Academic Year
2012-2013

Technologies and Management of Information and Communication Systems

Information and Communication Systems Security
Management of Information Systems
Information Management and Web Technologies
Communication and Computer Networking Technologies

Postgraduate Program Guide

University of the Aegean
DEPARTMENT OF INFORMATION AND COMMUNICATION SYSTEMS ENGINEERING

Karlovasi - Samos
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The establishment of the University of the Aegean is the realization of an idea of the great Greek mathematician Constantine Caratheodory. The University of the Aegean was founded in 1984 and is one of the newest universities in Greece. Today, having completed the second phase of its development with seventeen (17) academic Departments, twenty eight (28) Postgraduate Programs and thirteen thousand (13,000) undergraduate and graduate students, the University of the Aegean ranks among the largest universities in the country. Administrative headquarters of the University is Mytilene, while various departments have been established in towns of the islands of Lesvos.
(Mytilene), Chios (Chios), Samos (Karlovasi), Rhodes (Rhodes), Syros (Ermoupolis) and Lemnos (Myrina), forming a University-network covering both the administrative divisions of the Aegean (North and South Aegean).

The University of the Aegean, with its spatial dispersion, aims to provide modern scientific education and to promote high quality basic and applied research. Keeping a flexible, non bureaucratic, organizational structure, it has established high standards for the scientific level of both its graduates, and the research and teaching staff.

The main feature of the Departments of the University is the development of innovative disciplines, often interdisciplinary, which meet the needs of modern Greek and international society, as well as the demands and expectations of students for studies of high scientific value, combined with excellent prospects for career development.

The University of the Aegean is growing steadily and methodically, according to the Strategic Plans and the Five-Year Development Plans prepared. These plans reflect the experiences gained both from the operational difficulties of academic departments on border islands and the communication within a University-network, which operates under the particular conditions of the Greek Archipelago. These experiences led the University of the Aegean to be the first Greek University that fully integrates the information and communication technologies in everyday broad administrative practice, thereby creating the conditions of development of a Society of Information and Knowledge.
Currently the University of the Aegean comprises the following seventeen (17) Departments and Schools:

### School of Sciences (Samos)
- Dept. of Information and Communication Systems Engineering*
- Dept. of Mathematics
- Dept. of Statistics and Actuarial-Financial Mathematics

### School of Social Sciences (Lesvos)
- Dept. of Social Anthropology and History
- Dept. of Geography
- Dept. of Sociology
- Dept. of Cultural Technology and Communication

### School of the Environment (Lesvos)
- Dept. of Environment
- Dept. of Marine Sciences

### School of Business (Chios)
- Dept. of Business Administration
- Dept. of Shipping, Trade and Transport
- Dept. of Financial and Management Engineering*

### School of Humanities (Rhodes)
- Dept. of Primary Education
- Dept. of Pre-School Education and Educational Design
- Dept. of Mediterranean Studies

### Independent Departments
- Dept. of Product and Systems Design Engineering (Syros)*
- Dept. of Food Sciences and Nutrition (Limnos)

*The Engineering Departments will constitute the “School of Engineering” of the University of the Aegean, the founding of which has been already decided by the Greek Council for Higher Education.*
The University of the Aegean is managed by the Senate, the Rector and the Vice Rectors, who, for the academic year 2012-2013, are:

**Rector**
Professor Paris Tsartas

**Vice Rectors**
Associate Professor Nikolaos Soulakelis  
*Vice Rector of Academic Affairs and Student Welfare*
Professor Angelique Dimitracopoulou  
*Vice Rector of Research and Strategic Management*
Professor Ioannis Kallas  
*Vice Rector of Finance and Development*

The administrative facilities of the University of the Aegean are located at the following places:

**Lesvos (University Headquarters - Rector’s Office)**
University Hill, Administration Building, Mytilene, Lesvos, GR- 81100, Greece  
Tel. +30-22510-36000  
Fax: +30-22510-36009

**Samos**
Karlovasi, Samos, GR-83200, Greece

| Administrative Head | Eleni Papagrorigiou | Tel: +30-22730-82014/ 82017  
Fax: +30-22730-82008/ 82009  
Email: sam_regional_dir@samos.aegean.gr |
|---------------------|---------------------|-----------------------------|
| Secretariat of the Department of Information and Communication Systems Engineering | Eleni Papagrorigiou  
Eirini Grammatikou | Tel: +30-22730-82014/ 82017  
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Email: rena@aegean.gr |
| Undergraduate Studies Secretariat of the Department of Information and Communication Systems Engineering | Alexandros Shoinas  
Eirini Grammatikou | Tel.: +30-22730-82021  
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| **Postgraduate Studies Secretariat of the Department of Information and Communication Systems Engineering** | Mairi Loukaki | Tel.: +30-22730-82019  
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| --- | --- | --- |
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Fax.: +30-22730-82219  
Email: asxoin@aegean.gr |
| **Student Support** | Apostolos Galanopoulos | Tel.: +30-22730-82028  
Fax.: +30-22730-82009  
Email: agalan@aegean.gr |
| | Giorgos Mitatakis | Tel.: +30-22730-82011  
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Email: gmitatakis@aegean.gr |
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Email: cmagda@aegean.gr |
| **Computing Center** | Aggeliki Parianou | Tel.: +30-22730-82046  
Fax.: +30-22730-82049  
Email: apr@aegean.gr |
| |  | Helpdesk Tel.: +30-22730-82166  
Email: help@samos.aegean.gr |
| **Library** | Vasiliki Gouvala | Tel.: +30-22730-82030  
Fax.: +30-22730-82039  
Email: vgou@aegean.gr |
| **Administrative Services** | Manto Katsiani | Tel.: +30-22730-82010  
Fax.: +30-22730-82008  
Email: manto@aegean.gr |
| | Evina Vasmari | Tel.: +30-22730-82022  
Fax.: +30-22730-82009  
Email: evina@aegean.gr |
| **Financial Services** | Aggela Rina | Tel.: +30-22730-82016  
Email: aggela@aegean.gr |
| **Technical Services** | Nikos Zacharis | Tel.: +30-22730-82040  
Email: nzar@aegean.gr |
Facilities

The islands of the Aegean possess an architectural wealth of significant historical value. The exploitation of this wealth by the University of the Aegean contributes to the preservation of our national heritage. The aim of the University is that its activities are housed – where possible – in traditional buildings on the islands.

On the island of Samos, the University of the Aegean utilizes the following buildings:

**Karlovasi**
- Emporiki Sholi Building (Classrooms, Helpdesk)
- Igemoneio (Faculty Offices of Mathematics Department, Secretariat)
- Chatzigiannio (Library)
- Liberis Building (School of Science Secretariat, Faculty Offices of the Department of Information and Communication Systems Engineering, Secretariat)
- Vourlioti Building (Faculty Offices of the Department of Statistics and Actuarial-Financial Mathematics, Secretariat)
- Morali Building (Faculty Offices of the Department of Mathematics)
- Provatari Building (Classrooms, Faculty Offices)
- Tsobana Building (Multimedia center)
• Kalatzis Warehouses (under construction)
• “Former Papanikolaou” Building (Offices of Postgraduate Students)
• Middle Karlovasi School Group (Classrooms)
• Student Club – Projection Hall
• Student Residences of the University Unit of Samos
• “Former Katsika” Building (Technical Services)
• “Former Psatha” Building (offices)
• “Former Karagiannis” Building (warehouses)
• “Former Thrasyvoulou” Building (warehouses)
• “Former Pantazoni” Building (warehouses)

Vathi

• Maniakeio Institute (Seminar Room, Faculty Offices)
There are twenty eight (28) Postgraduate Programs in more than thirty (30) different fields of study in the University of the Aegean (www.aegean.gr).

The Postgraduate Program “Technologies and Management of Information and Communication Systems” operates in the Department of Information and Communication Systems Engineering, which is based on the island of Samos.
Emporiki Sholi Building (Classrooms, Helpdesk)
The Department of Information and Communication Systems Engineering

2.1 Teaching and Research

Information and Communication Technologies (ICTs) constitute a very dynamic part of the economy. The rapid proliferation of these technologies led to the development of the “New Economy”. The term New Economy, as we move towards the Information Society, includes the redesign of the existing economic activities concurrently with the creation of new ones, as digital technology makes storage, processing, dissemination and utilization of information easier, faster, cheaper and more efficient. The huge amount of available electronic information changes significantly the way companies and markets work, leading to a redesign of their operational framework that aims at the creation of new added value by exploiting the available information.

In this New Economy, the efficiency and competitiveness of organizations, in both the public and the private sector, highly rely on the effective exploitation of ICTs.

In this context, both the Undergraduate and Postgraduate Programs of the Department of Information and Communication Systems Engineering (www.icsd.aegean.gr) aim at preparing highly educated and skilled engineers in the area of ICTs, who:

- will have sound fundamental, as well as specialized knowledge,
- will be distinguished for their analytic, synthetic, critical and creative spirit,
- will be able to work effectively in a collaborative environment,
- will be able to contribute from positions of responsibility to the effective exploitation of ICTs in companies and organizations of the public, private and social sector of the economy,
will be able to take action in a collaborative environment, generating new knowledge through their participation in activities of basic and applied research and development.

2.2 Faculty

Head of Department: Professor Spiros Cotsakis
Director of Postgraduate Studies: Professor Spiros Cotsakis

Professor Spiros Cotsakis, Degree in Mathematics, National and Kapodistrian University of Athens, M.Sc. in Astronomy, Ph.D. in Mathematical Physics and Cosmology, University of Sussex (Differential Geometry, Mathematical Relativity, Generalized Theories, Mathematical Cosmology).


Professor Agis Iliadis, Degree in Physics, Aristotle University of Thessaloniki, M.Sc. in Electrical Engineering and Electronics, Ph.D. in Electrical Engineering and Electronics, University of Manchester Institute of Science and Technology (UMIST) (Semiconductors, Basic and Composite Materials for Semiconductors Construction).


Associate Professor Lilian Mitrou, Degree in Law, National and Kapodistrian University of Athens, Ph.D. in Law, Goethe-Universitat, Frankfurt (Legal Aspects of Information Society, Information Law, Individual Rights in the Information Society, Personal Data Protection).

