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Introduction

Greetings from the Rector of the University

It is with immense pleasure that I extend a warm welcome to you at Harokopio University!

Founded in 1990 in alignment with the visionary aspirations of the national benefactor Panagis Harokopos, our university stands as a testament to his enduring legacy. At Harokopio University, we take pride in offering exceptional study programs characterized by outstanding academic and technological infrastructure, coupled with a commitment to excellence in research.

Our institution places a strong emphasis on fostering an international presence, ensuring a privileged academic environment for our students. Recent ranking studies, such as the one conducted by the National Research Foundation covering the period 1996-2010, underscore our University's high standing among the country's academic institutions, particularly in terms of the research contributions of our esteemed professors.

A distinctive feature of the academic environment we provide is the opportunity for students to explore our premises, laboratories, classrooms, and technological infrastructure. These spaces are not only hubs of culture and education but also embody an academic environment characterized by healthy competition and a spirit of creation.

The success of our academic community is attributed to the dedication and collaborative efforts of both students and staff. We pride ourselves on maintaining an atmosphere of openness, mutual respect, and regular collaboration, which forms the bedrock of our smooth academic life.

I am delighted to share that the Department of Informatics and Telematics stands as the newest and fastest-growing department at our university. Adhering to international standards, the department ensures the quality of its curriculum through continuous evaluation, offering a blend of best educational practices that incorporate theory, laboratory exercises, group work, and real case studies.

Furthermore, the department actively cultivates partnerships with research institutes and the labor market, consistently promoting the recognition of both the department and the high caliber of its graduates through various initiatives and events. The department's commitment extends to significant research projects that contribute to its overall academic prowess.

The majority of our departmental graduates have successfully transitioned into related fields, either by furthering their studies in recognized institutions or participating in our department's esteemed postgraduate program.

As we envision lasting and continuous progress for the department, we recognize the invaluable contribution of our students. Their fresh ideas, creativity, and passion for science, coupled with a profound love for our university, are pivotal to the department's growth.

In this noble endeavor, the faculty, department staff, and I stand ready to offer unwavering support. I extend my best wishes for the enduring success and ever-increasing advancement of the Department of Informatics and Telematics at Harokopio University.

Warm regards,

Professor Maria Nikolaidi

Rector of Harokopio University of Athens

Greetings from the Dean of the School of Digital Technology

Dear Esteemed Students,

With great pleasure, I welcome you to the postgraduate program with a Specialization in Research in 'Computer Science and Informatics' at the Department of Informatics and Telematics of the School of Digital Technology. I am excited about the incredible opportunities that lie ahead.

Since our establishment in 2006, with the inaugural intake of students in the academic year 2007–2008, our department has consistently evolved to meet the dynamic demands of the international society and the ever-changing landscape of the labor market. The postgraduate program in 'Computer Science and Informatics' is the department's effort to enhance the research-oriented nature of its educational programs.

The graduates of this program are distinguished for their academic completeness in the department's subject areas and their close connection with every field of application in Informatics. The professional career prospects are highly encouraging, and the program is housed in a modern building with state-of-the-art facilities, providing students access to modern equipment and fostering excellent collaboration between professors and students.

Participation in a postgraduate study program not only allows you to test your knowledge in the respective field but also to evolve it into issues and problems that concern the research community, cultivating your critical thinking. In today's pace of Informatics evolution, the purpose is not only to educate you on current tools and scientific methodologies but also to actively contribute your own research results.

As the Dean of the Department of Informatics and Telematics, I welcome you as new students and express my best wishes for your successful journey. Seize the opportunities provided, expand your knowledge, and shape the horizons of your life.

Wishing you a successful and fulfilling course ahead.

Sincerely,

Professor Thomas Kamalakis

Dean of the School of Digital Technology, Athens, 2023

Greeting of the Postgraduate Program's Director

Welcome to the postgraduate study program in Research Specialization in 'Computer Science and Informatics' at the Department of Informatics and Telecommunications of the School of Digital Technology!

Having completed an initial phase of development, the Department of Informatics and Telecommunications has formulated a strategic development plan within the broader strategy of the University. Research plays a pivotal role in this plan, serving as a lever for growth by attracting human and material resources and expanding the department's community.

The new postgraduate program in 'Computer Science and Informatics' was introduced in 2023 to bolster the strategic development of research by enhancing the department's research potential, creating an attraction point for both graduates of the department and graduates from other universities in the country and abroad, preparing them to engage in research endeavors.

This program aims to foster research and prepare specialized scientists for doctoral studies. Simultaneously, it supports the education of specialized scientists in research methodologies and modern practices, applying them to industrial production and entrepreneurship. It aids in evolving and improving specialized individual and work-related skills, fostering connections between participants and research both within and beyond the institution, in collaboration with national and international Research Centers, Enterprises, Institutional Government Bodies, and Higher Education Institutions dealing with the topics of the Postgraduate Program.

Your participation in this specific postgraduate study program will allow you to delve into cutting-edge topics in Computer Science and Informatics research, develop critical thinking, and train in tools and methodologies used in relevant research fields.

As the Director of the Postgraduate Program, I welcome you to the challenging yet captivating journey of research and hope you enjoy it, gathering experiences and strength for your future path.

Athens, 2023

The Director of the Postgraduate Program

Professor Iraklis Varlamis

To Prospective Students

7 reasons to choose the MSc in Computer Science and Informatics at Harokopio University:

1. **Specialized Education:** The MSc focuses on research and advancement in advanced fields of Computer Science and Informatics.
2. **Applied Learning:** The program offers knowledge and practical skills that meet the demands of both research and the job market.
3. **State-of-the-Art Facilities:** The MSc operates in a new building equipped with modern laboratories and educational infrastructure.
4. **Effective Organization:** The organization and function of the MSc aim for the effective integration of students into research processes and the optimal use of their time.
5. **Successful Collaboration:** Collaboration between professors and students contributes to completing studies within the designated time and with the best possible results.
6. **Successful Employment:** Graduates are utilized in department and institutional research projects and are absorbed by research bodies and R&D departments of companies due to their high specialization.
7. **Further Studies:** Students have the opportunity to pursue a doctoral thesis and participate in high-level research projects.

Harokopio University of Athens

Establishment / History



Harokopio University, established in 1991 and chronologically the 18th university in the country, owes its inception to the visionary Professor Georgios Karabatzos (†2011). Named in honor of the national benefactor Panagis Harokopos, a forward-thinking Greek of the diaspora with a European perspective, the university embodies his dream of an educational institution equipped with outstanding infrastructure and facilities in harmony with the natural surroundings. This vision was made possible through the generous bequest of Panagis Harokopos and Evanthia Harokopou-Petroutsis, providing for the fulfillment of their wishes.

Conceived and developed according to international standards, the institution's blueprint originated from a study conducted by the Ministry of National Education and Religious Affairs, under whose auspices it operates.

Harokopio University is committed to delivering high-level undergraduate and postgraduate studies, aligning with Panagis Harokopou's vision to enhance the quality of life. The university's study programs cover various areas of human activity, emphasizing modern infrastructure, conducive educational environments, and fostering strong student-teacher collaborations.

A focal point of the university is its dedication to research activity and the pursuit of excellence. According to studies by the National Documentation Center, Harokopio University consistently ranks among the top five institutions in the country for the number of publications and recognition, as evidenced by cross-citations at the researcher level in its cultivated fields of knowledge.

The university comprises the following Faculties and Departments:

School of Environment, Geography, and Applied Economics

- Department of Economics and Sustainable Development
- Department of Geography

School of Health Science and Education

- Department of Dietetics and Nutrition Science

School of Digital Technology

- Department of Informatics and Telematics

All departments offer full four-year programs leading to a degree.

Situated on a sprawling 20-acre complex at El. Venizelou 70 in Kallithea, very close to the center of Athens, Harokopio University occupies a privately owned space bequeathed by the testators. Easily accessible by public transport and in proximity to the METRO station "El. Venizelos – Taurus," the university's location provides convenience for its diverse student body. The university remains steadfast in its commitment to academic excellence, research innovation, and the realization of Panagi Harokopou's enduring vision for an institution that contributes significantly to societal progress.



Research at the University

The University is committed to fostering both fundamental and applied research that contributes significantly to the progress of science, along with the provision of scientific, research, and technological services. Our University actively

supports the initiation and execution of scientific, research, and technological projects, whether funded by or conducted within the framework of international organizations and agencies.

Facilitated through the Special Research Funds Committee, which accumulates funds from various sources, the University allocates resources for research-related needs such as training, development, ongoing training projects, scientific, technological, and artistic services. This encompasses the execution of projects like special studies, tests, measurements, laboratory examinations, analyses, provision of opinions, and drafting specifications on behalf of third parties. All these services are conducted by our scientific staff or in collaboration with other specialized scientists, emphasizing the seamless integration of education and research with production.

Transparency is a hallmark of our research endeavors, ensuring that the results are made public and accessible to the University Community members. They are encouraged to utilize these outcomes while adhering to the rules and provisions of Greek, Community, and International Laws governing the protection of intellectual property.

To date, the Special Research Funds Committee has overseen more than one hundred and seventy programs, with a substantial portion successfully completed in terms of both physical and financial scope, while others are currently in the research phase. In line with our commitment to advancing research, the institution actively participated in and managed programs under the EU Research Frameworks, as well as those directly funded by the European Union.

In alignment with community and national legislation requirements for managing co-financed projects funded by the EU and national schemes, has been certified. This certification extends to the implementation and management of projects affirming the University's logistical and scientific competence to drive and elevate research initiatives. Our dedication to research excellence remains unwavering as we continue to contribute to the academic and scientific landscape.

The Department of Informatics and Telematics



Establishment - Operation

Established in 2006, our Department is dedicated to advancing Computer Science, with a primary focus on web/telematic applications, big data, machine learning, and web-centric technologies. We place special emphasis on application areas such as internet technologies, digital transformation, e-business, e-government, e-health, smart transportation, and more.

Recognizing the evolving needs of the global market, we aim to equip our graduates with comprehensive training in web and internet technologies. This enables them to contribute effectively to the design and development of intricate information systems and advanced services. Graduates from our Department possess a well-rounded set of scientific and technical skills directly applicable to the diverse fields within Information Science, making them well-prepared to address the contemporary demands of the labor market.

As part of our commitment to fostering innovation, we encourage students to explore and develop cutting-edge services using open source platforms. This is often facilitated through their thesis work under Research and Development (R&D) projects, allowing them to actively contribute to the University's e-services ecosystem.

The professional rights of our graduates align with those of all University Departments across the country specializing in Informatics and Telecommunications. By ensuring that our curriculum remains dynamic and relevant, we empower our

students to become adaptable professionals who can thrive in the ever-evolving landscape of technology and information science.



Aims - Objectives

As previously mentioned, our Department is dedicated to exploring the application, utilization, and impact of digital technology across various spheres of human activity. To achieve this, we focus on the design, development, and integration of standard methods and tools within computer and telecommunications technology, enabling the creation of contemporary telematics applications. The key areas of emphasis within the Department's activities encompass:

- **Provision of Electronic Services:** Creating unrestricted electronic services, adaptable to diverse mobility and interface devices (e.g., e- and m-services) across sectors such as health, transportation, governance, and commerce.
- **Information Management and Exploitation:** Handling the vast amounts of information generated and disseminated in modern environments (e.g., the Internet) and transforming it into knowledge by leveraging the connections within different networks (e.g., computer, corporate, human).
- **Technological Development and Integration:** Advancing technologies, including new-generation wireless optical systems, cloud computing services, and the integration of smart devices (e.g., sensors, smartphones) to enhance service efficiency and simplify the daily lives of modern individuals. Examples include applications like the Internet of Things and smart cities.

- **Integrated Support for Established Digital Technology Areas:** Collaborating with other Departments of our University, we provide integrated support for established application areas of digital technology, such as corporate IT, health IT, and educational IT.
- **Impact Assessment of Digital Technology:** Investigating the influence of digital technology on daily life and business activities, with a focus on techno-economic and social analyses related to the adoption of technologies and products.

The Department is driven by the overarching goal of fostering research and excellence in these domains to facilitate integrated technological solutions and their effective implementation in modern society. To achieve this, a comprehensive strategic plan for medium and long-term research has been formulated, prioritizing application areas aligned with our expertise.

Furthermore, our commitment extends to delivering high-level curricula at both undergraduate and postgraduate levels, adhering to international standards and guidelines. By imparting specialized knowledge, we aim to empower our graduates to excel in the dynamic and rapidly evolving fields of digital technology.

Research

The Department stands as a distinguished research unit both nationally and internationally, actively engaged in pioneering research spanning various cutting-edge domains associated with Information Technology (IT) and its applications. Our research endeavors encompass the following key areas:

- **Data Management, Artificial Intelligence/Machine Learning, and Computer Vision, Statistics, and Applications:**
 - Exploring advanced techniques in data management.
 - Investigating the realms of artificial intelligence, machine learning, and computer vision.
 - Conducting statistical analyses with diverse practical applications.
- **Algorithms, Techniques, and Programming Languages:**
 - Advancing algorithms and techniques for enhanced computational efficiency.
 - Exploring innovative programming languages to optimize software development.
- **Information Systems:**
 - Investigating various facets of information systems, including management aspects, distributed computing, supply chain dynamics, e-commerce, simulation techniques, and systems security.
- **Cloud Computing:**
 - Delving into the intricacies of cloud computing, covering distributed computing, architectural and service design, performance evaluation, programming techniques, and optimization.
 - Conducting techno-economic analyses to understand the economic implications of cloud-based solutions.
- **Communication Networks and Internet of Things (IoT):**
 - Exploring both wireless and wired technologies and their applications.
 - Investigating cyber-physical systems and their integration into intelligent transport and autonomous vehicles.
 - Researching applications of IoT in smart cities and e-health.

Our commitment to these research areas positions us at the forefront of innovation, contributing valuable insights to the evolving landscape of IT. The Department's continuous dedication to cutting-edge research not only enriches academic discourse but also informs practical applications that can shape the future of Information Technology.

Graduates

Graduates from our Department undergo comprehensive training in Informatics, Computer Science and Telecommunications, providing them with the expertise to adeptly meet the heightened demands of contemporary society and the fiercely competitive professional landscape.

Key points regarding our graduates include:

- **Scientific Mastery and Preparedness:** Equipped with scientific proficiency, our graduates possess the knowledge and skills needed to effectively navigate and contribute to the dynamic challenges of modern society.
- **Legislated Professional Rights:** The professional rights of our graduates are precisely delineated by legislative acts from competent Ministries, mirroring those established for corresponding University Departments nationwide in the fields of Information Technology and Telecommunications.
- **Continued Academic Pursuits:** Many of our graduates pursue postgraduate studies at esteemed institutions in Greece and abroad, further enhancing their expertise and contributing to the global knowledge landscape.
- **Successful Employment and Specialization:** According to a study conducted in April 2022, our alumni are predominantly employed in the private sector, securing positions aligned with the specialized focus of our Department. Importantly, they encounter no obstacles in terms of work rehabilitation.

