



School of Informatics AUTH

Postgraduate Studies Program Communication Networks and Systems Security

M2.3 Postgraduate Study Guide of the current academic year (with all ECTS credits and expected learning outcomes of the program) -

EN



ARISTOTLE UNIVERSITY OF THESSALONIKI

FACULTY OF SCIENCES

SCHOOL OF INFORMATICS

POSTGRADUATE STUDIES GUIDE

«COMMUNICATION NETWORKS & SYSTEMS SECURITY»

ACADEMIC YEAR 2022-2023

THESSALONIKI 2023

This document has been edited by Professor A. Miliou with the assistance of the administrative staff, Mrs M. Milosi, Mr. S. Gkoutzamanis, E. Trikka, G. Theochari, and A. Kournoutou.

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1. PREFACE

The School of Informatics at the Faculty of Sciences at the Aristotle University of Thessaloniki (AUTH) was established in 1991 and accepts students since the academic year 1992-1993. The establishment of the School was a milestone for the Faculty of Sciences and AUTH, bringing a particularly important impact on the scientific life and technological development at the city of Thessaloniki.

Today, the School is considered as a renowned and distinguished School at both national and international levels. Its outstanding reputation is due to the distinctions and awards it has achieved, the research activities of its members, the research or development programs it coordinates or participates in, and mainly due to the high quality of education it offers and the professional recognition of its graduates (more information at <https://www.csd.auth.gr/studies/undergraduate/study-guides/>).

The School of Informatics offers several Postgraduate Programs of high standards:

- [Technologies of interactive Systems](#)
- [Communication Networks and Systems Security](#)
- [Data and Web Science](#)
- [Artificial Intelligence](#)
- [Digital Media – Computational Intelligence](#)

It also offers Postgraduate Programs in collaboration with other Schools at AUTH (crossdisciplinarity programs):

- [Management and Information Systems](#)
- [Medical Informatics](#)
- [Biomedical Engineering](#)

The Program of Postgraduate Studies (PPS) “Communication Networks & Systems Security” is aiming at the promotion of knowledge, and the training of high-level scientists in the cutting-edge subjects of Communication Networks and Systems Security, as well as the advancement of research in the above scientific areas with the graduates who will be able to successfully fill positions of the Private and Public Sector as well as positions in Research and Educational Institutions.

As Head of the School of Informatics at the Aristotle University of Thessaloniki and on behalf of all the teaching, research, and administrative staff of the School, I would like to congratulate and welcome all new students and wish to the entire academic community, a happy and creative academic year!

Ioannis Stamelos

President of the School of Informatics

2. COGNITIVE OBJECTIVES OF THE PROGRAM

We live in an era where the international environment of telecommunications and digital communications is changing radically, as new technologies help accelerate the process of completing the digital transformation of societies in developed economies. Network operators are making investments to modernize and expand their fiber-based networks while operators are making strategic decisions to develop future 5G/6G networks supporting a multitude of new applications and realizing the vision of a fully digital age, which is expanding beyond connectivity, and towards the Internet of Things (IoT), real-time applications such as distributed content webcasting and mobile broadband to meet the growing demands of users. New markets include automotive industry, online gaming, personal cloud services, sensor networks, remote healthcare services, and much more.

In addition, the trustworthiness and security of the above systems are essential for the economic and social activities. The size, frequency and impact of security breaches are increasing and pose a major threat to the operation of networks and information systems. Such incidents can hinder economic activities, undermine user's trust, and cause significant damage to a country's economy. In the era of globalization of networks and information systems, and especially the Internet, these incidents play an essential role in facilitating the cross-border movement of goods, services, and people. Due to their international nature, any significant disruption of these systems, whether intentional or not and regardless of where it occurs, can affect the entire chain of interconnected systems as well as the flow of information, demonstrating that the security of networks and information systems is of a major importance for the trouble-free operation of the market.

Technological advancements and the requirements in the field of communication networks as well as the security and reliability of systems and information set new business perspectives for the development of advanced networks, techniques, and systems such as:

3. growth of investments in fixed networks,
4. establishing standards to ensure interoperability between networks,
5. development of advanced services and applications (Tactile internet, Virtual/Augmented reality, Industrial control systems, autonomous vehicles, etc.),
6. smart city solutions, which include smart homes, smart transportation, smart waste management systems, smart public lighting systems, smart traffic management systems, etc. through a network of sensors.

while in the field of security they aim to:

7. the fight against electronic crime,
8. the protection of intellectual property in the digital age,
9. the protection of personal data and ensuring the privacy of communications.

These modern scientific areas express the new trends, which are developing rapidly with particularly important challenges especially for young scientists.

Graduates of the program will be employed as:

10. Network Managers/Security Administrators (Network Manager and Security Administrator) in telecommunications providers, banks, data centers, energy providers, etc..
11. Network Designer and Network Architecture (Network Designer and Network Architecture) in telecom providers, banks, data centers, energy providers, etc..
12. Project managers in IT companies (project manager in the IT industry).
13. Researchers / PhD students in Communication Networks or Systems Security (Researchers - PhD students).

3. LEARNING OUTCOMES OF THE PROGRAM

The postgraduate program "Communication Networks and Systems Security" aims to promote knowledge, and train high-level scientists in the cutting edge of Communication Networks and Systems Security, as well as advance research in the above scientific areas producing graduates who will be able to successfully fill positions in the IT and Public Sector as well as positions in Research and Educational Institutions.