Assistant Professor (tenured) Spyros Kokolakis, Degree in Informatics, Ph.D. in Information Systems, Athens University of Economics and Business (Information Systems, Information Systems Security).

Assistant Professor (tenured) Asimakis Leros, Diploma in Electrical Engineering, University of Patras, M.Sc. in Electrical & Computer Engineering, University of Massachusetts at Amherst, Ph.D. in Computer Engineering and Informatics, Univer-

Assistant Professor (tenured) **Charalampos Skianis**, Degree in Physics, University of Patras, Ph.D. in Informatics, University of Bradford (Computer Networks, Modeling and Performance Evaluation of Wireless and Mobile Communication Networks).

Assistant Professor (tenured) **Theodoros Tzouramanis**, Diploma in Electrical and Computer Engineering, Ph.D. in Informatics, Aristotle University of Thessaloniki (Databases, Geographical Information Systems).

Assistant Professor **Yannis Charalabidis**, Diploma in Electrical and Computer Engineering, Ph.D. in Complex Software Systems, National Technical University of Athens (ICT enabled Collaborative Governance, Linked / Open Data, Social Participation Systems, Complex Societal Systems Modeling and Simulation, Enterprise Interoperability).

Assistant Professor **Emmanouil Kalligeros**, Diploma in Computer Engineering and Informatics, M.Sc. in Computer Science and Technology, Ph.D. in Embedded Testing of Digital Circuits, University of Patras (VLSI Design and Test, Design for Testability, CAD Methodologies for VLSI Testing, Test-Data Compression and Built-In-Self-Test Architectures).


Assistant Professor **Alexis Kaporis**, Degree in Mathematics, Ph.D. in Threshold Phenomena in Combinatorial Problems, University of Patras (Algorithm Analysis, Probabilistic Techniques, Algorithmic Game Theory, Data Structures).


Assistant Professor **Ergina Kavallieratou**, Diploma in Electrical and Computer Technology Engineering, Ph.D. in Document Image Processing and Optical Character Recognition, University of Patras (Image Processing, Computer Vision, Pattern Recognition).

Assistant Professor **Elisavet Konstantinou**, Degree in Informatics, University of Ioan-

* Elected.
nina, M.Sc. in Signal and Image Processing Systems, Ph.D. in Public Key Cryptography, University of Patras (Cryptography).

Assistant Professor **Georgios Kormentzas**, Diploma in Electrical and Computer Engineering, Ph.D. in Traffic Control and Management of Broadband Networks using Abstract Information Models and Distributed Object Architectures, National Technical University of Athens (Computer Networks, Wireless Communications, Service Quality, Traffic Modeling and Analysis).

Assistant Professor **Manolis Maragoudakis**, Degree in Computer Science, University of Crete, Ph.D. in Artificial Intelligence, University of Patras (Data Mining, Privacy Preserving Data Mining, Machine Learning, User Modeling, Semantic Web, Databases, Bayesian Networks, Knowledge Engineering).


Assistant Professor **Efstathios Stamatatos**, Diploma in Electrical and Computer Technology Engineering, Ph.D. in Natural Language Processing, University of Patras (Natural Language Processing, Machine Learning and Computer Music).

Assistant Professor **Demosthenes Vouyioukas**, Diploma in Electrical and Computer Engineering, M.Sc. in Business Administration (MBA), Ph.D. in Wireless and Mobile Communications, National Technical University of Athens (Mobile and Satellite Communications, Digital Communication Systems, Propagation and Antennas, Broadband Networks).

Lecturer **Dimitrios Drosos**, Degree in Computer Science, University of Crete, MBA International (specialization e-commerce), Ph.D. in Mobile Advertising Effectiveness, Athens University of Economics and Business (e-Business, Wireless Technologies for Business Applications).

Lecturer **Christos Goumopoulos***, Diploma in Computer Engineering and Informatics, Ph.D. in Distributed Software Systems, University of Patras (Parallel and Distributed Computing).

Lecturer **Georgios Kofinas***, Degree in Physics, National and Kapodistrian University of Athens, M.Sc. in Theoretical Physics, University of Alberta, Ph.D. in Physics, National and Kapodistrian University of Athens (Relativistic Classical and Quantum Cosmology, Gravity in Higher Dimensions, Generalized Theories).

* Elected.
Dr. **Lambros Boukas**, Degree in Mathematics, Ph.D. in Parallel Algorithms, National and Kapodistrian University of Athens (Parallel Scientific Computing, Parallel Systems).


Dr. **Antonios Tsokaros**, Diploma in Electrical Engineering, Aristotle University of Thessaloniki, M.Sc. in Theoretical Physics, Ph.D. in Mathematical Physics, University of Wisconsin-Milwaukee (Mathematical Relativity, Numerical Relativity, Differential Geometry).

### 2.3 Technical Laboratory Personnel

Dr. **Dimitrios N. Skoutas**, Diploma in Electrical and Computer Technology Engineering, University of Patras, Ph.D. in Communication Networks, University of the Aegean.

**Christina Theocharopoulou**, Degree in Mathematics, University of the Aegean.

### 2.4 Research Activities

Basic and applied research is in the core of the transformation process of modern society into a society of knowledge. Basic research produces the knowledge, which will lead to the innovations of the future. Applied research is the answer to the constantly increasing demands for economic growth and progress, based on innovation for the benefit of the society and development of the country. The acceleration of social, economic and technological development created the need for rapid interaction between basic and applied research, particularly in the rapidly developing field of information technology and telecommunications.

Research requires robust planning, infrastructure supported by continuous investment, and, most of all, researchers with high expertise, broad and valuable knowledge base, inclination for participation in the research process and high-level collaborative view, practice and effectiveness. As a system of knowledge production, research is closely linked with education and technology.

In this context, investment in research is a primary objective and a key in the development of the Department of Information and Communication Systems Engineering.
The Department invests in pioneering and important areas of basic and applied research, such as:

- Algorithms and Computational Complexity
- Information Retrieval
- Knowledge Representation
- Information and Communication Systems Security and Protection of Privacy
- Databases
- Intelligent Agents
- Intelligent Systems
- Applications of Differential Equations
- e-Commerce – e-Business – e-Governance
- Foundations of Computer Science
- Mathematical Physics
- Nanotechnology and Bioelectronics
- Legal and Regulatory issues of Personal Data Protection
- Multi-agent Systems
- Investment and Strategy of Information Systems
- Personal and Mobile Communications Systems
- Decision Support Systems
- Privacy Enhancing Technologies
- Communication Systems and Networks
- Computer Supported Collaboration
- Digital Integrated Circuits and Systems

The faculty members of the Department of Information and Communication Systems Engineering have extensive experience in designing and carrying out competitive research and development projects. Such projects have been funded by the European Commission and the European Committee for Standardization, through programs such as: FP7, FP6-STREP, FP6-IST, TEN / TELECOM, ISIS, Leonardo, ACTS, INFOSEC ETS II, ESPRIT / ESSI, Telematics Applications, ACTION 2, INFOSEC, ESPRIT LTR, BRITE EURAM, INNOVATION, RACE, VALUE II, LRE, ESPRIT, EURATN, AIM, etc.

The Department’s faculty has similar experience in designing and carrying out national competitive research and development projects. Funders of such projects are: the Ministries of Interior, Foreign Affairs, Justice, Transparency and Human Rights,
Finance, Education and Religious Affairs, Culture and Sports, Health, Public Order and Citizen Protection, Labor, Social Insurance and Welfare, Marine and the Aegean, as well as the General Secretariat for Research and Technology, the General Secretariat for Greeks Abroad, the National Centre for Vocational Orientation, the National Organization for Medicines, the Social Insurance Institute, the Greek State Scholarship Foundation, the Information Society SA, and many private organizations and enterprises.

Also, by taking advantage of the European Union financing capabilities through the ERASMUS / SOCRATES programs, the Department has developed and maintains educational and research collaborations with several European universities, including, among others, the following: Royal Holloway and Bedford New College (University of London), University of Plymouth, University College Dublin, Aston University, Kingston University, Trinity College Dublin, University of Stockholm, University of Lund, Chalmers Institute of Technology, Karlstad University, University of Hamburg, University of Essen, University of Regensburg, Catholic University of Leuven, University of Vienna, Technical University of Graz, University of Oulu, University of Rome “La Sapienza”, University of Milano, Deusto University, University of Malaga, Polytechnic University of Catalunya, and Copenhagen Business School.
3 Postgraduate Program

3.1 Objective

The objective of the Postgraduate Program of the Department of Information and Communication Systems Engineering is to provide high-level education and promote basic and applied research in the area of Information and Communication Systems.

3.2 Degrees that can be obtained through the Postgraduate Program

The Postgraduate Program of the Department of Information and Communication Systems Engineering leads to the following Degrees:

- Master’s Degree (M.Sc.) in “Technologies and Management of Information and Communication Systems”
- Doctor of Philosophy (Ph.D.) Degree
4 Master’s Degree Program (M.Sc.)

4.1 Scope

The scope of the Master’s Degree Program in “Technologies and Management of Information and Communication Systems” is to provide high quality education for University graduates in the area of Information and Communication Systems.

4.2 Purpose

The purpose of the Master’s Degree program, apart from providing high-level education and promoting basic and applied research in the area of Information and Communication Systems, is also to study and exploit methodologies and tools in this vital area.

4.3 Objective

The objective of the Master’s Degree program is to train University graduates so as to provide scientists with advanced knowledge, skills and specialization, thus being able to:

- promote science through their participation in basic and applied research and development activities in the area of Information and Communication Systems,
- meet the needs of companies and organizations of the public, private and social sectors of the economy for specialized personnel in the areas of analysis, design, implementation, management and evaluation of Information and Communication Systems.
The Master’s Program in “Technologies and Management of Information and Communication Systems” of the Department of Information and Communication Systems Engineering consists of the following four Streams:

Stream I

*Information and Communication Systems Security*

Stream II

*Management of Information Systems*

Stream III

*Information Management and Web Technologies*

Stream IV

*Communication and Computer Networking Technologies*
5.1 Stream I

Information and Communication Systems Security

5.1.1 Scope and Objectives
The aim of the “Information and Communication Systems Security” Stream is to educate the postgraduate students on all aspects pertaining to the development, management and evaluation of a secure Information and Communication System. In particular, this Stream will offer all the knowledge and skills required for:

- analyzing, designing, developing, managing and evaluating the security level of an Information and Communication System, in close analogy to the “real” operational environment of a typical organization,
- creating new knowledge, by participating in research and development activities in the area of Information and Communication Systems Security.