The Department's commitment to providing a holistic education ensures that our graduates not only excel in their initial professional endeavors but also have the adaptability and knowledge base to thrive in a rapidly evolving technological landscape.



Activities

Initiatives of the Department that have been successfully completed and ongoing activities are briefly summarized below:



Research - Collaborations

Active Participation in Diverse Research Initiatives

Engaging in a spectrum of research and development projects, our involvement spans projects funded by national and European resources, as well as private entities. This commitment reflects our dedication to contributing innovative solutions and advancing knowledge on a broad scale.

Interdepartmental Collaboration for Robust Research Ecosystem

Fostering collaboration with key university departments, such as the Department of Geography and the Department of Dietetics and Nutrition Science, extends beyond theoretical collaboration. Together, we jointly conceive and execute research projects, creating a synergistic environment that amplifies the impact of our collective efforts.

Global Networking through Cooperation Protocols

Actively forging cooperation protocols with esteemed Research Organizations and Universities across Europe and internationally, we aim to create a network that transcends geographical boundaries. These strategic collaborations facilitate the exchange of intellectual capital and resources, enriching the global research landscape.

Empowering Future Leaders with Scholarships

In our commitment to nurturing the next generation of researchers, we have established scholarships for both students and PhD candidates. These scholarships not only financially support their academic pursuits but also cultivate a culture of excellence and innovation within our academic community.

Facilitating International Mobility Programs

Systematically institutionalizing and organizing student and researcher mobility, we leverage prestigious programs like Erasmus and Erasmus+. Capitalizing on our existing partnerships and proactively entering into new ones, these initiatives enable a seamless exchange of ideas and talent, fostering a diverse and enriching academic experience for all involved.

In embracing these collaborative initiatives, we aspire to elevate the standards of research, foster interdisciplinary cooperation, and cultivate a dynamic academic environment that propels our institution to the forefront of global innovation.



Organization of conferences

- IEEE CISOSE 2023: IEEE International Congress on Intelligent and Service-Oriented Systems Engineering
- Annual National Free and Open Source Software Communities Meeting (FOSSCOMM) in 2012 and 2017
- Annual Panhellenic Conference on Informatics in October 2014 (PCI 2014)
- IEEE Research Challenges in Information Science in May 2015 (RCIS 2015)
- 13th International Conference on Economics of Grids, Cloud, Systems and Services (GECON 2016)
- 14th International Conference on Open Source Systems (OSS 2018)
- 11th International Conference on Random Generation of Combinatorial Structures (GASCom 2018)



Relations with the job market and society

- Incorporation of internships.
- Participation in the Greek Free & Open Source Software Society (GFOSS).
- Undertaking projects for training and educational actions in collaboration with other Universities (University of Athens, Aristotle University of Thessaloniki, University of Peloponnese) and non-profit organizations (GFOSS).

A successful organization, in collaboration with the Department's student association, of the annual Free and Open Source Software Communities Meeting (FOSSCOMM) in April 2013 and November 2017, each with over 600 participants.

- Recognition of students, both undergraduate and postgraduate, in technology and entrepreneurship competitions at national and European levels.
- Enhancement of the Department's position in the job market through the organization of established entrepreneurial conferences (ICT Forum) and workshops/seminars in the field of Computer Science and Telecommunications.



Study programs

Ensuring the delivery of top-tier education is a foremost commitment of the Department, encompassing both undergraduate and postgraduate levels. This commitment involves an integration of scientific principles and theories with a keen awareness of market and societal needs.

Our meticulously crafted curricula adhere to the esteemed standards set forth by international bodies such as the Association for Computing Machinery (ACM) and the Institute for Electrical and Electronic Engineers (IEEE). These curricula aim to foster daily engagement within the Department's Laboratories, encouraging students to be a consistent presence within the academic community. Additionally, a strong emphasis is placed on fostering connections with the labor market, providing internship support for students who opt for this valuable experience.

Since its inception, the Department has championed the European Credit Transfer and Accumulation System (ECTS) for its study programs. This commitment is evident in the determination of ECTS credits and the issuance of diploma supplements in both Greek and English.

Our educational approach leverages modern pedagogical techniques, including the integration of theory with hands-on laboratory exercises, collaborative group work, and the analysis of real-world case studies. Through this multifaceted approach, we strive to equip our students with not only theoretical knowledge but also practical skills, ensuring their preparedness for the dynamic challenges of their chosen fields.

Scholarships/Awards

The State Scholarship Foundation annually bestows performance scholarships, grants, and loans upon students who have demonstrated excellence in entrance and semester exams at the A.E.I. The Department's Secretariat releases an announcement listing scholarship and award recipients, accompanied by a reasonable deadline for students to submit supporting documents. These scholarships aim to spotlight exceptional cases of effort, moral character, and academic performance, providing financial support to students who excel amid challenging circumstances.







Harokopio University hosts the "Spyros Harokopou and Evan Petroutsi" Foundation, which awards postgraduate study scholarships based on academic performance, family and social context, and individual or family income. Each academic year, the Foundation discloses the number and duration of scholarships, along with the application process details, in October. This initiative seeks to assist graduates of Harokopio University in pursuing further studies.






To honor the late Professor Georgios Karabatzos, the Department of Informatics and Telematics instituted the "G. Karabatzos" financial Performance Scholarship. Awarded to three students per Master's Program direction, this scholarship fully refunds tuition fees for the top-performing first-grader in each direction and partially for the second and third-performers (totaling 9 scholarships). Payments are disbursed at the end of each semester based on students' academic performance.



Additional funding sources for awards and scholarships may include donations, sponsorships, University endowments, and proceeds from cultural and sporting events organized by the Foundation. The Liaison Office provides information regarding these awards and scholarships.

Faculty members

	<p>Dimosthenis Anagnostopoulos is a Professor in the Department of Informatics and Telematics of Harokopio University in the field of Information Systems and Simulation. He was Rector of Harokopio University for a four-year term (9/2011 to 1/2016) and Dean of the School of Digital Technology. He has been Elected President of the Committee of Rectors of Greek Universities (1/2014 to 6/2014). He is Visiting Professor at the Universities of Sussex, UK and Manchester, UK. He is a Graduate and Doctor of the Department of Informatics and Telecommunications of the University of Athens. He was the EU National Representative for ICT in Horizon 2020 (2014 to 2015). He was General Secretary of Information Systems of the Ministry of Economy and Finance (2004 to 2009). Between 2019 and 2023, he served as General Secretary of Public Administration Information Systems of the Ministry of Digital Governance, contributing to the rapid development of the digital transformation of our country in recent years.</p>
	<p>Mara Nikolaidou is a Professor in the Department of Informatics and Telematics at Harokopio University of Athens, since 2007. Prior to her appointment she worked as a computer engineer in the private sector and as IT consultant for the government. She currently serves as the Rector of the University (since 2016). She is appointed as the representative of Greek Universities in the European University Association (EUA) for 2023-2024. Her research focuses on distributed systems and complex system design. Over the last years she actively participated in numerous research projects funded by national, European and international agencies on system engineering, the Internet of Things, Cloud and Edge computing, Cyber-physical Systems and Smart Cities, emphasizing human-in-the-loop and autonomous systems. Recently, she explores responsible computing and ethical requirements in system design. She has published more than 200 papers in international journals and conferences and actively participates in the organization of international conferences in the area of software and systems engineering. She is a member of IEEE (SMC society) and Systems Council. She also participates in OMG, in the working groups for SysML and responsible computing (https://mara.dit.people.hua.gr/)</p>
	<p>Malvina Vamvakari is a Professor in the area of Probability-Combinatorics-Statistics and Applications at the Department of Informatics and Telematics of Harokopio University. She graduated from the Department of Mathematics of the National Kapodistrian University of Athens in 1991 and was awarded a PhD degree by the same Department in 1997. She had been a postdoctoral fellow at the Computer Engineering Department of the University of Patras and a researcher at the Institute of Computer Technology of Patras. Her research interests include asymptotic combinatorial enumeration, discrete probability distributions, stochastic analysis, random graphs, and statistical data analysis.</p>
	<p>Thomas Kamalakis (https://thkam.dit.people.hua.gr/) was born in Athens in 1975. He obtained his BSc in Informatics and MSc in Telecommunication with distinction, from the University of Athens in 1997 and 1999 respectively. In 2004 he completed his PhD thesis in the design and modelling of Arrayed Waveguide Grating devices. He was a research associate for the Optical Communications Laboratory of the University of Athens from 2004 to 2007 and an adjunct lecturer in Electronics for the University of Peloponnese at the same period. In 2008 he joined the Department of Informatics and Telematics at Harokopio University of Athens where he is currently a full professor and Dean of the School of Digital Technology. He has over 100 publications in peer reviewed journal and international conferences. His research interests include integrated optics, nanophotonics, optical detection, free space optics and system technoeconomics.</p>
	<p>Iraklis Varlamis is a Professor at the Department of Informatics and Telematics at Harokopio University, specializing in Data Management. He holds a doctoral degree in Computer Science from the Athens University of Economics and Business, having previously completed his Master's in Information Systems Engineering at UMIST in the UK. His research focuses on knowledge discovery from the web, behavior analysis in social networks and journalism, as well as the creation and management of business knowledge. He has published 3 books and 1 edited book, and over 200 articles in international journals and conferences. He has participated</p>

	<p>in numerous national, European, and international research projects as Scientific Coordinator. For more information, visit https://varlamis.dit.people.hua.gr/.</p>
	<p>Chryssa Sofianopoulou is Associate Professor at Harokopio University of Athens, Dept of Informatics and Telematics. She holds a bachelor's degree in Mathematics and a PhD in Education Sciences from the University of Athens. Her area of expertise is "Analysis of Educational Performance and Computer Training". She is visiting professor at the University of Cergy-Pontoise in Paris and at the University of Mons in Belgium. She is National Project Manager and member of Governing Board of the OECD PISA Program, member of the Governing Board of the Institute of Educational Policy and EU National Expert. She has been adviser to the French Minister of National Education on issues related to educational performance. Her research focuses on socio-economic factors and geographical characteristics related to educational performance, social inequality in the educational system, and the use of ICT to improve the quality of learning.</p>
	<p>Georgios Dimitrakopoulos is an Associate Professor at the Department of Informatics and Telematics of the School of Digital Technology of Harokopio University since 2010. He holds a degree in Electrical and Computer Engineering from the National Technical University of Athens (2002) and a PhD from the University of Piraeus (2007). He actively participates, for more than 20 years, in research and development programs in the field of electronic communications and IT, funded mainly by the European Union (Horizon 2020, ECSEL, KDT, Horizon Europe). In the past he has worked as a General Manager in a construction company and as a researcher-engineer in the field of Information and Communication Technologies (ICT). In addition, he has developed activity in start-ups, in Greece and the USA. His research interests focus on the design and development of communication network optimization algorithms, with an emphasis on cognitive networks, intelligent transportation systems, and automated driving. He is the author of three books and more than 200 scientific articles in international scientific journals and conferences. He is among the top 2% of scientists worldwide, according to the annual rankings of Stanford University.</p>
	<p>Dimitrios Michael is Associate Professor of the Department of Informatics and Telematics of Harokopio University. He obtained the Diploma in Electronic Engineering and Computer Engineering from the Technical University of Crete. He then obtained an MSc in Computer Science and a PhD in Algorithms from the Max-Planck Institute for Informatics in Germany. He has been a postdoctoral fellow at the Max-Planck Institute for Informatics as well as at the INRIA Institute in Sophia-Antipolis, France. His research interests revolve around the development of algorithms in modern computational models. It typically deals with topics such as graph algorithm development, knowledge mining with an emphasis on graphs, and machine learning. He has recently developed an activity in topics related to the use of machine learning in computer vision problems in the field of remote sensing. He has participated as a researcher in numerous European research and development programs (TELEIOS, Fortissimo, AfarCloud, TEACHING, and DeepCube).</p>
	<p>Christos Michalakelis, PhD is an Associate Professor at the Department of Informatics and Telematics, Harokopio University of Athens. His research interests and field of expertise focus on technoeconomics engineering, costing, pricing and brokering services in the area of ICT, mainly cloud computing and the Internet of Things (IoT). He has worked for many years with the Greek Ministry of Education, as an IT manager. He has participated into a number of projects regarding the design and implementation of database systems, as well as in several technoeconomic and socioeconomic activities for telecommunications, networks and services. He has published more than 100 papers to international journals and conferences. He is the Director of the Postgraduate program "Applied Informatics" (https://applied.dit.hua.gr/) a conversion course (Master's degree) in Computer Science for scientists that don't have a background in information technology. He is the President of "Study in Greece" (http://www.studyingreece.edu.gr), the National Agency of Greece (Hellas), for the internationalization of the Greek Universities.</p>

	<p>Konstantinos Tserpes is an Associate Professor at the Department of Informatics and Telematics of Harokopio University since 2021. He graduated in 2003 from the Department of Computer Engineering and Informatics, while in 2007 he successfully defended his doctoral thesis at the School of Electrical and Computer Engineering of NTUA. His research interests revolve around modern computing infrastructures and distributed systems for novel data analysis and management applications. He has participated in more than 10 collaborative research projects in these fields while he has coordinated another 4 (+Spaces, SocIoS, Consensus, BASMATI) and is principal investigator for another 6 (TEACHING, ACCORDION, COLLABS, CHARITY, MASTER and SmartShip). He participates in these projects as a software architecture manager and coordinator of the project's software development team.</p>
	<p>Panagiotis Rizomiliotis is an Associate Professor at the Department of Informatics and Telematics of Harokopio University, specializing in Information Systems Security and Cryptography. He holds a bachelor's degree in Informatics, a master's degree in Electronics and Radioelectronics and a PhD in Cryptography from the Department of Informatics and Telecommunications of the National Kapodistrian University of Athens. From 2012 to 2018 he served as a member of the plenary of the Hellenic Authority for Communication Security and Privacy, while in parallel he was an assistant professor of the Department of Information and Communication Systems of the University of the Aegean. From 2005 to 2007 he worked as a researcher at the security and cryptography laboratory COSIC of the Katholieke Universiteit Leuven in Belgium with a Marie Curie fellowship of the European Commission. For the last 3 years he has been an external expert of the European Union Agency for Cybersecurity (ENISA). He has participated in numerous national and European research projects on system security and privacy protection, either as a technical manager or as a researcher, and has offered consulting services to public organizations on security issues. He has published more than 60 articles in scientific journals and conferences, related to the security of information systems and cryptography.</p>
	<p>George Kousiouris is an Assistant Professor at the Department of Informatics and Telematics of the Harokopio University of Athens. He received his Dipl. Eng. in Electrical and Computer Engineering from the University of Patras, Greece in 2005 and his Ph.D. in Cloud Computing at the Telecommunications Laboratory of the Dept. of Electrical and Computer Engineering of the National Technical University of Athens in 2012. He has participated in numerous EU funded projects such as H2020 PHYSICS, H2020 BigDataStack, H2020 CloudPerfect (as lead architect and technical coordinator), H2020 SLALOM, FP7 COSMOS (as lead architect and technical coordinator), FP7 ARTIST (as WP leader), FP7 OPTIMIS (as WP leader), FP7 IRMOS and national projects. He has published over 70 publications on topics including Cloud platforms and architectures, Cloud services evaluation and benchmarking, Cloud applications design, Service Level Agreements, IoT platforms, Performance engineering and estimation.</p>
	<p>Teta Stamati is an Associate Professor specializing in "Information Systems Management and Electronic Governance" in the Department of Informatics and Telecommunications at Harokopio University. She holds a Ph.D. from the Department of Informatics and Telecommunications at the National and Kapodistrian University of Athens, with her doctoral thesis focusing on the "Development of a Model for the Transformation and Adoption of Electronic Governance." She also holds an MPhil from the Computation Department at UMIST, UK, and an MBA from the Management School at Lancaster University. With a research focus on technology management, digital transformation, electronic governance, and cutting-edge innovative technologies, Teta Stamati has authored over 70 articles, with more than 30 published in international journals, gaining significant recognition and impact.</p>
	<p>Cleopatra Bardaki is an Assistant Professor of Pervasive Information Systems and Supply Chain Management at Dep. of Informatics and Telematics of Harokopio University of Athens (HUA). Dr Bardaki also leads the Technology Transfer Office of HUA. She holds a PhD in Information Systems (IS) enabled by Internet-of-Thing (IoT) in the Supply Chain from Athens University of Economics and Business (AUEB), an MSc in IS from AUEB and a BSc (with honors) in Informatics and Telecommunications from University of Athens. Her research interests include Design & Evaluation of Information Systems, IoT-enabled Digital Transformation, Supply Chain Management, Data analytics for Decision Making, Information Quality of IS; and Business Process</p>

