 0	60	4
Course objective: The student should acquire the knowledge on database programming on various platforms.			
Course contents: Relational data model. Object data models. SQL server. Data management controls. Parameter queries. Working with triggers. Locking levels and mechanisms. Cross-blocking. Application locks. Designing a web form for communication with a database.			

Course: Information Systems Design			Course designation: ORS124
Semester:	Lectures + exercises + seminar:	Total:	ECTS credits:
6	2 + 2 + 0	60	4
Course objective: Acquiring the knowledge on the logical design of information systems (IS). To train the students for independent and team work in the use, methodology, methods and techniques of IS design for business organizational systems. By acquiring and using the course-gained knowledge, students will get to understand there is no realization of a real and complex IS without conducting a detailed analysis and preparing a documented IS project, which is the basis for the development (physically realization) of the IS.			
Course contents: Definitions and structure of information systems - descriptive and genetic definition of an information system (IS). Place and role of the IS in organizational (business) systems. The life cycle of the IS, phases and content of IS development. IS designing methods, models and modeling- their significance in IS development. Modeling real system processes using a structural system analysis (SSA). Developing the process model using a data flow diagram (DFD) method and the rules for preparing the DFD. Description of DFD data flows and storage (data dictionary). Data models and modeling. Conceptual data modeling (ER- entity Relationship -data model). Rules of developing and connecting in the ER data model. Logical setting fundamentals of a relational data model. Object-oriented data modeling. Translating the conceptual (ER) data model into the relational data model. Vertical and horizontal normalization. Normal forms and their rules. Modeling the resources of information-communication technology in IS development. Modern CASE (Computer Aided System Engineering) tools for supporting IS development. Preparing the IS project documentation. Approximate cost estimate for the development of the designed IS.			