University of the Aegean
DEPARTMENT OF INFORMATION AND
COMMUNICATION SYSTEMS ENGINEERING

UNDERGRADUATE PROGRAM GUIDE

ACADEMIC YEAR
2014-2015

Karlovasi - Samos
The Department of Information and Communication Systems Engineering is one of the pioneering departments of the University of the Aegean.

It has been designed and operates so as to offer high quality courses, within a creative environment, with emphasis on the connection of studies with practical application and research.

This guide contains all the necessary information for current, as well as future students of the Department.
University of the Aegean

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Department of Information
and Communication Systems Engineering

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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 sixteen (16) 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 sixteen (16) Departments and Schools:

### School of Sciences (Samos)
- Dept. of Information and Communication Systems Engineering*
- Dept. of Mathematics
- Dept. of Product and Systems Design Engineering (Syros)*

### 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
- Dept. of Food Sciences and Nutrition (Lemnos)

### 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

* 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 2014-2015, are:

**Rector:** Professor Stefanos Gritzalis

**Vice Rectors:** Professor Amalia Polydoropoulou  
Department of Shipping, Trade and Transport  
Associate Professor Alexandra Bounia  
Department of Cultural Technology and Communication  
Associate Professor Spyridon Syropoulos  
Department of Mediterranean Studies

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**

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| Undergraduate Studies Secretariat of the Department of Information and Communication Systems Engineering | Alexandros Shoinas | Tel.: +30-22730-82021  
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Fax.: +30-22730-82009  
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| **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  
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| **Administrative Services** | **Manto Katsiani**    | Tel: +30-22730-82010  
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| **Financial Services**   | **Fotis Kyriakou**     | Tel.: +30-22730-82015  
Email: fotisk@aegean.gr |
| **Technical Services**   | **Nikos Zacharis**     | Tel: +30-22730-82040  
Email: nzar@aegean.gr |
**University of the Aegean**

<table>
<thead>
<tr>
<th>Chios</th>
<th>Rhodes</th>
</tr>
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<tbody>
<tr>
<td>Michalon 8, Chios, GR-82100, Greece</td>
<td>Demokratias Avenue 1, Rhodes, GR-85100, Greece</td>
</tr>
<tr>
<td>Tel. +30-22710-35000</td>
<td>Tel. +30-22410-99000</td>
</tr>
<tr>
<td>Fax: +30-22710-35099</td>
<td>Fax: +30-22410-99009</td>
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<tr>
<th>Syros</th>
<th>Lemnos</th>
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<tbody>
<tr>
<td>Ermoupolis, Syros, GR-84100, Greece</td>
<td>Mitropoliti Ioakeim 2, Myrina, GR-81400, Greece</td>
</tr>
<tr>
<td>Tel. +30-22810-97000</td>
<td>Tel. +30-22540-83013</td>
</tr>
<tr>
<td>Fax: +30-22810-97009</td>
<td>Fax: +30-22540-83109</td>
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<table>
<thead>
<tr>
<th>Athens</th>
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<tbody>
<tr>
<td>30 Boulgaroktonou Str., Athens, GR-11472, Greece</td>
</tr>
<tr>
<td>Tel. +30-210-6492000</td>
</tr>
<tr>
<td>Fax: +30-210-6492299</td>
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*For more information about the University of the Aegean please visit our web site:*

http://www.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)
- Chatzigianneio (Library)
- Liberis Building (School of Science Secretariat, Faculty Offices of the Department of Information and Communication Systems Engineering, Secretariat, Classroom, Laboratories)
- 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)
“Throughout the world, information and communications technologies are generating a new industrial revolution already as significant and far-reaching as those of the past. It is a revolution based on information, itself the expression of human knowledge. Technological progress now enables us to process, store, retrieve and communicate information in whatever form it may take - oral, written or visual - unconstrained by distance, time and volume. This revolution adds huge new capacities to human intelligence and constitutes a resource which changes the way we work together and the way we live together.”

Bangemann Committee Report 1994

The technological revolution, which, since 1994, has led European countries to adopt, as their central objective, the development of a European Information Society, has changed radically almost every aspect of economic and social life. Despite the impressive penetration of new technologies in all areas of life, new trends and visions pop up constantly, making the field of information and communication systems the most dynamic field of modern science and technology.

At this point in time, when there is an effort for the vision of a European Information Society to be translated into action for overcoming the technical, social and economic barriers and establishing national and European information infrastructures for the benefit of European citizens and their quality of life, the scientists in this field are asked to take an important, creative, and very demanding role, as far as it regards their knowledge and skills.

The Department of Information and Communication Systems Engineering of the University of the Aegean (www.icsd.aegean.gr) has, as main goal, the training of engineers with a high level of education, creative and critical spirit, able to analyze problems
and take advantage of modern Information and Communication Technologies for the design, development and management of information and communication systems. The educational activity of the Department combined with the extensive activity in basic and applied research aims to produce new knowledge and disseminate it in a National and European level.

Since the time of its foundation in 1997, the Department had already embraced the vision that in a very short time the classical concepts of telecommunications engineers and computer scientists would no longer be a separate entity and a new integrated scientific subject, the one of Information and Communication Systems Engineering, would be required to meet those needs. The integration of information and communication technologies has given a special character to the Department, which is maintained and enhanced until today.

The Department of Information and Communication Systems Engineering of the University of the Aegean adopts the above concept as to the nature of information and communication systems. An information system is a system that is able to receive, store, retrieve and process information. It is an organized set of separate interacting components: people, processes, data, software and hardware. This approach covers not only the first component of the name of the department, but the second one as well, since according to it, the term “communication system” is not regarded as an independent and complementary subject, but as an intrinsic characteristic of an integrated information system. Thus, the two dimensions of the name of the Department reflect the completeness of the studies required to achieve the stated objectives.

The Curriculum of the Department has been designed taking into account international standards of education, which are adapted to the needs of the Greek reality. It covers all the objects that make up the core of knowledge related to information and communication systems, offering high quality courses. In this direction, student-centered teaching systems, assessment of the educational process, a high level of cooperation between teachers and students and actions connecting teaching with production are adopted.

In addition, the curriculum is constantly updated following the dynamics of the industry, so that the studies offered by the Department have always a modern, dynamic and competitive character.

Faculty

**Head of Department:** Associate Professor Charalabos Skianis  
**Vice Head of Department:** Associate Professor Euripidis Loukis  
**Director of Postgraduate Studies:** Associate Professor Charalabos Skianis

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).

Associate Professor Charalabos 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).

Associate Professor Efstatios 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 (tenured) 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 (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, University of Patras (Estimation Theory, Parallel Algorithms, Digital Signal Processing, Systems Modeling and Simulation).
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 (tenured) **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).

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 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 Ioannina, 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, Pri-
vacancy Preserving Data Mining, Machine Learning, User Modeling, Semantic Web, Databases, Bayesian Networks, Knowledge Engineering).


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).


Dr. Ifigenia Klaoudatou, Degree in Mathematics, National and Kapodistrian University of Athens, M.Phil. in Astronomy, Cardiff University, Ph.D. in Applied Mathematics and Mathematical Physics, University of the Aegean (Mathematical Relativity and Cosmology).

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.
Research Activities – Postgraduate Program

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
- Information Law
- 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
- Pervasive Computing 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, EURET / 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 Eu-
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.