The purpose of postgraduate program "Communication Networks and System Security" is fulfilled by attending organized postgraduate courses and preparing a Diploma Thesis in accordance with international academic standards that guarantee specialization and training in Communication Networks or in Systems Security.

In particular, upon successful completion of the program, the student in the direction of:

A. "Communication Networks" investigates advanced technologies and new generation networks enabling the student to expand his/her knowledge on the dominant technologies used, analyze and examine future trends as well as cutting edge technologies. Specifically, the student will be able to:

- Describe the operation of a cellular mobile network, the fundamentals of operation of 2G, 3G, 4G cellular networks, and know the technologies used in 5G networks as well as in networking in data centers.
- Understand how affordable high-speed optical communications can be using standard semiconductor manufacturing technology with the goal of future replacement of copper wires with optical fibers or waveguides and electrons with photons.
- Become familiar with advanced distributed algorithms for new large-scale distributed computing environments such as cloud computing.
- Investigate issues related to the operation of modern networks, with an emphasis on the best practices followed at different network levels and the possibility of planning and implementing large corporate networks as well as solving their problems.
- Investigate the architecture of the Internet of Things systems by understanding the rapid technological developments with new applications in our daily life and the economy, understand the interactions between devices as well as between devices with the cloud

computing environment , and become familiar with device programming on sensor control and communication with the cloud computing environment.

- Gain a comprehensive view of the field of optical networks at an advanced level through the implementation of laboratory exercises and bibliographic studies including the security of optical networks.
- Investigate issues related to the physical layer in networks, multiple access issues, new generation wireless networks, wireless network security and related research trends.
- Become familiar with modern photonic systems for optical switching network architectures, introduction to photonic integration technologies, familiarization with integrated photonic amplification, switching and routing devices, and software for optical communication.
- Understand cryptography and cryptanalysis, network and internet security protocols, systems security, addressing threats to systems, identifying, and addressing security problems and vulnerabilities, security policies, introducing systems' litigation, economic, legal and ethical issues in security systems.
- Understand the concepts of modeling, simulating, and evaluating the performance of parallel and distributed computing systems and become familiar with advanced techniques for modeling, simulating and analyzing the performance of computing systems consisting of multiple processors.

B. "Systems Security" utilizes the background on communication networks and focuses on the reliability and security of the dominant systems and technologies by acquiring a cognitive background in an extremely important part of modern communication technology. Specifically, the student will be able to:

- Describe the operation of a cellular mobile network, the fundamentals of operation of 2G, 3G, 4G cellular networks, and know the technologies used in 5G networks as well as in networking in data centers.
- Become familiar with advanced distributed algorithms for new large-scale distributed computing environments such as cloud computing.
- Investigate issues related to the operation of modern networks, with an emphasis on the best practices followed at different network levels and the possibility of planning and implementing large corporate networks as well as solving their problems.
- Systematize elementary knowledge of basic cryptography and acquire new fundamental knowledge that is used in computer security.
- Understand the fundamental issues and technologies of computer security, be aware of security threats and vulnerabilities at the computer, infrastructure, application, and service level, understand the basic principles of access control mechanisms and become familiar with the design of appropriate protection for addressing security issues.

- Gain a comprehensive view of the field of optical networks at an advanced level through the implementation of laboratory exercises and bibliographic studies including the security of optical networks.
- Investigate issues related to the physical layer in networks, multiple access issues, new generation wireless networks, wireless network security and related research trends.
- Become familiar with modern photonic systems for optical switching network architectures, introduction to photonic integration technologies, familiarization with integrated photonic amplification, switching and routing devices, and software for optical communication.
- Understand cryptography and cryptanalysis, network and internet security protocols, systems security, addressing threats to systems, identifying, and addressing security problems and vulnerabilities, security policies, introducing systems' litigation, economic, legal and ethical issues in security systems.
- Understand the concepts of modeling, simulating, and evaluating the performance of parallel and distributed computing systems and become familiar with advanced techniques for modeling, simulating and analyzing the performance of computing systems consisting of multiple processors.

Diploma Thesis are targeted at contemporary cutting-edge topics of the two specialization areas, simulations and/or experimental subjects, with modern software tools that are also used in companies, universities and large research centers while at the same time the students are given the opportunity to gain practical experience using the equipment and the infrastructure of the research laboratories belonging to the Department.

Finally, in addition to specialized knowledge, the student will know how to search at the literature, to implement one or more established (state-of-the-art) techniques in terms of which he/she will compare the performance of the technique which suggests.

At the same time, the students in the various courses will make presentations of their work (communication skills, correct use of presentation techniques, familiarity with audience questions).

The goal of all the above, with the successful completion of the program, is

1. the generation of specialized scientific professionals that will be able to immediately join the labor market and meet the growing professional demand experienced internationally in the fields of communication networks and system security, both in the private and the wider public sector,
2. the connection of the educational process and the produced know-how with businesses in order to spread the new technologies connecting the Greek economy with the new dynamic branches of the international economic development while at the same time the elite of human resources (our graduates) will remain and work in Greece.

4. THE FACULTY OF SCIENCES

The Faculty of Sciences was established in 1925 (until 1982 was called Faculty of Physics and Mathematics).