	<p>Management and Transformation. Previously, she was a Research Coordinator and Senior Researcher at ELTRUN E-business Research Center of AUEB and she has long experience in the research coordination and project management of leading-edge research and development projects funded mostly by the EU. Dr Bardaki has published over sixty papers in peer-reviewed academic journals, proceedings of international academic conferences and edited books. She has also edited (in Greek) a volume titled “Στρατηγική και Διακυβέρνηση για την Επόμενη Ημέρα (Strategy and Governance for the Next Day”-Γ. Δουκίδης και Κ. Μπαρδάκη, Εκδόσεις Σιδέρης, 2021, proposing strategies for organizations and the government to overcome the challenges that the pandemic has caused.</p>
	<p>Christos Diou is an Assistant Professor of Artificial Intelligence and Machine Learning at the Department of Informatics and Telematics, Harokopio University of Athens. He received his Diploma in Electrical and Computer Engineering and his PhD in Analysis of Multimedia with Machine Learning from the Aristotle University of Thessaloniki. He has over 80 publications in international scientific journals and conferences in the areas of Artificial Intelligence and Machine Learning. His recent research interests include the development of robust machine learning algorithms that generalize well, the modeling of uncertainty in machine learning, as well as the development of machine learning models that estimate causal effects from observational data. He has more than 15 years of participation in European and national research projects, while he is the Principal Investigator of projects REBECCA and RELEVIMUM which develop applications of artificial intelligence in healthcare.</p>
	<p>Georgios Th. Papadopoulos is an Assistant Professor at the Department of Informatics and Telematics of Harokopio University of Athens. He received his Electrical Engineering Diploma and PhD degree from the Department of Electrical and Computer Engineering of the Aristotle University of Thessaloniki (AUTH) in 2005 and 2011, respectively. He has been a Postdoctoral Researcher at the Centre for Research and Technology Hellas (CERTH) and the Foundation for Research and Technology Hellas (FORTH). He has published over 50 articles in peer-reviewed international journals and conferences. He has participated in many European Union-funded research projects, such as aceMedia, K-Space, MESH, Vidi-video, GLOCAL, CEEDs, REVERIE, RePlay, LASIE (deputy Technical Coordinator), DANTE (Technical Coordinator), ANITA (Technical Coordinator) and HR - Recycler (deputy Coordinator). He is the Technical Coordinator of the European Anti-FinTer and Ceasefire projects. His research interests include computer vision, pattern recognition, machine/deep learning, image and video processing, human-computer interaction, and explainable artificial intelligence.</p>
	<p>Angelos Charalambidis received his B.S. degree in Informatics and M.S. degree in Computer Systems from the University of Athens in 2005 and 2008 respectively. In 2014 he completed his Ph.D. thesis on the proof procedures of higher-order logic programming. He was a postgraduate researcher in the Institute of Informatics and Telecommunications of the NCSR Demokritos. In 2020, he was a visiting professor at Jefferson University. In 2022, he joined the Department of Informatics and Telematics at Harokopio University where he is currently assistant professor. His research interests include declarative programming languages, computational logic and reasoning.</p>
	<p>Vasilis Efthymiou is an Assistant Professor at the Department of Informatics and Telematics of Harokopio University of Athens (HUA), Greece. He received his Diploma in computer science in 2010, his master's degree in Information Systems and in Bioinformatics in 2012, and his PhD on the topic of entity resolution in the Web of data in 2017, from the Computer Science Department of University of Crete (UOC). Before joining HUA, he was a postdoctoral researcher at the Information Systems Laboratory of FORTH-ICS, a visiting instructor at UOC, and a postdoctoral researcher at the database group of IBM Research in Almaden Research Center, CA, USA. After his PhD research internship at IBM T.J. Watson Research Center, NY, USA, on matching Web tables to Knowledge Graphs (KGs), he has been co-organizing the SemTab challenges at ISWC, an effort to benchmark systems dealing with the tabular data to KG matching problem, and the TaDA workshop at VLDB. He has co-authored two books, more than 60 papers, and co-invented four US patents.</p>



Eirini Liotou (<https://eliotou.dit.people.hua.gr/>) is an Assistant Professor at the Department of Informatics and Telematics, Harokopio University of Athens. She holds a PhD degree from the Department of Informatics and Telecommunications at the National and Kapodistrian University of Athens (2017). She obtained the MSc in Informatics and Telecommunications from the National and Kapodistrian University of Athens (2011) and the MSc in Communications and Signal Processing from the Imperial College of London (2012). She received the Diploma in Electrical and Computer Engineering from the National Technical University of Athens in 2006. She has worked as a Software Engineer at Siemens AG and as a Senior Software Engineer at Siemens Enterprise Communications in the R&D department (2007-2011). Between 2017 and 2021, she worked as a Post-Doc researcher in the Communication Networks Laboratory of the Department of Informatics and Telecommunications at the National and Kapodistrian University of Athens. Between 2021 and 2023, she has been working as a Project Manager / Senior Researcher for EU Research Projects at the Institute of Communications and Computer Systems (ICCS), serving as Deputy Project Coordinator of EU projects. She has participated in more than 20 European and national projects as well as COST actions. Her research interests include: Software-Defined Networking (SDN), Networks Functions Virtualization (NFV), Quality of Experience (QoE) and Cooperative, Connected and Automated Mobility (CCAM).





Georgia Dede is Assistant Professor at the Department of Informatics and Telematics of the School of Digital Technology of Harokopio University in the area of Evaluation of Systems and Electronic Services. She holds a PhD in Decision Making and Uncertainty Modeling for the Development of Roadmap for Future Home Networks from the Department of Informatics and Telecommunications of the University of Athens (2015). She holds an MSc in Management and Economics of Telecommunication Networks from the Departments of Informatics and Telecommunications and Economic Sciences of the University of Athens (2007). She also holds a degree (BSc) in Informatics and Telecommunications from the Department of Informatics and Telecommunications of the University of Athens (2005). Dr. Georgia Dede manages and participates in research and development programs funded by the European Union (Horizon Europe, Digital Europe). She has worked as Senior Information Security Consultant and Manager in the cybersecurity at Netcompany Intrasoft as well as at the European Agency for Cybersecurity (ENISA). In the past she has also worked as research associate at the Universities of Athens and Patras participating in EU and national projects. She has published papers in scientific journals, books and conferences, and is also a reviewer in scientific journals.

Assisting Staff members








Alexandra-Anna Gasparinatou is a member of Teaching Laboratory Staff at the Department of Informatics & Telematics of Harokopio University. She holds a Ph.D. from the department of Informatics and Telecommunication, of the National and Kapodistrian University of Athens, in the field of "Educational Technology - didactic of Informatics" with an emphasis on "Adaptive Online Educational Learning Environments for Distance Education". She received the B.Sc. degree in Physics from the University of Patras. She holds an MSc in "Medical Physics", an MSc in "Computational Mathematics and Informatics, of the University of Patras and an MEd in "Educational Sciences" from the Hellenic Open University. In addition, she has successfully completed four thematic modules in "Information Systems" of the Hellenic Open University. Over the last years, she worked in Secondary Education as a School Advisor and as an Educator in Informatics. Since 2013, she has been collaborating with the Hellenic Open University as an Associate Teaching Staff Member. At the same time, she has supervised undergraduate and postgraduate diploma theses. She has published over 30 papers in international journals and conferences. She also participates as a trainer in training programs. Her current research interests mainly include the utilization of Media in Distance Education and especially Adaptive Online Learning Environments, Informatics Text Comprehension, Learning Styles.

	<p>Anargyros Tsadimas (https://tsadimas.github.io/) was joined Harokopio University as a research associate in 2004. He holds a PhD in the area of Information Systems with a focus on Model-based design of Enterprise Information Systems using SysML, from the school of Digital Technology of Harokopio University. His current position is Teaching Laboratory Staff at the Department of Informatics & Telematics of Harokopio University. He obtained his Bsc in Applied Informatics from the University of Macedonia in 2002, and his MSc in Advanced Information Systems from the Department of Informatics & Telecommunications of the National and Kapodistrian University of Athens in 2005. His research interests lie in the areas of Modeling & Simulation of Systems, Distributed Systems and Enterprise Information Systems Engineering. He has 25 publications in international conference proceedings and Journals. He has participated in R&D projects founded by the European Union and the Greek State. Moreover, he has working experience in startups as Software Engineer, DevOps, and Technology Advisor.</p>
	<p>Vassilis Dalakas is a distinguished professional in the realm of Information and Communication Technology (ICT), boasting an impressive academic background and over two decades of expertise in IT service management. Holding a Degree in Physics, an M.Sc. Degree in Digital Signal Processing, and a Ph.D. with a specialization in Digital Communications, all from the National Kapodistrian University of Athens (NKUA), Greece, Dr. Dalakas has been a stalwart contributor to the field. Currently serving as a consultant seconded to the Secretary General of Information Systems and Digital Governance in the Ministry of Digital Governance of Greece, he plays a pivotal role in advising on matters such as data centers, cybersecurity, cloud computing, AI, and the procurement of IT systems and software. Simultaneously, he holds a position as laboratory teaching staff in the Department of Informatics and Telematics at Harokopio University of Athens (HUA).</p>

Department Secretariat

The staff of the Secretariat consists of high-level executives with postgraduate studies and excellent training.

	<p>Angeliki Niki Presvelou is the Deputy Head of the Secretariat at the Department of Informatics and Telematics of the School of Digital Technology of Harokopio University from 2022. She holds a PhD from the Department of Sociology of the Panteion University of Social and Political Sciences on the subject "Social and demographic changes: health structures, morbidity and mortality in Argolis in the 19th century. The case of the municipal hospital of Nafplio, 1837-1861". She holds a Master's Degree (D.E.A.) in Demography from Paris I-Pantheon-Sorbonne, UFR d'Histoire. She received her Undergraduate Diploma from the Department of Sociology of the Panteion University of Social and Political Sciences. She has worked in administrative positions of responsibility in both the public and private sectors. Her scientific interests are in the field of Historical Demography, History of Health and digitization of Historical Demographic Data.</p>
	<p>Foteini Daneli is a member of Special Technical Laboratory Staff (ETEP) at the Department of Informatics and Telematics of the School of Digital Technology of Harokopio University of Athens, since 2019. She holds a Bachelor's degree in Geography (2006) and a Master's degree in Applied Geography and Spatial Planning / Spatial Policies and Development in Europe (2009), both from the Department of Geography at Harokopio University of Athens. From 2007 to 2019, she contributed to Harokopio University by supporting administrative, financial and technical processes of the Department of Informatics and Telematics. She actively participated in various activities, EU and national projects. Additionally, she has professional experience in spatial analysis and real estate matters within the private sector. Her interests include topics related to urban development, spatial planning, applications of Geographic Information Systems (GIS) and smart cities.</p>

	<p>Eleni Kalampaliki is a member of Special Technical Laboratory Staff (ETEP) at the Department of Informatics and Telematics of the School of Digital Technology of Harokopio University of Athens. She holds a Bachelor's Degree in Home Economics and Ecology (2006) and a Master's Degree in Education and Culture both from the Department of Home Economics and Ecology at Harokopio University of Athens. From 2006 to 2023, she contributed to Harokopio University by supporting mostly administrative and technical processes of the Department of Informatics and Telematics. She actively participated in various activities, EU and national projects.</p>
	<p>Foteini - Maria Mine works at the Secretariat of the Department of Informatics and Telematics, School of Digital Technology of Harokopio University since 2022. She holds a bachelor degree in International and European Studies and a master's degree in Maritime Studies of the University of Piraeus. In the past, she has worked in various administrative positions of responsibility both in the private and public sectors.</p>
	<p>Nikolaos Sfakianos is a Sociologist, a graduate of Panteion University since 2014. He received two Master's degrees, from the same University, in Sociology and Social Psychology in 2006 and 2020 respectively. From 2021, he is working on his PhD thesis entitled: "Social Comparison in General Use Social Networking Media: Masculinity - Femininity Standards and Influence on the User's Self-Esteem". Subsequently, he has worked in the private sector as a business consultant, participating as an external collaborator in research projects since 2019, while his interests are focused on social research methods, social representations of Social Media and the sociology of emotions. From 2022, he works at Harokopion University in supporting activities related to quality management and evaluation of the Postgraduate Programs of the Department of Informatics and Telematics.</p>

Operating Hours

The Secretariat serves students, staff and the public on working days between 10:00 and 14:00. It also serves postgraduate students from Monday to Thursday and in the afternoons from 15:00 to 18:00.

International Advisory Board

The Department has set up an International Advisory Committee made up of distinguished academics in the field of Informatics and Telematics. It is made up of internationally distinguished foreign academics in the field of Informatics and Telematics. Its role is multifaceted, aiming to ensure the best quality in:

- academic curriculum development, and
- in participating in high-level research actions

The Committee acts supportively in the organizational and academic development of the Department, and strengthens its international collaborations with the aim of developing synergies.

