Study program | Application of Information and Communication Technologies (ICT) in Teaching
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Faculty | Contemporary Sciences and Technologies
Study Cycle | Second Cycle (Postgraduate)
ECTS | 60
Title | Master of Computer Sciences - Module: Application of ICT in Teaching
Accreditation archive number [60] | 03-371/2
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Description of the program

Second Cycle Study program in Application of ICT in Teaching - 60 ECTS is a cohesive program designed to enhance the knowledge, skills, and professional development of teachers and others through modern approaches in the adoption of new knowledge. The studies focus on effective use of technology in education and teaching. The outcome from these studies results in gaining new knowledge about how to design a program based on technology, the usage of information technologies for the preparation and maintenance of classes, usage and development platforms for learning, creating digital educational content, e-learning, educational software, as well as multimedia projects in the classroom. The study program provides professional development for teachers and others interested in education studies.

The studies are based on the latest research and practices in e-learning and enhance learning through ICT. The study program develops practical skills and analytical understanding of ICT and e-learning and its role in professional practice.

Career

Students who will finish this master will be able to:
- implement the ICT in the process of teaching and evaluation - control;
- design modern courses;
- designing courses for students with special needs;
- monitoring and understanding of trends in ICT development and its application in modern teaching.

Learning outcomes

Knowledge and understanding

- Ability to develop and implement original and creative IT ideas to ensure the quality of teaching;
- Ability to apply IT skills and knowledge and demonstrate specialized competencies of computer science and information technology in order to organize interactive teaching in education;
- Have the knowledge and understanding of the areas of computer science, engineering and computer science (programming, web technologies, databases, basic networking, computing and information systems and multimedia);
- Have knowledge of one or more subject areas that can be qualify the student as an expert on the application of knowledge in a given area;

**Applying knowledge and understanding**

- Ability to critically, independently and creatively solve problems in new and never encountered before, or environments that have no previous experience in education. Planning, management and evaluation of independent research in the field of education and development and implementation of appropriate interactive and multimedia materials and online learning tools and testing through play;
- Creativity and originality in the interpretation of the knowledge from science to solve problems related to the objectives and materials in the area where they teach;

**Making judgement**

- Ability for creative integration and synthesis of knowledge from many areas of education, as well as administration and evaluation of pupils using IT tools designed and created for a specific problem domain. Creating educational processes using computer tools and techniques;
- Ability to deal with complex situations associated with specific educational processes resulting in real-time in education;
- Ability to identify appropriate specialized instances of education and making sound judgments in situations of lack of complete information or data based on personal, social and ethical principles and responsibilities associated with the application of knowledge and understanding;

**Communication skills**

- Ability to share findings and proposals with rational argumentation and reliance on those findings when dealing with both - professionals, as well as with unskilled people – clearly and unambiguously;
- Taking considerable responsibility for the shared outcomes;
- Leading and initiating activities.

**Learning skills**

- Ability to identify individual needs and set tracks for individual and independent education and its performance independently and autonomously in the common information fields;
- Ability to take responsibility for continued individual study in specialized areas of business and IT areas within networked economy;
- Ability to take responsibility for further professional development and training.

**List of courses**

**Semester 1**

- [MAICTT-303] [6.0 ECTS] E-learning 2.0 - Theory and Practice
- [MAICTT-301] [6.0 ECTS] Introduction to Databases
- [MAICTT-103] [6.0 ECTS] Research Methodology
- [6.0 ECTS] Elective course
- [6.0 ECTS] Elective course

**Semester 2**

- [MAICT2010] [24.0 ECTS] Master Thesis
- [6.0 ECTS] Free elective course

**Description of courses**

**Core courses**

- **E-learning 2.0 - Theory and Practice**
  As part of this course, students will: - Gain knowledge of designing a modern, technology-based teaching and learning study programs. - Develop the skills related to the potential for designing lectures through specific
technology-based tools; - Gain knowledge of modern, technology-based learning tools including PC, multimedia technologies, and communication technologies, and how they can be used to enhance learning; - Gain knowledge of how different technology-based lecture designs can enhance learning; - Develop a plan for design and development of a module for e-learning; - Identify the characteristics of the model for e-learning; - Will conduct lecture analysis; - Integrate strategies for learning and teaching in planning the design and development of the module.

• Introduction to Databases
Goals of the study programme (competencies): - Present the conceptual model and the model based on entities and relations, conceptual modelling, ER diagram; - Presentation of the relational model; - Introduction to SQL language; - Normalization of database schema; - Introduction to database management systems, the tools for defining, using and maintaining databases, as well as the tools for creating forms and reports.

• Research Methodology
This course provides a comprehensive introduction to research methodologies, the basic research theories and protocols, and writing research proposals. Students in this course will learn about the cyclical nature of applied research and the iterative process of research writing. The course teaches students how to identify the subject of study, formulate questions, organize a literature review, and select appropriate research projects and methodologies. By the end of the course, students will complete a proposal that includes an introduction, a statement of the problem (the meaning of the study), literature review, methodology section, references, and schedule of the project.

