FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGIES-BITOLA

Study programme: Computer Science and Communications Engineering

Duration: 1 year / 2 semesters

ECTS credit points: 60

Goals of the study programme

Society is pressed by the "information revolution", primarily due to increased power and low cost of computers, along with advances in technology and communications. As a result, "information explosion" happens and the amount of information in the world, and access to it, is rapidly increasing. Information is the lifeblood of any company, organization, institution - large or small which means that we need to qualify for quality and selective approach to it, educating staff for this purpose.

In recent years, our country is among "transition" countries that are faced with necessity for opening its economy, accepting the principle of free market competition and the challenge of globalization. All this caused a change in the attitude of the relationship "man - machine". Computers have become an integral part of our daily life and work in almost all spheres of economy and systems take part in industry and service sectors to manage and control the flow of information. Therefore, there is need for suitable staff to manage new technologies.

The needs to modernize the university studies of second cycle and introduce a new one-year study program at the Faculty of Information and Communication Technologies - Bitola arise for several reasons, including:

In the last two decades, it happens a quiet but significant revolution in all spheres of human life caused by the explosive development of computer and information technology. Advanced information technology opens up new horizons and develop new approaches to solve problems in various areas. Therefore, this area expands continuously and promotes and supplements with new skills and knowledge.

Learning outcomes (specific qualification descriptors)

Knowledge and comprehension

- He/She has depth knowledge of information and communication technologies for successful involvement in companies. He/She has knowledge for software engineering and architecture of computer systems and application programs, installation and upgrading.

- Describes and discusses systematic and creatively for the key aspects and concepts in the field of computer science and computer engineering, such as: architecture of computing systems, programming languages and technologies, information systems

and networks, databases, information processing, artificial intelligence and systems data processing, organization and methodology of designing computational systems.

- Develops up with the latest research and development and wider application context of informatics and computer equipment.

Knowledge and comprehension application

- He/she could apply the knowledge to develop advanced desktop applications, web applications, software systems development, information systems and applications for mobile platforms

- He/she could apply the knowledge for advanced design and management of IT systems, computer networks and communication technology, computer-aided design / manufacturing, composition of multimedia projects, IT education and distance learning.

- He/she can assess the level of information society development and the possibility of realization of own thoughts and ideas in a business environment, taking into account the solid knowledge of society informatisation and IT business companies in the country.

- Makes an accurate assessment in applying and evaluating knowledge which is crucial in the field of computer science and computer technology, taking into account the relevant personal, social, scientific or ethical aspects.

- He/she has the abillity to estimate how to apply the acquired theoretical and practical knowledge of information and communication technologies.

Communication skills

- He/she has a clear and unambiguous professional communication in the field of informatics and computer technology in and around software engineering, design and management of ICT systems, communication with foreign companies and individuals, communication in multicultural environments, representing own and company interests/ or the institution of business and professional (information) aspect.

- To communicate precisely through written reports and oral presentations, using proper terminology and technical language.

- To initiate discussions, share and explain the concepts and ideas in the field of computer science and computer engineering, with information community and the whole social community.

- Abillity to be a leader in a teamwork by sharing responsibilities and tasks.

Learning skills

- He/she can work on depth study of new information and communication technologies and their application in software processes to achieve optimal development of a competitive software product or hardware solution.

- He/She knows that with continuous monitoring and study of modern information and communication technologieshe could upgrade professionally .

- He/She takes initiatives to identify the needs for further professional improvement.

Semester 1

Elective subjects (student chooses 4 subjects)

Advanced Databases – 7 ECTS credit points

Aims of the course program: Introducing the student in advanced concepts of organization and manipulation of data in conventional relational and nonrelation databases, putting emphasis on the theoretical aspects as embedded in modern management systems, as well as the latest trends and open problems of theoretical and practical aspect in the development of databases.

Bioinformatics and Medical Informatics – 7 ECTS credit points

Aims of the course program: to familiarize students with the algorithms applied to the data given from experimental technologies in Bioinformatics and Medical Informatics and Data Visualization, as well as reverse engineering and prediction methods in Medical Information Systems and Medical Imaging.

Software Testing, Quality Assurance and Maintenance– 7 ECTS credit points

The student will get to know techniques and skills for creation and evaluation of software systems of different sizes and complexities. They will learn about tools for software maintenance and verification with more details on automated testing procedures. They will learn skills for maintenance and modifications (fixing or improvement) of SW systems in production.

Semantic e-business Solutions– 7 ECTS credit points

After an overview of the goals which should be achieved by B2B applications, can be seen that a large panel of existing B2B ontologies and their current modus operandi, are based on Semantic web technologies. The goal of this course is to comprehend and to be able to explain that the use of semantic technologies can simplify the automatic management of many B2B partnerships. The main objectives are, also, to found, promote or develop, some solutions, which are the prototypes how to help with the merging of B2B ontologies (based on Semantic WEB and Data Model for Ontologies).

Mobile Distributed Systems– 7 ECTS credit points

After completing the course the student is expected to have profound knowledge about the mobile and distributed systems, distributed transaction processing in mobile environment, Web services, replications in distributed systems and designing distributed systems.

Wireless Multimedia Systems– 7 ECTS credit points

Aims of the course program: Gaining knowledge of wireless multimedia technologies and transfer of multimedia content; Assuring quality of service for wireless networks and learning the mechanisms for adaptation of multimedia contents to the variable network conditions; Gaining knowledge of the IP multimedia subsystem(IMS) and its functions; Managing the next generation wireless multimedia networks.

Knowledge-based Information System– 7 ECTS credit points

The aim of this course is to introduce student in knowledge management systems. In order to achieve this aim the student have to learn core concepts of knowledge management, different type of knowledge and different way of their management; concept of case based rezoning; concept of knowledge discovery in database - KDD and knowledge base creation.