Contact

Address: 9 Omirou Street, Tavros, 17778 (2nd floor)

Tel.: +30 210 9549400, +30 210 9549402

Email: itpsec@hua.gr

Access



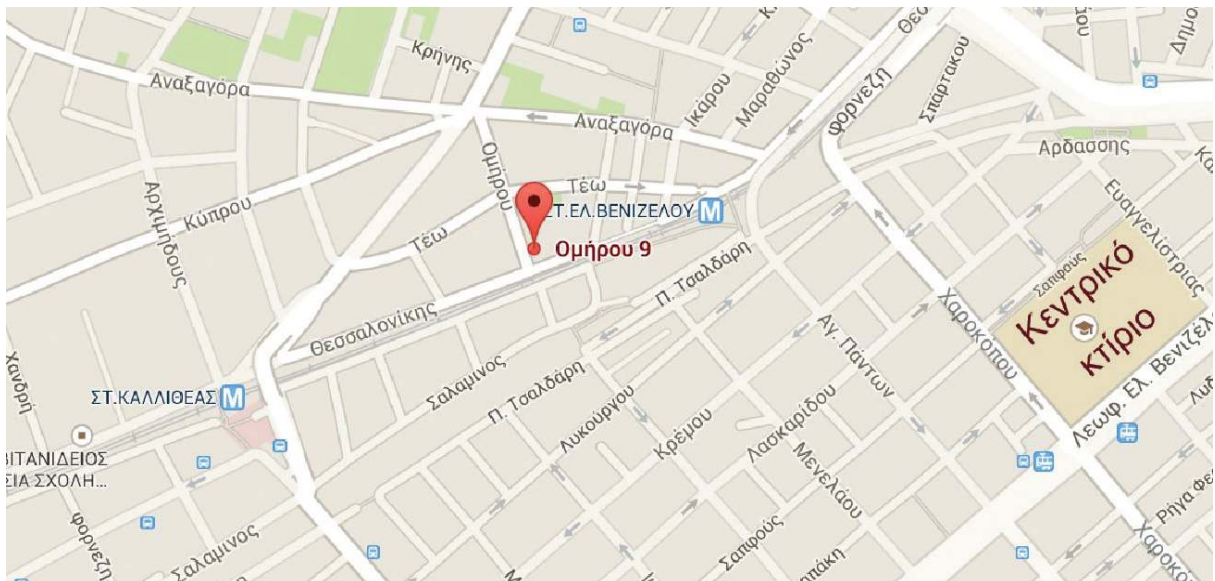
The Department is housed in the newly built University building at 9 Omirou Street, in Tavros. The building is located at a distance of 800 meters from the main complex of Harokopio University on El. Venizelou 70, in Kallithea.

Buses - Transportation

Access to the IT and Telematics Department is done in the following ways:

- ISAP (Line 1 – Electric). Eleftherios Venizelos Station (Tauros). From there, walking for about 3 minutes next to the electric lines, in the direction of Piraeus, you reach Omirou Street. The building is on your right.
- ILPAP (Trolley), Line 3 or 5. OSY (City Bus), Line 040. Stop outside the central Harokopio (El. Venizelou). From there, following Harokopou Street and then crossing the ISAP station of Tavros, you will reach the Department of Informatics and Telematics by walking for about 10 minutes.

Map



Teaching

Studies - Teaching

The duration of study in the postgraduate study program, to obtain the degree, is two (2) semesters of study and is organized as follows:

Organization of the Academic Year

The start and end of the academic year, scheduling of semesters and examination periods, the number of planned lectures, and holidays are determined in the institution's study regulations and announced on the program's website (<https://mphil.dit.hua.gr>).

The academic year kicks off on September 1 and concludes on August 31 of the subsequent calendar year. The September repeat examination period is designated for the preceding academic year. Each academic year is divided into two (2) semesters: winter and spring. The winter semester spans from September 1 of each year to February of the following year, while the spring semester commences immediately after the winter semester's conclusion and wraps up in the first half of July. Each semester encompasses a minimum of thirteen (13) full weeks of instructional sessions.

During the winter semester, classes and exams do not take place on October 28th, November 17th, during the Christmas holidays from December 24th to January 6th, and on January 30th. In the spring semester, no classes or exams are held on Ash Monday, March 25th, during the Easter holidays spanning Holy Monday to St. Thomas, on May Day, and on Holy Spirit Sunday. Additionally, both classes and exams are suspended on the days of Rector's and Student elections.

Examination periods

The time and location of examination activities are determined by the institution's study regulations. At the discretion of course instructors, assessment may be based on alternative assignments that should correspond to the appropriate workload, in accordance with the ECTS descriptions of the course.

Integration of ICT in the Educational Process - e-Class Platform

Information and Communication Technologies (ICT) play a pivotal role in the delivery and facilitation of courses, employing various tools to enhance the educational experience:

- Electronic Notes:
 - Course materials, including slides and supplementary resources, are accessible on the e-class platform.
- Teaching Methods:
 - Leveraging the e-class electronic distance learning platform.
 - Utilizing electronic presentations for material dissemination and task management.
 - Engaging in electronic communication with students through platforms such as student telson, email, and announcements.
- Laboratory Education:
 - Direct integration of ICT into laboratory education, with IT courses relying on computer-based labs.
 - Support for diverse application development environments tailored to the requirements of each course.

- Assessment Strategies:
 - Employing ICT in student assessment, primarily through the e-class electronic platform.
 - Managing assignments, submission, and result announcements through the e-class platform.
 - Conducting laboratory examinations for exercises directly in electronic environments for select courses.
- Communication Channels:
 - Facilitating communication between students and instructors through the e-class electronic platform for student management, discussions, and general communication.
 - Utilizing electronic mail (e-mail) for direct communication.
 - Posting announcements electronically.
 - Fostering student interaction through electronic forums.

This comprehensive integration of ICT not only enriches the educational process but also streamlines communication, collaboration, and assessment, creating a dynamic and technology-driven learning environment.

Distance Learning Facility

Our university boasts a meticulously organized and well-supported distance learning room, efficiently managed by the technical services of the institution. This facility is instrumental in fostering connections between our department and corresponding departments both within Greece and abroad. Its primary purpose is to enhance communication, facilitating collaboration, and furthering the educational and research objectives of our esteemed faculty members. The availability and utilization of this resource exemplify our commitment to advancing the reach and impact of our academic pursuits.

Building and Laboratory Facilities



In June 2013, the construction and equipment of the new 6-storey University building, originally designed to house the new Department, was completed and the Department was relocated to it, along with the renewal of the laboratory and central computing and network equipment. With the help of the Informatics and Networks Center, a proprietary optical fiber network has been installed and is operating, which connects the Department building on Omirou Street with the central complex of the University. The optical fiber network allows uninterrupted access to the internet while saving resources since no telecommunication fees are paid to telecommunication providers.

The Department has all the necessary classrooms and laboratory infrastructure to support the main teaching work:

Rooms:

- Auditorium with a capacity of 120 people, equipped with multimedia equipment.
- Three (3) Rooms with a capacity of more than 30 people which have: projection system, camera and microphone

Laboratories:

- 2 PC labs/Linux, features: 35 jobs /laboratory, Heavy-duty printer, Interactive Whiteboard.

Erasmus Student Exchange Program at the Department of Informatics and Telematics

The Department has forged a robust network of collaborations with esteemed International Universities and Research Centers, underscoring its commitment to academic excellence. Embracing the Erasmus+ program, the Department endeavors to enrich the mobility of students, faculty, and administrative staff by fostering connections with partner institutions across Europe.

To facilitate this, the Department actively engages in establishing bilateral Erasmus+ agreements with European Universities, spanning all academic levels—undergraduate, postgraduate, and doctoral studies. These agreements not only support the exchange of teaching staff but also encourage the mobility of administrative staff for specialized training.

Pioneering a proactive approach, the Department consistently explores new partnerships to create fresh opportunities for its students. Within the framework of these agreements, provisions are made for reciprocal student exchanges with European institutions, while faculty and administrative staff visits are facilitated for teaching and practical training, respectively.

Participating students in the Erasmus program enjoy full recognition of their successfully completed coursework at partner institutions, with the ability to transfer these credits back to their home institution based on pre-agreed terms with the department head Erasmus coordinator. This ensures a seamless transition upon completion of their study program, mitigating any loss of time or credits.

The Department places a strong emphasis on supporting two-way mobility—both to and from Harokopion University. This commitment is evident in the initiatives undertaken, such as inviting lecturers at both undergraduate and postgraduate levels and creating conducive conditions for incoming students to attend offered courses.

Expanding its horizons beyond Europe, the Department actively participates in the Erasmus Mundus program, aiming to fortify the mobility of researchers to and from international universities outside Europe. The ERASMUS Office, under the Department of International & Public Relations, plays a pivotal role in facilitating the conclusion and operation of agreements, thereby strengthening Harokopio University's external relations and internationalization efforts. This collaborative approach fosters robust academic partnerships, primarily within the European Higher Education Area and beyond, contributing to the university's global presence and academic excellence.

Erasmus+ Cooperations

So far the department has bilateral agreements with the following institutes:

- Freie Universität Berlin, Germany (D BERLIN01): Department of Mathematics and Computer Science, Info for international studies
- Bordeaux Institute of Technology, France (F BORDEAU 54): Graduate School of Engineering in Electronics, Computer Sciences, Telecommunications, Mathematics and Mechanics, Courses Syllabus
- Université des Sciences & Technologies de Lille (F LILLE01): UFR IEEA - Informatique, Electronique, Electrotechnique et Automatique. FIL - Formations en Informatique de Lille1

- University of Granada (E GRANADA01): ETSIT – Escuela Técnica Superior de Ingenieras, Informática y de Telecomunicación και Escuela Internacional de Posgrado - International School of for Post-Graduate Studies.
- University of Malaga (E MALAGA01): ETSII - Escuela Técnica Superior de Ingeniería Informática (Undergraduate & Postgraduate level)
- AGH University of Science and Technology, Krakow (PL KRAKOW02): Faculty of Computer Science, Electronics and Telecommunications και International Courses Program
- European University of Cyprus, Nicosia. (CY NICOSIA24): Department of Computer Science and Engineering
- University of Cyprus (CY NICOSIA01): Department of Computer Science
- Universidad Politécnica de Madrid (E MADRID05): ETSIINF (Escuela Técnica Superior de Ingenieros Informáticos)
- University of Cagliari (I CAGLIAR01): Dipartimento di Ingegneria Elettrica ed Elettronica

Promoting Extroversion

The Department is committed to fostering extroversion through targeted initiatives aimed at enhancing its societal impact and promoting internationalization. Several measures are in place to achieve this, including:

- Digital Presence:
 - Maintaining official department pages on popular social networks such as Facebook and LinkedIn to actively engage with the community.
 - Curating a department YouTube channel featuring a wealth of video lectures from both undergraduate and postgraduate courses.
 - Offering courses on the OpenCourses platform and providing comprehensive information on the department's official website.
- Educational Outreach:
 - Organizing school visits, often in collaboration with the institution's liaison office, to showcase the department's facilities and introduce students to cutting-edge technologies. This initiative aims to attract talented individuals through national exams.
- Industry Interaction:
 - Arranging events and speeches that feature speakers from the IT industry and companies, both within Greece and internationally. These engagements provide valuable insights and networking opportunities for students.
- Competitions and Hackathons:
 - Encouraging student participation in code competitions, such as hackathons. Notable examples include the EUvsVirus hackathon in 2020, AffectUs hackathon in 2018, and PHYSICS hackathon in 2023.
- Student Groups and Development Clubs:
 - Actively supporting the creation of student groups, exemplified by initiatives like the Harokopio Google Student Developer Club.
 - Encouraging student involvement in activities such as the Google Summer of Code in 2022 and 2023.

These strategic measures collectively contribute to the department's dynamic engagement with society, nurturing a culture of innovation, collaboration, and continuous learning. By participating in diverse events, competitions, and

outreach programs, the department not only enriches the student experience but also establishes itself as a vibrant hub within the broader academic and professional communities.

Outreach

The department implements specific outreach measures aimed at increasing its penetration into society while simultaneously targeting internationalization. Specifically, this includes the official pages of the department on social networks like Facebook and LinkedIn, the department's channel on YouTube containing various video lectures from undergraduate and postgraduate courses, and the courses offered through the [opencourses.gr](https://www.opencourses.gr) platform, and the department's website. Occasionally, through the institution's liaison office, the department organizes school visits to its facilities, aiming to familiarize students with new technologies and attract prospective students through national examinations. Simultaneously, it arranges events and talks inviting speakers from the IT industry in Greece and internationally. Additionally, the department organizes student groups to participate in coding competitions (hackathons) such as the EUvsVirus hackathon 2020, conducting similar events within the framework of research programs (e.g., AffectUs hackathon 2018, PHYSICS hackathon 2023). Similarly, it encourages the creation of student groups (Harokopio Google Student Developer Club) and their participation in relevant activities (Google Summer of Code 2022, 2023).

Department's Social Networks

The Department has a significant presence on social networks through its official pages, which are as follows:



<https://www.facebook.com/ditharokopio/>



<https://www.linkedin.com/company/77699385>



<https://www.youtube.com/channel/UCEHkYirpXF1nSLxDcRfDZ4A>



<https://www.instagram.com/dithua/>

Post-graduate Program MSc by research

MPhil in Computer Science and Informatics

Focus

The focus of the MPhil is research in Computer Science and Informatics, aiming to specialize postgraduate students in cutting-edge research topics within the School of Digital Technology. It aims to provide high-level knowledge and develop research skills to enhance students' research background in the fundamental subjects taught at the undergraduate level. This program aims to guide them towards research and the job market, equipped with enhanced knowledge and skills in the relevant fields it addresses.

Objectives

The objectives of the MSc program are to foster research and prepare specialized scientists for doctoral studies, train specialized researchers in research methodologies and modern practices, apply these in industrial production and entrepreneurship, advance and improve specialized individual and professional skills in program-related subjects, and connect participants with research within and beyond the institution. Collaboration with national and international Research Centers, Enterprises, State Institutions, and Tertiary Education Institutions dealing with the program's subjects is facilitated. Through a contemporary educational program and utilizing modern synchronous and asynchronous (distance) teaching techniques, the MSc aims to:

- Promote knowledge, foster research, and prepare specialized scientists for doctoral studies at home or abroad.
- Educate specialized researchers in research methodologies, modern practices, and their application in industrial production and entrepreneurship.
- Evolve and enhance specialized individual and professional skills in the program's subjects.
- Connect participants with research both within and outside the institution, in collaboration with other universities, research centers, enterprises, and state institutions on a national and international scale.

Structure and Operation

The MSc program awards a Master's Degree in Research (MPhil) in "Computer Science and Informatics".

The program offers both full-time and part-time attendance options. The timeframe for awarding the Master's Degree is set at three (3) academic semesters. For part-time students, the aforementioned period is doubled, according to the provisions of Article 33, paragraph 2 of Law 4485/2017.