The Faculty of Sciences comprises six (6) Departments:

1. Department of Biology
2. Department of Geology
3. Department of Mathematics
- 4. Department of Informatics**
5. Department of Physics
6. Department of Chemistry

DEAN'S COUNCIL

DEAN

Prof. H. Charalambous School of Mathematics

MEMBERS

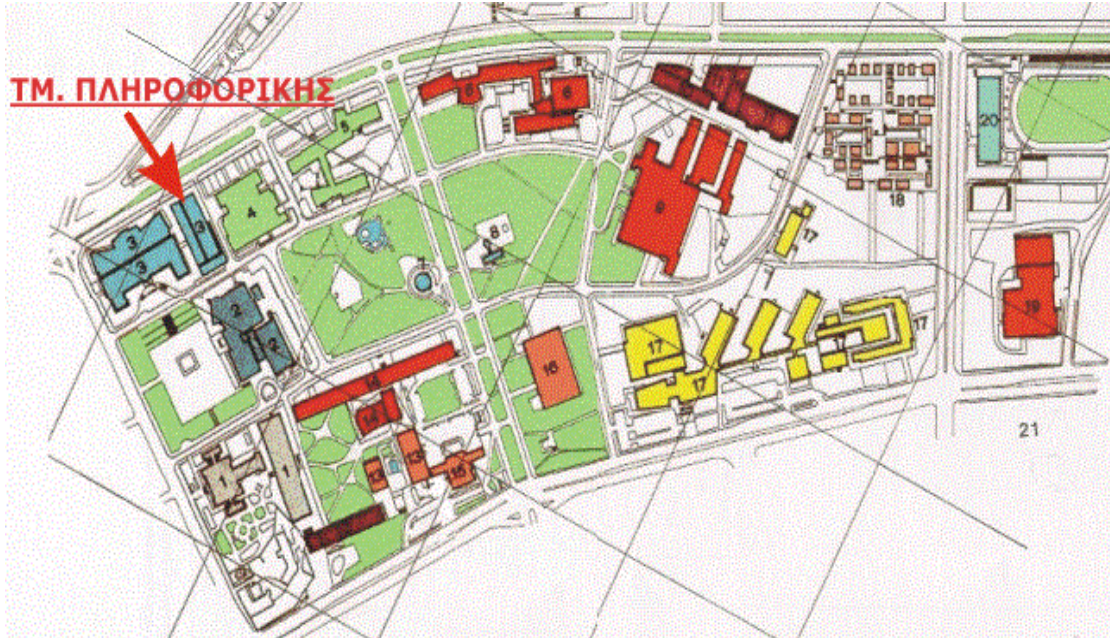
Prof. M. Giangou	Head of the School of Biology
Ass. Prof. K. Vouvalidis	Head of the School of Geology
Ass. Prof. R.D. Malikiosis	Head of the School of Mathematics
Prof. I. Stamelos	Head of the School of Informatics
Prof. A. Ioannidou	Head of the School of Physics
Prof. Th. Karapantziou	Head of the School of Chemistry

SECRETARY

E. Raftopoulou

5. ACCESS TO THE SCHOOL OF INFORMATICS

The School of Informatics and the postgraduate program “Communication Networks & Systems Security” are hosted in the premises of the Faculty of Sciences as shown in the following map of AUTH. In addition, the School of Informatics maintains some space in Kalamaria (Ethnikis Antistaseos 16, see relevant map: <http://tinyurl.com/csd-auth-east>) for hosting laboratories, classrooms, offices of faculty members and administrative staff.



Branch of the School of Informatics – Ethn. Antistaseos 16, Kalamaria



6. ORGANIZATION OF THE SCHOOL OF INFORMATICS

The School of Informatics has three main sectors. Each sector serves academic and research activities in different scientific areas.

A. Web, Data and Knowledge Engineering Division

Director: Prog. Athena Vakali

Two research laboratories belong to this sector:

Data and Web Science Laboratory (DataLab)

Director: Professor Athena Vakali

Members:

1. Anastasios Gounaris (Associate Professor)
2. Apostolos Papadopoulos (Associate Professor)
4. George Christodoulou (Associate Professor)

Webpage: <https://datalab.csd.auth.gr/>

Intelligent Systems Laboratory (ISL)

Director: Professor Ioannis Vlahavas

Members:

1. Nick Bassiliades (Professor)
2. Dimitrios Vrakas (Assistant Professor)
3. Grigorios Tsoumakas (Associate Professor)
4. George Meditskos (Assistance Professor)

Webpage: <https://intelligence.csd.auth.gr/>

B. Software, Hardware and Foundations Division

Director: Associate Professor Panagiotis Katsaros

Two research laboratories belong to this sector:

Software and Interactive Technologies Laboratory (SWITCH)

Director: Professor Ioannis Stamelos

Members:

1. Christos Katsanos (Assistant Professor)
2. Panagiotis Katsaros (Associate Professor)
3. Dionisios Politis (Assistant Professor)
4. Stavros Demetriadis (Professor)

5. Thrasyvoulos Tsiatsos (Associate Professor)

Webpage: <http://switch.csd.auth.gr/>

Statistics, Applied Mathematics and Electronic Physics Laboratory (SAMEP Lab)

Director: Professor Nikos Konofaos

Members:

1. Lefteris Angelis (Professor)
2. Konstantinos Draziotis (Assistant Professor)
3. Georgios Keramidas (Assistant Professor)
4. Nikolaos Tsitsas (Associate Professor)

Webpage: <http://samep.csd.auth.gr/>

C. Communication Networks and Information Analysis Division

Director: Professor Petros Nikopolitidis

Two research laboratories belong to this sector:

Artificial Intelligence and Information Analysis Laboratory (AIIA Lab)

Director: Professor Ioannis Pitas

Member:

1. Constantine Kotropoulos (Professor)
2. Nikolaos Laskaris (Associate Professor)
3. Nikolaos Nikolaidis (Associate Professor)
4. Anastasios Tefas (Professor)
5. Christos Ouzounis (Professor)

Webpage: <http://www.aiia.csd.auth.gr>

Network and Communication Systems Laboratory (NetCom Lab)

Director: Professor Georgios Papadimitriou

Members:

1. Amalia Miliou (Professor)
2. Petros Nikopolitidis (Professor)
3. Nikolaos Pleros (Associate Professor)

Webpage: <http://netcom.csd.auth.gr/>

7. POSTGRADUATE COURSE OF STUDIES: GENERAL INFORMATION

1. The academic year starts on September 1st and ends on August 31st of the next calendar year. Each academic year consists of two semesters. Each semester comprises of at least thirteen (13) full weeks devoted to educational activities.
2. Fall semester starts in the last week of September and ends at the last week January. The examination period of the winter semester follows. The spring semester starts in mid-February and ends at the end of May. The examination period of the spring semester follows. The exact dates are determined by the Senate of the University and are mentioned in the academic calendar of the University (https://www.auth.gr/academic_calendar/).
3. If for any reason the number of weeks of educational activities carried out in a course is less than thirteen, the course is considered not taught and is not examined in the following examination period.
4. An extension of the duration of a semester is allowed only in exceptional cases in order to complete the required minimum number of weeks of educational activities. Each extension may not exceed two weeks and is decided by the Rector, following a recommendation by the Dean of the relevant faculty along with a relevant recommendation of the School.
5. The student registers at the program at the beginning of each semester on dates set by the University and decides the courses he/she chooses on dates set by the Postgraduate Studies Coordinating Committee (MSC).
6. Students who are proven to work at least 20 hours a week can register as part-time students, following an application, which is approved by the dean's office of the faculty after a recommendation of the School. The duration of the program is double compared to the full-time students.
7. The course exams are conducted exclusively after the end of the winter and spring semesters for the courses taught in these semesters, respectively. In all cases, the students can only be examined in the courses he/she has registered at the beginning of the corresponding semester. Special care is taken for the oral examination of students with proven dyslexia before their admission to program.
8. No classes are held during the two examination periods. Also, there are no classes during Christmas Eve until the day of the Epiphany, from Thursday before Lent to the day after Lent Monday and from the Monday of Easter Week to the Sunday after Easter Sunday. In addition, there are no classes or examinations during weekends and during the following dates:
 - a. October 26th - St. Demetrius day
 - b. October 28th -National holiday
 - c. November 17th
 - d. January 30th
 - e. March 25th - National holiday
 - f. May 1st - Labor day
 - g. Holy Spirit day (June 8th, 2020)
 - h. Students' election day

9. The curriculum is divided into semester courses. Educational activities are considered: (a) the lectures, (b) teaching in small groups of students, (c) laboratory exercises and the corresponding exams, d) supervision of bachelor thesis or course projects and e) the organization of seminars or other similar activities aiming at consolidating students' knowledge.
10. The Curriculum includes the title, content, and weekly schedule (lectures, laboratory practices etc.) of all courses (both compulsory and elective) as well as their temporal succession and dependencies (if any). According to the National Qualifications Framework for Higher Education, the curriculum also contains the learning outcomes and qualifications attained from the curriculum as a whole, as well as from each individual course or educational activity or internship included therein. The credit units of each course, as well as the level of qualifications acquired, are matched with the rules set by the National Qualifications Framework, the European Lifelong Learning Qualifications Framework, and the Qualifications Framework of the European Higher Education Council.
11. Lectures are supplemented with the corresponding teaching materials, i.e., printed, or electronic books (including free access electronic books) as well as printed or electronic non-academic notes, which correspond in a comprehensive manner to the subject taught in the course and cover all or the most of its material, as defined in the regulation of graduate studies guide. All course teaching notes and slides should be available to the students at the e-learning platform.
12. Each instructor should distribute in the first week of the classes to all students that are enrolled in the course the course's study plan and outline, bibliography, and supplementary documentation.
13. Grading is being provided by the course instructor who can conduct written and/or oral exams or grade students on the basis of assignments or laboratory exercises.
14. Each semester course contributes a specific number of ECTS credits that are defined in accordance with the European Credit Transfer System (ECTS). The ECTS credits are a numerical value assigned to each course and it represents the workload required by the student to successfully complete the course. One ECTS unit corresponds to 30 hours of workload. One semester corresponds to 30 ECTS, while one full academic year corresponds to 60 ECTS.
15. Students have the right to suspend their studies. The procedure to be followed is described in the Regulations Guide of the Postgraduate Study Program (article 5).
16. From the websites <https://elearning.auth.gr/> students can download information on various topics related to the courses of the curriculum (announcements, material, lecture schedule, assignments and workshops, lecture slides, etc.). Announcements and information about events organized by the School of Informatics <http://www.csd.auth.gr/> and the Postgraduate program , <https://cnss.csd.auth.gr/> can also be obtained from the corresponding websites and from the Facebook, (<https://www.facebook.com/csdauthgr/> and <https://www.facebook.com/pmscnss> respectively).
17. Every semester, before the examination period, students have the right and the obligation to evaluate the courses and teachers with the aim of improving the quality of studies. More information is available on the website of the Quality Assurance Unit (MODIP-APTH <http://qa.auth.gr>) and on the website of the School.
18. In the event of a disciplinary offense (such as cheating during exams, use of electronic media, cheating while writing assignments, etc.) the General Assembly of the School will

impose actions (from a written reprimand to exclusion from participating in the exams for the following semesters).