As far as the Postgraduate Program in “Technologies and Management of Information and Communication Systems” of the Department is concerned, its aim is to provide high quality education for University graduates in the cognitive area of Information and Communication Systems. It 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

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 six Streams:

- Information and Communication Systems Security
- e-Government
- Intelligent Information Systems
- Communication and Computer Networking Technologies
- Information and Communication Systems
- Digital Innovation and Entrepreneurship

For more information about the possibilities of postgraduate studies please visit our web site:

http://msc.icsd.aegean.gr
Program of Study Structure - Courses

According to the Curriculum of the Department of Information and Communication Systems Engineering, in the first three years of study the students follow a program of compulsory courses, while in the fourth year they can choose one of three Streams of the Department (“Information Systems”, “Computer, Telecommunication and Network Technologies”, “Foundations and Applications of Computer Science”). The Diploma Thesis is prepared in the fifth year of study. In the last (10th) semester there are no courses so that students can be devoted to the preparation of their Diploma Thesis. The courses of the Department are divided in the following categories: “Compulsory Courses” (C), “Stream Compulsory Courses” (SC), “Stream Optional Courses” (SO), “Optional Courses” (O), “Free Courses” (F).

- **Compulsory Courses (C).** There are thirty six (36) Compulsory Courses (C) which must be successfully attended by all students. The distribution of the compulsory courses per semester is as follows:

<table>
<thead>
<tr>
<th>Semester</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
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<tr>
<td>Compulsory Courses</td>
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<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
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</tbody>
</table>

- **Diploma Thesis – English Language.** In addition to these compulsory courses, the Diploma Thesis and a successful examination in English language are also compulsory.

- **Stream Compulsory Courses (SC).** These courses are compulsory only for those students who have chosen the specific Stream. The distribution of Stream Compulsory Courses (SC) per semester, for each of the three possible Streams, is as follows:

<table>
<thead>
<tr>
<th>Semester</th>
<th>7th</th>
<th>8th</th>
<th>9th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream Compulsory Courses (per Stream)</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

- **Stream Optional Courses (SO).** In each of the semesters 7th, 8th and 9th there is a number of optional courses offered for each of the three possible streams. All students are expected to choose and successfully attend a minimum of three (3) Stream Optional Courses (SO) of the stream they follow, in order to qualify for obtaining their Diploma.

- **Optional Courses (O).** These courses are not included in any particular stream, but they are taken into consideration for obtaining the Diploma and for the calcul-
lation of the Diploma’s grade (see the relevant paragraph of the Regulation of Studies).

 DISCLAIM (F). These courses are not taken into consideration for obtaining the Diploma or for the calculation of the Diploma’s grade. The only exceptions to that rule (only for the calculation of the Diploma’s grade) are the Free Courses (F) of French language (see the relevant paragraph of the Regulation of Studies).

Course Declaration

All students can declare a maximum of nine (9) courses in each semester, except for the students in 9th and 10th semester, who can declare as many courses as they want. At least six (6) of these courses must belong to the semester which the student attends or in previous semesters, while a maximum of three (3) courses can be of later semesters (exceptions can be made only in special cases, which are evaluated by the General Assembly of the Department, upon request of the student). This rule applies only to students of the first three years. Students of the fourth year of study (semesters 7th and 8th) are also asked to declare up to nine (9) courses, but in any way they wish. For the students of the Department there is also the possibility during their studies, to declare courses from the programs of other Departments of the University Unit of Samos, which are deemed as Optional Courses (O). It should be noted though that the maximum number of courses from programs of other Departments of the University Unit of Samos that can be taken into account as Optional Courses for the calculation of the Diploma’s grade is three (3). In addition, these courses may not have content that overlaps with that of courses of the Department of Information and Communication Systems Engineering.

The courses of English Language (321-0121, 321-0131 and 321-0141) cover three levels of language skills. They are compulsory, they are not counted in the number of courses declared per semester and, as far as it regards their contribution to the Diploma’s Grade, they are considered as a single course. The students, at the beginning of the first semester and after qualifying examinations, are distributed to the first (A) and second (B) level of English language, depending on their level of knowledge. Their enrollment at the next level is possible only after successful examination of the level they attend. All students are expected to successfully attend the B and C level. The overall objective of English language courses is to ensure that students, at the end of their second year of study, will have the ability to study scientific texts of Informatics and Telecommunications in English, attend lectures and seminars and create their own oral and written presentations. Apart from the above mentioned compulsory courses of English language, the Curriculum of the Department also includes two free courses taught during the 7th and 8th semester respectively. Their purpose is to prepare the students who wish
to pursue postgraduate studies in English-speaking universities, for participating in examinations that prove their ability to use the English language (TOEFL).

Similarly, the courses of the French Language (321-0822, 321-0832, 321-0842 and 321-0852) cover four levels of skill and are not counted in the total number of courses declared per semester. All four levels are considered as a single free course. The students, after qualifying examinations, are distributed to the four levels, according to their knowledge of French. Their enrollment at the next level is possible only after successful examination of the level they attend. The overall objective of French language courses is learning the French language to a sufficient level of communication, understanding and production of spoken and written speech. Furthermore, these courses, through the study of the appropriate material, enable students to read scientific texts, to attend lectures, seminars and present their own work in French.

Stream Selection Procedure
The students declare the Stream they wish to follow at the start of the fourth (4th) year of study, along with the declaration of courses for the 7th semester. If a student wishes so, they can change the stream that they selected with a new declaration, but only during the Stream declaration period of the next academic year. There is no limit to the number of times a student can change Streams during their studies, although no more than one Stream declaration can be submitted during the same academic year.

Graduation Requirements – Diploma’s Grade
The following requirements must be fulfilled in order for a student to obtain their Diploma:
1. Successful examination in every Compulsory Course (C).
2. Successful examination in every Stream Compulsory Course (SC) of the Stream they have chosen.
3. Successful examination in at least three (3) Stream Optional Courses (SO) of the Stream they have chosen.
4. Successful examination in a total of fifty four (54) courses (excluding the English Language courses and the Diploma Thesis).
5. Successful examination in the compulsory English Language courses.

The Diploma’s Grade is calculated as follows:

Diploma’s Grade = 0.15 \times \text{Diploma Thesis grade} + 0.85 \times \text{Courses Grade}

The Courses Grade is equal to the average of the grades in the courses required for a
student to obtain their Diploma (54 courses plus a single grade for the compulsory English Language courses). If a student has successfully attended the free French Language courses, then an additional single grade for those courses can be taken into account for the calculation of the Courses Grade (i.e., the Courses Grade in this case is the average of 56 rather than 55 courses).

For the calculation of the Diploma’s Grade, only a single grade is taken into account for the compulsory English Language courses (that is, the average of the grades of the courses with codes 321-0131 and 321-0141).

For the calculation of the Diploma’s Grade, only a single grade is taken into account for the French Language courses. This grade is equal to the average of the grades obtained in the examinations of the various courses of French language, which students have successfully attended (the number of these courses depends on the level at which they were initially placed, after the qualifying examinations). A student is considered to have successfully attended the French Language courses, only after having succeeded in the examinations of the French Language 4 course (321-0852).

If a student has been successfully examined in more courses than those required for graduation, they can choose not to take into account the grades of some courses for the calculation of the Diploma’s Grade, provided that requirements 1-5 above are still met.