During the first semester, students must select three (3) thematic units from the total of eleven (11) available from the MSc program. The second and third semesters are dedicated to the composition of the dissertation. The selection of three thematic units and the dissertation constitute mandatory activities.

The program's instructors present extensive research, teaching, and academic work relevant to the program's subject matter. They focus on related research areas, engage extensively in research and development projects, participate in research and industrial activities, and collaborate with research bodies, state institutions, and tertiary educational institutions related to the MSc's subjects. They contribute to enhancing the profile of the students. At least sixty percent (60%) of them originate from academic staff (teaching and research staff) of the Department or instructors according to the provisions of Law 407/1980 (A' 112) or Article 19 of Law 1404/1983 (A' 173) or paragraph 7 of Article 29 of Law 4009/2011, and all hold a doctoral degree.

Invited lectures are also given by academic staff from other departments of Greek Universities, recognized visiting researchers, and distinguished members of university faculties and research centers abroad.

The program is designed

- for graduates of Computer Science, Informatics, Computer Engineering, Natural Sciences, and related fields, as well as Technological Institutes of the country or equivalent Departments of similar Institutes abroad in scientific fields relevant to the program's subject matter.

Benefits

The program covers topics related to interdisciplinary research in Computer Science and Informatics, emphasizing cutting-edge research fields associated with Artificial Intelligence and Machine Learning, Data Science, Embedded Systems and Robotics, Systems Security, and Cryptography, among others.

Students in the program will acquire significant knowledge and skills to:

- Conduct high-level research in cutting-edge areas of Computer Science and Informatics, such as artificial intelligence and machine learning, data management and knowledge discovery, modern cloud-native architectures, etc.
- Apply research outcomes by designing and implementing innovative solutions that enhance competitiveness and have a direct impact on society and businesses.
- Holistically manage the design, development, and administration of information systems, focusing on modern aspects like security and privacy, scalability, reliability, transparency, digital equivalents, etc.
- Actively advocate interdisciplinary approaches by practically leveraging their knowledge across different scientific fields like Social Sciences, Humanities, Health Sciences, etc.

By emphasizing the fundamental principles of research within Computer Science and Informatics, the program aims to provide a high level of knowledge on subjects within these fields. Its goal is to strengthen students' research background in the fundamental subjects taught at the undergraduate level in Computer Science and Informatics departments. Ultimately, it aims to guide students primarily toward research and secondarily toward the job market with enhanced knowledge and skills in the fields covered by the MSc program.

Selection Process for Students

Every year, during the Spring Semester, the Department publishes an invitation on its website for the admission of students to the MSc program, scheduled to commence in the immediately following academic year. This invitation is also circulated to relevant Ministries, Public Legal Entities, or Private Legal Entities, as well as interested professional bodies. The Department may, upon a decision by the Departmental Assembly, following a substantiated proposal by the Director of the MSc Program, publish additional invitations for student admissions during the academic year.

Prospective applicants have the right to submit their applications for enrollment in the MSc within the specified timeframe set upon the publication of the invitation. Candidates' applications must be accompanied by the required documentation.

A detailed description of the process and the necessary documentation is available in the Operating Regulation of the MSc, accessible on the website: <https://mphil.dit.hua.gr>

Structure and Description of the Program

Table of Courses

1st SEMESTER

Code	Course Title	Y/S	C/E/EC	Supervising Members	ECTS credits
MPHIL1	Data science	1/W	EC	Varlami (Prof.), Vamvakari (Prof.), Michail (Assoc. Prof.), Papadopoulos (Asst. Prof.)	10
MPHIL2	Computational Intelligence and Cognitive Computing	1/W	EC	Diou (Asst. Prof.), Charalambidis (Asst. Prof.), Varlami (Prof.), Papadopoulos (Asst. Prof.)	10
MPHIL3	Embedded systems and Robotics	1/W	EC	Papadopoulos (Asst. Prof.) Diou (Asst. Prof.), Xydis (Asst. Prof. NTUA), Violos (Ext. Tutor)	10
MPHIL4	Computing Infrastructures, Services and Systems	1/W	EC	Tserpes (Assoc. Prof.), Kousiouris (Asst. Prof.), Nikolaïdi (Prof.), Violos (Ext. Tutor)	10
MPHIL5	System security and Cryptography	1/W	EC	Rizomiliotis (Assoc. Prof.), Michail (Assoc. Prof.), Charalambidis (Asst. Prof.), Varlami (Prof.)	10
MPHIL6	Technology Management	1/W	EC	Bardaki (Asst. Prof.), Stamati (Asst. Prof.), Michalakelis (Assoc. Prof.), Sofianopoulou (Assoc. Prof.), Anagnostopoulos (Prof.)	10
MPHIL7	System Engineering	1/W	EC	Nikolaïdi (Prof.), Bardaki (Asst. Prof.), Tserpes (Assoc. Prof.), Kousiouris (Asst. Prof.)	10
MPHIL8	Communication and Network Technologies	1/W	EC	Dimitrakopoulos (Assoc. Prof.), Kamalakis (Prof.), Michalakelis (Assoc. Prof.)	10
MPHIL9	Programming Languages/Software Systems	1/W	EC	Charalambidis (Asst. Prof.), Tserpes (Assoc. Prof.), Michail (Assoc. Prof.)	10
MPHIL10	Algorithms and Optimization	1/W	EC	Michail (Assoc. Prof.), Anagnostopoulos (Prof.), Charalambidis (Asst. Prof.), Vamvakari (Prof.)	10
MPHIL11	Internet of Things	1/W	EC	Dimitrakopoulos (Assoc. Prof.), Nikolaïdi (Prof.), Kousiouris (Asst. Prof.), Bardaki (Asst. Prof.)	10
TOTAL ECTS CREDITS					30

Elective compulsory courses (3 out of 11 must be selected)

- MPhil1 Data science, Data Mining, Big Data Algorithms, Statistical Thinking
MPhil2 Artificial Intelligence, Deep Learning, Representation Learning for Images, Audio, Text and Signals, Reinforcement Learning and Autonomous Agents, Knowledge Representation and Reasoning
MPhil3 real-time, mobile, small scale embedded systems, Human-robot interaction, Modeling & simulation environments, Computer Vision
MPhil4 Cloud Infrastructures, Cloud Services, Intranets, Fog, Edge and Cloud Computing, dynamic resource management, autonomous systems
MPhil5 Cybersecurity, network security, IoT security, cryptography techniques
MPhil6 Information Systems, Business Systems Application Landscape, Digital Transformation, Data Management, Decision Support, Business Process Management, Modeling Languages, Supply Chain Digitization, Business Analytics, IS Success, Pervasive IS, Technology Acceptance, Education and Technology
MPhil7 Requirements Engineering, System Design, System Modeling – SysML, Design Methodologies – SysML, Ethical and Sustainable System and Service Engineering, Disruptive Technologies, Systems-of-Systems-, Digital Twins, Gamified IS, System Evaluation, Simulation, Information Quality, User Behavior, User Acceptance, Business Impact/ KPIs effect, ICT Market Investments Assessment
MPhil8 Study of natural layers, Network Protocols, Network Management, Models of Systems and Communications, Simulation of Systems and Communications, Implementation of Systems, Sensor Networks, 5G/6G Systems, Performance assessment and network optimization algorithms, Techno-economic evaluation of communication technologies
MPhil9 Theory and Design of Programming Languages, Design and Implementation of Modern Software Systems, Static and Dynamic Analysis, Automatic Program Analysis, Dynamic Languages, Modern Compilation and Optimization Techniques, Languages and Technologies for Parallel/Distributed Systems, Code Generation, Error Analysis
MPhil10 Theoretical Computer Science, Theory of Computing, Design and Analysis of Algorithms, Data Structures, Algorithm Engineering, Optimization, Linear and Integer Programming, Convex Optimization, Non-Linear Optimization
MPhil11 Internet of Things and Applications, Services and Applications in Smart Environments, Intelligent Transport Systems and Autonomous Driving, Smart Cities, e-health

2nd and 3rd Semester

Code	Course Title	Y/S	C/E/CE	ECTS Credits
Diss	Diploma Thesis (MPhil Dissertation)	2 semesters	Y	60
TOTAL ECTS CREDITS				60

Diploma Thesis

For each postgraduate student, a Thesis is defined, corresponding to sixty (60) credit units (ECTS). To be able to submit and present the thesis, they must first have submitted its content or part thereof in the form of a scientific article to an international journal or conference with reviewers.

The thesis is evaluated by a three-member committee composed of the instructors of the MSc program. One faculty member, the supervisor, defines the topic of the thesis. The title of the work and the supervisor are declared to the Secretariat in a document co-signed by the student and the supervisor. Proposals for topics come to the Departmental Assembly, where each supervisor suggests the other two members of the three-member committee of the student, who can be i) faculty members of the Department of Informatics and Telecommunications or other Departments of Harokopio University, ii) faculty or researchers from other departments in Greece or abroad, iii) researchers of the A', B', or C' levels in recognized Research Centers or Institutions in Greece or abroad, provided they hold a Ph.D. and possess recognized scientific work.

Theses represent original research work aiming to produce research results with broader scientific interest, resulting from experiments or system implementation by the student. Therefore, in order to submit and present

the thesis, students must first have submitted its content or part thereof in the form of a scientific article to an international journal or conference with reviewers.

Requirements for Obtaining a Postgraduate Degree

In the first semester, students must select three (3) thematic units from the total of eleven (11) offered by the M.Sc. program. They need to specialize in each chosen unit and reflect the results in a project. Specialization occurs through lectures, which may also be offered within other M.Sc. programs of the Department, research meetings, and participation in research activities, according to a plan set by the instructors of the unit for each postgraduate student. The successful completion of a thematic unit is achieved by submitting a technical report and presenting the research results, which can take place either at the end of the 1st semester or at the end of the 2nd semester (if deemed necessary by the responsible individuals of the unit). In the last two semesters, postgraduate students must conduct research in a specialized field of knowledge and write a thesis as described above.

Attendance and Examination

Attendance in the activities of each thematic unit is mandatory. Evaluation for the thematic units and the Thesis is graded up to 10, considering a pass when a student achieves at least 6. The examination process is the responsibility of the thematic supervisors.

Teaching for the thematic units of the M.Sc. program, as well as thesis writing, can be conducted in Greek and/or English. The educational activities of the M.Sc. program leverage existing technological means and the possibilities of distance learning in accordance with the current legislative framework.

Re-examination process

Students who do not achieve a passing grade in the subjects of the first semester will have the opportunity to pass within the next two semesters. However, students are obliged to complete the 90 credit units (ECTS) within 3 years. Otherwise, they will be deregistered by the decision of the Department's Assembly.

Calculation of Degree Grade

For awarding the MPhil title, either for full or partial attendance, both the following conditions must be fulfilled:

- Successful completion of three (3) thematic units totaling 30 credit units,
- Completion of the Master's Thesis under the supervision of the designated faculty member (60 credit units).

The final grade for the postgraduate degree is calculated as the weighted average of the student's grades in the courses and the Master's Thesis.

$$\frac{\sum_{i=1}^N ECTS_i \cdot M_i + ECTS_{M\Delta} \cdot M\Delta}{\sum_{i=1}^N ECTS_i + ECTS_{M\Delta}}$$

Όπου

M_i : The grades obtained by the student in each thematic unit,

$ECTS_i$: The credit units of the corresponding thematic unit,

$M\Delta$: The grade of the Master's Thesis,

$ECTS_{M\Delta}$: The credit units of the Master's Thesis.

The degree grade is rounded to the first decimal place and categorized as follows:

- Excellent: 8.6 – 10
- Very Good: 7.1 - 8.5 (inclusive)
- Good: 5.0 - 7.0 (inclusive).

Infrastructure & Central Services

E-Services



Upon enrollment, students across all three study cycles are granted a unique username and password, essential credentials facilitating access to a spectrum of electronic services offered by both the University and the state. The meticulous management of this process is overseen by the University's Informatics and Networks Center.

The sequence of events unfolds as follows:

- Registration in University User Directory (LDAP):
 - The Informatics and Networks Center initiates the students' registration in the University's user directory (LDAP), ensuring a seamless integration into the digital ecosystem.
- Access Code Generation:
 - Subsequently, an access code is generated, serving as the gateway to a range of electronic services. Students can conveniently obtain this access code either from the departmental secretariat or through electronic means, as stipulated by NOC).
- Personalized Use of Credentials:
 - The assigned password and username are strictly personal, emphasizing the confidentiality and security of each student's digital identity.

Diverse Electronic Services Offered:

University students enjoy access to a diverse array of electronic services, categorized as follows:

a) Basic Electronic Services:

- Email functionality for communication.
- Website hosting capabilities.

- Creation and secure storage of files and data within the computing cloud.

b) E-Learning Services:

- Facilitation of e-learning platforms, enhancing the educational experience.

c) Access to Electronic Resources:

- Retrieval and utilization of a multitude of electronic resources.

d) University-Provided Applications:

- Utilization of applications tailored for the academic community, fostering an enriched educational environment.

This comprehensive digital infrastructure ensures that students can seamlessly navigate and leverage a suite of electronic services, fostering a technologically enhanced and interconnected academic experience.

Student Advocate

The dedicated offices of the Student Advocate and the Advisor for Students with Special Educational Needs are strategically located on the institution's premises. To ensure optimal support and adhere to best practices, detailed arrangements and procedures are meticulously defined in alignment with both current legislation and the internal study regulations of the institution. This commitment guarantees that students, including those with special educational needs, receive tailored assistance, fostering an inclusive and supportive academic environment.

Library and Information Center (LIC)

Harokopio University is equipped with a state-of-the-art Library and Information Center dedicated to fulfilling the diverse needs of the academic community in accessing scientific information. Tailored services are designed to support students, offering a multifaceted approach to enhance their learning experience:

- User Training Seminars:
 - Specialized seminars are organized to provide students with the necessary skills to effectively navigate and utilize the resources available in the Library and Information Center.
- Reading Room Facilities:
 - A dedicated reading room is available, fostering an environment conducive to focused study and research.
- Computer Access for Research:
 - Access to computers is provided, facilitating the search for both printed and electronic materials.
- Storage Cabinets for Personal Items:
 - Convenient storage cabinets are at the disposal of students for the secure storage of personal items during their time in the Library and Information Center.
- Automated Borrowing and Photocopying:
 - The institution facilitates automated borrowing and photocopying services, adhering to copyright protection legislation. This streamlines the process, ensuring efficient access to essential materials.
- Remote Services:

- Recognizing evolving circumstances, part of the Library and Information Center services, including assistance and resources, can be accessed remotely. This ensures continued support even in situations where on-site visits may be challenging.

Harokopio University is committed to providing a dynamic and accessible learning environment, ensuring that students have the tools and resources needed to excel in their academic pursuits.

Student Service Center (S.S.C.)