ALUMNI PORTAL

A dedicated portal for the alumni of the School of Informatics (undergraduate students) is maintained at the following webpage: <http://grads.csd.auth.gr/>. Furthermore, for the postgraduate students a separate postal is maintained at alumni_pepms@lists.auth.gr. The purpose of these portals is to offer a contact point with the alumni of the School after their graduation.

8. THE POSTGRADUATE STUDY PROGRAM GUIDE

The Postgraduate Program entitled "Communication Networks and Systems Security" which leads to a master's degree is organized and operated from the academic year 2018-19 by the School of Informatics of the Aristotle University of Thessaloniki (AUTH).

The Study Regulations Guide of the program, determine its operation in accordance with the current legislation, and contain the following articles:

- Article 1. Purpose – Cognitive Objectives
- Article 2. Administrative bodies of the Postgraduate Studies Program
- Article 3. Categories of candidates for studying at program
- Article 4. Number of Enrollments, Criteria and Selection Procedure
- Article 5. Duration and Terms of Study
- Article 6. Study Program
- Article 7. Scholarships
- Article 8. Teaching Staff
- Article 9. Program Revenues - Financial Management Process
- Article 10. Administrative Support - Infrastructure
- Article 11. Postgraduation Ceremony
- Article 12. Type of Postgraduate Degree Awarded
- Article 13. Plagiarism
- Article 14. Other Provisions

EUROPEAN CREDIT TRANSFER SYSTEM (ECTS)

ECTS, the European Credit Transfer System, was developed within the framework of the ERASMUS (European Community Action Scheme for the Mobility of University Students) program in order to provide common procedures to guarantee academic recognition of studies abroad by measuring and comparing learning achievements and/or transferring them from one academic institution to another. The ECTS is based on mutual trust and confidence in the academic performance of partner institutions.

ECTS credits are a numerical value allocated to course units to describe the student's workload required to complete them. They reflect the quantity of work each course unit requires in relation to the total quantity of work necessary to complete a full year of academic study at the institution, that is, lectures, practical work, seminars, tutorials, fieldwork, private study - in the library or at home - and examinations or other assessment activities. ECTS is thus

based on a full student Guide for Undergraduate Studies School of Informatics workload and not limited to contact hours only. In ECTS, 60 credits represent the workload of an academic year of study, whereas the workload for a semester and a term (defined as a 4-month period) usually corresponds to 30 and 20 credits respectively. Each ECTS credit unit corresponds to 30 hours of workload under Greek law regulations.

ECTS credits are allocated to all compulsory and elective courses. Credits can also be allocated to project work and thesis where the “units” are an integral part of the degree program. Credits are awarded only when the course has been finalized and all required examinations have been successfully completed.

Further information is provided by the ERASMUS Program Officer at the School of Informatics, Associate Professor P. Katsaros (katsaros@csd.auth.gr) or the University’s Department of Euro-pean Educational Programs (DEEP).

9. OTHER POSTGRADUATE PROGRAMS AT THE SCHOOL OF INFORMATICS

Postgraduate Degree Programs

From 2018-2019, the School of Informatics offers more 4 postgraduate degree programs.

Postgraduate Studies Program «[Digital Media – Computational Intelligence](https://dmci.csd.auth.gr/en/)”

Director: Professor Christos Ouzounis

Website: <https://dmci.csd.auth.gr/en/>

Postgraduate Studies Program “[Artificial Intelligence](https://ai.csd.auth.gr/en/)”

Director: Associate Professor Grigoris Tsoumakas

Website: <https://ai.csd.auth.gr/en/>

Postgraduate Studies Program “[Data and Web Science](https://dws.csd.auth.gr/en/)”

Director: Associate Professor Anastasios Gounaris

Website: <https://dws.csd.auth.gr/en/>

Postgraduate Studies Program “[Technologies of interactive Systems](https://ihst.csd.auth.gr/en/)”

Director: Professor Nikolaos Konofaos

Website: <https://ihst.csd.auth.gr/en/>

Contact Information:

School of Informatics Secretariat
Aristotle University of Thessaloniki
541 24, Thessaloniki
E-mail: pms_info@csd.auth.gr
Tel: 2310998930, 2310998709

Interdepartmental Postgraduate Programs

The School of Informatics participates in three postgraduate programs in collaboration with other schools at AUTH:

(α) “[Management and Information Systems](http://deps.csd.auth.gr/)” (in collaboration with the School of Economic Sciences at AUTH)

Director: Professor Nikolaos Bassiliades

Website: <http://deps.csd.auth.gr/>

Contact Information:

School of Informatics Secretariat

Aristotle University of Thessaloniki
541 24, Thessaloniki
E-mail: deps_info@csd.auth.gr
Τηλ: 2310998709

(β) “[Medical Informatics](#)” (in collaboration with the Schools of Medicine, and Electrical and Computer Engineering at AUTH).

