



RIGA TECHNICAL  
UNIVERSITY

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

Please note! This is a preliminary list of courses for the study year 2018/2019. Changes may occur!

**SPRING 2018**  
**BACHELOR COURSES**

**DSP201 Database Management Systems**

4.00 CP (6.00 ECTS)

Concepts of database (DB) technology. DB management systems (DBMS) and their functionality. DBMS types. Possibilities and restrictions of relation DB. DB data definition languages. Query languages SQL and QbE. Application design in DB systems. Tools of programming automatization. DBMS programming languages. Data exchange standards. Main principles of DB design.

**DIP321 Algorithms and Methods of Programming**

2.00 CP (3.00 ECTS)

The aim of the course is to develop algorithmization skills, practical software development. Definition of algorithm. Parts of algorithm theory. Algorithms and software. Communication and synchronization between running algorithms.

**DIP392 Applied System Software**

2.00 CP (3.00 ECTS)

The issues of Applied Software development and practical application are considered. Concepts of building different AS are discussed: transport information systems, banks and insurance information systems, etc. Special attention is paid to the use of design patterns, components and semantic web in AS development process.

**DMS214 Random Processes**

2.00 CP (3.00 ECTS)

Definition and application of random process. Multivariate distributions. Correlation theory. Classification of processes. Stationary processes. Markov chain with discrete and continuous time. Markov processes. Gaussian processes. Imitation of random processes.

**DIP381 Operating Systems**

3.00 CP (4.50 ECTS)

Conception of Operating System. Tasking and processes. Process coordination and synchronization. Physical and virtual memory organization. OS performance evaluation. OS examples - MS DOS, UNIX, OS/2, Windows.

**DOP201 Introduction to Operations Research**

3.00 CP (4.50 ECTS)

Operations Research is a very important field of study, which is closely related to business applications. It combines the three broad disciplines of Mathematics, Computer Science, and Business Applications. The study course presents the most important operations research problems and diversity of the addressed methods; provides knowledge about possibilities of using the theoretical models in real situations and quantitative analysis of systems.

**DPI230 Object-Oriented Programming**

3.00 CP (4.50 ECTS)

This course covers object-oriented (OO) programming concepts and techniques using C++ language as an example. After completing the course students will understand the basic principles of OO programming and obtain OO programming skills. OO basic concepts - abstraction, encapsulation, inheritance and polymorphism are discussed as well as practical programming issues, including class hierarchy formation, an exception handling, templates, etc. Comparison of C++ with some other OO programming languages (eg C # or Java) is also given. During laboratory work students must demonstrate theoretical knowledge and acquire programming skills.

### **DIP383 Software Engineering**

2.00 CP (3.00 ECTS)

Software life-cycle. Software development paradigms. Requirement analysis and definitions. Software specification. Software design. Evaluation of design quality. User interface. Verification and validation. Testing goal and methods. Testing process: testing of modules, testing of systems, testing strategies. Software maintenance.

### **DSP342 Methods of Systems Theory**

2.00 CP (3.00 ECTS)

Job of a system analyst is directly related to the analysis of different business and technical systems. For this purpose a system analyst must know methods and tools for the identification and describing of characteristics and operating principles of different systems. The main attention of the course is devoted to the development of the systematical thinking of the students by concerning the use of system theory methods in the analysis of different kinds of systems. The following topics are considered during the course: origin of systems science and its specific methods, basic elements of systems thinking, principles of systems classification, cybernetic approach to systems thinking, principles and elements of system control and management, evaluation of system complexity, the role of information and communication in system management, system laws and principles, as well as life cycles. By developing an individual work students must apply theoretical knowledge to the analysis of real world systems.

### **DSP341 Fundamentals of Computer Systems Design**

2.00 CP (3.00 ECTS)

Systems life cycles and design. Stages of system design. Top down and bottom up design strategies. Traditional and advanced approaches to Subject help to understand tasks of system designing and place in the system development' s process. Students form project team, led by a student. The group consists of subgroups which are also conducted by the students. Students' task is to establish requirements for designed system, design it and realize at least in the prototype' s level. The system has a real customer, and all student activities proceed in natural conditions of the systems designing. Subject also includes the theoretical aspects of the systems designing: upward and downward designing, traditional and modern methods of the system designing, different types of the system designing.