5.1.2 Courses per Semester
The “Information and Communication Systems Security” Stream offers eight (8) courses. The titles as well as the distribution of the courses per semester are presented in the table below. All eight courses of this Stream are compulsory (C) and students are expected to successfully attend all of them.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course title</th>
<th>Course Type-Hours/week</th>
<th>ECTS Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter Semester</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>323-1001</td>
<td>Applied Cryptography I</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-1054</td>
<td>Computer Network Security</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-1100</td>
<td>Database Systems Security</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-1451</td>
<td>Advanced Internet Security and Privacy Issues</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>Spring Semester</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>323-1201</td>
<td>Applied Cryptography II</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-1252</td>
<td>Mobile and Wireless Networks Security</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-1501</td>
<td>Information Systems Security Management</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-1352</td>
<td>Special Issues in Information Law</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-1400</td>
<td>M.Sc. Thesis</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>
### 5.1.3 Courses Syllabus and Learning Outcomes

(for each course, syllabus is shown first and learning outcomes follow)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours/Week</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>323-1001</td>
<td>Applied Cryptography I</td>
<td>(C) 3 hours/week</td>
<td>7.5 ECTS</td>
</tr>
</tbody>
</table>

Introduction to number theory, prime numbers, finite fields, modular arithmetic, Chinese remainder theorem, one-way functions, historical cryptographic algorithms, one-time pad, public key cryptography (RSA, Rabin, ElGamal, elliptic curves), key management, Diffie-Hellman key agreement, stream ciphers, block ciphers, hash functions, digital signatures with appendix, digital signatures with message recovery.

Deep knowledge of the basic elements of number theory and familiarity with the most well known cryptographic algorithms.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours/Week</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>323-1054</td>
<td>Computer Network Security</td>
<td>(C) 3 hours/week</td>
<td>7.5 ECTS</td>
</tr>
</tbody>
</table>


This course focuses on advanced topics of network security. The learning objectives of this course are as follows: To understand how network security is perceived and materialized; to understand the various ways in which networks can be attacked and realize the tradeoffs in protecting networks; to provide students with a deep understanding of the architecture, risks, vulnerabilities and penetration testing techniques in both single and multi-domain networks; to articulate informed opinion about security by design vs. security as afterthought. The structure of the module follows the OSI/ISO architecture of network security and more specifically that of the Internet.
model. Case studies and student projects are an important component of the course. Their aim is to provide students with the knowledge and skills necessary to design and support network security, meaning to design and implement secure networks that streamline accessibility while minimizing exposure or susceptibility to security risks. The aforementioned objectives are accomplished through course lectures, paper readings, and extensive laboratory exercises.

323-1100  Database Systems Security  (C) 3 hours/week  7.5 ECTS

Database models, mechanisms and policies that ensure data confidentiality, integrity and availability. Discretionary and mandatory access control, role-based access control, multilevel secure database management system architectures. Digital watermarking in databases, surviving information warfare attacks on databases, data mining and intrusion detection, data corruption and database recovery. Encryption of data and translucent databases. Security in statistical, object-oriented, distributed and medical databases. Case studies: Oracle Database, Microsoft SQL Server, IBM DB2, MySQL, etc.

In this course, the students learn about challenges and threats, in their most serious form, against data security and privacy in modern database systems, and about the most effective countermeasures developed to protect data and ensure that legitimate and authorized users retain safe access to these data for processing.

323-1451  Advanced Internet Security and Privacy Issues  (C) 3 hours/week  7.5 ECTS


This course will give an overview of advanced topics in security and cryptography. It emphasizes on issues related to the Future Internet.

323-1201  Applied Cryptography II  (C) 3 hours/week  7.5 ECTS

Modular arithmetic, finite fields, algorithms that solve difficult mathematical problems (integer factorization, square root modulo n, discrete logarithm), pseudorandom number generator (BBS, RSA), production, management and distribution of crypto-
graphic keys, secret sharing, cryptanalysis, attacks and threats against symmetric systems and hash functions.

This course will give an overview of advanced topics in cryptography, ranging from asymmetric to symmetric key algorithms.

323-1252 Mobile and Wireless Networks Security  (C) 3 hours/week    7.5 ECTS


This course addresses security and privacy issues in wireless systems, including cellular and wireless LAN and MAN networks. Topics include confidentiality, integrity, availability, privacy, and control of fraudulent usage of wireless networks. The learning objectives of this course are: To impart state-of-the-art technologies and protocols of wireless network security; to identify and investigate both early and contemporary threats to mobile and wireless networks security; to apply proactive and defensive measures to deter and repel potential threats, attacks and intrusions; to develop an understanding of security architecture issues towards 4G. The emphasis is on security problems of MAC and upper layers. Case studies and student projects are an important component of the course. The aforementioned objectives are accomplished through course lectures, paper readings, and extensive laboratory exercises.

323-1501 Information Systems Security Management  (C) 3 hours/week    7.5 ECTS


Skills of Information Systems security officer.

The aim of this course is to offer to the students of the Postgraduate Program the opportunity and the possibility to gain an overview of the legal and institutional issues, which pertain to the Information and Communication Technologies (ICTs) in their socio-economic environment. The knowledge and understanding of the regulatory context of ICTs and of the main legal rules and principles allow the students to integrate their technical knowledge in a wider social, economical and institutional context. The knowledge and the understanding of these issues, the requirements of the socio-economic environment and the regulatory system are of major importance, as on the one side they enhance the inter-disciplinary knowledge and approach, and on the other side they provide the students with a wider range of skills, which prove to be useful for their professional course.

5.1.4 Research Activities

The research areas of interest of the faculty members and the collaborating researchers of the Laboratory of Information and Communication Systems Security (Info-Sec-Lab), which supports the “Information and Communication Systems Security” postgraduate Stream, include, among others:

- Security and Protection of Privacy in Mobile, Wireless and Sensor Networks
- Technical and Legal Issues of Secure e-Government
- Technical and Legal Issues of Secure e-Voting
- Secure e-Commerce and e-Business
- Secure e-Learning
Streams of the Master’s Program

- Health Information Systems Security
- Applied Cryptography
- Formal Methods in Security and Protection of Privacy
- Privacy Enhancing Technologies
- Theory and Development Practices of Public Key Infrastructure
- Information Systems Risk Assessment Methodologies
- Information Systems Security Policies
- Legal and Regulatory Issues of Personal Data Security and Privacy
- Security and Privacy Preservation Economics
- Information Law
- Intrusion Detection Systems
- Security on the Grid
- Technology and Applications of Smart Cards

The Info-Sec-Lab members have participated in numerous research and development competitive projects supported by EU programs (e.g., IST, CRAFT, Telematics for Administrations, ESPRIT, European Trusted Services ETS I & ETS II, ISIS, INFOSEC, Healthcare Telematics, RACE, ACTS, AIM, VALUE, STAR, ORA, Socrates / Erasmus, etc.), by the European Standardization Committee (CEN), or by the Greek Government (GSRT, ministries, public organizations, etc.).

In the framework of these projects, collaboration has been developed with more than 150 organizations, universities, research centers, private companies and public institutions from Greece, country members of the European Union and the USA. Doctoral and postgraduate students of the “Information and Communication Systems Security” postgraduate Stream perform high quality research by participating in the research and development activities of national and international competitive programs.

Members of the Info-Sec-Lab have participated as authors of books or book chapters, book editors or editors of conference proceedings, authors of invited journal papers, and authors of scientific journal or international conference articles, in more than 500 publications on Information and Communication Systems Security and Privacy Protection.

Furthermore, members of the Info-Sec-Lab have served more than 700 times as Conference General Chairs, Program Chairs, Program Committee Members, Members of Organizing Committees, referees in scientific journals and international confer-
ences, in the area of Information and Communication Systems Security and Privacy Protection.

The number of citations (from non co-authors) to the scientific work of the Info-Sec-Lab members exceeds 1,500.


Detailed information about all the above issues is available at the webpage of Info-Sec-Lab.

5.1.5 Honors – Graduates’ Impressions

All doctoral and a significant number of postgraduate students of the “Information and Communication Systems Security” postgraduate Stream have presented original papers in scientific journals and international conferences in Europe and the USA. Detailed information about these publications is available at the webpage of Info-Sec-Lab.

In addition, groups of students of this specific Stream, in collaboration with faculty members and other teaching staff, have implemented high quality software for the academic community, such as the MILC (http://milc.samos.aegean.gr/) and Pandora (http://pandora.samos.aegean.gr/) services. Specialized software applications implemented during the courses have been awarded in important contests. Such an exam-
ple is the EARTH application, which received the second prize in the National Contest of HTC Hellas for the development of applications in the Android platform. Also, students of the “Information and Communication Systems Security” postgraduate Stream participate in prestigious international contests in the area of information systems security (see http://www.appsecresearch.org/uni-challenge/).

Furthermore, many graduates of the “Information and Communication Systems Security” Stream, immediately after their graduation, have been employed by leading companies in Informatics and Telecommunications, working mainly on information systems’ and network security issues.

Finally, note the possibility for postgraduate students to stay for four months in one of the several collaborating European Universities through the Erasmus / Socrates program, in order to work on their M.Sc. Thesis.

Paraskevi Kostaki (M.Sc.)

The specialized scientific knowledge gained upon successful completion of the “Information and Communication Systems Security” Stream of the Master’s Program of the Information and Communication Systems Engineering Department, University of the Aegean, Samos, created the conditions for me to be hired immediately after my graduation, in one of the largest IT and Telecommunication companies in Greece, working as a security consultant in the development of integrated information systems for a large number of customers.