Director: Professor Antony Aletras

Website: <http://promesip.med.auth.gr/>

Contact Information:

Medical Informatics Lab
School of Medicine
P.O. Box 323
Aristotle University of Thessaloniki
541 24, Thessaloniki
E-mail: promesip@med.auth.gr
Τηλ.: 2310999272

(γ) “[Biomedical Engineering](#)” (in collaboration with the Schools of Electrical and Computer Engineering, Mechanical Engineering, Chemical Engineering, Informatics, Medicine and Biology at AUTH).

Director: Professor Dimitris Kugiumtzis

Website: <http://bme.web.auth.gr>

Contact Information:

E-mail: bme@auth.gr

10. DOCTORAL STUDIES

The School of Informatics awards a doctoral degree in a wide range of research fields. The research of the PhD candidates is supervised by the Professors of the School who all have extensive research experience in their knowledge domains. The results of the doctoral thesis research are published in leading conferences and journals of the most important scientific organizations in Computer Science, such as: Association for Computing Machinery (ACM) and Institute of Electrical and Electronics Engineers (IEEE).

Website: <https://www.csd.auth.gr/el/studies/doctoral-studies>

11. STUDENTS' MOBILITY

ERASMUS+ PROGRAM

Information about the ERASMUS+ program is provided below. Further information can be given by the Associate Professor P. Katsaros, who serves as the designated ERASMUS+ Program Coordinator of the School of Informatics (katsaros@csd.auth.gr) and by the Department of European Educational Programs (DEEP) (<http://eurep.auth.gr>).

STUDY MOBILITY

The Erasmus+ program enables postgraduate students to carry out their bachelor, Graduate Diploma Thesis in any of the countries of the European Union or the rest of the world that are associated with the School of Informatics.

PARTICIPATION IN THE ERASMUS+ PROGRAM

ERASMUS+ Mobility Scholarships are offered to students of all levels of education (undergraduate, postgraduate, and doctoral).

Rules for participation:

1. The beneficiaries must be Citizens of a Member State of the European Union or of another country participating in the program.
2. The website of DEEP <https://eurep.auth.gr/en/agreementsform/viewall> contains a list with the School of Informatics cooperation agreements and the Universities in which a student can apply for.
3. Students must have completed at least the first year of their studies and have successfully passed 50% of the ECTS by the current semester of studies. Also, the students must have not completed the minimum required ECTS credit level to obtain their degree in order to pursue part of their studies at the host University.
4. The applicant should have a proven and sufficient knowledge of the language in which the courses are offered at the host University. At the website of the Department of Education and Science at <https://eurep.auth.gr/en/agreementsform/viewall> the student can verify the foreign language degree that is required by the host University. An exception is the preparation of a thesis or postgraduate thesis, which can also be written in English.
5. The period of study at the host University can range from 3 up to 12 months.
6. The student may participate in the ERASMUS+ program only once during his/her studies.
7. There are no tuition fees, enrollment fees, exams, etc. at the host University.
8. National scholarships and loans are still fully paid to selected students.
9. The ERASMUS+ program also provides the opportunity to opt ERASMUS+ students without a scholarship as long as the mobility criteria are met.

At the website of the Department of Education and Science, the detailed procedure for evaluating student applications is depicted (<http://eurep.auth.gr/en/students/international/studies/evaluation>). The website also contains all the required steps that must be followed before the student's mobility, during his/her movement as well as the process to certify the successful completion of the attended courses.

12. VALUABLE SERVICES TO AUTH STUDENTS

All students studying at Aristotle University of Thessaloniki may request the assistance of the valuable University services in order to solve various problems they may face during their studies. They could also become themselves volunteers by offering their services to other colleagues or fellow students in need.

Website: <http://www.auth.gr/services>

SOCIAL POLICY AND HEALTH COMMITTEE

The Social Policy and Health Committee (SPHC) aims to create conditions that will make the University an accessible place to all members of the University community, by giving priority to accessibility to disabled persons in all classrooms and labs of the School.

For this reason, qualified members of the teaching staff can train students with visual impairment to use electronic equipment linked with Braille printers installed in some of the University libraries. Also, the SPHC tries, to the extent possible, to ensure that there are audio books available to these students.

The SPHC also provides a bus for disabled people, in order to facilitate their movement in the campus for classes and exams during the academic year. It is worth mentioning that the University has created a Program for the Promotion of Self-Help, which is basically run by a team of volunteers, the majority of whom are students (email: selfhelp@auth.gr, website: <http://www.selfhelp.gr/en/>).

Many years ago, the Social Policy and Health Committee established the institution of Voluntary Blood Donation, which also led to the creation of a Blood Bank in AHEPA hospital. Since May 2007, a second Blood Bank was founded too, in the School of Physical Education in Serres with the collaboration of the Social Policy and Health Committee and the General Hospital of Serres. Voluntary blood donation takes place twice a year during the months of November and April, at the Ceremony Hall of Aristotle University. The target is to cover all needs for blood through voluntary blood donation, while currently covers 40% of total needs. Volunteering for blood donation, which is a safe and a complications-free procedure, is open to every person above 18 years old, who does not have special health problems.

Email: socialcom@ad.auth.gr

Website: <http://ekpy.web.auth.gr/>

Tel./Fax: 2310 995386, 2310 995360

COUNSELLING AND PSYCHOLOGICAL SUPPORT COMMITTEE/CENTER

The Counselling and Psychological Support Committee aims to the better organization and operation of the University infrastructure that offer psychological assistance and counselling to AUTH students.