• Master Thesis
This module enables students to transfer their skills and knowledge to research and make more complex task of master thesis. The module is designed to be fully practical and students to acquire the necessary knowledge and skills to approach writing the thesis. The module has unique return result-to enable students to write the master thesis with minimal difficulties, and with maximum efficiency. The course aims to improve research techniques and style of writing paper, taking account to stop illegal means, such as plagiarism and infringement of copyright, which are prohibited by the Statute of SEEU.

Elective courses

• Computer Systems
Upon completing this course, students should: - Understand the basics of computer systems and their organization; - Know how to integrate various numeric systems; - To understand Boolean algebra and its application; - To understand the principles of computer architecture; - To differentiate between different operating systems and their application; - To understand the basics of computer networks.

• Multimedia in Education
Goals of the study programme: - To enable students to acquire basic knowledge and skills in the multimedia area; - To enable students to acquire theoretical and practical knowledge in the field of multimedia, and to implement these same techniques and methodologies in their classes; - To enable students to broaden and deepen the general knowledge of multimedia concepts (text, image, audio and video) and use them in designing the learning process; - To enable students to work on projects, individual or group, who by nature, may be scientific - research projects, development projects or internship.

• Professional Ethics of Information Technologies
The course provides an introduction to ethical and moral values in general, and use of information Technologies, in particular. Also the course is an introduction to the design and implementation of IT professional codes of ethics in public and private institutions. It analyzes and discusses ethical dilemmas in professional use of information technologies. Through concrete examples it covers all areas of study related to ethics when using information technologies.

• Assistive Technologies for Students with Disabilities
The aim of the course is to help students learn the technology for easing the education of children with special needs. This course covers information about the use of technology for many types of handicap, such as blindness, deafness, students with motor obstacles, etc. The course covers a broad overview of the use of contemporary technology and online resources which could be used to help students in their everyday tasks envisioned with the teaching plan.

• Software for Educational Purposes
Objectives of the curriculum (Competencies) - The definition of educational software, the importance of using various software in the educational process, its usage, evaluation of the benefits of the use of educational software; - Presentation of various educational software, both free and commercial; - Use of educational software for learning a subject (e.g., subjects of science, language, etc.) - Principles for design and engineering of educational software.

- **Introduction to Technologies in Education**
  Goals of the study programme (competencies): - To demonstrate knowledge, skills and concepts connected to technology and computers; - To use current and new technologies in improving and integrating education for instruction, knowledge and learning; - To identify and evaluate / review the suitability of computer software in education as well as the suitability and adaptability of students with special needs; - To identify and use suitable / appropriate internet sites and resources to improve the education and learning; - To demonstrate the usage of computers for developing teaching material and using children software to support and improve the learning for students of all ages; - To select suitable technological tools in learning, teaching, grading and evaluation; - To develop activities through development domains which incorporate the usage of technology and to secure adaptation for all students.

- **Rhetoric**
  During its long history of 2,500 years, rhetoric was used to indicate many different things; but rhetoric nowadays is considered as the art of persuasion through language. Rhetoric marks the way that an individual is linked to a particular theme or idea in order to convince the others. Rhetoric is characterized by several distinguishing features.

- **Multilingualism and multiculturalism**
  The purpose of this subject will be multilingualism in multicultural societies as a social phenomenon. This phenomenon is massive in the world. During the lectures, more precise terms such as monoculturalism and multiculturalism will be considered. The term ‘linguistic nationalism’ has at least two forms of this nationalism, which collide with each other: for the leaders of the most powerful countries nationalism means expansion, and for minorities it takes the form of defiance and struggle for the affirmation of identity, despite such pressure. The emphasis during the program will be multiculturalism in education. In the schools curricula consists of contents from different cultures.

- **Selected Advanced Topics in IT Applications for Preparing a Scientific Paper**
  The aim of this subject is: To display the technical elements, the structure of the text and design of a scientific research. To enable students to acquire advanced knowledge and skills from selected advanced chapters of IT applications that will be needed in preparing the scientific and research paper. Practical application of these objectives in preparing student’s individual research paper.

- **Selected Advanced Topics in Applications for Statistical Data Processing**
  The aim of this subject is: To display the technical elements in the field of statistics: organizing, processing, comparing through analysis and publication of data. To enable students to acquire advanced knowledge and skills from selected advanced chapters of the applications for statistical data processing. Practical application of these objectives in statistical processing of data obtained from questionnaires, reports, scientific studies and other documents.

- **Professional Communication**
  The course is focused on the development of those communication skills that are essential for effective functioning in the professional world. Students will study the process for analysis of different communication situations, and will accordingly comprehend them. Among the themes that will be covered are communication in organization, interpersonal and group communication, oral presentations, interviews for employment, professional business letters and interpersonal skills including group dynamics and teamwork.