Harokopio University is dedicated to providing students with a robust support system through its Student Service Center (S.S.C.). This centralized hub serves as a vital resource, ensuring students are well-informed about various aspects of university life. The S.S.C. plays a pivotal role in enhancing the overall student experience by offering the following services:

- Information Hub: The S.S.C. serves as an information hub, keeping students abreast of crucial details regarding the university's operations, their rights and obligations, and the array of services provided by both the State and the University.
- Electronic and In-Person Assistance: Whether electronically or in person, the Student Service Center is readily available to assist students. This accessibility ensures that students can conveniently access the information and support they need.
- Student Care Services: As part of its comprehensive approach, the S.S.C. includes Student Care Services. This facet is designed to cater to students' well-being, offering support and guidance in various aspects of their academic journey.
- Study and Career Liaison Office: The S.S.C. houses the Study and Career Liaison Office, a valuable resource that aids students in navigating the transition from academia to the labor market. This office provides essential information and advisory services, guiding students in making informed decisions about their career paths, both in Greece and internationally.

Harokopio University's Student Service Center is a cornerstone of student support, fostering a holistic environment that empowers students with the knowledge and assistance they need to thrive academically and beyond.

Enhancing Language Proficiency and Student Support at Harokopio University

Foreign Language Teaching Center (F.L.T.C.)

At Harokopio University, we prioritize the cultivation of linguistic skills, recognizing the importance of multilingual proficiency in today's globalized world. Our dedicated Foreign Language Teaching Center (F.L.T.C.) offers specialized courses tailored to the needs of our program's students. The center's mission is to ensure a comprehensive grasp of a foreign language, aligning with the stipulations outlined in current legislation. Our commitment to linguistic excellence is reflected in the diverse language courses available, providing students with valuable language skills for academic and professional success.

Study Advisor

Navigating the academic journey is a significant aspect of student life, and at Harokopio University, we understand the importance of having a guiding hand. The Study Advisor, a faculty member of the Department, serves as a reliable resource for students. This dedicated advisor is appointed during the students' first year of study, offering guidance and support to facilitate a successful academic experience. The Study Advisor plays a crucial role in fostering a positive and enriching learning environment.

Student Mobility

Harokopio University values the enriching experiences that come with student mobility programs. Students enrolled in the program have the exciting opportunity to participate in mobility programs both at home and abroad. Whether through European programs, initiatives by European universities, or bilateral agreements between national and international institutions, we encourage our students to explore the world and broaden their horizons. Our commitment to fostering a global perspective aligns with current legislation, allowing students to engage in internal mobility programs for a well-rounded educational experience.

At Harokopio University, we are dedicated to providing comprehensive support, enhancing language proficiency, and promoting global engagement for our students' success.

APPENDIX - Detailed Description of thematic areas

MPHIL01 - Data science

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL01	SEMESTER OF STUDIES	1st
COURSE TITLE	Data science		
	TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>	COURSE LOAD (HOURS OF WORK)	ECTS CREDITS
	Report on lab assignments	125	
	Individual study	125	
	TOTAL	250	10
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISITE COURSES:	Data Structures, Databases, Data Mining, Probability, Statistics, Algorithms		
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://eclass.hua.gr/courses/MPHIL101/		

(2) LEARNING RESULTS

Learning Results

The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course.

Consult Appendix A.

- *Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area*
- *Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B*

The objective of the subject is to introduce students to the concepts of data science and help them acquire and validate the basic knowledge required to conduct further research in the subject areas, through study and participation in the activities assigned to them.

Upon successful completion of the course, the student will be able to:

- analyze a data-related problem and formulate/design/implement a technical solution
- understand the theoretical background of open problems in the subject area and identify research opportunities beyond the existing research level
- use software, models, and libraries to develop standard solution implementations and evaluate them.

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- | | |
|--|---|
| ● <i>Search, analysis and synthesis of data and information, also using the necessary technologies</i> | ● <i>Project planning and management</i> |
| ● <i>Adapting to new situations</i> | ● <i>Respect for diversity and multiculturalism</i> |
| ● <i>Decision making</i> | ● <i>Respect for the natural environment</i> |
| ● <i>Autonomous work</i> | ● <i>Demonstrating social, professional and ethical responsibility and sensitivity to gender issues</i> |
| ● <i>Teamwork</i> | ● <i>Exercising criticism and self-criticism</i> |
| ● <i>Working in an international environment</i> | ● <i>Promoting free, creative and inductive thinking</i> |
| ● <i>Working in an interdisciplinary environment</i> | ● <i>...</i> |
| ● <i>Generating new research ideas</i> | ● <i>Other</i> |

Search, analysis and synthesis of data and information with the use of the assorted technologies

Adaptation in new conditions

Decision Making

Independent work

Employment at an international level

Formulation of new research ideas

Project design and management

Promoting reasoning and self improvement

Promoting free, creative and deductive reasoning

(3) COURSE CONTENT

Data Mining, Big Data Algorithms, Statistical Thinking

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	- Data mining and machine learning libraries and models

	<ul style="list-style-type: none"> - Statistical tools - Communication via OpenClass and email 								
<p>TEACHING MANAGEMENT</p> <p><i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.</i></p>	<table border="1"> <thead> <tr> <th>Activity</th> <th>Workload in Semester</th> </tr> </thead> <tbody> <tr> <td>Report on lab assignments</td> <td>125</td> </tr> <tr> <td>Individual study</td> <td>125</td> </tr> <tr> <td>Course total</td> <td>250</td> </tr> </tbody> </table>	Activity	Workload in Semester	Report on lab assignments	125	Individual study	125	Course total	250
Activity	Workload in Semester								
Report on lab assignments	125								
Individual study	125								
Course total	250								
<p>STUDENT EVALUATION</p> <p><i>Description of the evaluation process Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.</i></p>	<p>Individual work that includes:</p> <ul style="list-style-type: none"> - Individual research and study - Technical report - Overview 								

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:

1) Probability and Statistics for data analysis

Fundamental theory in probability and statistics, which is necessary for basic research and data analysis tasks.

2) Multivariate Statistical Analysis

Fundamental Multivariate Statistical Analysis Methods applied in Data Science, including linear regression, logistic regression, clustering analysis, principal component analysis, factor analysis.

3) Statistics for Big data

Statistics in the era of big data. Statistical Network Analysis. Implementation using R and Python.

4) Recommender systems: Balancing between personalization and privacy

<https://www.sciencedirect.com/science/article/pii/S2095809917303855>

<https://ieeexplore.ieee.org/abstract/document/9599369>

5) Recommender systems: Context-aware RS

https://www.sciencedirect.com/science/article/pii/S0950705117305075?casa_token=v1MC4Cj3BioAAAAA:caErwu7xuKitQ6EFn8hFhe6UBIVXqybX2BWXa9ZUt1HPITi0ON2ERUh1WbNkWw cEI-pGs1gghqs

6) Recommender systems: RS in smart cities and IoT

https://www.sciencedirect.com/science/article/pii/S0306437920300478?casa_token=3K350B3L6twAAAAA:ngKUTo2gTqHTkjbE_LqkyvOvTqx01eb4jZm22RFa2RwFiamMPRizJd8CivRMj_VTk

X64-0v07Q

7) Federated Learning with non-iid data

https://www.sciencedirect.com/science/article/pii/S0925231221013254?casa_token=SORoQusaMfQAAAAA:dUv4eHX9ZGutCJk5xBlvSc9CQ-jn1zm-m57kWJa1uuJ_krl2a2pLynRBOEuJpsRrh04u0hG-8h4

8) Reinforcement learning in multi-agent environments: Multi armed bandits

<https://www.nowpublishers.com/article/Details/MAL-068>
<https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=9431107>
<https://dl.acm.org/doi/abs/10.1145/3173574.3173682>

9) Large language models and their use in Text-mining tasks: Vector similarity search for Greek document collections

<https://github.com/RedisAI/vecsim-demo>
<https://lablab.ai/t/efficient-vector-similarity-search-with-redis-a-step-by-step-tutorial>

10) Large language models and their use in Text-mining tasks: Development of a chatbot over a Greek document collection

<https://www.athenarc.gr/en/theano-covid19-chatbot>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7256567/>

11) Scan (X-ray) image analysis for fine-grained visual recognition

<https://www.sciencedirect.com/science/article/abs/pii/S0925231222014138>
<https://ieeexplore.ieee.org/document/9956127>
<https://www.sciencedirect.com/science/article/abs/pii/S0031320321004416>
<https://ieeexplore.ieee.org/document/9722843>
<https://www.sciencedirect.com/science/article/abs/pii/S0950705121010686>

12) Graph neural network architectures for video captioning

https://openaccess.thecvf.com/content_CVPR_2020/html/Pan_Spatio-Temporal_Graph_for_Video_Captioning_With_Knowledge_Distillation_CVPR_2020_paper.html
https://openaccess.thecvf.com/content_CVPR_2020/html/Zhang_Object_Relational_Graph_With_Teacher-Recommended_Learning_for_Video_Captioning_CVPR_2020_paper.html
<https://ieeexplore.ieee.org/abstract/document/9709204>
<https://ieeexplore.ieee.org/abstract/document/9762283>

13) Scene classification using graph neural networks in the context of autonomous driving

http://openaccess.thecvf.com/content_ECCV_2018/html/Jianwei_Yang_Graph_R-CNN_for_EC_CV_2018_paper.html
<https://www.nuscenes.org/>

- Relevant Scientific Journals:

Journals

- Data Mining and Knowledge Discovery
- Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery
- Big Data Mining and Analytics
- Journal of AI and Data Mining

- Machine Learning and Data Mining in Pattern Recognition (MLDM)

Conferences

- ACM SIGKDD International Conference on Knowledge Discovery & Data Mining
- ACM International Conference on Web Search and Data Mining
- IEEE International Conference on Data Mining
- Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD)

MPHIL02 - Computational Intelligence and Cognitive Computing

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL02	SEMESTER OF STUDIES	1st
COURSE TITLE	Computational Intelligence and Cognitive Computing		
TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>	COURSE LOAD (HOURS OF WORK)	ECTS CREDITS	
Project	125		
Individual study	125		
TOTAL	250	10	
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISITE COURSES:	The course requires a strong, undergraduate-level background in linear algebra, univariate and multivariate calculus, probability theory, as well as knowledge of basic knowledge of numerical analysis and optimization methods. Furthermore, this course requires good knowledge of computer programming (especially Python), for the implementation of research projects and experiments.		
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://eclass.hua.gr/courses/MPHIL103/		

(2) LEARNING RESULTS

Learning Results

The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course.

Consult Appendix A.

- Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area
- Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B
- Comprehensive Guide to Writing Learning Outcomes

Upon successfully completing this unit the students will be in a position to

- Know how to study and fully comprehend articles that are published in the current scientific literature
- Get accustomed with all stages followed during modern research production, including study of the bibliography, research of innovative solution, design and implementation of experiments, as well as the writing of scientific publications
- Be in a position to identify research opportunities and open problems in the areas of Artificial Intelligence and Machine Learning as well as to identify the first steps towards possible solutions.

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- | | |
|--|---|
| ● <i>Search, analysis and synthesis of data and information, also using the necessary technologies</i> | ● <i>Project planning and management</i> |
| ● <i>Adapting to new situations</i> | ● <i>Respect for diversity and multiculturalism</i> |
| ● <i>Decision making</i> | ● <i>Respect for the natural environment</i> |
| ● <i>Autonomous work</i> | ● <i>Demonstrating social, professional and ethical responsibility and sensitivity to gender issues</i> |
| ● <i>Teamwork</i> | ● <i>Exercising criticism and self-criticism</i> |
| ● <i>Working in an international environment</i> | ● <i>Promoting free, creative and inductive thinking</i> |
| ● <i>Working in an interdisciplinary environment</i> | ● <i>...</i> |
| ● <i>Generating new research ideas</i> | ● <i>Other</i> |

Search, analysis and synthesis of data and information with the use of the assorted technologies

Adaptation in new conditions

Decision Making

Independent work

Employment at an international level

Formulation of new research ideas

Project design and management

Promoting reasoning and self improvement

Promoting free, creative and deductive reasoning

(3) COURSE CONTENT

In the context of this course, students will perform in-depth study of modern methods that are related to one or more of the following areas of Artificial Intelligence:

- Machine learning
- Representation learning for images, sound, text and signals
- Reinforcement learning and autonomous agents
- Knowledge representation and reasoning

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings								
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	<ul style="list-style-type: none"> - Machine learning and/or knowledge representation libraries and models - Libraries for auto-differentiation which support hardware acceleration - Communication via eClass and email 								
TEACHING MANAGEMENT <i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.</i>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Activity</th> <th style="width: 40%;">Workload in Semester</th> </tr> </thead> <tbody> <tr> <td>Project</td> <td>125</td> </tr> <tr> <td>Individual study</td> <td>125</td> </tr> <tr> <td>Course total</td> <td>250</td> </tr> </tbody> </table>	Activity	Workload in Semester	Project	125	Individual study	125	Course total	250
Activity	Workload in Semester								
Project	125								
Individual study	125								
Course total	250								
STUDENT EVALUATION <i>Description of the evaluation process Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.</i>	Individual work that includes: <ul style="list-style-type: none"> - Individual research and study - Technical report - Overview 								

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:
- Astn Zhang, Zachary C. Lipton, Mu Li and Alexander J. Smola, "Dive into Deep Learning", <https://d2l.ai/>
- Ian Goodfellow, Yoshua Bengio and Aaron Courville, "Deep Learning", MIT Press, 2016 <https://www.deeplearningbook.org/>
- Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson, 4th Edition (2020)
- Timothy Chou, "Precision: Principles, Practices and Solutions for the Internet of Things", 2016
- Deisenroth, Marc Peter, A. Aldo Faisal, and Cheng Soon Ong. Mathematics for machine learning. Cambridge University Press, 2020.
- R. Sutton & G. Barto. Reinforcement learning, 2020

- Relevant Scientific Journals:
- International scientific journals

- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Neural Networks and Learning Systems
- Engineering Applications of Artificial Intelligence
- Expert Systems with Applications
- Journal of Machine Learning Research
- Journal of Artificial Intelligence Research

Neural Computing and Applications
International Journal of Computer Vision

Proceedings of international scientific conferences:

Neural Information Processing Systems
International Conference on Learning Representations
AAAI Conference on Artificial Intelligence
Computer Vision and Pattern Recognition
International Conference on Computer Vision
International Joint Conference on Artificial Intelligence

MPHIL03 - Embedded systems and Robotics

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL03	SEMESTER OF STUDIES	1st
COURSE TITLE	Embedded systems and Robotics		
TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>	COURSE LOAD (HOURS OF WORK)	ECTS CREDITS	
Project	125		
Individual study	125		
TOTAL	250	10	
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISIT E COURSES:	Signal processing, image analysis, machine learning, algorithms, probability, statistics		
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://eclass.hua.gr/courses/MPHIL104/		

(2) LEARNING RESULTS

Learning Results

The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course.