The services provided by the University Centre for Counselling and Psychological Support are offered to students and University staff. The Committee works closely with other related Committees and organizes workshops with students, as well as with the administrative and other staff of the University community. Among the future targets of the Committee is the operation of a campus hotline, in order to provide immediate assistance to people in crisis and to those facing personal difficulties and who could feel safer to talk about their problems in anonymity and in absence of visual contact.

The Counselling and Psychological Support Committee is located on the ground floor of the University Student Club, in the Sanitary Service Section at offices 5 & 8.

Website: <http://kesypsy.web.auth.gr/>

Email: vpapadot@ad.auth.gr

Fax: 2310 992607 & 210992621

VOLUNTEER COMMITTEE

The Volunteer Committee has as its prime goal to promote to the members of AUTH the idea of volunteering as a contemporary social demand. In this direction, the Volunteer Committee having also as its motivation the improvement of the daily life of everyone working in Aristotle University –students, teaching, and administrative staff– in areas such as student affairs, environmental issues, and social aid, and encourages all members of the University community to take initiative by submitting ideas and suggestions. To this end, some Networks of Volunteers in Schools and Faculties have already been established, consisting of a faculty member and a student, in order to develop a body of volunteers in each School/Faculty of AUTH.

Email: vrect-ac-secretary@auth.gr

Tel: 2310996713, 996708

SURVIVAL GUIDE

The School of Studies of the Aristotle University of Thessaloniki (<http://dps.auth.gr/en>) publishes a Survival Guide targeting primarily at freshments offering useful information about the city of Thessaloniki and Aristotle University.

Website: <http://www.dps.auth.gr/en/info/main>

CAREER OFFICE AT AUTH

The AUTH Career Office is a hub for information, support, networking and encouragement for students and graduates of the University in matters related to their studies and professional careers. The services and activities that it is developing daily have a single target: to help students and graduates approach their professional future, discover their skills, and acquire a job in the modern,

competitive environment or even start their own business. AUTH Career Office provides information on graduate studies in Greece and abroad, scholarships and grants as well as advisory support. It also organizes consulting workshops, entrepreneurship workshops, career events, and career days and it also announces new jobs and internships In its electronic bulletin board.

Website: <http://career.auth.gr>

In addition, AUTH has developed - and continues to develop - procedures and services that exceed beyond the basic obligations arising from the legislation and are oriented towards the continuous improvement and increase of benefits, despite the constantly shrinking resources, such as the following:

- University Student Restaurant Club (<http://www.pfl.auth.gr/>) .
- Libraries and online Libraries (The Central Library remains open 24 hours a day during examination periods), while the reading hall for graduate students and PhD candidates is open 8:00 – 20:00 (<https://www.lib.auth.gr/el/b001>).
- Scholarships and endowments (<https://klirodotimata.auth.gr/>).
- Department of European Programs (<https://eurep.auth.gr/>).
- Department of International Relations (<https://international-relations.auth.gr/>).
- Student Support Office of Sensitive Social Groups (<https://studentaid.auth.gr/>).
- Student Advocate: for issues other than grades and exams (<https://law.auth.gr/συνήγορος του φοιτητή>).
- Gender Equality Committee: for discrimination issues (<https://www.auth.gr/committee/com-gaei/>).
- Scientific student associations (<https://auth.acm.org/>).
- Children's Center (<https://paidiko.auth.gr/>).
- Office Coordinating Volunteers and Student Activities (<https://www.facebook.com/volunteercoordinationauth/>).
- Various groups of a cultural and social nature at the level of the Foundation and Schools (<https://www.auth.gr/cultural-clubs/>).
- University Gym (https://www.auth.gr/university_unit/gym/).
- University Camp (<https://camping.auth.gr/>).
- Electronic services through special applications, and via mobile phone (<https://it.auth.gr/>).

13. POSTGRADUATE STUDY PROGRAM

The basic elements of the Postgraduate Study Program are as follows:

- **Specializations:** There are two majors in the program (Communication Networks & Systems Security).
- **Language of instruction:** Greek or English
- **Credit units of each course:** 7.5 ECTS
- **Diploma thesis credits:** 30 ECTS
- **Total credits of the program:** (8 X 7.5) + 30 = 90 ECTS
- The workload for each master's degree/or full-time student at the program during an academic year is estimated at sixty (60) credits, and during an academic semester it is estimated at thirty (30) credits (ECTS).

Some important points are the following:

- The maximum number of postgraduate students is defined as 20 people per elective course. In case that more than 20 students select a particular course as an elective, then the students are selected based on the priority order of their electronic registration.
- A grade equal or greater than six (6), on a scale 0-10 with one decimal point, is considered as passing grade both for the postgraduate courses and for the postgraduate thesis.
- The student has the obligation to attend and be examined in eight (8) courses:
 - For the 'Communication Networks' major, successful completion of the program is considered when the postgraduate student successfully completes the requirements of six (6) compulsory courses (ComSC) and 2 electives (ELC) in 2 semesters and also submit his/her master's thesis.
 - For the 'Systems Security' major, successful completion of the program is considered when the postgraduate student successfully completes the requirements of five (5) compulsory courses (ComCS) and 3 electives (ELC) in 2 semesters and also submit his/her thesis.

The Postgraduate Program in Communication Networks & Systems Security has two majors (a) Communication Networks and (b) Systems Security and the curriculum of offered courses is structured accordingly. The title of each course is a hyperlink that leads to the detailed description of the course, on the website of the Quality Assurance Unit (MODIP) of AUTH.