It should be mentioned again that Free Courses (F) are not taken into consideration for obtaining the Diploma or for the calculation of the Diploma’s grade. The only exceptions to that rule (only for the calculation of the Diploma’s grade) are the free courses of French Language.

Grade Improvements and Changes to Program of Study

Students, who have been successfully examined in a course and do not meet the graduation requirements, may request a repetition of the examination in order to improve their grade in the specific course, by submitting an application to the Department’s Secretariat. The repetition of the examination takes place during the examination period of September and only for courses which have been declared by the student during the current academic year.

Especially for students who attend the fifth or higher year of their study, there is the possibility of repeating the examination of a maximum of five (5) courses, in which they have been successfully examined in previous years. In this case, the repetition of the examination takes place during the examination period of January for fall semester courses, during the examination period of June for spring semester courses and during the examination period of September for all courses. In all cases, the final grade is the greater of the two grades.

The Department’s Curriculum undergoes frequent changes, in order to accommodate advances in scientific knowledge and the constantly changing needs of the market.
# Courses per Semester

## 1st semester

### Compulsory Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Teaching Hours</th>
<th>Lab Hours / Review-Problem Session Hours</th>
<th>ECTS units</th>
</tr>
</thead>
<tbody>
<tr>
<td>321-1203</td>
<td>Introduction to Programming</td>
<td>3</td>
<td>4</td>
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<tr>
<td>321-1406</td>
<td>Introduction to Computer Science and Communications</td>
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<td>Logic Design</td>
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<td>321-1105</td>
<td>Calculus</td>
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<td>321-2353</td>
<td>Physics I</td>
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### Free Course

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## 2nd semester

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<td>Programming Methodologies and Languages I</td>
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### 3rd semester

#### Compulsory Courses

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<td>321-3551</td>
<td>Computational Logic and Logical Programming</td>
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<td>321-3004</td>
<td>Data Structures</td>
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<td>321-3354</td>
<td>Computer Architecture</td>
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<td>Stochastic Calculus</td>
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#### Free Course

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## 4th semester

### Compulsory Courses

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<td>Information Systems Analysis and Design</td>
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<td>321-4201</td>
<td>Algorithms and Complexity</td>
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<td>321-3203</td>
<td>Databases I</td>
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<td>321-4102</td>
<td>Operating Systems</td>
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<td>321-2254</td>
<td>Differential Equations</td>
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### Free Course

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## 5th semester

Every course in this semester is **Compulsory**.

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<td>Computer Networks</td>
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<td>Databases II</td>
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<td>321-5501</td>
<td>Signals and Systems</td>
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<td>321-4002</td>
<td>Software Engineering</td>
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<td>321-8104</td>
<td>IT Project Management</td>
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### 6th semester

Every course in this semester is **Compulsory**.

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<th>Course Code</th>
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<td>321-6503</td>
<td>Information Systems Management</td>
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<td>321-3603</td>
<td>Artificial Intelligence</td>
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<td>321-3404</td>
<td>Information and Communication Systems Security</td>
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<td>321-7951</td>
<td>Distributed Systems</td>
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<td>321-3452</td>
<td>Telecommunications</td>
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<td>321-5204</td>
<td>Information Law</td>
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### 7th semester

**Stream Information Systems**

1. **Stream Compulsory Courses**

<table>
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<th>Course Code</th>
<th>Course Title</th>
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<th>ECTS units</th>
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<tbody>
<tr>
<td>321-5154</td>
<td>Information Systems Analysis and Design Methodologies and Tools</td>
<td>4</td>
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<tr>
<td>321-9702</td>
<td>Computer Network Security and Privacy Enhancing Technologies</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>321-5752</td>
<td>Privacy and Data Protection Law</td>
<td>3</td>
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2. **Stream Optional Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Teaching Hours</th>
<th>Lab Hours / Review-Problem Session Hours</th>
<th>ECTS units</th>
</tr>
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<tbody>
<tr>
<td>321-8952</td>
<td>Internet Entrepreneurship</td>
<td>3</td>
<td>–</td>
<td>5</td>
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<tr>
<td>321-9453</td>
<td>Advanced Methods for Data Management</td>
<td>3</td>
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</table>
Stream **Computer, Telecommunication and Network Technologies**

1. Stream Compulsory Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<th>ECTS units</th>
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<tbody>
<tr>
<td>321-7802</td>
<td>Wireless Communications</td>
<td>3</td>
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<tr>
<td>321-11000</td>
<td>Networks and Cloud Technologies</td>
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<tr>
<td>321-7902</td>
<td>Microelectronics</td>
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2. Stream Optional Courses

<table>
<thead>
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<th>Course Title</th>
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<th>ECTS units</th>
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<tbody>
<tr>
<td>321-8353</td>
<td>Network Management</td>
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<td>–</td>
<td>5</td>
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<tr>
<td>321-9702</td>
<td>Computer Network Security and Privacy Enhancing Technologies</td>
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<td>2</td>
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<tr>
<td>321-9304</td>
<td>Digital Signal Processing</td>
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Stream **Foundations and Applications of Computer Science**

1. Stream Compulsory Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Teaching Hours</th>
<th>Lab Hours / Review-Problem Session Hours</th>
<th>ECTS units</th>
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<tbody>
<tr>
<td>321-6701</td>
<td>Theory of Computation</td>
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<td>–</td>
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<tr>
<td>321-9854</td>
<td>Mathematical Modeling</td>
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<td>2</td>
<td>5</td>
</tr>
<tr>
<td>321-7752</td>
<td>Pattern Recognition and Applications in Robotics</td>
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2. Stream Optional Courses

<table>
<thead>
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<th>Course Code</th>
<th>Course Title</th>
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<th>Lab Hours / Review-Problem Session Hours</th>
<th>ECTS units</th>
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<tbody>
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<td>321-10000</td>
<td>Algorithms and Combinatorial Optimization</td>
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<tr>
<td>321-9453</td>
<td>Advanced Methods in Data Management</td>
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<td>Networks and Cloud Technologies</td>
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## Free Course

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### 8th semester

#### Stream Information Systems

### 1. Stream Compulsory Courses

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<tbody>
<tr>
<td>321-8502</td>
<td>Decision Support Systems</td>
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<tr>
<td>321-88102</td>
<td>Internet Programming</td>
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<td>321-8205</td>
<td>E-Commerce Technologies and Applications</td>
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### 2. Stream Optional Courses

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<td>321-10201</td>
<td>Information Retrieval</td>
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<td>–</td>
<td>5</td>
</tr>
<tr>
<td>321-8052</td>
<td>Cryptography</td>
<td>3</td>
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</tr>
<tr>
<td>321-9252</td>
<td>Data Mining and Data Warehouses</td>
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<td>321-3504</td>
<td>Compilers</td>
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<td>Electronic Government Technologies and Applications</td>
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Stream **Computer, Telecommunication and Network Technologies**

1. **Stream Compulsory Courses**

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<td>Mobile Communication Networks</td>
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2. **Stream Optional Courses**

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<td>Information Theory</td>
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<tr>
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<td>Mobile and Wireless Networks Security</td>
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Stream **Foundations and Applications of Computer Science**

1. **Stream Compulsory Courses**

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<th>Lab Hours / Review-Problem Session Hours</th>
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<td>Information Theory</td>
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<tr>
<td>321-9252</td>
<td>Data Mining and Data Warehouses</td>
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<td>321-10201</td>
<td>Information Retrieval</td>
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### 2. Stream Optional Courses