Consult Appendix A.

- *Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area*
- *Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B*
- *Comprehensive Guide to Writing Learning Outcomes*

The aim of this subject is to introduce the students to some of the fundamental concepts found in the fields of the so-called 4th industrial revolution (Industry 4.0) and digital transformation (Digital transformation). In particular, the course will focus on the study, analysis and application of modern cutting-edge methods and technologies related to the

scientific subjects of machine vision, human-computer interaction and embedded systems. Upon successful completion of the course, the student will be able to:

- analyze the requirements of a relevant application (e.g. in the fields of industry, process automation, maintenance, etc.) and implement a relevant technical solution
- study the relevant literature and the different solutions/products available on the market and carry out a comparative evaluation of them
- to utilize software, models, libraries and development environments for the implementation and evaluation of technical solutions that will be designed.

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- | | |
|--|---|
| ● <i>Search, analysis and synthesis of data and information, also using the necessary technologies</i> | ● <i>Project planning and management</i> |
| ● <i>Adapting to new situations</i> | ● <i>Respect for diversity and multiculturalism</i> |
| ● <i>Decision making</i> | ● <i>Respect for the natural environment</i> |
| ● <i>Autonomous work</i> | ● <i>Demonstrating social, professional and ethical responsibility and sensitivity to gender issues</i> |
| ● <i>Teamwork</i> | ● <i>Exercising criticism and self-criticism</i> |
| ● <i>Working in an international environment</i> | ● <i>Promoting free, creative and inductive thinking</i> |
| ● <i>Working in an interdisciplinary environment</i> | ● <i>...</i> |
| ● <i>Generating new research ideas</i> | ● <i>Other</i> |

Search, analysis and synthesis of data and information with the use of the assorted technologies
 Decision making
 Individual work
 Project design and management
 Promoting reasoning and self-improvement
 Promoting free, creative and deductive reasoning

(3) COURSE CONTENT

Machine vision, human computer interaction, embedded systems

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings	
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	Machine/deep learning and digital signal processing libraries and models - Statistical tools - Communication via OpenClass and email	
TEACHING MANAGEMENT <i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive</i>	Activity	Workload in Semester
	Project	125

<i>Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.</i>	Individual study	125
	Course total	250
<p align="center">STUDENT EVALUATION</p> <i>Description of the evaluation process Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.</i>	Individual work that includes: - Individual research and study - Technical report - Overview	

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:

Large-scale multi-agent human-robot collaborative learning

* <https://ieeexplore.ieee.org/abstract/document/9431107>

Machine vision applications

* <https://ieeexplore.ieee.org/abstract/document/9537584>

* <https://ieeexplore.ieee.org/abstract/document/10011760>

* <https://ieeexplore.ieee.org/abstract/document/9439463>

* <http://armbench.s3-website-us-east-1.amazonaws.com/>

* <https://ieeexplore.ieee.org/document/10062210>

Synthesis and optimization of RISC-V System-on-Chips

* A. Amid et al., ""Chipyard: Integrated Design, Simulation, and Implementation Framework for Custom SoCs,"" in IEEE Micro, vol. 40, no. 4, pp. 10-21, 1 July-Aug. 2020

* S. Karandikar et al., ""FireSim: FPGA-Accelerated Cycle-Exact Scale-Out System Simulation in the Public Cloud,"" 2018 ACM/IEEE 45th Annual International Symposium on Computer Architecture (ISCA), Los Angeles, CA, USA, 2018

- Relevant Scientific Journals:

IEEE Transactions on Robotics, Machine Vision and Applications (Elsevier), Design Automation for Embedded Systems (Springer)

MPHIL04 - Computing Infrastructures, Services and Systems

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL04	SEMESTER OF STUDIES	1st
COURSE TITLE	Computing Infrastructures, Services and Systems		
TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>	COURSE LOAD (HOURS OF WORK)	ECTS CREDITS	
Project	125		
Individual study	125		
TOTAL	250	10	
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISIT E COURSES:	Good skills in Programming Fair understanding of the principle of Distributed, Operating and Network systems		
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://mphil.dit.hua.gr/en/studies/		

(2) LEARNING RESULTS

Learning Results

The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course.

Consult Appendix A.

- *Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area*
- *Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B*
- *Comprehensive Guide to Writing Learning Outcomes*

Advance the students' knowledge on Computing Infrastructures, Services and Systems.
Specialise on cutting edge technologies on relevant research fields.

Develop problem-solving skills while tackling research-oriented challenges.
Deliver research publications, software repositories or technical reports

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- Search, analysis and synthesis of data and information, also using the necessary technologies
- Adapting to new situations
- Decision making
- Autonomous work
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Generating new research ideas
- Project planning and management
- Respect for diversity and multiculturalism
- Respect for the natural environment
- Demonstrating social, professional and ethical responsibility and sensitivity to gender issues
- Exercising criticism and self-criticism
- Promoting free, creative and inductive thinking
- ...
- Other

Search, analysis and synthesis of data and information with the use of the assorted technologies
Adaptation in new conditions
Decision Making
Independent work
Formulation of new research ideas
Promoting free, creative and deductive reasoning

(3) COURSE CONTENT

Cloud Infrastructures, Cloud Services, Intranets, Fog Edge and Cloud Computing, dynamic resource management, autonomous systems

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings									
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	email, messengers, online meetings software, software repositories, software libraries, software and models for managing content (e.g. latex)									
TEACHING MANAGEMENT <i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.</i>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Activity</th> <th style="width: 40%;">Workload in Semester</th> </tr> </thead> <tbody> <tr> <td>Project</td> <td>125</td> </tr> <tr> <td>Individual study</td> <td>125</td> </tr> <tr> <td>Course total</td> <td>250</td> </tr> </tbody> </table>		Activity	Workload in Semester	Project	125	Individual study	125	Course total	250
Activity	Workload in Semester									
Project	125									
Individual study	125									
Course total	250									

STUDENT EVALUATION

project-based

*Description of the evaluation process
Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others
Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.*

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:

<https://link.springer.com/article/10.1007/s13174-010-0007-6> (cloud computing)

<https://www.sciencedirect.com/science/article/pii/S1383762118306349> (edge computing)

<https://ieeexplore.ieee.org/abstract/document/8016573> (mobile edge computing)

<https://www.sciencedirect.com/science/article/pii/S0167739X13000241> (IoT)

<https://ieeexplore.ieee.org/abstract/document/6567202> (big data)

<https://www.sciencedirect.com/science/article/pii/S0306437914001288> (big data & cloud computing)

<https://ieeexplore.ieee.org/abstract/document/8763885> (deep learning and edge computing)

google scholar search using keywords:

"cloud computing"

"edge computing"

"IoT"

"middleware"

"service-oriented systems"

"software systems"

"computing systems"

"microservices"

"serverless computing"

"blockchains"

etc

- Relevant Scientific Journals:

Future Generation Computer Systems

Journal of Software and Systems

IEEE Transactions on Parallel and Distributed Systems

IEEE Transactions on Cloud Computing

IEEE IoT

MPHIL05 - System security and Cryptography

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL05	SEMESTER OF STUDIES	1st
COURSE TITLE	System security and Cryptography		
TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>		COURSE LOAD (HOURS OF WORK)	ECTS CREDITS
Project		125	
Individual study		125	
TOTAL		250	10
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISITE COURSES:	Course in Information Systems Security Course in Cryptography		
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://eclass.hua.gr/courses/DIT285/		

(2) LEARNING RESULTS

<p>Learning Results</p> <p><i>The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course. Consult Appendix A.</i></p> <ul style="list-style-type: none"> ● <i>Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area</i> ● <i>Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B</i> ● <i>Comprehensive Guide to Writing Learning Outcomes</i> <p>- Familiarity with identity management standards</p> <p>- Experimental development of authentication systems</p> <p>- Design and implementation of applications with homomorphic and multi-party computation</p>

encryption libraries
 - European legislative framework for qualified services

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- Search, analysis and synthesis of data and information, also using the necessary technologies
- Adapting to new situations
- Decision making
- Autonomous work
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Generating new research ideas
- Project planning and management
- Respect for diversity and multiculturalism
- Respect for the natural environment
- Demonstrating social, professional and ethical responsibility and sensitivity to gender issues
- Exercising criticism and self-criticism
- Promoting free, creative and inductive thinking
- ...
- Other

Search, analysis and synthesis of data and information with the use of the assorted technologies
 Independent work
 Formulation of new research ideas
 Promoting free, creative and deductive reasoning

(3) COURSE CONTENT

It involves research dealing with the subject of systems security and cryptography in the fields of:

- 1) of authentication technologies
- 2) identity management technologies
- 3) qualified services
- 4) homomorphic cryptography
- 5) multi-party computation

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings									
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	eclass									
TEACHING MANAGEMENT <i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.</i>	<table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Activity</th> <th style="text-align: left;">Workload in Semester</th> </tr> </thead> <tbody> <tr> <td>Project</td> <td>125</td> </tr> <tr> <td>Individual study</td> <td>125</td> </tr> <tr> <td>Course total</td> <td>250</td> </tr> </tbody> </table>		Activity	Workload in Semester	Project	125	Individual study	125	Course total	250
Activity	Workload in Semester									
Project	125									
Individual study	125									
Course total	250									

STUDENT EVALUATION	Research Project
<p><i>Description of the evaluation process</i> <i>Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others</i> <i>Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.</i></p>	

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:

Security Engineering: A Guide to Building Dependable Distributed Systems, 3rd Edition

Ross Anderson

Computer Security, by Dieter Gollmann

Computer System Security: Basic Concepts and Solved Exercises , Gildas Avoine and Philippe Oechslin

- Relevant Scientific Journals:

journal of information security and applications (elsevier)

journal of cryptology (springer)

MPHIL06 - Technology Management

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL06	SEMESTER OF STUDIES	1st
COURSE TITLE	Technology Management		
TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>		COURSE LOAD (HOURS OF WORK)	ECTS CREDITS
Project		125	
Individual study		125	
TOTAL		250	10
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISITE COURSES:	Information Systems (IS) Organizational Science Social Sciences Methodologies Analysis, Design and Evaluation of IS		
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://eclass.hua.gr/courses/MPHIL107/		

(2) LEARNING RESULTS

Learning Results

The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course. Consult Appendix A.

- *Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area*
- *Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B*
- *Comprehensive Guide to Writing Learning Outcomes*

The course introduces the students to

- research methodologies in the field of Information Systems, Business digitization and

Technology Transfer in general

- research questions development and conducting research with valid research methods such as case studies, survey research, design science research etc.

Ultimately, the students will acquire the following knowledge and skills:

- Conducting literature review in a systematic manner
- Identification of research gaps and new research questions
- Research models development
- Conducting research with credible research methods
- Paper writing for peer-reviewed academic journals and conferences

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- *Search, analysis and synthesis of data and information, also using the necessary technologies*
- *Adapting to new situations*
- *Decision making*
- *Autonomous work*
- *Teamwork*
- *Working in an international environment*
- *Working in an interdisciplinary environment*
- *Generating new research ideas*
- *Project planning and management*
- *Respect for diversity and multiculturalism*
- *Respect for the natural environment*
- *Demonstrating social, professional and ethical responsibility and sensitivity to gender issues*
- *Exercising criticism and self-criticism*
- *Promoting free, creative and inductive thinking*
- *...*
- *Other*

Search, analysis and synthesis of data and information with the use of the assorted technologies

Adaptation in new conditions

Decision Making

Independent work

Work at an interdisciplinary framework

Formulation of new research ideas

Project design and management

Promoting reasoning and self improvement

Promoting free, creative and deductive reasoning

(3) COURSE CONTENT

Research on the following indicative research topics:

- Assessment of Technology Impact on Organizations
- Factors that affect Technology adoption by Organizations
- Relationship of Digital Maturity of Organizations with their Performance/ Success
- Business Analytics in Organizations - Applications, Challenges, Benefits

- Innovation in Organizations: Assessment, Innovation development
- Relationship of Digital Maturity of Organizations with their Innovation level
- Feasibility of Innovative/ State of the art Technologies
- Financial Management of Cloud services
- Innovation models/ types
- Sustainability in organizations (New approaches, New business models)
- New Technology Diffusion Models
- FinTech

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings									
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	e-class document editors, presentation tools online sources for papers literature review tools statistics tools business process management tools other tools based on the research field									
TEACHING MANAGEMENT <i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.</i>	<table border="1" style="width: 100%;"> <thead> <tr> <th style="background-color: #e6f2ff;">Activity</th> <th style="background-color: #e6f2ff;">Workload in Semester</th> </tr> </thead> <tbody> <tr> <td>Project</td> <td>125</td> </tr> <tr> <td>Individual study</td> <td>125</td> </tr> <tr> <td>Course total</td> <td>250</td> </tr> </tbody> </table>		Activity	Workload in Semester	Project	125	Individual study	125	Course total	250
Activity	Workload in Semester									
Project	125									
Individual study	125									
Course total	250									
STUDENT EVALUATION <i>Description of the evaluation process Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.</i>	<ul style="list-style-type: none"> - Assignment (Literature review report, Research/ Technical report) - Writing paper for peer-reviewed academic journals and conferences 									

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:

Papers from peer-reviewed academic journals and conferences

- Relevant Scientific Journals:

Technological Forecasting and Social Change

Information Systems Research

Journal of Business Research

International Journal of Production Economics

MPHIL07 - System Engineering

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL07	SEMESTER OF STUDIES	1st
COURSE TITLE	System Engineering		
	TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>	COURSE LOAD (HOURS OF WORK)	ECTS CREDITS
	Project	125	
	Individual study	125	
	TOTAL	250	10
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISIT E COURSES:	System Engineering System Analysis Object Oriented Programming Web applications programming Service oriented architectures		
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://eclass.hua.gr/modules/course_info/index.php?course=MPHIL108		

(2) LEARNING RESULTS

Learning Results

The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course.

Consult Appendix A.

- Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area
- Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B
- Comprehensive Guide to Writing Learning Outcomes

The course introduces the students to

- methodologies and frameworks for system analysis, design and development
- languages and tools for system analysis and modeling
- system architecture design
- research questions development and conducting research with valid research methods.