Enviromatics and Knowledge Integration– 7 ECTS credit points

Aims of the course program: Acquiring knowledge for the application of modern information technologies and software tools for environmental protection.

Product Lifecycle Management- 7 ECTS credit points

Aims of the course program: Students gain knowledge about the basic components of the platform for lifecycle management of product related to the development, design, technological procedures for preparation, production, exploitation and sustainability of the product, as well as managing data across business processes that make up the mentioned stages.

Optimization Methods– 7 ECTS credit points

The aim of the course is to provide knowledge of optimization problems, formulation of optimization problems and their classification, classical and heuristic methods and algorithms for solving them, and use in science. After completion of the course the student is expected to know how to formulate optimization problem, to classify it according to the strict theoretical aspects and to choose the appropriate classical and / or heuristic methods to solve it.

Applied Expert Systems– 7 ECTS credit points

Aims of the course program: Introduction to basic concepts and features of expert systems, and examples of their application in engineering.

Modern Cryptography and Communications – 7 ECTS credit points

Aims of the course program: students to acquire theoretical and practical knowledge of modern cryptography and modern communications.

Advanced Network Forensics and Analysis– 7 EK ECTS credit points

Aims of the course program: Introduction to advanced technologies for network forensics and modern techniques of Reverse Engineering to perform static and dynamic network forensic analysis of malware and network software.

Social Network Analysis– 7 ECTS credit points

After completing the course the expectations from the students are as follows: to have mastered of the social networks concept, to know to practice social network analysis and to apply it for purposes related to the development of information systems in business organizations.

Entrepreneurship and e-commerce– 7 ECTS credit points

The aim of this course is students to gain scientific knowledge and skills related to current approaches, models, processes and trends in the field of entrepreneurship and electronic commerce. In order to achieve this aim within the course will be discussed theoretical aspects of these areas with special emphasis on their practical application.

Financial tools for business decision making in e-business– 7 ECTS credit points

Aims of the course program: Introduction of students with issues of business related to accounting and communication skills, financial reports based on general accounting principles as a factor in the information and business decision making.

Non-teaching professional activities – 1 ECTS credit points

Semester 2

Elective subjects (student chooses 2 subjects)

Formal Methods and Performance Evaluation– 7 ECTS credit points

Aims of the course program: Assessment of performance, reliability and availability as a key step in the design, analysis and tuning of computer systems. Combining insights and results from the field of formal methods – traditionally focused on functionality – with techniques for performance modeling and analysis.

Collaborative Software Systems– 7 ECTS credit points

After completing the course the student is expected to have profound knowledge about the architecture and components of collaborative software systems and ability to model and develop collaborative software systems.

Architectures of Next-Generation Networks– 7 ECTS credit points

Aims of the course program: Advanced knowledge and skills for analysis and architecture design of heterogeneous high data-rate next-generation communication systems.

Information Visualization- 7 ECTS credit points

The aims of the Course program (competentions): Introdction to issues as multidimensional and multivariate data (mdmv data), representation of mdmv data needed for

different types of data analysis, types of data and information and analysis and representations possibilities. The course will develop students' abilities to view the best opportunities for mdmv proper analysis and data visualization and convenient use of tools for Information visualization.

Machine Learning and Pattern Recognition– 7 ECTS credit points

The aim of the course is to get knowledge of basics and implementation of machine learning, types of algorithms, classifiers combinations, clustering techniques and classification. Students will be enabled for designing typical problem and implementing the most adequate technique.

Development of Game Engines- 7 ECTS credit points

The student will get to know techniques and skills for creation and functioning of a video game engine. The students will be taught to create a basic full-featured video game engine using the latest tools and technologies.

Management of Human Resources and e-business Performances– 7 ECTS credit points

Aims of the course program (competences): The course provides a theoretical basis for the contemporary concept of the scientific discipline Management of human resources through the study of its processes, approaches, examination, experiences and methods of treatment of the human resources in organizations. It puts special attention to fostering of the situational approach in the cycle of staff treatment: providing, development, activation and retention of the human resources. After mastering the course, the students are expected to:

- Know the Holistic and Process model of HRM

- Understand the core of the Strategic Focused Organization (SFO)

- Know the key points and sense the differences between the old, personal and the contemporary concept of human resources management, with particular emphasis to the strategic HRM

- Be able to perform a job analysis, using one of the methods for that purpose

- Be able to prepare a job description and job specification for their future job

- Be able to conduct a interview for selection

- Be able to prepare an agenda for one day corrective workshop

- Be able to conduct a disciplinary procedure and counseling process

- Be able to apply a performance appraisal procedure (Performance management), from individual plan to realization of interview for employees' appraisal as a basis for development of the organization's business performances

- Be able to apply specific methods of staff analysis, measurements and research

- Understand the key aspects of the, so called, behavioral (socio-psychological) approach to the scientific research in this area.

ICT and Social Entrepreneurship– 7 ECTS credit points

Social entrepreneurship as a bridge between the public and private sector, allows to apply entrepreneurial principles in the social sector in order to improve the "quality of life". Social entrepreneurship is an alternative approach to the development of society. Social entrepreneurs apply models and techniques in order to solve social problems. This module is a multidisciplinary approach to promote concepts, practices and challenges of social entrepreneurship for students and allows students to recognize opportunities and business principles in identifying social problems. Specifically, this course enables students to: identify global social problems; understanding the factors that cause social problems, to recognize the types of social enterprises, to understand the role of social enterprises in sustainable community development; to develop skills in writing business plans for social enterprises.

Elective subject of the free-elective subjects offered by the public universities' units – 5 ECTS credit points

Non-teaching professional activities – 1 ECTS credit points

Master thesis – 18 ECTS credit points