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<td>321-8000</td>
<td>Game Theory</td>
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<td>321-3504</td>
<td>Compilers</td>
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<td>5</td>
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<td>Dynamical Systems</td>
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<td>Parallel and Distributed Computing</td>
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<td>Digital Image Processing</td>
<td>3</td>
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</table>

### Optional Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Teaching Hours</th>
<th>Lab Hours / Review-Problem Session Hours</th>
<th>ECTS units</th>
</tr>
</thead>
<tbody>
<tr>
<td>321-7602</td>
<td>Practice</td>
<td>–</td>
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### Free Course

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<th>Course Code</th>
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<tr>
<td>321-0151</td>
<td>English Language (TOEFL)</td>
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### 9th semester

#### Compulsory Course

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<th>ECTS units</th>
</tr>
</thead>
<tbody>
<tr>
<td>321-7102</td>
<td>Diploma Thesis</td>
<td>–</td>
<td>–</td>
<td>See 321-7102, Semester 10th</td>
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</table>

#### Stream Information Systems

1. Stream Compulsory Courses

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Teaching Hours</th>
<th>Lab Hours / Review-Problem Session Hours</th>
<th>ECTS units</th>
</tr>
</thead>
<tbody>
<tr>
<td>321-5402</td>
<td>Information Systems Strategy and Investment</td>
<td>3</td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td>321-7405</td>
<td>Knowledge Engineering and Knowledge Systems</td>
<td>3</td>
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2. Stream Optional Course

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<th>Lab Hours / Review-Problem Session Hours</th>
<th>ECTS units</th>
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</thead>
<tbody>
<tr>
<td>321-5605</td>
<td>Human - Computer Interaction</td>
<td>3</td>
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</table>

#### Stream Computer, Telecommunication and Network Technologies

1. Stream Compulsory Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Teaching Hours</th>
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<th>ECTS units</th>
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<tbody>
<tr>
<td>321-6255</td>
<td>Internet Protocols and Architectures</td>
<td>3</td>
<td>–</td>
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<tr>
<td>321-10651</td>
<td>Satellite Communications</td>
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2. Stream Optional Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<th>Lab Hours / Review-Problem Session Hours</th>
<th>ECTS units</th>
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</thead>
<tbody>
<tr>
<td>321-6554</td>
<td>Multimedia</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>321-7852</td>
<td>Microprocessors</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>321-9402</td>
<td>Broadband Networks</td>
<td>3</td>
<td>–</td>
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### Stream Foundations and Applications of Computer Science

#### 1. Stream Compulsory Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Teaching Hours</th>
<th>Lab Hours / Review-Problem Session Hours</th>
<th>ECTS units</th>
</tr>
</thead>
<tbody>
<tr>
<td>321-7405</td>
<td>Knowledge Engineering and Knowledge Systems</td>
<td>3</td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td>321-9002</td>
<td>Computational Complexity</td>
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#### 2. Stream Optional Courses

<table>
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<th>ECTS units</th>
</tr>
</thead>
<tbody>
<tr>
<td>321-6605</td>
<td>Computer Vision</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>321-90001</td>
<td>Numerical Analysis</td>
<td>3</td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td>321-6554</td>
<td>Multimedia</td>
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<td>2</td>
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#### Optional Courses

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<thead>
<tr>
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<th>ECTS units</th>
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<tbody>
<tr>
<td>321-8552</td>
<td>Language Engineering</td>
<td>3</td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td>321-99100</td>
<td>Regulatory and Social Issues in Information Society</td>
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#### 10th semester

### Compulsory Course

<table>
<thead>
<tr>
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<th>Teaching Hours</th>
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<th>ECTS units</th>
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<tbody>
<tr>
<td>321-7102</td>
<td>Diploma Thesis</td>
<td>–</td>
<td>–</td>
<td>30</td>
</tr>
</tbody>
</table>

Undergraduate Program Guide 2014-2015
Syllabus and Learning Outcomes of Courses per Semester

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

1st semester

321-1203  Introduction to Programming

Introduction to programming, programming languages, The C programming language, Variables and constants, Declarations, Operators, Expressions, Data input and output, conditional expressions, functions, Matrices, Pointers, Formatted input and output, Complicated structures, File manipulation, Dynamical structures, The C preprocessor, Error handling.

The student should become fluent in C programming language.

321-1406  Introduction to Computer Science and Communications


Understanding the fundamentals of computer science. Web development skills.

321-2003  Logic Design


Knowledge of basic concepts of digital systems. Ability of analyzing and designing combinational and synchronous sequential circuits in logic level.

**321-1501 Discrete Mathematics I**

Sets, set operations, the principle of inclusion and exclusion. Logic and propositions, propositional calculus, predicate calculus, inference rules. Proof techniques, mathematical induction. Computability and formal language theory, the N.Chomsky Hierarchy on the generative grammars and languages types. Enumeration (samples, permutations, etc.). The probability theory. Relations and functions, binary relations, properties of binary relations, equivalence relations, partial and total orders. Graph theory. Basic definitions and terminology, bipartite graphs, connectivity, Eulerian graphs, Hamiltonian graphs. Trees, spanning trees, rooted trees, binary search trees, breadth-first search, depth-first search.

The widening of the field of mathematics for the student by examining a series of concepts and issues, which represent the foundation of Computer Science and are not included in the General Applied Mathematical courses. Aiming at developing and deepening students’ perception of related disciplines, such as the Foundations of Computer Science, the Theory of Algorithms, the Formal Language Theory, the Probability Theory, the Graph Theory, the Theory of Computation, the Data Structures, etc.

**321-1105 Calculus**


The purpose of the course is to give a complete and working knowledge of differential and integral calculus. It covers and expands material presented in the last years of high school, including functions, basic calculus, limits, derivatives and integrals. One objec-
The course is to provide a solid background to the analysis of functions of a single variable and to expose the mathematical rigor through the proofs of most of the theorems and propositions. For example, one of the goals is to introduce the student to the definitions of the concept of the limit of a function or that of the continuity, so that concrete examples of functions can be treated using these definitions. At the same time, the course also focuses on direct applications of the covered material to a number of problems from everyday life, from geometry (areas, volumes) or from physics. The student should realize that beyond the terse formalities used in the proofs, there is a very vivid and practical aspect in calculus. Similarly, the definition of the definite integral as summation should be understood, but at the same time a variety of integration techniques should be taught for practically computing complicated integrals. More advanced topics such as improper integrals or solving simple differential equations or a presentation of Taylor theorem should also be understood.

**321-2353 Physics I**


The course covers and expands in an intense and quick manner, topics in mechanics which are known from high school, but with the use of higher mathematics. Differential calculus, elements of vector analysis and simple differential equations are introduced in the description of the basic laws of mechanics and used for solving problems. Using integrals, the student should be able to compute the kinematical quantities of an arbitrary motion in a straight line, in a general curvilinear motion, or to find the orbit of a point particle from Newton’s law, e.g., inside a Keplerian gravitational field. Given a force field, the student should be able to determine if this is conservative or not and to find the potential energy when this exists. Another objective of the course is the use of integration techniques to compute the centre-mass, the moments of inertia and the gravitational field of an extended body. More advanced topics such as the dynamics of a system of particles and special relativity should also be understood.