Evaggelos Rekleitis (Ph.D. candidate, collaborating researcher)

After my graduation from the Department of Information and Communication Systems Engineering, University of the Aegean, and the significant experience earned by obtaining an M.Sc. from Imperial College, University of London, I feel that my participation in the Info-Sec-Lab in order to conduct research on security issues in wireless and mobile communication networks, as well as my fruitful visits to international research centers and universities in Europe and the U.S. for exchanging views and experiences with researchers collaborating with the Info-Sec-Lab, are particularly exciting and rewarding.
5.2 Stream II

Management of Information Systems

5.2.1 Scope and Objectives

In Greece but also internationally, the graduates of “traditional” Computer Science and Engineering departments have primarily technological knowledge and skills. They usually lack knowledge and skills on business operation, management, and electronic support based on the use of modern information systems. This knowledge and skills are crucial for a successful professional career of computer science and engineering graduates, and especially for the occupation of high positions with critical administrative responsibilities.

The “Management of Information Systems” postgraduate Stream aims at filling this “gap”. In particular, this Stream is designed to produce graduates that combine the knowledge of information and communication technologies with administrative knowledge and skills. Modern enterprises are in great need for such kind of personnel, so as to be able to introduce new methods of organization and management, as well as new products and services that rely on new technologies.

The basic philosophy that runs through the Stream is that modern information systems personnel should be able to adopt several perspectives (technological, economic, administrative, social), achieve immediate goals while looking at the future, as well as focus on something specific (e.g., a project) without losing the overall perspective (e.g., the overall objectives and strategies). In addition, they should be able to communicate and cooperate harmoniously with all enterprise departments (e.g., financial, commercial, production), understand the present and future needs, and offer business-function-support solutions using new technologies. It is also essential that information systems personnel have the ability to adapt to a constantly changing dynamic economic and technological environment.

Based on the above, the “Management of Information Systems” postgraduate Stream targets Computer Science and Engineering graduates, or even other science graduates with, at least, some basic knowledge in the field of Information and Communication Technologies. It aims to offer them all the necessary knowledge and skills so as to be able to effectively deal with management and decision making issues in the field of information systems, which concern:
• the company or organization they work for, as scientific or administrative employees in various levels of hierarchy, or
• other organizations, as external technical or management consultants.

5.2.2 Courses per Semester

The titles as well as the distribution of the courses per semester for the “Management of Information Systems” Stream are presented on the table below.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course title</th>
<th>Course Type-Hours/week</th>
<th>ECTS Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter Semester</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>323-2000</td>
<td>Enterprise Management</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-2050</td>
<td>Enterprise Functions</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-2101</td>
<td>Management Information Systems (MIS)</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-2150</td>
<td>Information Systems in Context</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>Spring Semester</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>323-2300</td>
<td>Integrated Business Information Systems</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-2350</td>
<td>e-Business: Inter- and Intra-Business Information Flows</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-2251</td>
<td>Information Systems Security Management</td>
<td>(O)* 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-2401</td>
<td>Special Issues in Information Law</td>
<td>(O)* 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-2750</td>
<td>Information Systems Interoperability</td>
<td>(O)* 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-2900</td>
<td>Key Issues in Information Systems Management</td>
<td>(O)* 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-2500</td>
<td>M.Sc. Thesis</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

(C): Compulsory course, (O): Optional Course, (*): Students are expected to choose and successfully attend two (2) out of the four (4) optional courses

5.2.3 Courses Syllabus and Learning Outcomes

(for each course, syllabus is shown first and learning outcomes follow)

323-2000 Enterprise Management

Introduction to management. The management cycle. Basic enterprise functions. External enterprise environment. Internal environment and ways of management. Enter-

Acquisition of core knowledge on management, covering all the cycle - planning, organization, leadership and controlling. Identification of key issues and management techniques through case studies.

**323-2050  Enterprise Functions**  
(C) 3 hours/week  
7.5 ECTS


The acquaintance with core enterprise functions and the development of core managerial skills, through theory and practice.

**323-2101  Management Information Systems (MIS)**  
(C) 3 hours/week  
7.5 ECTS


Students will be able to understand and evaluate the applications of information systems for meeting the needs of modern organizations.

**323-2150  Information Systems in Context**  
(C) 3 hours/week  
7.5 ECTS

Ability to solve complex problems in information systems in the context of dynamic organizational environments.

**323-2300 Integrated Business Information Systems** (C) 3 hours/week 7.5 ECTS

Introduction, definitions. Enterprise Resource Planning (ERP) systems, structure, modules and interconnection. Electronic support - module of General Accounting: creation of chart of accounts, posting of general ledger entries, creation of budgets, design of special reports, initial set-up. Electronic support - module of Sales and Procurement: creation of customers and vendors master files, posting of transactions (quotes, orders, shipments/receipts, invoices, cash receipts/payments, returns, credit memos), initial set-up, interconnection with General Accounting module. Electronic support - module of inventory management: creation of items and storage locations master files, posting of intra-firm transfers, initial set-up. Electronic support - module of production planning and monitoring: initial set-up (definition of workcenters, items’ routings and bills of materials), production orders entry, processing and monitoring, production and materials’ requirements planning. Implementation of various business scenarios concerning the above modules using Microsoft Navision ERP system. Integrated business information systems implementation methodology and critical success factors.

In-depth understanding of the structure of an integrated business information system, and also of the functionality (capabilities) of its main modules and the interconnections among them. Advanced skills concerning the use, adaptation and business exploitation of the main modules.

**323-2350 e-Business: Inter- and Intra-Business Information Flows** (C) 3 hours/week 7.5 ECTS


Acquisition of knowledge and skills to introduce new structures and e-business models and to effectively manage digital enterprises.
323-2251  Information Systems Security Management (O) 3 hours/week  7.5 ECTS


323-2401  Special Issues in Information Law (O) 3 hours/week  7.5 ECTS


The aim of this course is to offer to the students of the Postgraduate Program the opportunity and the possibility to gain an overview of the legal and institutional issues, which pertain to the Information and Communication Technologies (ICTs) in their socio-economic environment. The knowledge and understanding of the regulatory context of ICTs and of the main legal rules and principles allow the students to integrate their technical knowledge in a wider social, economical and institutional context. The knowledge and the understanding of these issues, the requirements of the socio-economic environment and the regulatory system are of major importance, as on the one side they enhance the inter-disciplinary knowledge and approach, and on the other side they provide the students with a wider range of skills, which prove to be useful for their professional course.

323-2750  Information Systems Interoperability (O) 3 hours/week  7.5 ECTS

Definitions and main impact of interoperability. Interoperability in information systems in Greece, European Union and Internationally. Organizational, semantic, technical and policy interoperability. Interoperability infrastructures and standards for elec-

The acquaintance with the main issues of interoperability at technological, semantic and organizational level.

323-2900 Key Issues in Information Systems Management  (O) 3 hours/week  7.5 ECTS


Ability to develop business plans. ERP systems configuration and operation skills. Ability to develop mobile marketing plans and mobile commerce applications.

5.2.4 Research Activities

The effective integration and utilization of information and communication technologies in a modern enterprise, their rational administration/management, security policies planning, the redesign of processes and organizational structures based on the capabilities offered by the information and communication technologies, and, ultimately, the production of the highest possible value from them, are now critical issues for all enterprises. The faculty members and instructors of the “Management of Information Systems” postgraduate Stream, in collaboration with postgraduate students, conduct high level scientific research in this specific cognitive field, combining elements (perspectives, models, variables, etc.) from computer science, as well as the management, social and economic sciences, a fact that makes such research especially interesting and creative. The main axes of this research activity include the generation of Value Flow Models, which depict the entire mechanism of creating value from information systems, the administration/management of information systems security in organizations, Information Systems Investment, their impact on business performance and their synergies with complementary actions, as far as it regards organizational changes, innovation, human resources, etc., Enterprise Resource Planning (ERP) Systems, e-Government, e-Democracy, and e-Participation. Specifically, the instructors of this postgraduate Stream have been active in the following research areas:

- Enterprise Information Systems
- Information Systems Evaluation
- Value Flow Models
- Information Systems Security Management
- Information Systems Management
- Enterprise Resource Planning (ERP) Systems
- Information Systems Investment
- Information Systems Strategy
- Medical Decision Support Systems
- e-Government, e-Governance
- e-Democracy, e-Participation
- e-Business
- e-Learning


Furthermore, significant research collaborations have been developed with high-level organizations such as the European Commission, the Greek General Secretariat for Research and Technology, the Swiss Federal Institute of Technology (ETH) Zurich, the Dartmouth College, USA, University of Leuven, Belgium, University of Koblenz, Germany, the National Technical University of Athens, University of Patras, Greece, the Athens University of Economics and Business, ICAP SA (Greece), European Dynamics SA (Greece), Athens Technology Center (ATC), and more. Moreover, the instructors of the “Management of Information Systems” postgraduate Stream have significant experience of successful participation in international research projects such as the following:
- PADGETS ("Policy Gadgets Mashing Underlying Group Knowledge in Web 2.0 Media"), Framework Programme 7, European Commission
- ENGAGE ("An Infrastructure for Open, Linked Governmental Data Provision towards Research Communities and Citizens"), Framework Programme 7, European Commission
- NOMAD ("Policy Formulation through non moderated crowdsourcing"), Framework Programme 7, European Commission
- Affiliated institution in “DEMO-net”, Network of Excellence in e-Participation, project IST FP6-2004-27219, European Commission
- “Factors increasing the productivity of IT and Communication expenses of Greek enterprises – international comparisons”, PENED 2003, Greek General Secretariat for Research and Technology, Ministry of Development
- “i-Learn: Research and development of optimized methodology, procedures and specifications of an integrated software platform for high-standard education and training through the Internet”, PAVET Program - NE 2004, Greek General Secretariat for Research and Technology, Ministry of Development

5.2.5 Honors – Graduates’ Impressions

Postgraduate students of the “Management of Information Systems” Stream have participated in scientific publications presented in high quality scientific journals and international conferences. Some of them are mentioned below (students’ names in italics).


C. Alexopoulos, E. Loukis, Y. Charalabidis, I. Tagkopoulos, “A Methodology for Evaluating PSI e-Infrastructures Based on Multiple Value Models”, 16th Panhellenic Conference on Informatics with international participation (PCI 2012), 5-7 October 2012 Piraeus, Greece. (Submitted)


Ioakeim Sapounas (Ph.D.)

