UNIVERSITETI I EVROPËS JUGLINDORE
УНИВЕРЗИТЕТ НА ЈУГОИСТОЧНА ЕВРОПА
SOUTH EAST EUROPEAN UNIVERSITY

Study program	Information Systems and Management (2022/2023)
Faculty	Contemporary Sciences and Technologies
Study Cycle	Third Cycle (PhD)
ECTS	180
Code	N-PhDISM
Title	Doctor of Sciences in Information Systems and Management
Accreditation archive number [180]	03-177/14
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Decision for starting of the program	
Accreditation date	23.09.2022

Description of the program

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Information systems and services are an essential part of everyday life, whether it is personal, social, or professional work or life. Trends point out that these tools are invaluable to businesses since they support their day-to-day processes, data processing and by use the latest technologies help businesses in making strategic decisions, and by this ultimately fostering digital innovation.

The third cycle of doctoral studies in **Information Systems and Management** at the Faculty of Contemporary Sciences and Technologies supports traditional IT technologies with an emphasis on business orientation towards industry. This expertise is a widely known discipline in continental Europe. It focuses not only on technical issues, but also on information systems and structural approaches to modeling and analyzing business processes and problems towards better management of various processes in private or public management. The program is particularly important because it offers and requires scientists to conduct innovative research that addresses the complex and exciting interconnectedness of technology and information systems, economics, public policy, and governance.

The program is a continuation of the education of the staff, who have completed the undergraduate and postgraduate studies. The program will provide a higher degree of training in scientific, research and professional fields and in their independent research activities, as well as in academic and professional careers. Through this study process, students will gain academic, intellectual, and technical competencies and communication skills through various forms of preparation for research work. Rapid changes in society impose and require a new approach to preparing the new generations with scientific titles, and the goal is to create managers with new views and ways of thinking, developing skills for predicting the future, and accepting the challenges and opportunities offered by business in the 21st century.

Doctoral studies in Information Systems and Management cover a wide range of topics and issues, but some key areas that

are proposed but not limited to include:

- Economy of digitalization;
- Analysis of large-scale data, including Machine Learning and Artificial Intelligence;
- e-Government and Smart Society Services;
- Finance and banking services;
- Information security and privacy;
- Transdisciplinary business services such as:

1. Building Information Modeling (BIM) - Digital Transformation in the Architecture, Engineering and Construction Industry (AEC);
2. Health care and IT;
3. Mobility and digital transport;
4. Digital rights, data protection and policy management, and others.

Career

The program provides continuing education of personnel, who have completed undergraduate and postgraduate studies. The program will enable the highest level of scientific-research preparation in the professional field and own research activities, as well as in professional and academic career. In this process of study, students will be equipped with competencies and academic, intellectual and technical communications skills through various forms and will be prepared for scientific research work. Rapid changes in society impose and require new approaches for preparing new generations of scientific knowledge to the needs of the knowledge-based society and are dedicated to the global labor market in the field of Information Systems and Management.

Learning outcomes

Knowledge and understanding

- Possession of knowledge and understanding in the field of Information Systems and Management.
- Ability to develop and implement original and creative ideas in environments of overlapping or interconnected areas of field of Information Systems and Management.
- Ability to apply interdisciplinary knowledge and demonstration of specialist competencies in field of Information Systems and Management.

Applying knowledge and understanding

- Ability to critically, independently and creatively solve problems in new, previously not encountered or environments for which has no prior experience in a multidisciplinary context of real organizational environment.
- Planning, managing and evaluation of independent research in the field of Information Systems and Management implementing appropriate Calculator tools, environments and technologies.
- Creativity and originality in the interpretation of the knowledge of e-technological processes and appropriate use of computer-based tools and environments based on defined techniques for research and investigation.

Making judgement

- Ability for creative integration and synthesis of knowledge from many areas related to media processes and use of computer tools and techniques.
- Ability to deal with complex situations related to process-specific technologies, the identification of appropriate specialized domain instances on the internet and informatics and making sound judgments in situations lacking complete information or data based on personal, social and ethical principles and responsibilities related to the application of knowledge and understanding.

Communication skills

- Ability to clearly and unambiguously communicate conclusions, results, studies and knowledge of Information Systems with the ability to adapt to the style and form of expression for non-specialists.
- Competence for critical, independent and creative argumentative research, evaluation methodologies and proposing and defending new hypotheses.

- Ability to initiate, conduct, and taking responsibility for individuals and groups in cases where communication, organizational and informatics competencies are of essential importance.