Ultimately, the students will acquire the following knowledge and skills:

- Conducting literature review in a systematic manner
- Identification of research gaps and new research questions
- System modeling with established languages and tools
- Paper writing for peer-reviewed academic journals and conferences

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- | | |
|--|---|
| ● <i>Search, analysis and synthesis of data and information, also using the necessary technologies</i> | ● <i>Project planning and management</i> |
| ● <i>Adapting to new situations</i> | ● <i>Respect for diversity and multiculturalism</i> |
| ● <i>Decision making</i> | ● <i>Respect for the natural environment</i> |
| ● <i>Autonomous work</i> | ● <i>Demonstrating social, professional and ethical responsibility and sensitivity to gender issues</i> |
| ● <i>Teamwork</i> | ● <i>Exercising criticism and self-criticism</i> |
| ● <i>Working in an international environment</i> | ● <i>Promoting free, creative and inductive thinking</i> |
| ● <i>Working in an interdisciplinary environment</i> | ● <i>...</i> |
| ● <i>Generating new research ideas</i> | ● <i>Other</i> |

Search, analysis and synthesis of data and information with the use of the assorted technologies

Adaptation in new conditions

Decision Making

Independent work

Work at an interdisciplinary framework

Formulation of new research ideas

Project design and management

Promoting reasoning and self improvement

Promoting free, creative and deductive reasoning

(3) COURSE CONTENT

Research on the following indicative research topics:

- System engineering frameworks
- System modeling languages
- System architectures e.g. event-based

- Distributed architectures and systems
- System design considering new requirements e.g. ethics, privacy protection
- Exploring technologies suitable for specific applications
- Process modeling with CMMN language (application and evaluation of CMMN)
- Green system design
- Quality and Efficiency of Systems and Architectures
- Methodologies and tools for system testing

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings									
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	e-class document editors, presentation tools online sources for papers literature review tools statistics tools system modeling/ design tools integrated development environments									
TEACHING MANAGEMENT <i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.</i>	<table border="1"> <thead> <tr> <th>Activity</th> <th>Workload in Semester</th> </tr> </thead> <tbody> <tr> <td>Project</td> <td>125</td> </tr> <tr> <td>Individual study</td> <td>125</td> </tr> <tr> <td>Course total</td> <td>250</td> </tr> </tbody> </table>		Activity	Workload in Semester	Project	125	Individual study	125	Course total	250
Activity	Workload in Semester									
Project	125									
Individual study	125									
Course total	250									
STUDENT EVALUATION <i>Description of the evaluation process Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.</i>	<ul style="list-style-type: none"> - Assignment (Literature review report, Research/ Technical report) - Design/ Development of application/system - Writing paper for peer-reviewed academic journals and conferences 									

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:
Papers from peer-reviewed academic journals and conferences
- Relevant Scientific Journals:

IEEE Transactions on Systems, Man, and Cybernetics: Systems
IEEE Software
Journal of Systems and Software
Software and Systems Modeling

MPHIL08 - Communication and Network Technologies

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL08	SEMESTER OF STUDIES	1st
COURSE TITLE	Communication and Network Technologies		
TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>	COURSE LOAD (HOURS OF WORK)	ECTS CREDITS	
Project	125		
Individual study	125		
TOTAL	250	10	
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISITE COURSES:	Basic Notions of Network and Communication technologies & Python		
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://eclass.hua.gr/modules/course_info/index.php?course=MPHIL106		

(2) LEARNING RESULTS

Learning Results

The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course.

Consult Appendix A.

- Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area
- Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B
- Comprehensive Guide to Writing Learning Outcomes

- Familiarity with various design and simulation tools
- Experimental development and study of systems
- Design of protocols and applications
- Digital twins

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- Search, analysis and synthesis of data and information, also using the necessary technologies
- Adapting to new situations
- Decision making
- Autonomous work
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Generating new research ideas
- Project planning and management
- Respect for diversity and multiculturalism
- Respect for the natural environment
- Demonstrating social, professional and ethical responsibility and sensitivity to gender issues
- Exercising criticism and self-criticism
- Promoting free, creative and inductive thinking
- ...
- Other

Search, analysis and synthesis of data and information with the use of the assorted technologies
 Independent work
 Formulation of new research ideas
 Promoting reasoning and self improvement

(3) COURSE CONTENT

This thematic unit involves research dealing with the subject of communication systems and networks in the fields of:

- 1) the technologies of communication systems (optical, satellite, wireless, etc.)
- 2) the physical layer (PHY)
- 3) layer 2 (Data link layer) and MAC layer
- 4) network layer (including IP and TCP)
- 5) network applications
- 6) management and design of network systems

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings	
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	Eclass	
TEACHING MANAGEMENT <i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.</i>	Activity	Workload in Semester
	Project	125
	Individual study	125
	Course total	250
STUDENT EVALUATION <i>Description of the evaluation process</i>	Theses	

Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others

Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:

Computer Networks, Tanenbaum, 5th edition, Pearson Education India

Satellite Communication System and its applications: Civilian and Military wireless communication applications, Prajapati, LAP LAMBERT Academic Publishing

Optical Networks: A Practical Perspective, Ramasmawi, 3rd Edition 3rd Edition, Morgan Kaufmann

- Relevant Scientific Journals:

IEEE Journal on Selected Areas in Communications

IEEE Communications Magazine

IEEE Network

IEEE Internet of Things Journal

IEEE Transactions on Cognitive Communications and Networking

MPHIL09 - Programming Languages/Software Systems

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL09	SEMESTER OF STUDIES	1st
COURSE TITLE	Programming Languages/Software Systems		
TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>	COURSE LOAD (HOURS OF WORK)	ECTS CREDITS	
Project	125		
Individual study	125		
TOTAL	250	10	
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISITE COURSES:	Programming, Data Structures, Algorithms		
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://eclass.hua.gr/courses/MPHIL102/		

(2) LEARNING RESULTS

Learning Results

The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course.

Consult Appendix A.

- Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area
- Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B
- Comprehensive Guide to Writing Learning Outcomes

Upon successful completion of this course, the students will be able to:

- understand the underlying theory of programming languages and software systems,
- know how to study and fully comprehend research articles,

- familiarise themselves with the steps of research process,
- use tools and libraries to develop research prototypes and experimental evaluations.

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- Search, analysis and synthesis of data and information, also using the necessary technologies
- Adapting to new situations
- Decision making
- Autonomous work
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Generating new research ideas
- Project planning and management
- Respect for diversity and multiculturalism
- Respect for the natural environment
- Demonstrating social, professional and ethical responsibility and sensitivity to gender issues
- Exercising criticism and self-criticism
- Promoting free, creative and inductive thinking
- ...
- Other

Search, analysis and synthesis of data and information with the use of the assorted technologies

Adaptation in new conditions

Decision Making

Independent work

Employment at an international level

Formulation of new research ideas

Project design and management

Promoting reasoning and self improvement

Promoting free, creative and deductive reasoning

(3) COURSE CONTENT

- Foundations of programming languages: semantics, type theory, domain theory, category theory.
- Programming language design and implementation.
- Program analysis and formal verification: static and dynamic analysis, model checking.
- Program synthesis

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings	
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	- Communication via OpenClass and email	
TEACHING MANAGEMENT <i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc.</i>	Activity	Workload in Semester
	Project	125

The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.	Individual study	125
	Course total	250
<p align="center">STUDENT EVALUATION</p> <p><i>Description of the evaluation process</i> <i>Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others</i> <i>Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.</i></p>	<p>Individual work that includes:</p> <ul style="list-style-type: none"> - Individual research and study - Technical report - Overview 	

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:
- R. D. Tennent, Semantics of Programming Languages, Prentice Hall, ISBN: 978-0-13-805599-8, 1991.
- Benjamin Pierce, Types and programming languages, MIT Press, ISBN: 978-0-262-16209-8, 2002.
- Samson Abramsky, Domain Theory, In Handbook of Logic in Computer Science. Vol. III. Oxford University Press, ISBN 0-19-853762-X, 1994.
- Benjamin Pierce, Basic Category Theory for Computer Scientists, MIT Press, ISBN: 978-0-262-66071-6, 1991.
- Flemming and Hanne, Principles of Program Analysis, Springer Berlin, ISBN: 978-3-662-03811-6, 2015.
- Handbook of Model Checking, Springer International Publishing, ISBN: 978-3-319-10574-1, 2018.
- Relevant Scientific Journals:
- Journals
- ACM TOPLAS (Transactions on Programming Languages and Systems)
- JFP (Journal of Functional Programming)
- TPLP (Theory and Practice of Logic Programming)
- Conferences
- POPL (Symposium on Principles of Programming Languages)
- PLDI (Programming Language Design and Implementation)
- ICFP (International Conference on Functional Programming)
- ICLP (International Conference on Logic Programming)

MPHIL10 - Algorithms and Optimization

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL10	SEMESTER OF STUDIES	1st
COURSE TITLE	Algorithms and Optimization		
TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>	COURSE LOAD (HOURS OF WORK)	ECTS CREDITS	
Project	125		
Individual study	125		
TOTAL	250	10	
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISITE COURSES:	Combinatorics, Graph Theory, Algorithms, Programming		
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://eclass.hua.gr/courses/MPHIL105/		

(2) LEARNING RESULTS

Learning Results

The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course.

Consult Appendix A.

- Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area
- Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B
- Comprehensive Guide to Writing Learning Outcomes

Upon successful completion of this course, the students will be able to:

- understand theoretical and practical aspects of algorithms, computation and optimisation,
- know how to study and fully comprehend research articles,
- familiarise themselves with the steps of research process.

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- Search, analysis and synthesis of data and information, also using the necessary technologies
- Adapting to new situations
- Decision making
- Autonomous work
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Generating new research ideas
- Project planning and management
- Respect for diversity and multiculturalism
- Respect for the natural environment
- Demonstrating social, professional and ethical responsibility and sensitivity to gender issues
- Exercising criticism and self-criticism
- Promoting free, creative and inductive thinking
- ...
- Other

Independent work

Promoting free, creative and deductive thought

(3) COURSE CONTENT

- Theoretical Computer Science
- Theory of Computing
- Algorithms: Design and Analysis of Algorithms, Data Structures, Algorithm Engineering
- Optimization: Linear and Integer Programming, Convex Optimization, Non-Linear Optimization

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings	
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	eclass platform	
TEACHING MANAGEMENT <i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.</i>	Activity	Workload in Semester
	Project	125
	Individual study	125
	Course total	250
STUDENT EVALUATION <i>Description of the evaluation process Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others</i>	Project	

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:
- Stephen Boyd and Lieven Vandenberghe, Convex Optimization, Cambridge University Press.
- W. Cook, W. Cunningham, W. Pulleyblank and A. Schrijver, Combinatorial Optimization.
- C. Papadimitriou and K. Steiglitz, Combinatorial Optimization: Algorithms and Complexity, Prentice-Hall, 1982.
- Alan Frieze and M. Karonski, "Introduction to Random Graphs", Cambridge University Press, 2015.

- Relevant Scientific Journals:
- Symposium on Discrete Algorithms (SODA)
- ACM Transactions on Algorithms

MPHIL11 - Internet of Things

(1) GENERAL

SCHOOL	Digital Technology		
DEPARTMENT	Informatics and Telematics		
STUDY LEVEL	Postgraduate		
COURSE CODE	MPHIL11	SEMESTER OF STUDIES	1st
COURSE TITLE	Internet of Things		
TEACHING ACTIVITIES <i>in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits</i>	COURSE LOAD (HOURS OF WORK)	ECTS CREDITS	
Project	125		
Individual study	125		
TOTAL	250	10	
COURSE TYPE <i>general background, special background, specialization, general knowledge, skill development</i>	General background		
PREREQUISITE COURSES:			
STUDY and EXAMS LANGUAGE:	English/Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEB PAGE (URL)	https://eclass.hua.gr/modules/course_info/?course=MPHIL109		

(2) LEARNING RESULTS

Learning Results

The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the successful completion of the course.

Consult Appendix A.

- Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area
- Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B
- Comprehensive Guide to Writing Learning Outcomes

The course aims to integrate the IoT domain with a multitude of architectures that have to do both with its application in a wide range of areas of interest (Transportation, Smart Cities, Industry 4.0) as well as with the exploitation of new trends and developments in the

operational part and the context of the Computing Continuum (device/edge/cloud) and the use of Artificial Intelligence. Also included are ways to interconnect and integrate subsystems to create unified workflows and synergies to achieve the end goals of each application. At the end of the course, students will be able to understand the complex interactions that are necessary to create added value services on top and across diverse systems as well as exploit key functionalities in order to deliver such applications.

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Appendix and listed below), which one(s) is the course aimed at?

- *Search, analysis and synthesis of data and information, also using the necessary technologies*
- *Adapting to new situations*
- *Decision making*
- *Autonomous work*
- *Teamwork*
- *Working in an international environment*
- *Working in an interdisciplinary environment*
- *Generating new research ideas*
- *Project planning and management*
- *Respect for diversity and multiculturalism*
- *Respect for the natural environment*
- *Demonstrating social, professional and ethical responsibility and sensitivity to gender issues*
- *Exercising criticism and self-criticism*
- *Promoting free, creative and inductive thinking*
- *...*
- *Other*

Search, analysis and synthesis of data and information with the use of the assorted technologies

Adaptation in new conditions

Decision Making

Independent work

Formulation of new research ideas

Project design and management

Respecting the natural environment

Promoting free, creative and deductive reasoning

(3) COURSE CONTENT

IoT in Transportation:

Research on IoT applications for traffic management, vehicle-to-vehicle communication, and autonomous vehicles.

Edge Computing in IoT:

Research on edge computing architectures for optimizing data processing in IoT environments.

Research on distributed Continuum application workflows (edge/cloud/device) and tradeoffs

Research on supporting services, platforms and frameworks for the IoT

IoT in Smart Cities

Research on IoT applications for traffic management, waste management, and energy conservation in smart cities.

Sustainability and environmental impact of IoT implementations in urban areas.

IoT and AI Integration:

Investigating the synergy between IoT and artificial intelligence for predictive maintenance and data analytics.

Developing AI algorithms for real-time decision-making in IoT systems.

IoT and Industry 4.0:

Examining IoT's role in the fourth industrial revolution, including smart factories and supply chain optimization.

IoT-enabled automation and robotics in manufacturing

Evaluating use of AI (safety, performance improvement, regulatory requirements etc) in Industry 4.0

Standardization and Interoperability:

Studying the challenges and solutions for IoT device interoperability and standardization.

(4) TEACHING and LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD <i>Face to face, Distant learning, etc.</i>	Distant and face to face meetings								
USE OF ICT <i>Use of ICT in Teaching, Lab education, Communication with the students</i>	Eclass, Google Meet Open Data Sources and Smart Cities APIs Software tools per case (e.g. Node-RED for workflows, Spark for data processing, Minio for data storage etc.)								
TEACHING MANAGEMENT <i>The way and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed.</i>	<table border="1"><thead><tr><th>Activity</th><th>Workload in Semester</th></tr></thead><tbody><tr><td>Project</td><td>125</td></tr><tr><td>Individual study</td><td>125</td></tr><tr><td>Course total</td><td>250</td></tr></tbody></table>	Activity	Workload in Semester	Project	125	Individual study	125	Course total	250
Activity	Workload in Semester								
Project	125								
Individual study	125								
Course total	250								
STUDENT EVALUATION <i>Description of the evaluation process Assessment Language, Assessment Methods, Formative or Deductive, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.</i>	Written Assignment								

(5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:

Research Papers per topic

- Relevant Scientific Journals:

IEEE Internet of Things
IEEE Transactions on Industrial Informatics
Elsevier Future Generation Computer Systems