After completing my undergraduate education in the field of economics and my graduate studies in the field of total quality management (TQM), and having already a considerable work experience in the Hellenic Telecommunications Organization (OTE), I decided to pursue a Ph.D. at the Department of Information and Communication Systems Engineering, University of the Aegean. I chose a particularly ambitious and modern research topic: information systems investment, their impact on business performance and their synergies with the adoption of new forms of organization. The results exceeded my expectations: I had the opportunity to study the most advanced international literature in this field and to work with one of the most prestigious international universities, ETH Zürich. I managed to contribute to this cognitive area and publish papers in prestigious international journals and conferences. I believe that the knowledge and critical - creative ability that I gained will greatly help me in my future career.

Maria Gouni (M.Sc.)

After obtaining my degree from the Department of Technology Education and Digital Systems, University of Piraeus, I decided to go into graduate studies in the area of business information technology, aiming at a career in the field of consulting firms. I believe that the choice of the postgraduate Stream “Management of Information Systems”, of the Department of Information and Communication Systems Engineering, University of the Aegean, was an ideal choice. The program included a series of very interesting courses on the basic enterprise functions, their electronic support with various types of information systems (e.g., integrated enterprise resource planning - ERP, e-commerce systems, etc.), information systems management, integrated security policies design, etc. The faculty members and instructors of the courses of the Stream, combined theoretical knowledge with professional experience in their fields and had an intense research activity at international level (participation in international research projects, international publications, etc.), which they managed to incorporate creatively in everyday teaching and in the content of their courses. Moreover, the academic community in Samos has a small “human” scale, which allows a much better communication with the instructors and fellow students. I believe that the knowledge I gained will significantly help me in my future career.
5.3 Stream III

*Information Management and Web Technologies*

5.3.1 Scope and Objectives

Information is the DNA of modern economic and social life. The “Information Management and Web Technologies” postgraduate Stream prepares the scientists who understand the current needs, design and develop the advanced systems that manage the complexity and volume of available information.

This Stream deals with the challenges faced when trying to organize the ubiquitous and abundant information. The needs that have already arisen are particularly compelling, due to the rapid development of the web and information management technologies on the web, areas which are emphasized by the “Information Management and Web Technologies” postgraduate Stream.

The Stream aims at providing knowledge and developing skills needed to design and develop systems that meet the needs and requirements of users in the environment of the web, or in organizations with increased needs for information management. It provides postgraduate students with fundamental knowledge and skills to design and implement information management systems and services. Through teaching and research the Stream deals with the collection, description, classification, storage, retrieval, handling and distribution of information, with emphasis on web technologies. It specializes in content description of sources of information and complex information objects, the combination of heterogeneous information sources, advanced information management techniques using database systems, distributed systems technologies, agent systems, machine learning, multimedia data, and computer vision. Students elected to attend this specific Stream are expected to have excellent knowledge of the areas of algorithms and data structures, databases, and artificial intelligence. Particular emphasis is given on system design and development capabilities, as well as on the use of mathematical concepts.

The creativity of candidates and their motivation to learn and work on innovative aspects of computer science are key requirements for successful completion of the Stream’s program of study, within a demanding teaching and learning environment.

Graduates of this postgraduate Stream have a wide open horizon of professional options, with career opportunities in corporate and government positions, involving the design and implementation of information management systems. At the same
time, students have acquired the necessary knowledge so as to be able to continue
their studies for obtaining a Ph.D. in a definitely cutting edge field.

The scientific community of Information Management and Web Technologies in
the Department of Information and Communication Systems Engineering is multifac-
eted. The interaction between community members is encouraged through seminars,
discussions, presentations and case studies. Through these, students gain valuable
experience and knowledge on specific issues of cutting edge technology. The high
standards of teaching and the climate of cooperation guarantee the quality of student
support.

Having been chosen to attend the “Information Management and Web Technolo-
gies” postgraduate Stream, a student joins a rich, restless community of students, re-
searchers and research assistants, with increased requirements. Teachers and post-
graduate students of the previous year’s program of the Stream are willing to share
their experience and knowledge with younger students, in understanding informa-
tion management and web technologies.

### 5.3.2 Courses per Semester

The “Information Management and Web Technologies” Stream offers eight (8) courses. The titles as well as the distribution of the courses per semester are presented on the

table below. All eight courses of this Stream are compulsory (C) and students are ex-
pected to successfully attend all of them.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course title</th>
<th>Course Type-Hours/week</th>
<th>ECTS Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Winter Semester</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>323-3202</td>
<td>Machine Learning</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-3002</td>
<td>Knowledge Representation and Semantic Web</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-3101</td>
<td>Distributed Systems and Web Services</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-3651</td>
<td>Combinatorial Optimization</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>Spring Semester</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>323-3252</td>
<td>Image Processing and Computer Vision</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-3201</td>
<td>Data Mining in the World Wide Web</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-3750</td>
<td>Databases for Multidimensional Data and Web Applications</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-3451</td>
<td>Research &amp; Development Project</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>323-3500</strong></td>
<td><strong>M.Sc. Thesis</strong></td>
<td></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>
### 5.3.3 Courses Syllabus and Learning Outcomes

(for each course, syllabus is shown first and learning outcomes follow)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>323-3202</td>
<td>Machine Learning</td>
<td>(C) 3 hours/week</td>
<td>7.5 ECTS</td>
</tr>
</tbody>
</table>


Familiarity with basic principles of machine learning. Ability to use and understanding of properties of concept learning algorithms, decision trees, artificial neural network algorithms, Bayesian learning algorithms, memory-based learning algorithms, support vector machines, algorithms for learning sets of rules, genetic algorithms, and reinforcement learning algorithms. Familiarity with standard methods to evaluate classifiers.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>323-3002</td>
<td>Knowledge Representation and Semantic Web</td>
<td>(C) 3 hours/week</td>
<td>7.5 ECTS</td>
</tr>
</tbody>
</table>


Understanding of basic principles of knowledge representation and the Semantic Web. Familiarity with the Propositional Logic and the Predicate Logic. Ability to represent a problem as a CSP. Understanding the use of algorithms for solving CSPs. Familiarity with the Satisfiability concept. Ability to understand and use structured Web documents. Ability to understand and use ontology description languages. Ability to understand and use ontology querying languages. Familiarity with rules and reasoning of the Semantic Web. Familiarity with ontology engineering and its applications. Ability to develop ontologies and knowledge bases.
323-3101  Distributed Systems and Web Services  (C) 3 hours/week  7.5 ECTS
The development of ways to think and manipulate problems in a distributed fashion, in contrast to acting in a centralized manner.

323-3651  Combinatorial Optimization  (C) 3 hours/week  7.5 ECTS
The introduction to optimization methods and to their application in important problems.

323-3252  Image Processing and Computer Vision  (C) 3 hours/week  7.5 ECTS
Specific issues: Acquaintance with basic computer vision terms, Acquaintance with image processing methodologies, Introduction to the current computer vision problems, Ability to understand the operational methodologies of the computer vision systems. General Issues: Acquaintance with research, Practice on real problems, Learning of presenting and reporting research results.

323-3201  Data Mining in the World Wide Web  (C) 3 hours/week  7.5 ECTS
Web Mining: Data collection, preprocessing, data modeling. Opinion Mining: Sentiment classification, argument extraction, opinion comparison. Wrappers: instance based wrapper learning, DOM trees and automatic creation from trees. Web crawling: general purpose crawlers, focused crawlers, local crawlers. Link Analysis: Social net-

The course intends to give an insight into data mining techniques applied to Internet related data, and what they can be used for. After successful completion of the course, the students should be able to: a) identify and differentiate among application areas for web content mining, web structure mining and web usage mining, b) describe key concepts such as deep web, surface web, semantic web, web log, hypertext, social network, information synthesis, corpora and evaluation measures such as precision and recall, c) discuss the use of methods and techniques such as word frequency and co-occurrence statistics, normalization of data, machine learning, clustering, vector space models and lexical semantics, d) explain in detail the architecture and main algorithms commonly used by web mining applications, e) appropriately select between different approaches and techniques of web mining for, e.g., sentiment analysis, targeted marketing, linguistic forensics, topic/trend-detection-tracking and multidocument summarization (information aggregation), f) apply human language technology tools such as tokenizers, stemmers, part-of-speech taggers, noun phrase chunkers and shallow parsers on different types of web content gathered, for instance, from e-commerce sites, and perform analysis of linguistically processed data using a suitable statistical classifier, g) set requirements, compare and assess the quality of existing web mining tools, h) analyze and explain what web mining problems are satisfiably solved, what is worked upon at the research frontier and what still lies beyond the current state-of-the-art, and i) independently solve a well-defined practical web mining problem using tools and techniques introduced in the course, or analyze it through theoretical studies seeking information beyond the course literature.

**323-3750  Databases for Multidimensional Data and Web Applications**

Introduction to databases for multidimensional data objects. Databases for geographical, spatial, temporal and spatiotemporal data. Spatial networks and mobile objects databases. Databases for multimedia: text, documents, images, audio and video clips. Data models, query languages, indexing and retrieval of multidimensional objects. The generation and visualization of large synthetic datasets for benchmarking pur-
poses. Access multidimensional databases through the web and specialized search engines. Database outsourcing in unsecure and untrustworthy servers. Emerging research topics. Case studies: the ESRI Geodatabase, representation and manipulation of complex multidimensional data objects in Oracle Database, in Microsoft SQL Server, in IBM DB2, in MySQL and in PostgreSQL. Software tools for the implementation of applications and the visualization of multidimensional objects through web-based interfaces: MapServer, Oracle MapViewer, etc.

The course provides the student with knowledge of the fundamentals and trends in multidimensional data handling, and also with ideas on how to apply a sequence of relative core concepts, methods and algorithms in cutting-edge and diverse application domains, such as the multimedia and geographical information systems (GIS) industry, computer-aided design & manufacturing (CAD/CAM), astronomy, molecular biology, etc., reaching beyond the traditional fields of database management applications.

| 323-3451 Research & Development Project | (C) 3 hours/week | 7.5 ECTS |

During the first month, the instructors present to the students their research interests and suggest possible topics of research. Each student chooses the topic that attracts them more and, for the remaining of the semester, is doing research work under the supervision of the corresponding instructor. At the end of the semester, the students present their research results.