Major: Communication Network

1st Semester: The student needs to select 4 out of 5 offered courses.

Code	Title	Hours	ECTS	Type	Teaching Staff
CNSS101	Network Infrastructure	3	7,5	ComSC	P. Nikopolitidis A. Miliou N. Pleros
CNSS102	Optoelectronic Systems Technology	3	7,5	ComSC	A. Miliou
CNSS103	Distributed Processing in Grids and Clouds	3	7,5	ComSC	E. Karatza

CNSS104	Advanced Topics on Network Security	3	7,5	ELC	G. Pallas
CNSS105	Internet of Things	3	7,5	ELC	P. Katsaros

Major: Systems Security

1st Semester: The student needs to select 4 out of 5 offered courses.

Code	Title	Hours	ECTS	Type	Teaching Staff
CNSS101	Network Infrastructure	3	7,5	ELC	P. Nikopolitidis A. Miliou N. Pleros
CNSS103	Distributed Processing in Grids and Clouds	3	7,5	ELC	E. Karatza
CNSS104	Advanced Topics on Network Security	3	7,5	ELC	G. Pallas
CNSS106	Cryptography	3	7,5	ComSC	K. Draziotis
CNSS107	Software and Computer Systems Security	3	7,5	ComSC	P. Katsaros

Major: Communication Network

2nd Semester: The student needs to select 4 out of 5 offered courses.

Code	Title	Hours	ECTS	Type	Teaching Staff
CNSS201	Optical Networks: Architectures and Security Issues	3	7,5	ComSC	G. Papadimitriou
CNSS202	Wireless Networks: Architectures and Security Issues	3	7,5	ComSC	P. Nikopolitidis
CNSS203	Advanced Topics on Optical Switching	3	7,5	ComSC	N. Pleros
CNSS204	Internet Security	3	7,5	ELC	P. Nikopolitidis
CNSS205	Modelling, Simulation and Performance Evaluation on Parallel and Distributed Systems	3	7,5	ELC	E. Karatza

Major: Systems Security

2nd Semester: The student needs to select 4 out of 5 offered courses.

Code	Title	Hours	ECTS	Type	Teaching Staff
CNSS201	Optical Networks: Architectures and Security Issues		7,5	ComSC	G. Papadimitriou
CNSS202	Wireless Networks: Architectures and Security Issues		7,5	ComSC	P. Nikopolitidis
CNSS203	Advanced Topics on Optical Switching		7,5	ELC	N. Pleros
CNSS204	Internet Security		7,5	ComSC	P. Nikopolitidis
CNSS205	Modelling, Simulation and Performance Evaluation on Parallel and Distributed Systems		7,5	ELC	E. Karatza

3rd SEMESTER: POSTGRADUATE DIPLOMA THESIS

- Postgraduate students apply for a Postgraduate Diploma Thesis selecting from a list of topics published each academic year by the teaching staff of the program (<https://elearning.auth.gr/course/view.php?id=17526>) and following the procedure described at the Guide for Postgraduate Diploma Thesis (<https://cnss.csd.auth.gr/studies/diploma-thesis>) published at the site of the program.
- The Graduate Studies Coordinating Committee (GSCC) following the candidate's application, which states the proposed title of the Postgraduate Diploma Thesis, the proposed supervisor, and a summary of the proposed work, assigns his/her supervisor and a Three-Member Examination Committee, one member of which is the supervisor. The members of the Examination Committee must have the same or related scientific interests as the subject of the Thesis.
- The Postgraduate Diploma Thesis (GDT) may be of research or technical nature and must have a sufficient degree of originality or demonstrate good knowledge and in-depth understanding of a specific topic of current research or technical interest. GDT work is carried out under the guidance of a supervisor. In exceptional cases, i.e., in case of illness or resignation the supervisor or a member of the Examination Committee could be replaced following the resolution of the General Assembly of the School.
- The work of the GDT is carried out within the 3rd or higher semester of studies. Postgraduate students send by email the subject they have chosen at the Secretariat of the Program and this email takes the place of the application for renewal of their registration for the 3rd semester of studies and is accompanied by the payment of the corresponding amount of tuition fees.
- A necessary condition for the examination of the GDT is the successful examination in the eight (8) courses of the program.
- The Thesis must be submitted and examined at least 12 weeks after the beginning of the 3rd semester.
- The GDT can be presented following its approval by the Examination Committee in dates and times decided by the GSCC in relation to the dates of the Postgraduation Ceremony of the Department's undergraduate and graduate students.
- The Thesis is written in the Greek language with an extensive summary in the English language, except in cases where the supervisor decides otherwise, in which case the Thesis is written in the English language with an extensive summary in the Greek language.
- In case that the student cannot complete his/her thesis within the time frame of a semester, the student renews his/her registration, each time accompanied by payment of the corresponding amount of tuition fees and for each subsequent academic semester until the completion of his/her Thesis and always within the maximum allowed period of study (a total of five [5] academic semesters).
- The grade 'Excellent' (grade ten [10]) is considered for a GDT that comprises an original research or technological project published or submitted for publication in a scientific journal or conference.

- The technical details of how to write a GDT (e.g. font size, content organization, number of copies if printed, etc.) are determined based on a relevant template file and they can be found at <https://cnss.csd.auth.gr/studies/diploma-thesis>.

14. CONTACT INFORMATION

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