**321-0121 English Language 1**

Development of skills needed in oral and written students’ projects. Basic computer vocabulary from the book “Oxford English for Computing”. Basic terminology of
Mathematics from the book “English for Mathematics”, including: geometry, the number system, mathematical operations, mathematical symbolism, matrices, equations, proportion, functions, real analysis, complex numbers, sequences, series, curves and surfaces, differentiation, integration, vectors, elementary statistics, probability, group theory, logic.

Enabling the students to study scientific books and papers in English, as well as to prepare and present their own work.

321-0822  French Language 1

Basic knowledge of French language (grammar, syntax), descriptions of persons and objects, exchange of simple information, suggestions and views that enable communication in familiar, everyday situations.

Ability to use the French language in the cases mentioned in the syllabus of the course.

2nd Semester

321-2103  Programming Methodologies and Languages I

Object-oriented programming, Classes, Object Oriented Analysis and Design, Objects, Recursion, Constructor, Destructor, Member Functions, const Functions, Inline functions, Complex Classes, Input / Output in C++, Output to file, Input from file, Control loops, Pointers, Memory Allocation, References, Derived class, Inheritance, Overriding, Overloading vs. Overriding, Virtual functions, Abstract classes, Polymorphism, Virtual Inheritance.

The course aims to introduce object-oriented programming to the students using C++. It targets three areas; the student should be able to: 1) identify the potential classes and their structure from a brief description, 2) understand existing code, and 3) develop a system in C++.

321-2551  Circuit Theory

Knowledge of main methodologies for circuits’ analysis. Knowledge of basic MOSFET characteristics. Familiarity with key features of digital circuits like the structure and function of digital gates, noise margins, propagation delay and power dissipation.

321-2450 Discrete Mathematics II


Correct usage of mathematical formalism, language, and notation. Mathematical formulation and solution of elementary theoretical computer science problems. Capability to follow a mathematical proof. Correct usage of proof techniques.

321-3154 Linear Algebra


The purpose of the course is to introduce the first year students to the concepts of linear algebra which usually have not been met before. After an introduction to the complex numbers, one main objective of the course is to provide a complete and working knowledge of the theory of linear spaces. The notions of linear independence, linear superposition, basis and dimension should be well understood. Another goal is the study of the theory of matrices, of row equivalence and of the solution of a linear system of equations. Techniques for computing trivial and non-trivial determinants should be discussed. Students must also understand more advanced topics of linear algebra, such as eigenvalues-eigenvectors, linear mappings and diagonalization.
321-2402 Probability and Statistics

Axiomatic definition of probability, independent events, conditional probabilities, Bayes theorem, combinatorial analysis, discrete and continuous random variables, distribution functions, distributions of special interest: Bernoulli, binomial, Poisson, uniform, exponential, normal, Gamma, Weibull. Joint distribution functions, independent random variables, conditional distributions, moment generating functions, limit theorems, central limit theorem, strong law of large numbers. Descriptive statistics.

Comprehension of basic notions of combinatorial analysis and probability theory. Familiarity with the basic categories of random variables.

321-2051 Physics II

Electrostatics: Coulomb’s law, electric field, potential, flux, Gauss’s law, Poisson equation, potential energy, boundary conditions, method of images, electric dipole, multipole expansion, conductors, capacity, dielectrics, polarization, electrical displacement. Electric current, continuity equation, steady current, Ohm’s law. Magnetostatics: Laplace’s force, Lorentz, force on a current-carrying wire, magnetic dipole, Biot-Savart’s law, Ampere’s law, vector potential, field of a magnetic dipole, magnetic materials, magnetization. Ampere-Maxwell’s equation, Faraday’s equation, scalar potential of EM field, mutual inductance, self inductance, RL, RC, RLC circuits, Maxwell’s equations, energy/momentum conservation theorems, equations of potentials in Coulomb, Lorentz gauges, elements of electromagnetic waves.

The course covers and expands material which is normally presented in the last years of high school, but with the use of higher mathematics. One of its basic goals is to introduce the students to the use of differential calculus and vector analysis for the study of the laws of electrostatics, magnetostatics and electromagnetism. Various theorems and equations (e.g., Gauss, Biot-Savart, Ampere, Faraday, Maxwell’s equations) should be understood in their general form and not just in their simplified versions exposed in high school textbooks. Beyond that, one of the objectives of the course is the physical and mathematical study of more sophisticated topics of electricity and magnetism, such as the method of images, the electric dipole, the dielectrics, the magnetic materials, the scalar and vector potentials of electromagnetism, the energy/momentum conservation theorems and elements of electromagnetic waves.

321-0131 English Language 2

See course 321-0121.
**321-0832 French Language 2**

Acquisition of communication skills through simple dialogues on familiar and contemporary issues, understanding of written and oral language, writing paragraphs, letters, CVs, announcements.

Anything mentioned in the syllabus of the course.

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**3rd semester**

**321-3651 Programming Methodologies and Languages II**


This course covers the fundamentals of Object Oriented Programming (OOP) using Java. The main learning objectives for this course are: To build and develop OOP thinking: Learn to think in objects; to familiarize students with the basic features of the language API so as to use it correctly and efficiently; to cover the usage principles of encapsulation, coupling, cohesion, inheritance, polymorphism and method overloading / overriding; to create Java applications using sound OOP practices and program structuring; to develop analytical programming thinking and reasoning skills. The aforementioned objectives are achieved through course lectures and extensive laboratory exercises.

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**321-3551 Computational Logic and Logical Programming**

Propositional logic: Syntax and semantics, Propositional entailment, Truth tables and formal proofs (inference rules, axiom schemata, provability, soundness and complete-
Understanding of syntax and semantics of propositional logic. Ability to apply semantic methods to prove a clause given a set of premises. Familiarity with formal proof methods. Understanding and application of the resolution method in propositional logic.

Understanding of syntax and semantics of predicate logic. Familiarity with the application of the Herbrand method. Ability to apply the algorithm of transforming an expression of predicate logic to conjunctive normal form. Understanding and application of the unification method and the algorithm of finding the most general unifier of two clauses in predicate logic. Understanding of the resolution method in predicate logic. Understanding of the basic strategies to apply the resolution method. Familiarity with the main principles of logic programming. Ability to write programs in PROLOG to solve practical problems.

321-3004 Data Structures

Introduction - Basic concepts of algorithms and data structures, Abstract Data Types (ADT), Performance Algorithm, Analysis of algorithms, Asymptotic notations, Arrays (multidimensional, special forms, sparse), Lists (simply connected, circular, doubly linked), Stacks (with implementation table with a list implementation, applications), tails (realization with a round table with a list implementation, applications), Trees (quantitative data, representation of arrays and pointers, cross), priority Queue, heap Structure, Search (linear, binary, with interpolation), Sort (with option to import, bubble, quicksort, heap with merger), binary search trees, weighted search tree, red-black trees, B-trees, hash (dictionary function and hash table, collisions, fragmentation chains, linear and double fragmentation), Graphs (a reconstruction table / list of neighborhood, breadth-first search, depth-first search).

The design or selection of appropriate data structures for specific programming problems. The implementation and evaluation of different structures. Basic algorithmic techniques.