Acquaintance with research. Practice on real problems. Learning of presenting and reporting research results.

5.3.4 Research Activities

In the Society of Knowledge, the enormous amount of information resulting from the activities of organizations and communities, has made it imperative to develop applications that are able to collect, exploit and manage different forms of information, from different sources, with different usage. The faculty members and instructors of the “Information Management and Web Technologies” postgraduate Stream conduct basic and applied research, which aims: to produce schemes and languages for representing the content of information, to develop methods and techniques for data mining, to exploit semantic information, to design databases for data of many dimensions, to develop algorithmic techniques for problems that arise during the processing of large amounts of data, and to develop systems that exploit distributed information. Specifically, the research areas in which the instructors of the Stream have been active are:
• Language technology
• Text mining
• Data mining
• Plagiarism detection
• Intelligent music processing
• Document image processing
• Optical character recognition
• Historical document, image and photo processing
• Bayes belief networks
• Combinatorial optimization
• Algorithmic techniques and applications
• Computational complexity
• Approximation and direct algorithms
• Large-scale optimization
• Service positioning problems
• Resource assignment and routing problems
• Algorithmic game theory issues
• Efficient algorithm implementation
• Ontology engineering
• Semantic Web technologies

The instructors of the “Information Management and Web Technologies” postgraduate Stream have considerable experience in designing and carrying out national, as well as international research and development projects. Such projects have been funded by the European Commission, the Greek General Secretariat for Research and Technology, the Ministry of Education and Religious Affairs, Culture and Sports, and the University of the Aegean. Postgraduate and undergraduate students work as research assistants in such projects, actively participating in research activities of increased requirements.

The instructors of the Stream have also developed educational and research collaborations with many Greek and European Universities and research institutes. Examples include the following: NCSR Demokritos (Athens, Greece), Computer Technology Institute & Press “Diophantus” (Patras, Greece), University of Patras (Greece), University of Macedonia (Thessaloniki, Greece), University of Piraeus Research Center (Greece), Max-Plank Institut fur Informatik (Germany), Bauhaus Universitaet Weimar (Germany), Universitat Politecnica de Valencia (Spain), Instituto Tecnologico de Informatica, Valencia (Spain), Universitat Autonoma de Barcelona (Spain), Lehigh University (USA), Dartmouth College (England), Johannes Kepler University Linz (Austria), OFAI (Austria), University of Genova (Italy).

Particular emphasis is given on linking teaching with research through the Research & Development Project course (see Section 5.3.3), but also through invited speakers’ lectures, as part of the remaining courses of the Stream. Students prepare their theses on contemporary research topics and are encouraged to submit their work for publication, under the guidance of their supervisors.

5.3.5 Honors – Graduates’ Impressions

Student’s honors and publications (students’ names in italics):


T. Balafoutis and K. Stergiou, “Algorithms for Stochastic CSPs”, 12th International

I think that the “Information Management and Web Technologies” postgraduate Stream is one of the most challenging, as well as interesting of the Master’s Program of the Information and Communication Systems Engineering Department, University of the Aegean. The technologies taught are at the forefront of technology developments and address completely new fields in relation to the Undergraduate Program of the Department. Courses such as Machine Learning, Knowledge Representation (Ontologies) and Multi-agent Systems spurred my interest more. As a graduate of Mathematics, I initially met some difficulties, especially in terms of coding requirements, which they finally helped me to improve though. After my graduation, I worked on representation and processing of biological data, in the form of ontologies, in the field of Systems Biology at the National Hellenic Research Foundation. I also worked at the EKTORAS project of the University of the Aegean.

Athanasios Balafoutis
(M.Sc., Ph.D.)

My participation in the “Information Management and Web Technologies” Stream of the Master’s Program of the Information and Communication Systems Engineering Department, University of the Aegean, was an unforgettable experience; it exceeded my expectations. I was not searching for an “indifferent” postgraduate program that would provide a degree that will soon “decorate a wall”. I was looking for something more and the specific postgraduate Stream did not disappoint me: with a demanding course program, adapted to modern trends and developments in the field of information management and web technologies, and with instructors following the new scientific work, being part of it actually, and investing in imparting knowledge. In this way, ideal conditions are created for anyone who really wants to set high personal goals, through, of course, significant personal effort. In addition, I would like to say that being part of a small-sized academic community has many advantages. It helps in creating a “family-like” environment among students and instructors that favors cooperation. It gives the opportunity of a “personalized” education to students, as instructors can devote more time to them, imparting more easily not only knowledge, but also a research way of thinking. I strongly recommend to those who consider attending the specific Stream to do so. They will be pleasantly surprised.
5.4 Stream IV

**Communication and Computer Networking Technologies**

5.4.1 Scope and Objectives

Communication and computer networks are among the fastest growing areas in the field of informatics and communications, with important technological developments that change the way of life of modern people. Modern companies operating in this area require their personnel to have, on the one hand, a strong theoretical background, and on the other, a very good knowledge of recent technological innovations.

The “Communication and Computer Networking Technologies” postgraduate Stream is the oldest Stream of the Master’s Program of the Information and Communication Systems Engineering Department, since it operates from the beginning of the program, during academic year 2002-2003. Trying to meet the demands of the Greek and international market for well trained personnel in modern trends in this area, the Stream offers high-level postgraduate education, providing both theoretical foundations and practical knowledge on recent developments in the area of communication and computer networks.

The Stream is mainly aimed at higher education graduates with qualifications relevant to computer science, computer engineering and electrical engineering, who wish to focus on:

- the design and development and/or management and operation of wired and wireless computer networks, in small or large companies in the field of telecommunications and networks in Greece and internationally,
- research in the same area.

The selection of the Stream courses and their content has been done in such way as to deal with specific needs and deficiencies of the telecommunications market personnel in a wide range of issues, which, among others, include technologies of access and trunk networks, protocols, architectures, reliability and performance evaluation of modern networks, as well as modern business issues. Upon successful completion of the Stream’s program of study, graduates will have gained important advantages, such as:

- strong knowledge of modern networking technologies,
- ability to compare and evaluate products and services,
- ability of management and supervision of complex and demanding telecommunications projects.
5.4.2 Courses per Semester

The titles as well as the distribution of the courses per semester for the “Communication and Computer Networking Technologies” Stream are presented on the table below.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course title</th>
<th>Course Type-Hours/week</th>
<th>ECTS Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter Semester</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>323-4000</td>
<td>Performance Evaluation of Computer Networks</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-4901</td>
<td>Mobile and Satellite Communications</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-4951</td>
<td>Network, Green Technology and Next Generation Services Issues</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-1054</td>
<td>Computer Network Security</td>
<td>(O)* 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-3101</td>
<td>Distributed Systems and Web Services</td>
<td>(O)* 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>Spring Semester</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>323-4201</td>
<td>Wireless Communication Networks</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-5000</td>
<td>Design and Development of Networks and Services</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-4452</td>
<td>Internet Technologies</td>
<td>(C) 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-1252</td>
<td>Mobile and Wireless Networks Security</td>
<td>(O)* 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-5050</td>
<td>VLSI Systems Design</td>
<td>(O)* 3 hours/week</td>
<td>7.5</td>
</tr>
<tr>
<td>323-4400</td>
<td>M.Sc. Thesis</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

(C): Compulsory course, (O): Optional Course, (*): Students are expected to choose and successfully attend one (1) out of the two (2) optional courses in each semester.

5.4.3 Courses Syllabus and Learning Outcomes

(for each course, syllabus is shown first and learning outcomes follow)

323-4000 Performance Evaluation of Computer Networks  (C) 3 hours/week  7.5 ECTS

Markov and semi-Markov processes. Renewal theory. Birth-and-death processes. Queuing theory: M/M/1, M/M/1/K, M/M/m, M/M/m/m, M/M/∞, M/G/1 systems. Queuing networks; Jackson networks; Aloha systems. Network performance evaluation. Experimental setup and simulation.

Understanding of mathematical and statistical models of computers and networks. Understanding of major elements and function of simulation software. Capability for setting up and carrying out an experiment. Capability of statistical analysis and interpretation of simulation results.
323-4901  Mobile and Satellite Communications  
(C) 3 hours/week   7.5 ECTS


The course consists of a series of lectures dealing with the issues of mobile and satellite communications. Aspects considered include the analysis, design and evaluation of wireless and satellite systems, along with the knowledge of radio propagation issues, characterization and understanding of the physical layer and advanced mobile services and satellite systems. This course is designed to meet the needs of the Greek and international market for specialization in a wide range of issues relating to communication networks.

323-4951  Network, Green Technology and Next Generation Services Issues  
(C) 3 hours/week   7.5 ECTS

Dynamical addressing for mobile terminals and the usage of DVB-T/ and DVB-H technologies. Usage of DVB for triple-play service provisioning in rural areas. Cross-layer and Cross-system design and evaluation using advanced simulation tools. Management of distributed heterogeneous systems that also contain sensor nodes. Distributed, self-organized systems with location awareness. Advanced services for the future Internet. Experimental platforms for the evaluation of large systems (such Panlab, Onelab, GENI). Design of networks and services using energy efficiency as a prime factor.

Skills related to advanced networking topics, green technologies and advanced services in next generation networking environment.

323-1054  Computer Network Security  
(O) 3 hours/week   7.5 ECTS

This course focuses on advanced topics of network security. The learning objectives of this course are as follows: To understand how network security is perceived and materialized; to understand the various ways in which networks can be attacked and realize the tradeoffs in protecting networks; to provide students with a deep understanding of the architecture, risks, vulnerabilities and penetration testing techniques in both single and multi-domain networks; to articulate informed opinion about security by design vs. security as afterthought. The structure of the module follows the OSI/ISO architecture of network security and more specifically that of the Internet model. Case studies and student projects are an important component of the course. Their aim is to provide students with the knowledge and skills necessary to design and support network security, meaning to design and implement secure networks that streamline accessibility while minimizing exposure or susceptibility to security risks. The aforementioned objectives are accomplished through course lectures, paper readings, and extensive laboratory exercises.