Learning skills

- Ability to identify personal needs and directions for individual and autonomous additional education and its performance independently and autonomously in the Information Systems areas.
- Ability to assume responsibility for continuous individual learning in specialized and new e- technologies.

List of courses

Semester 1

- [C2012] [10.0 ECTS] **Quantitative Research Methods**
- [C2013] [10.0 ECTS] **General Economics and Theory**
- [DET0103] [10.0 ECTS] **Advanced Topics in Information Systems**

Semester 2

- [C2017] [10.0 ECTS] **Research Methods in Computer Sciences**
- [10.0 ECTS] **Professional Elective Course**
- [10.0 ECTS] **Professional Elective Course**

Semester 3

- [DET0105] [20.0 ECTS] **Preparation and submission of the application for the topic of doctoral dissertation-res**
- [DET0106-S3] [10.0 ECTS] **Doctoral seminar with a presentation of the report I**

Semester 4

- [DET0107] [10.0 ECTS] **Researching and organizing a workshop for research practice**
- [C2301] [15.0 ECTS] **Publications**
- [C2021] [5.0 ECTS] **Student Mobility**

Semester 5

- [DET0109] [20.0 ECTS] **Presentation of research results**
- [DET0106-S5] [10.0 ECTS] **Doctoral seminar with a presentation of the report II**

Semester 6

- [C2300] [30.0 ECTS] **Doctoral Dissertation**

Description of courses

Core courses

- **Quantitative Research Methods**
  This course introduces students to problems in econometrics, including the specifical choices and functional forms, prevention of abuse of the assumptions of the classical linear model, the elements of probability and statistics Econometrics, intuition and theoretical estimate regression models with one or more variables performance of original empirical research, extension of the general linear model, the structure of the dynamic model and evaluation of variables with limited depending, etc. This subject is designed for students who are preparing for the preparation of the doctoral thesis project. The main goals of the course are to offer students tools to conceptualize their thesis regarding finding research questions and the creation of data collection methods qualitative analyses. The course is focused on problems quantitative methods and techniques, such as statistical analysis, texts related to theory and testing hypothesis. Equally important are topics of descriptive and causal inference, longitudinal comparative

research and case study. Advanced information data collection will be offered for working with text. The goal is to analyze the qualitative data finally putting all theoretical and practical intoxicating function design and writing of the thesis. Epistemological aspects of the subject will materialize through issues. What is the theory of knowledge, which is knowledge, as it comes to scientific knowledge and truth?

- **General Economics and Theory**
  The objective of this course is the make the students aware of the advanced principles of economics and also the contemporary issues. This course will help the student in deciding their area of research interest. Specifically, the aims of the General Economics and Theory course are to enable students to: - develop an understanding of microeconomic and macroeconomic theories and concepts and their real-world application; - develop an appreciation of the impact on individuals and societies of economic interactions between nations; - develop an awareness of development issues facing nations as they undergo the process of change.

- **Advanced Topics in Information Systems**
  The study program goals: Study of advanced concepts from the field and terminology of information systems. - Information systems and advanced concepts: hardware, software, networks - E-world: advanced choice for e-business and e-commerce - Evolutionary Processes To learn more about information systems and advanced technologies that improve business values and different business processes across the organization. To apply concepts with different management disciplines, during the process of analysis, interpretation, evaluation and decision making. Understand the redesign process of organizations using information systems. To describe the role of information systems in decision making. To consider information security as well as ethical and social questions. Become familiar with the Internet, electronic commerce (e-commerce) and electronic business (e-business). Students will be enabled to work on projects, individually or in groups, who by nature can be case studies, scientific-research projects, development projects or practical work.

- **Research Methods in Computer Sciences**
  The aim of this course program is to introduce research methods concepts in Computer Science to PhD students that are going to peruse in their research, understand the strengths and weakness of each of these methods, how to choose suitable method(s) for their investigations, how to carry out investigations using these methods, properly identify the threats associated with these methods and how to deal with them as well as reporting the results of these investigations.

- **Preparation and submission of the application for the topic of doctoral dissertation-res**
  After the second semester, students begin their activities for the development of the plan on his/her doctoral dissertation. Activities include the definition of literature, defining hypothetical framework, the definition of the work methodology and determination of the individual plan as well as the first public presentation. If necessary, can be held elective courses for this purpose.

- **Doctoral seminar with a presentation of the report I**
  Candidates will submit a list of all seminars attended, which are relevant to their field and/or their research interest at anywhere in the world, on the attached prescribed form to their supervisors for acknowledgement. These seminars should be research in nature. A report should be written by the students in his/her own words for each seminar attended. The report summarizes key points and provides students' critical assessment. The student is typically required to initiate a discussion with fellow researchers on the topic to help him/her write the report.