- **Labor Market**
  The main aim of the course “Labor Market” is to provide second cycle students with basic and in-depth knowledge in the field of labor market theory and the mechanism of functioning of the market economy. The objective of the course Labor Market is to provide and teach students about categories, laws and basic principles through which the labor market functions. The course makes a detailed analysis of behavior pattern and the role that key agents play in labor market: individuals, companies and government. The analysis is based on two basic categories - labor demand and labor supply, which are applied in almost all the topics that are addressed in this course. The knowledge gained by the students from this course, serves as essential theoretical basis necessary to understand and grasp the different theories and policies that are applied in the labor market. The course teaches students to understand how labor
markets distribute and use efficiently the rare factor of production - the labor. Lectures include knowledge about the concepts of labor demand and labor supply and their practical application; behavior of individuals in the labor market, in order to maximize their usefulness; behavior of companies in the labor market, aiming profit maximization; government's role in the labor market, the different structures of labor markets: labor market in full competition, monopoly in the labor market, the role of unions in the labor market, the bilateral monopoly in the labor market. Lectures and class discussions cover material that may not be in the book and some aspects of the material contained in the basic literature will not be discussed in class, but are left for active studying of the student. Therefore in order the student to achieve success in learning the course is to be present in lectures and workshops by participating actively in the discussion of various issues related to labor market.

• **Methodology of Teaching**
  The aim of the course is to introduce the students to the basic teaching approaches and methods. They are expected to gain knowledge and skills in order to be able to apply the active educational tools. The course also offers development, learning and teaching as concepts and basic practices that allow teachers to teach about the development of thinking. Throughout this course, students will gain both theoretical background and entirety of strategies that will enable them to reflect and develop both their own and their students' critical thinking.

• **Philosophy of Social Sciences**
  This module covers information that will provide the learner to gain knowledge, skill and competence of the social sciences, including general methodology (explaining, theorizing, testing), the application of philosophy (especially individualism versus holism), the nature of rationality, and the history of theories and concepts. This module offers an advanced survey of current debates about the ontology, methodology, and aims of the social sciences. It will focus on the central issues of the social sciences: Ethno methodology; Evolution; Phenomenology; Rationality; Relativism; Scientific Methods; Textual Interpretations. Learning outcomes: On successful completion of the course, students will be able to: Understand the goal of social sciences. Tell the difference between explaining and understanding human behavior; To explain the different approach in explanation of the social sciences compare the natural sciences, the peculiarities about human beings and social phenomena; To understand the social structures, practices, norms, institutions, etc. The relationship between individuals and larger social structures; To explain the rely not only on facts about individuals and their mental states, but also the cases in which social phenomena cannot be explained in terms of individual behavior; To understand the value-laden in a different way or to a different degree than natural science, the possibility to have a value-free social science, the possibility to have an objectivity in social science.

• **Project Management**
  On successful completion of the course, students will be able to: plan the activities necessary to implement the project, identify their interdependencies, their duration and costs; prepare the necessary reports and perform all the required communication between the project and the client, as well as among the team members and the other stakeholders. structure the project to its constituent activities; prepare a Gantt-chart and a network plan for the project and identify the shortest time needed to complete the project; use MS Project as a tool in the process of planning, implementation and review of the project; define the project, identify its scope and objectives and develop project specification;

• **Optimization Methods**
  The aim of this course is to present techniques of modeling and optimization in order to prepare students for developing their ability to prepare models for solving real problems in the field of computer science. The course explore the importance of matrix factorizations as an important tool which offers modality for optimizing the solutions of different numerical algorithms which are of basic interest for problem solving in the area computer sciences. The course introduces optimization theory and approach to find the optimum. The different methods of optimization will be analyzed such as the simplex method, duality problem and sensitivity of the problems of linear programming. The aim is to explore a computer implementation for each of the problems followed by the proposal of the corresponding model for optimization.

• **Ethical and Legal Issues in Information Technology (IT)**
  Aims of the course program: to develop an understanding of the relationship between computing, technological change, society and the law; to emphasize the powerful role that computers and computer professionals play in a technological society; to provide an understanding of legal areas which are relevant to the discipline of computing; to provide an understanding of ethical concepts that are important to computer users and professionals; to provide experience in the consideration of ethical matters and the resolution of ethical dilemmas.

• **Protection of Human Rights**
  The purpose of this course is: to introduce students with the concept of international law on human rights, their
implementation, influence of those rights in the creation of national policies; to encourage students to critically reflect on the relationship between international law and national law; make them aware of current international events, how they affect the daily lives of people in the world; encourage students to contribute in matters of drafting laws for the protection of human rights hoping that, the law makers will consult them same during the creation and implementation of state policies.