**323-3101  Distributed Systems and Web Services**  
(O) 3 hours/week  7.5 ECTS


The development of ways to think and manipulate problems in a distributed fashion, in contrast to acting in a centralized manner.

**323-4201  Wireless Communication Networks**  
(C) 3 hours/week  7.5 ECTS

Evolution of second and 2.5 (GPRS) generation mobile communication networks into

The aim of this course is the study of advanced topics in wireless next generation systems. Aspects of wireless local area networks, packet routing, cellular systems and ad-hoc networks, at physical and MAC layer are considered. Upon successful completion of this course, the students will be able to explain the limitations of wireless access, and whether these limitations affect the performance of higher layers. Also, they will have understood the structure and operation of wireless and cellular networks and next generation systems, and they will be able to identify their specific features and limitations.

323-5000 Design and Development of Networks and Services
(C) 3 hours/week 7.5 ECTS

Introduction into advanced networking technologies (NAT, IP multicast, WEP, IEEE 802.1X, 802.21, etc.), architectures (MPLS, Diffserv, IntServ, etc.), protocols (RSVP, Mobile IP, IPv6, OSPF, BGP, etc.) and services (WebTV, IPTV, p2p, v2v, CDN). Active services with features, such as self-organization, environmental knowledge, location awareness, APIs for cost estimation, mobility, safety and QoS.

Advanced skills of designing and developing modern networking systems and services.

323-4452 Internet Technologies
(C) 3 hours/week 7.5 ECTS


Students will develop a basic understanding of technologies and protocols used on the Internet, and how to effectively use Internet tools, including current web-based applications, e-mail, and social networking tools. They will also become acquainted with searching strategies development and basic web authoring.

This course addresses security and privacy issues in wireless systems, including cellular and wireless LAN and MAN networks. Topics include confidentiality, integrity, availability, privacy, and control of fraudulent usage of wireless networks. The learning objectives of this course are: To impart state-of-the-art technologies and protocols of wireless network security; to identify and investigate both early and contemporary threats to mobile and wireless networks security; to apply proactive and defensive measures to deter and repel potential threats, attacks and intrusions; to develop an understanding of security architecture issues towards 4G. The emphasis is on security problems of MAC and upper layers. Case studies and student projects are an important component of the course. The aforementioned objectives are accomplished through course lectures, paper readings, and extensive laboratory exercises.

Application Specific Integrated Circuits (ASICs), Field-Programmable Gate Arrays (FPGAs), Hardware Description Languages (Verilog, VHDL), Combinational and Sequential digital circuits, Design simulation, Design synthesis, Timing analysis, Post-synthesis simulation, Finite State Machines (FSMs), FIFOs, Handshaking, Memories and memory interface, Clock distribution issues, CAD tools.

Familiarity with the process of designing and implementing a digital system by using hardware description languages, CAD tools and FPGA-based boards.

The members of the “Computer and Communication Systems Laboratory” and
structors of the “Communication and Computer Networking Technologies” postgraduate Stream conduct research in a wide range of areas of communication networks and their applications, and hold relevant patents and accreditations (ELOT EN ISO / IEC 17025:2005 for high frequency electromagnetic fields measurements). Their current activities balance between basic and applied research and include:

- Next generation network and communication architectures and services
- Mobile and wireless network security
- Wireless multimedia communications
- Network management and middleware technologies
- Networks and services focusing on energy efficiency, quality and safety
- Mobile and wireless communication networks
- Ad hoc networks, sensor networks and wireless grid networks
- Satellite communications, cooperative satellite and terrestrial networks
- Smart energy networks
- Heterogeneous technologies, reconfigurable and cognitive networks
- Mobile and pervasive computing
- Measurement and evaluation of electromagnetic fields
- Traffic modeling and performance evaluation
- Radio coverage and propagation in wireless terrestrial and satellite networks
- Cloud computing technologies
- Network and communication applications (e.g., e-government, medical informatics)
- Multimedia services, information servers and integrated platform architectures
- Internet of Things services
- Digital integrated circuits and systems

The instructors of the Stream participate in numerous European and National research and development projects with the support of postgraduate and doctoral students, who gain significant experience in the areas of communication networks and applications. Some of these projects are:

- “COGEU: COgnitive radio systems for efficient sharing of TV white spaces in EUropean context”, FP7, 2010 -, Funding: European Commission
Streams of the Master’s Program

- GEneration NetwoRks - PASSENGER”, FP7, 2008 - 2009, Funding: European Commission
- “HURRICANE: Handovers for Ubiquitous and optimal bRoadband ConnectIvity among CooperAtive Networking Environments”, FP7, 2008-2010. Funding: European Commission
- “UNITE: Virtual Distributed Testbed for Optimization and Co-existence of Heterogeneous Systems”, FP6-STREP, 2006-2009, Funding: European Commission
- “Development of an Autonomous System for Measuring Electromagnetic Radiation”, 2010-2011, Funding: Greek General Secretariat for Research and Technology
- “Development of a Wireless Local Area Network (WLAN) for providing external and internal access to the students of the University of the Aegean, School of Science, Karlovasi, Samos”, 2005-2008
- “High availability, reliability and management of wireless communication in special-purpose ad-hoc networks”, Pythagoras Project, 2004-2006, Funding: Greek Ministry of Education and Religious Affairs, Culture and Sports

The instructors of the Stream have also organized and/or served as chairs of technical program and organizing committees of international conferences, some of which are listed below:

IEEE International Conference on Communications (IEEE ICC 2012), 10-15 June 2012, Ottawa, Canada

International conference on Telecommunications and Multimedia (TEMU) 2012, Heraklion, Crete, Greece July 30 - August 1, 2012
IEEE Consumer Communications and Networking Conference (CCNC), January 7 -10 2012, Las Vegas, Nevada USA
IEEE International Conference on Communications (IEEE ICC 2011), 5-9 June 2011, Kyoto, Japan
IEEE Consumer Communications and Networking Conference (CCNC), January 9 -12 2011, Las Vegas, Nevada USA
IEEE International Conference on Communications (IEEE ICC 2010), 23 -27 May 2010, Cape Town, South Africa
1st International Conference on Mobile Lightweight Wireless Systems (Mobilight 2009), May 18-20, 2009, Athens, Greece
8th IEEE International Workshop on IP Operations and Management (IPOM 2008), September 22-26, 2008, Samos Island, Greece

Collaborations with other higher education institutions, research institutes and companies operating in the area of networks and communications have been developed in the framework of research and development projects. In order to link teaching with research and recent technological developments in the market, people from various organizations have been invited for lectures to the postgraduate students of the Stream. Additionally, for students with excellent performance, there is the opportunity to visit such organizations and/or work on a part of their M.Sc. Thesis. Some of the aforementioned collaborations are indicated below.

National: National Technical University of Athens, National and Kapodistrian University of Athens, NCSR Demokritos, University of Piraeus, University of Patras, Technological Educational Institute of Larissa, Technological Educational Institute of Crete, Athens Information Technology, COSMOTE SA, ERICSSON HELLAS, F-IN, Synelixis, Greek Air Force, PeSYP of Thessaly, PeSYP of North Aegean, Administrative Division of North Aegean, Informatics and Telematics Institute, General Hospital of Athens G. Gennimatas, Foundation for Research and Technology, Alfa Logic SA, Minoan Lines.
International: IBM (Zurich), FRANCE TELECOM R & D (France), University of Surrey (UK), CEA LETI (France), EURECOM (France), Anect (Czech Rep.), ATOS (Spain), ENGINEERING (Italy), Thales (UK), Rohde & Schwarz (Germany) Technische Universität Dresden (Germany), Waterford Institute of Technology (Ireland), INSTINTUTO TELECOMUNICAÇÕES (Portugal), SIGINT Solutions Ltd (Cyprus), University of Malaga (Spain), University of Portsmouth (UK), University of Cyprus (Cyprus), Nowcasting International (Ireland), Cyprus Institute of Neurology and Genetics (Cyprus), Harvard Medical School, Boston (USA), OmegaCube SA (Italy), Indra Espacio SA (Spain) Mondragon-Enyca SA (Spain) Trinity College Dublin (Ireland) Poznan University of Technology (Poland) Institut für Rundfunktechnik (Germany) Centre Tecnològic de Telecomunicacions de Catalunya (Spain).

5.4.5 Honors – Graduates’ Impressions

Best Student Paper Award:

Students awarded by the ERICSSON Awards of Excellence in Telecommunications:
Prodromos Makris (M.Sc., Ph.D. candidate)

Current occupation: Ph.D. candidate, Department of Information and Communication Systems Engineering, University of the Aegean, researcher in various European and National projects of the Computer and Communication Systems Laboratory such as FP6-IST-UNITE, FP7-ICT-HURRICANE, FP7-ICT-PASSIVE, FP7-ICT-COGEU, COSMOTE PEDION 24, etc.

The “Communication and Computer Networking Technologies” Stream of the Master’s Program of the Information and Communication Systems Engineering Department, University of the Aegean, gave me the opportunity to further develop the knowledge of a Department’s graduate on computer and communication network issues. The cooperative attitude of the instructors of this specific Stream and the general mood of cooperation among all faculty members of the Department in various converging research activities, offer the students many opportunities to develop their skills beyond their purely academic obligations. My active participation in large-scale research projects and the personal contact with colleagues from different European countries and research organizations (e.g., research institutes, universities, multinational corporations, small and medium enterprises) gave me the opportunity to enrich my CV and, most of all, to use in the best possible way the knowledge I received during the Master’s Degree Program.

Nikolaos Nomikos (M.Sc., Ph.D. candidate)

Current occupation: Ph.D. candidate working on “Spectral Efficient Cooperative Relaying with Interference Mitigation in Heterogeneous Networks”, Quality Manager of the Computer and Communication Systems Laboratory (ELOT EN ISO 17025:2005 Certified), Department of Information and Communication Systems Engineering, University of the Aegean, Project Engineer in the program PEDION24 for the continuous and uninterrupted awareness of the levels of electromagnetic radiation in various regions of Greece.