- **Researching and organizing a workshop for research practice**
  Researching and organizing a workshop for research is an integral part of the study program. Candidates will enhance their knowledge, broaden research outlook, and improve thinking and communication skills. Attendance and participation in workshop, together with the related discussions with fellow researchers on topics addressed in the workshop, will aid in the candidate skills of conducting the dissertation.

- **Publications**
  Publication of research activities under the table relevant to the media for publication. Publication activities and successes of the candidate checked before scientific audience by area and the relevance of the research.

- **Student Mobility**
  During the fourth semester the student is obliged to visit and contribute to a relevant institution abroad for a period of

at least one week. The aim of PhD students' mobility is to request candidates to present, exchange and discuss their research work with their colleagues from other countries for improving the quality of their dissertation. For the realization of mobility, the student brings evidence to the mentor.

- **Presentation of research results**
  At the end of the 5th semester, after the research activities under the individual plan, overall results of this phase of the paper and the research will be presented publicly by the candidate.

- **Doctoral seminar with a presentation of the report II**
  Candidates will submit a list of all seminars attended, which are relevant to their field and/or their research interest at anywhere in the world, on the attached prescribed form to their supervisors for acknowledgement. These seminars should be research in nature. A report should be written by the students in his/her own words for each seminar attended. The report summarizes key points and provides student's critical assessment. The student is typically required to initiate a discussion with fellow researchers on the topic to help him/her write the report.

- **Doctoral Dissertation**
  Continuing the work of doctoral dissertation. Submitted thesis (dissertation), accepted by the Scientific-Teaching Council of the Faculty and submitted to committee members and begins the procedure of public defense.

Elective courses

- **Advanced topics in applied statistics for data processing**
  The purpose of this course is to enable students to acquire the advanced knowledge of statistics that have direct application in the field of computer science and technology. The goal is to learn how to do the processing of advanced statistics, their laws, their representation legalities of adopting appropriate conclusions based on data processed etc. Also, the aim is to learn advanced principles of probability and how these principles can be applied in various areas of everyday life, especially in the area computer sciences.

- **Advanced topics of security in Information Technology**
  Aims of the course program: Students of this course shall be able to: • understand advanced concepts in designing, developing, managing and analyzing security systems; • review inter-dependencies between system components and point out major vulnerabilities; • design security mechanisms; • reflect requirements and demands that have to be addressed when solving problems and security issues in common computer systems; • create both written project report and (oral) presentation of the project; • argue for their solution or analysis in the ways implied above.

- **Advanced Big Data Analytics**
  Aims of the course program: • Students should be aware of and use Big Data Flow for real projects; • To be competent to explain and relate the Data Analytics lifecycle with Big Data projects and guide other team subordinates in the practice; • To recognize and effectively make use of proper methods and tools to resolve real Big Data problems ; • To develop a comprehensive knowledge of Big Data ecosystem, including utilities such as HDFS, MapReduce, Hadoop, YARN, HBase, Spark, Pig etc.

- **Advanced Topics from the Application of Information and Communication Technologies in Other Fields**
  Aims of the course program: The course represents a specialized study within an area of Computer Sciences, guided by a supervisor. Topics include theoretical and applied aspects of Information and Communication Technologies in other fields. They are combined with a guided reading and research with a significant individual or group project component. Advanced topics will be adapted toward the common research interests of PhD candidates and the supervisor of the course. Different topic tracks can be selected from individual students.

- **Advanced Econometrics**
  This course will introduce students to modern econometric methods and practical application of these methods using RATS and Matlab. The course will include four parts: the first part includes questions of statistical mathematics, statistical findings and theory maximum likelihood, the second part includes questions linear models as simple and multiple linear regression, instrumental variables, the third section includes non-linear models such as nonlinear methods smallest squares and generalized method, the fourth part includes time series as stationary and stochastic process ARIMA (p, d, q) model and vector autoregression model (VAR).

- **Entrepreneurial Management - Advanced Level**
  This subject will treat the following topics: entrepreneurship as a field activity, the development of entrepreneurship, learning about the characteristics of entrepreneurs and their differences compared to managers, differences between entrepreneurial enterprise and small enterprise, industry analysis, creativity, recognition and innovation opportunities generating ideas, creating new businesses and their growth and development, relocation, combination and recombination of development resources, stages of development of enterprises, traditional and alternative sources of financing of enterprises, legal forms of organization to enterprises, marketing in emerging firms strategies for achieving competitive advantage of enterprises, exit strategies, entrepreneurship as an accelerator of economic growth and development measures for the development of small business and entrepreneurship, entrepreneurship in large enterprises, entrepreneurship in the administration, and preparation of a business plan.