321-3354 Computer Architecture

/ O modules. Evaluation of Computer. Forms of representation of numerical data (both
fixed and floating point). Structure and characteristics of the instruction set that sup-
ports the CPU. Machine language commands. Types of machine language commands.
Types and data size. Simple computers (RISC) and complex instruction set (CISC). Sup-
port high-level programming languages. Organization and operation of the Central
Processing Unit (CPU). Parallel processing. Multi-processor systems (MIMD, SIMD).
Implementation of arithmetic. Channels. Technologies and methodologies for design of
computer memory. Behavior management and multi-level memory hierarchy. Virtual
Memory. Addressing modes for data management and from memory. Ways of address-
ing memory. Memory technology. Semiconductor memories. Static direct access mem-
ories, dynamic random access memory directly. Semiconductor memories accessible by
content (Content Addressable Memories, CAM). Magnetic Memories. Memories of
magnetic disks. Memories of magnetic tape. Optical Memories.
Comprehension of the basic architectural elements of a computer system.

321-3751  Stochastic Calculus

Discrete and continuous random variables, expectation of functions of random vari-
ables, joint distribution functions, independent random variables, moment generating
functions, limit theorems, conditional probability and conditional expectation, the ex-
ponential distribution, definition of stochastic processes, the Poisson process, simulat-
ing discrete and continuous random variables, simulating stochastic processes, Markov
chains, Chapman-Kolmogorov equations, classification of states, limiting probabilities,
mean time spent in transient states.

Comprehension of the notion of stochastic processes and familiarity with the basic
families of them (i.e., Poisson processes and Markov chains).

321-4155  Applied Mathematics

Euclidean spaces. Curves. Scalar fields. Vector fields. Double, triple, and multiple inte-
grals, applications of multiple integrals. Set functions and integration, formula of change
of variables in multiple integrals. Coordinate systems, change of coordinates, vectors
and tensors.

The student should acquire fluency with functions of several variables.

321-0141  English Language 3

See course 321-0121.
321-0842  French Language 3

Understanding and participation in discussions of issues of everyday life, oral and written presentation of information and texts in a variety of topics. Expression of feelings, opinions, arguments, conclusions, cultural elements (everyday life, education, work in France).

Anything mentioned in the syllabus of the course.

4th semester

321-3104  Information Systems Analysis and Design


Basic knowledge of system analysis techniques. Systems analyst skills.

321-4201  Algorithms and Complexity


Knowledge of the most important algorithms of the theory of computation.

321-3203  Databases I

Introduction to Databases and Database Systems. Advantages of using a Database System. Database Systems architecture. Database users. Schemas and instances. The principle of data independence. The entity-relationship, the relational and the object-relational model. Integrity constraints and Database update operations. Relational Database design by entity-relationship to relational model mapping. Database languages: rela-
tional algebra; tuple and domain relational calculus; the QBE language. SQL as a query language: queries, views, update statements. Introduction to primary file organizations and indexes. Presentation of Database Management Systems.

The foundation of Database Science and, more precisely, developing students' knowledge of the principle of conceptual and logical modeling and designing of Databases, the Database programming languages, as well as of the options for implementation that are nowadays made available by Database Management Systems.

**321-3302  Computer Communications**


Introduction to the physical layer, data link layer and Medium Access Control sublayer of modern communication systems. Engineering skills on communication systems and technologies.

**321-4102  Operating Systems**


Understanding the modern computer systems’ complexity and the usefulness of operating systems. Knowledge of the most important resource-utilization issues arising in a computer system. Learning of the most popular solutions adopted by modern operating systems.
321-2254 Differential Equations


The student should be able to construct a differential equation that describes a simple physical system and solve it either analytically or numerically.

321-0852 French Language 4

This course aims at a high level of knowledge of the French language by assigning creative, academic projects. It enables recognition of advanced level of French language usage from official organizations and companies. It helps students who wish to pursue postgraduate studies at higher educational institutions of France and many French-speaking countries. It enables the acquisition of French language proficiency certificate issued by the Ministry of Education and Religious Affairs.

Ability to participate in exams for acquisition of French language proficiency certificate.

5th semester

321-2304 Business Operations and Information Systems

Introduction. Basic functions of a firm. Structure of the information system of a firm. Enterprise Resource Planning (ERP) systems. Commercial functions: sales, procurement, inventory management - basic concepts, implementation processes and functionality (capabilities) of the corresponding ERP modules. Financial statements - General Accounting: accounts, entries (credits/debits) for basic events and transactions, functionality of General Accounting module. Analytical Accounting - Costing: cost categories, cost centers, cost allocations, functionality of relevant modules. Production function: production planning and monitoring, Master Production Schedule - MPS, Materials Requirements Planning - MRP, functionality of production ERP modules. The laboratory of this course includes basic familiarization with the above modules of Microsoft Navision ERP system.

Gaining an understanding of the basic functions of a firm (commercial, financial and production), and also of the capabilities to support them through modern Enterprise Resource Planning (ERP) Systems.
321-6451  Computer Networks


Familiarity with the basic elements of networks and data transport. Development of network engineering skills.

321-3703  Databases II


Students will gain understanding and practical experience of the development life cycle of a Database System. The intention is to train students to conduct data analysis, database modeling and database application development, using a suitable database management system. The course will concentrate on methodologies for good database design and will give the student practical experience in designing and implementing standalone database systems. The student will gain skills so that they can understand and discuss with computing professionals, participate in project development teams, and effectively develop a database system for small to medium size business. At the end of this course, the student will be able to: a) clearly explain his/her knowledge of database technology, its importance, its architectures, and the central role Database technology plays in Information Systems, b) understand and apply appropriate development methodologies of data analysis, and to design and use appropriate modeling techniques for databases, and c) administrate transaction, recovery, optimization and concurrency issues in modern DBMS.

321-5501  Signals and Systems

Basic definitions of signals and systems, impulse function, linear systems, Linear Time Invariant systems, stability, causality, linear convolution. Fourier transform, properties and application to the study of linear systems. Fourier Series. Laplace transform, properties and relation to the Fourier transform. Use of the Laplace transform in the analysis of linear systems and the study of their stability. State space, state, observability, control-

Knowledge of basic techniques of signals and systems analysis and study. Knowledge of transformations (for continuous and discrete signals and systems) and their properties. Understanding fundamental relations and meanings, such as the relation that associates the output with the input of a system and the notions of stability and causality. Use of the above for solving problems.

321-4002 Software Engineering


The students get an overall view of software engineering methods and tools. Through their demo-prototype development in teams, they get initial experience in running and managing small software development projects.

321-8104 IT Project Management


Students will learn the basic principles of IT project management and will be able to apply fundamental methods for managing the cost and duration of IT projects.

6th Semester

321-6503 Information Systems Management

Enterprise information systems. Applying IS into businesses. Gaining competitive advantage through IS. Information technology infrastructure (software, hardware, communi-
cations and Internet). Business Intelligence. Enterprise applications. Electronic commerce. Enhancing decision support. Knowledge management. Ethical and social issues. Students will learn about the basic applications and the role of information systems into organizations. They will also learn about the necessary technological infrastructure.

321-3603  Artificial Intelligence


Ability to define an intelligent agent and familiarity with the types of intelligent agents. Ability to represent a problem so that it can be solved via state space search. Familiarity with blind search algorithms. Familiarity with heuristic search algorithms. Understanding of the properties of heuristic functions. Familiarity with local search algorithms. Ability to represent a problem as a constraint satisfaction problem. Familiarity with algorithms of solving constraint satisfaction problems. Understanding of planning methods and the algorithm of partial-order planning. Familiarity with the basic principles and algorithms of machine learning. Ability to develop programs that use artificial intelligence algorithms.