## **MASTER COURSES**

### **DSP422 Artificial Intelligence** (*graduate*)

4.00 CP (6 ECTS)

Artificial intelligence is developing towards four goals – to create systems that think or act like humans, as well as systems that think or act rationally. In this course students acquire knowledge about a modern approach to artificial intelligence – development of intelligent agents. The course is focused on properties, environment, architectures and programs of intelligent agents, logical agents, ontologies, planning, uncertain knowledge and reasoning, making simple and complex decisions, inductive learning, learning decision trees, neural networks and reinforcement learning. In development of a course work students must use their theoretical knowledge for implementation of agent based intelligent systems and analysis of their performance.

### **DIP414 Computer Aided Solution Processing** (*graduate*)

4.00 CP (6 ECTS)

Supervised machine learning, regression modelling, linear regression, least-squares method, model evaluation, automatic model building, heuristic search, genetic algorithms, genetic programming, nearest neighbour methods, regression trees and their practical applications.

### **DPI508 Methods and Evolution Trends of Applied Computer Science** (*graduate*)

4.00 CP (6 ECTS)

This course introduces students to advanced techniques of applied computer sciences. Students are encouraged to analyze information from the Internet, periodic scientific publications and topical information presented in international scientific conferences and symposiums. Thus, students are able to keep track of trends of applied computer science elaboration and to assess their perspectives. Practical work encourages using and developing the latest results and trends of applied computer sciences in the Master Thesis.

### **DSP560 Knowledge Management** (*graduate*)

4.00 CP (6 ECTS)

The course describes the notion of knowledge, nature of knowledge, and knowledge types in the context of organizational knowledge management. Students get acquainted with a lifecycle of knowledge management system and practice different tasks of each of the steps of the lifecycle by playing particular roles in knowledge management team(s). Students learn to identify knowledge needs and goals as well as to design methods and tools

for meeting the knowledge goals. They get acquainted with approaches to organizational learning and practice knowledge management ethics.

#### **DSP705 Artificial Intelligence in Business** (*graduate*)

4.00 CP (6 ECTS)

Artificial intelligence includes rather new technologies that can be used to solve complex business problems in different domains. The information technology specialist must be able to select the most suitable artificial intelligence technologies for business problems. The main topic is their usage for practical business problem solving. Different programming approaches are reviewed to show origins of the agent oriented programming and differences from other approaches. Overview of various types of agents and their applications is given in the course. Intelligent mechanisms, like planning, knowledge representation, inference and machine learning are covered, too. Already developed agent projects are analysed illustrating what types of agents are suitable for what projects. Algorithms used in artificial intelligence and their implementations as well as the agent oriented software engineering process are covered in the practical part of the course.

#### **DSP706 Business Process Management and Engineering** (*graduate*)

4.00 CP (6 ECTS)

Business process management and engineering requires understanding of basic principles of business process modelling, management, improvement, and reengineering. During the course students will learn to develop business process models, assign performance identifiers to process elements, assess the correspondence of business process to its goal, and to develop business process change proposals and implement changes at the level of a business process model.

#### **DLP700 e-Business Solutions** (*graduate*)

4.00 CP (6 ECTS)

The course concerns essential principles of e-business and their implementation by modern Internet technologies. The influence of Internet solutions to e-business development and different kinds of e-businesses are discussed. Main concepts of creating of corporate business portal based on Web technology are opened up. Students are introduced to the use of RFID, wearable computing, internet services and e-solutions software for managing and controlling business processes. Applications of e-solutions are illustrated by samples from several application domains (insurance, transport, logistics etc.).

#### **DOP701 Portfolio Management Technologies** (*graduate*)

4.00 CP (6 ECTS)

Development of new products and identification of growth directions is an important enterprise strategic planning problem. It also has to be balanced with current enterprise objectives, resources and competences. The course explores different solutions of this problem using business process modelling, multi-criteria decision-making methods and product and project feasibility analysis methods. The main attention is devoted to integration of portfolio management into the overall life-cycle of information systems development. Technological solutions used in evaluation of alternative projects and for integration with other information systems development tools are explored in laboratory work.

#### **DSP707 Service Science, Management, and Engineering** (*graduate*)

4.00 CP (6 ECTS)

The course is about service oriented approach in business and information systems and software engineering. It concerns vertical (inside the enterprise) and horizontal (inter-organisational) service provision situations. The emphasis is put on new innovative service development. The course comprises service design methods, basics of building service oriented architectures (SOA), and other topics of service engineering. Students will experiment with various service development and running technologies. They will learn approaches to service governance according to most popular service management methods and standards. Students are expected to have basic knowledge in business process modelling, systems theory and portfolio management. The course concerns also research advances in SOA.