- **Knowledge Management, innovation and competition**
  This course includes the following topics: individual and organizational knowledge, differences between knowledge and information in the organization, recovery and transferring knowledge (generating, maintaining, propagation and termination of knowledge), knowledge and organizational design, the critical role of knowledge, knowledge and competitive advantage, knowledge management in networked organizations, the development of knowledge sharing with partners, connecting knowledge with the organization's strategy.

- **Behavioral Environmental Economics**
  The course aims to provide understanding of topics in environmental and resource economics from a behavioral economics perspective. In more detail the learning outcomes are to gain: - Background about the behavioral economics, relevant theoretical advances, behavioral biases, experimental methods. - General overview of the “non-behavioral economics”: existing policy tools, theoretical models in brief. - An in-depth understanding of the adaptation and mitigation strategies under ambiguity using public goods games, weakest-link public goods game and coordination game. - An in-depth understanding of the cooperation in (dynamic) coordination games, auction mechanisms, provision of environmental conversation by means of payments for ecosystem services, technology adaptation subsidies and the role of leadership. Focus will be on instruments that can be used to improve coordination and cooperation. - Behavioral Economics approach to Sustainability - Students will have the knowledge of how to connect behavioral economics and environmental economics. - Students will be able to analyze and describe the related literature i.e., the environmental economics studies using behavioral perspective.

- **Virtual, Augmented and Extended Reality in Information Systems**
  This course aim to cover the technical and experimental foundation required for the implementation of immersive environments in current virtual, augmented and mixed reality platforms. As such, this course will cover a wide array of topics that will cover the state of the art in the field. It will cover topics from Computer Science as well as HCI such as VR, AR and MR, motion tracking, interactive 3D graphics, multimodal sensory integration, immersive audio, user interfaces, IoT, games and experience design.

- **Advanced topics in Healthcare and IT**
  This course presents the knowledge, infrastructure, functions, and tools of Healthcare and IT. It explores technology, planning and management and applications in healthcare. The emphasis is on conceptual frameworks as well as a deeper level of engagement on system applications. It focuses on the application of health technology. It is designed to familiarize students with core concepts and issues confronting managers in the health sector associated with planning, implementation and evaluation of information systems. The course provides an overview of the theory, processes and applications of information systems and how they relate to health policy and management. It also provides a basic understanding of data standards and requirements, and the critical concepts and practice in mapping and interpreting health information.

- **Advanced topics in Building Information Modeling (BIM)**
  The aims and topics of this course were originally researched by the latest academic education publications on BIM. As we know in the world BIM is becoming one of the key tools for process optimization in the construction sector. The aim of this course is to introduce students to the advanced techniques of BIM, but also to introduce them to the philosophical approach to using BIM. Furthermore, through a real example of a smart city where BIM is implemented, the processes and their interoperability will be analyzed. Finally, students will analyze and explore processes in which BIM technologies are implemented in all phases.

- **Advanced topics in Mobility and Digital Transport**
  This course is intended for doctoral students that wish to pursue their PhD thesis in one of the research areas related to transportation and mobility with digitalization means. Therefore, it is expected a lot of research and literature review in order to successfully complete the course. Technological advances affect the transport process as well as

travel behavior. Modern technological advances including here recent AI technologies have a huge impact on all areas of mobility. This includes definitely car manufacturers, car rental agencies, railways, airlines, aircraft manufacturers or logistic and warehousing companies. But the concerns also fall under city, government and traffic planners and additional public transportation providers that can benefit from extended knowledge and technological advancements in mobility and transportation.

- **Advanced topics in Digital Rights, Data Protection and Policy Management**
  Digital rights are those human rights that enable individuals to access, use, create and publish digital media or access and use computers, other electronic devices and telecommunications networks. The concept of the program specifically addresses the protection and realization of existing rights, such as the right to privacy and freedom of expression, in the context of digital technologies, especially the Internet. The course will focus on three areas: personal data protection, digital security and freedom of expression. Practical examples of violations, the consequences of these violations on the individual and society, as well as the mechanisms for protection of digital rights will be analyzed in each area. The aim of the program is advanced analysis and presentation of the concepts of personal data protection and their application in electronic communications, as well as proving the main challenges facing the privacy of individuals in the digital world, especially EU regulations on personal data protection.