321-3404  Information and Communication Systems Security


The course offers an introduction to Information and Communication Systems security. The undergraduate student will be able to attend more advanced security and cryptography related courses.

321-7951  Distributed Systems

Basic notions and principles of Distributed Systems. Model of customer-server. Com-

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

321-3452 Telecommunications


This course covers a large part of the telecommunication systems aiming at understanding the basic principles of analog and digital communication systems, which rely on wireless transmission of information. In particular, an introduction to the basic principles of analysis and design of telecommunication systems is considered, along with the transmission technologies of the physical layer. The theoretical and laboratory section of the course is a detailed presentation of all the necessary technical data, definitions and standards that are essential for understanding Analog Communication Systems, a presentation of basic analog and digital modulation, coding techniques and effects of noise to the signals. Upon completion of this course, the student will be able to understand the propagation of information and its techniques, as well as techniques necessary to implement basic data transmission telecommunication systems.

321-5204 Information Law


The objective of this course is to offer to the students the opportunity and the possibility to gain an overview of the legal and institutional issues which pertain to the Information and Communication Technologies (ICTs). 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 they enhance the inter-disciplinary knowledge and approach.

7th semester

**321-5154 Information Systems Analysis and Design Methodologies and Tools**


Basic knowledge of current information systems development methodologies. System analyst skills. Analytical and systems way of thinking.

**321-9702 Computer Network Security and Privacy Enhancing Technologies**


This course provides a broad-spectrum introduction to the fundamental principles of network security and privacy. The main learning objectives of this course are as follows: To obtain an understanding of network security and its changing nature; to understand how network security is perceived and carried out; to analyze the various categories of threats, vulnerabilities, countermeasures and repelling strategies; to conceptualize the
challenges of network security. The structure of the module follows the OSI/ISO architecture of network security and more specifically that of the Internet model. Also, the students will become familiar with the basic terminology and technologies of data privacy in networking environment and examine typical applications and use-cases. The aim of the laboratory projects is to provide students with the knowledge and skills necessary to design and support network security and privacy. The aforementioned objectives are met through course lectures, paper readings, and laboratory exercises.

321-5752 Privacy and Data Protection Law


The knowledge and understanding of the principles and basic legal rules referring to privacy and personal data protection are of major importance for studying, planning, designing and operating an information system. The planning and designing of information systems presuppose the knowledge of the regulatory framework and the respective legal barriers of data protection. The knowledge and the understanding of the issues concerning data protection and privacy are especially important as they are strictly correlated with the field of information systems and data security.

321-8952 Internet Entrepreneurship


Understanding all the principles, types and potential of electronic business. The student, at the end of the course, will be able to design and elaborate a successful and fully implementable business plan for a digital business.

321-9453 Advanced Methods for Data Management

New data management models for semi-structured and XML data, for biological data, for data streams, for big data. Data management methods for temporal, spatial, spatio-

An introduction to emerging data management technologies such as data mining; managing significant amounts of non-traditional data; security and privacy protection; and databases on the web. The students get an insight into data management research and some of the most popular topics that attract the data management research community today.

321-11000 Networks and Cloud Technologies

Advanced technologies for access and core networks (e.g., IEEE 802.1X, 802.21, 5G, DSL, Gigabit Ethernet), architectures (e.g. MPLS, DiffServ, IntServ), protocols (e.g. RSVP, Mobile IP, IPv6, OSPF, BGP) and services (WebTV, IPTV, P2P, V2V). Cloud computing technologies, types of services (NaaS, IaaS), development models (private, public, hybrid), tools (openflow), virtualization of networking services and functions (SDN, NFV).

Learning advanced topics of alternative access technologies, infrastructure and cloud services and virtualization. Developing of advanced knowledge in engineering networks and communications.

321-7802 Wireless Communications


The course aims at understanding the electromagnetism theory and its applications in transmission of electromagnetic signals and the antennas. This course provides the necessary knowledge to understand the basic principles of the propagation of electromagnetic waves in free space and the antennas, which are the means of transmission in wireless communications, through an extensive presentation of their basic characteristics and the electromagnetic waves they produce. Thus, the students become familiar with the wave propagation phenomena caused in a real environment and the measurement methods used in practice.
**321-9304 Digital Signal Processing**


Understanding of major Digital Signal Processing (DSP) applications, mainly in telecommunications and audio/acoustics. Exposure to the design of digital filters.

**321-7902 Microelectronics**

Nonlinear elements and circuits, Analysis of nonlinear circuits, Diodes, Dependent sources and the notion of amplification, Actual MOSFET characteristics – the Switch Unified (SU) MOSFET model, MOSFET amplifiers, Large-signal analysis, Small-signal analysis, The Operational Amplifier (Op Amp), Circuits with Op Amps, Analog-todigital and Digital-to-Analog conversion.

Familiarity with nonlinear elements, circuits and their analysis methods. Familiarity with analog transistor behavior, analog electronic circuits, their analysis methods and amplifiers.

**321-8353 Network Management**


Familiarity with Network Management aspects. Development of advanced engineering skills and experience on network management systems and associated tools and techniques.

**321-9702 Computer Network Security and Privacy Enhancing Technologies**


This course provides a broad-spectrum introduction to the fundamental principles of network security and privacy. The main learning objectives of this course are as follows: To obtain an understanding of network security and its changing nature; to understand how network security is perceived and carried out; to analyze the various categories of threats, vulnerabilities, countermeasures and repelling strategies; to conceptualize the challenges of network security. The structure of the module follows the OSI/ISO architecture of network security and more specifically that of the Internet model. Also, the students will become familiar with the basic terminology and technologies of data privacy in networking environment and examine typical applications and use-cases. The aim of the laboratory projects is to provide students with the knowledge and skills necessary to design and support network security and privacy. The aforementioned objectives are met through course lectures, paper readings, and laboratory exercises.

321-6701 Theory of Computation


To understand the limits of computation through the study of simple and complex computing machines.

321-9854 Mathematical Modeling

Complex numbers, the Riemann sphere, complex functions, calculus with complex variables, Laurent series, residues, applications of complex functions, Fourier series, applications to partial differential equations and boundary value problems.

The aim of this course is to familiarize the students with complex analytic methods which have proven especially useful in a broad spectrum of engineering applications as well as partial differential equations and boundary value problems.

321-7752 Pattern Recognition and Robotic Applications

Patterns and Features - Classifiers - Bayes classifier - The curse of dimensionality - Fea-
The course intends to familiarize the students with Pattern Recognition Systems, known methodologies and applications of the field. Moreover, it demonstrates the robot localization, locomotion and control through the use of pattern recognition techniques.

321-10000 Algorithms and Combinatorial Optimization

Mathematical modeling of combinatorial optimization problems, in the realm of areas such as Biology, Networks, time-dependent processes, resources allocation, game theory, etc. Study of techniques to tackle such problems, as branch and bound, heuristics, probabilistic techniques. Exploiting the limitations of these techniques and case study of resent developments. Dynamic programming and approximation algorithms. Polynomial time approximation schemes. Local search methods, PLS - completeness, neighborhood structures. Local search methods in the perspective of game theory.

Mathematical modeling of combinatorial optimization problems from a variety of areas and how to tackle these via algorithms.