As a graduate of the Department of Electrical and Computer Technology Engineering, University of Patras, with specialization in Telecommunications and Information Technology, the selection of “Communication and Computer Networking Technologies” Stream of the Master’s Program of the Information and Communication Systems Engineering Department, University of the Aegean, put me in touch with the latest developments in the field of Telecommunications and Networks. Furthermore, its instructors, with their experience in research, gave me the motivation to begin my career as a Ph.D. candidate in the Department. In conclusion, my studies in Samos not only helped me build my profile as an engineer, but gave me valuable partners in my further research and professional career.
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6.1 Library

The Library of the University Unit of Samos is housed in a renovated neoclassical building of 1903, the "Chatzigianneio". It is an annex of the Central Library of the University of the Aegean, which is located in Lesvos (Mytilene). It operates as a lending library and the opening hours are 8:30-15:00 daily, while, during the winter and spring semester, is some days open until 20:00, depending on the available administrative staff. The library has:

- 24,000 volumes of books. The largest part of the collection is related to the scientific disciplines of Computer Science, Mathematics, Technology and Natural Sciences, in
order to serve the teaching and research needs of the Departments of the University Unit of Samos. There are also literary books, essays, etc.

- 360 foreign and Greek journal titles. Some of these journals are available in electronic form or in microfilm.
- Access to Electronic Scientific Databases, which offer the capability of scientific articles search, up to the level of full text.
- Informational material (encyclopedias, dictionaries, etc.)
- Doctoral Dissertations, Master and Diploma Theses
- Audiovisual material which includes disks, CDs, videotapes, cassettes, CD-ROMs, DVD-ROMs.

All the services of the Library (Lending, Orders, Cataloguing, catalog search, journals, etc.) are automated. The search can be done from the website:

http://www.lib.aegean.gr

Additionally, in the same building, there is a fully equipped teleconference room.

6.2 Computing Center and Laboratories

The primary purpose of the Computing Center is the development and maintenance of the necessary telecommunication and network infrastructure, for serving the teaching and research needs of the Departments of the University Unit of Samos. In this context, the Computing Center helps and supports users during working hours, assists in software installation, develops and supports new applications as well as telecommunication and network connections that are created in Samos, and takes care of supplying, upgrading and monitoring of equipment and software. Meanwhile, students can use the specialized laboratories of the Department (Laboratories ALKMINI, ELECTRA, PHAEDRA and DORYSSA), which have modern computer systems, software products and hardware instruments, for supporting the teaching and research needs the Department.
Postgraduate Student Services

The following services are provided for the postgraduates students of the Department:

✦ Full medical and hospital care, which includes medical, hospital and clinical examinations and pharmaceutical care.
✦ Free meals and accommodation, under the condition that, according to the law and the internal regulation of the University of the Aegean, specific requirements relating to financial and family situation are met.
✦ Scholarships and loans, in accordance with the law and the internal regulation of the University.
✦ Discount tickets for public transport, including ferry, under certain conditions. The discount is interrupted throughout periods of possible suspension of study, military service or loss of student status.

More information is available on the Department’s website:
http://www.icsd.aegean.gr
Basic elements of Operation, Organization and Regulation of Postgraduate Studies

According to the current legal framework for the organization and operation of the Postgraduate Program of the Department, the competent bodies are:

- The General Assembly of Special Composition (G.A.S.C.) of the Information and Communication Systems Engineering Department
- The Coordinating Committee of Postgraduate Studies (C.C.P.S.) of the Information and Communication Systems Engineering Department
- The Director of Postgraduate Studies

The Director of Postgraduate Studies deals with the problems arising during the operation of the Postgraduate Program and brings in to the G.A.S.C. all matters relating to the effective implementation of the Postgraduate Program.

The C.C.P.S. is responsible for monitoring and coordinating the operation of the Postgraduate Program.

The G.A.S.C. is responsible for taking decisions on any matter regarding the Postgraduate Program.

Duration of Study

The duration of study for obtaining the Master’s Degree (M.Sc.) is three (3) full-time semesters, two of which are teaching semesters and include attending courses, laboratories, seminars and any other educational or research activity of the Master’s Program, and the third is dedicated to the preparation of the M.Sc. Thesis.

The teaching hours per week for each course are three (3). In addition to these hours and in order to meet the needs of possible laboratories, seminars, practical exercises, etc., extra hours can be added by a decision of the G.A.S.C.
Teaching, Studying, Exams

1. The start and end of the courses of the Master’s Program are defined according to the annual academic calendar of the University of the Aegean, which is included in the final pages of this guide.

2. The attendance of the educational (lectures) and other activities of the Master’s Program is mandatory for the postgraduate students. The fulfillment of this requirement is determined by the instructor of each course.

3. The method of evaluation of the postgraduate students’ progress in each course may include written examination, oral examination, preparation and presentation of project(s), another method or combination of methods at the discretion of the instructor. Written examinations take place at the end of each semester, according to the annual academic calendar of the University of the Aegean.

4. Each postgraduate student can be examined only once in each course. If a student fails the examination in one or more courses, then the possibility of repeating the examination, as well as the details of such an examination, are determined by a decision of the G.A.S.C., upon a reasoned request.

5. In cases, where postgraduate students are required to successfully pass the examination of preparatory courses of the undergraduate program of study of the Information and Communication Systems Engineering Department, those examinations take place during the first or – in case of failure – the second examination period of the year of enrollment.

M.Sc. Thesis

The cognitive area and the exact topic of the M.Sc. Thesis can be set after the end of the second semester of study, after consulting with a supervisor. For each postgraduate student, a faculty member is appointed as a supervisor by the G.A.S.C., after a proposal of the C.C.P.S. The supervisor has the scientific responsibility of the preparation of the M.Sc. Thesis and is appointed when the choice of the subject is made. Researchers at recognized research institutions, who hold a Ph.D., or other faculty members, may be appointed as co-supervisors of the postgraduate student. For the examination of the Master’s Thesis, a three-member committee is appointed by the G.A.S.C. of the Department, comprising the supervisor and two (2) other faculty members or researchers of grades A, B and C, who hold a Doctoral Degree. The examining
committee members must have the same or a related scientific specialty to the subject of the Master’s Program.

The title of the M.Sc. Thesis and the appointment of supervisor(s) are decided by the G.A.S.C., upon recommendation of C.C.P.S. at the end of the second semester of study. The M.Sc. Thesis is submitted to the three-member examining committee appointed by the decision of the G.A.S.C.

The M.Sc. Thesis defense is done in front of an audience at a date and time designated by the supervisor, during the examination period of the winter semester of each year. After M.Sc. Thesis defense, the committee evaluates and grades the thesis.

The three-member examining committee may refer back the M.Sc. Thesis for corrections, for a period of up to one (1) month. The Examining Committee Report shall be signed by all members present during M.Sc. Thesis defense, while a separate document with the signatures of all committee members who vote positively (i.e., that the candidate has passed) should be also included in the original text of the M.Sc. Thesis.

### Completion of Study

A postgraduate student is considered to have fulfilled their obligations if they have completed at least three (3) semesters of study, have attended and been examined successfully in all courses, laboratory and practical exercises included in the Master’s Program, and their M.Sc. Thesis has been approved by the examining committee, according to the regulation of postgraduate studies. Additionally, the postgraduate student must have been successfully examined in all preparatory undergraduate courses that may have been set by the G.A.S.C.

During the first two semesters of study, postgraduate students attend the courses and any other educational and research activities included in the Master’s Program. At the end of the second semester, and after having successfully been examined in all courses of the first two semesters, a postgraduate student may apply for starting preparing their M.Sc. Thesis.

### Calculation of the M.Sc. Degree Grade

Postgraduate students, who have successfully fulfilled their obligations, receive the M.Sc. Degree, the final grade of which is calculated as follows:

- M.Sc. Thesis: weight factor of 12
- Compulsory and Optional courses: weight factor of 3 (each)
Suspension of Study

1. Each postgraduate student has the right to request a suspension of attending the courses of the Master’s Program or of the preparation of their M.Sc. Thesis. The permission is granted by a decision of the G.A.S.C., can be given only once and cannot be longer than two semesters or shorter than one semester. Suspension permission for more than two semesters may be granted only in cases of prolonged health problems or significant personal reasons.

2. During the suspension of study, the student status is lost as well as all relevant rights of the postgraduate student. The student status is recovered after the expiry of the suspension.

3. Postgraduate students, who continue their studies after suspension, are expected to attend all courses and any other academic activities, in which they had not been succeeded before the suspension of the study.

Other Obligations

Postgraduate students may be asked to contribute as teaching assistants in undergraduate courses or participate in research activities of the Department, after a proposal of the C.C.P.S. and a decision of the G.A.S.C.

*These provisions are further specified in the Regulation of Postgraduate Studies of the Department of Information and Communication Systems Engineering, which is available on the website: [www.icsd.aegean.gr](http://www.icsd.aegean.gr)*
## WINTER SEMESTER

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Beginning of courses</td>
<td>01/10/2012</td>
</tr>
<tr>
<td>End of courses</td>
<td>13/01/2013</td>
</tr>
<tr>
<td>Semester duration</td>
<td>13 weeks</td>
</tr>
<tr>
<td>Examination period</td>
<td>From 14/01/2013 to 10/02/2013</td>
</tr>
</tbody>
</table>
| Holidays                     | 28 October 2012: National Holiday  
                              | 17 November 2012: Polytechnion Anniversary  
                              | 22/12/2012 – 06/01/2013: Christmas Holidays  
                              | 30 January 2013: Religious Holiday (Trion Ierarhon) |

## SPRING SEMESTER

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning of courses</td>
<td>11/02/2013</td>
</tr>
<tr>
<td>End of courses</td>
<td>26/05/2013</td>
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<tr>
<td>Semester duration</td>
<td>13 weeks</td>
</tr>
<tr>
<td>Examination period</td>
<td>From 27/05/2013 to 16/06/2013</td>
</tr>
</tbody>
</table>
| Holidays                     | 18 March 2013: Monday, the first day of Lent  
                              | 25 March 2013: National Holiday  
                              | 27/04/2013 – 12/05/2013: Easter Holidays  
                              | 1 May 2013: First of May Holiday  
                              | Students’ elections: *the exact date has not yet been decided*  
                              | 24 June 2013: Religious Holiday (Holy Spirit) |