321-0161 English Language (TOEFL)

The purpose of this course is to prepare students, who wish to pursue graduate studies in English-speaking universities, to participate in the TOEFL examinations for certifying their ability to use the English language.

Ability to participate in TOEFL examination

8th semester

321-8502 Decision Support Systems

ear Programming - Creation of models, solution and sensitivity analysis. Basic concepts, structure and design of Data Warehouses. Techniques of Data Mining for extraction of knowledge from data and decision support. The laboratory of this course includes familiarization with software tools for the analysis of both discrete options and continuous ranges of options decision problems, and also data warehousing and data mining tools. Understanding of some basic ways of supporting decision making with information technologies, and gaining skills of using relevant software tools.

### 321-88102 Internet Programming


Students get the basic knowledge and laboratory experience in web programming technologies, tools and methods. They also become acquainted with programming techniques for developing content and information management applications and services.

### 321-8205 E-Commerce Technologies and Applications


The understanding of e-Business and e-Commerce business models, main applications and services. The blending of enterprise models with programming techniques, for developing working prototypes of e-Business service platforms.

### 321-7652 Systems Theory

ory. Cybernetics and Control Systems. Structured and unstructured problems. The Vi-
able System Model. Systems Dynamics. Applications for Information Systems.
Students will learn about epistemological issues and will be able to apply basic methods
of systems thinking into problem understanding and problem solving.

**321-10201 Information Retrieval**

Introduction to information retrieval systems. Information retrieval/filtering and brows-
ing. Modeling: Set theoretic models, Algebraic models, Probabilistic models. Text
processing and compression. Zipf’s law and Heaps’ law. Introduction to markup lan-
guages. Indexing methods: inverted files, suffix trees and arrays, signature files. Online
search methods. Evaluation of information retrieval systems. User feedback and query
expansion. Web search: search engines, web crawling techniques, link-based methods.
Understanding of the distinction between data retrieval and information retrieval. Fa-
miliarity with the architecture of an information retrieval system. Understanding of the
properties of the Boolean, Vector-space, and Probabilistic models for information re-
trieval. Familiarity with the basic principles of text processing and basic properties of
text corpora. Understanding of the most popular indexing methods used in information
retrieval systems. Ability to evaluate information retrieval systems. Familiarity with
user feedback and query expansion methods. Understanding of the properties of web
information retrieval. Familiarity with web crawling techniques.

**321-8052 Cryptography**

Introduction to cryptography and cryptanalysis, historical cryptographic algorithms,
basic notions of number theory, modular arithmetic, one-way functions, the definition
of perfect secrecy, Shannon’s theorem, Vernam’s cryptosystem, public key cryptography
(RSA, Rabin), symmetric algorithms, DES and AES, hash functions, digital signatures.
Comprehension of basic notions of number theory and understanding of the operation
of well known cryptographic algorithms.

**321-9252 Data Mining and Data Warehouses**

Introduction to Data Mining Techniques: a) data, b) problems, c) applications, d) gen-
eral analysis and processing techniques. Data pre-processing: a) data cleansing, b) data
transformations, c) dimension reduction techniques. Clustering, Part I: a) introduction
to clustering, b) proximity measures, c) k-means and its variations, d) hierarchical clus-
tering. Clustering, Part II: a) DBSCAN, b) cluster validity, c) BIRCH. Association Rules
I: a) problem definition, b) a-priori algorithm, c) frequent itemsets. Association Rules
II: a) advanced methods for finding frequent itemsets, b) FP-Growth, c) association rules validation. Classification I: a) introduction, b) Decision Trees (entropy, Gini Index, classification error). Classification II: a) Bayesian classifiers, b) Support Vector Machines, c) KNN, d) rule-based classifiers, e) overfitting. Data Warehouses and OLAP: a) definitions, ROLAP, MOLAP, HOLAP, b) cuboid, c) cuboid implementation.

Critical awareness of current problems and research issues in Data Mining. Comprehensive understanding of current advanced scholarship and research in data mining and how this may contribute to the effective design and implementation of data mining applications. Ability to consistently apply knowledge concerning current data mining research issues in an original manner and produce work which is at the forefront of current developments in the sub-discipline of data mining. Proficiency with leading data mining software, including RapidMiner, Weka and Business Intelligence of MS SQL server. Understanding of how to apply a wide range of clustering, estimation, prediction and classification algorithms, including k-means clustering, BIRCH clustering, DBSCAN clustering, classification and regression trees, the C4.5 algorithm, logistic Regression, k-nearest neighbor, multiple regression, neural networks and support vector machines. Understanding of how to apply the most current data mining techniques and applications, such as text mining, mining genomics data, and other current issues. Understanding of the mathematical/statistics foundations of the algorithms outlined above.

321-3504 Compilers

Architecture processors, registers, programming at the machine, show commands. Assembly language and high level language implementation. Programming tools, compilers, linker, metaergaleia. Finite automata and regular expressions. Verbal analysis, verbal units, regression, the metaergaleio lex. Syntactic trees, automatic stacking, grammar, symbolism. Syntactic analysis, retrospective analysis of descent, the metaergaleio yacc. Tables of symbols, structures, range. Production of intermediate and final code optimization. Work of the course (compiler implementation in groups).

Familiarity with the process of designing and implementing a compiler using lexical and syntax analysis description languages.

321-10601 Geographic Information Systems

The understanding of the basic characteristics of the Geographic Information Systems (GIS) and the acquisition of the expertise for putting to use geographic data in several scientific and real-life applications.

**321-11100  Electronic Government Technologies and Applications**


The students will acquire knowledge on the principles, the processes and the tools of electronic government, with the support of information and communication technologies.

**321-7255  Mobile Communication Networks**


The course offers introduction to mobile and personal communications networks. The basic operating principles of these systems are examined. Specifically, issues such as wireless transmission conditions in different environments, propagation of radio channels, cellular systems design techniques, etc., are discussed in detail. Also, the operating principles, the architecture and features of popular mobile systems like GSM, GPRS, UMTS are analyzed. Upon completion of this course, the students will be familiar with
the concepts of propagation, cellular radio coverage and design, and will have experience in advanced mobile systems and technologies.

**321-9352 Digital Image Processing**

Introduction: what is Digital Image Processing (DIP), fields of using DIP. Digital image fundamentals: elements of visual perception, light and electromagnetic spectrum, image sensing and acquisition, sampling and quantization, mathematical tools used in DIP. Intensity transformation functions. Histogram processing. Spatial filtering, smoothing and sharpening spatial filters. Filtering in the frequency domain: sampling and the Fourier transform of sampled functions, 2-D Discrete Fourier Transform and its properties, filtering in the frequency domain, smoothing and sharpening frequency domain filters. Image restoration: noise models, restoration in the presence of noise only, linear position-invariant degradations, estimating the degradation function, inverse filtering, Minimum Mean Square Error (Wiener) filtering. Image compression: fundamentals (coding, spatial and temporal redundancy, irrelevant information, measuring image information, etc.), basic compression methods (lossy and lossless). Color image processing: color models, pseudocolor and full-color image processing, image segmentation based on color, noise in color images, color image compression.


**321-7001 Performance Evaluation & Simulation of Computer Systems & Networks**

Quantitative analysis of system performance, with emphasis on computer systems and networks, by both mathematical models and methods, and simulation tools. Poisson arrivals. Markov processes and their application in performance evaluation. Queueing analysis: M/M/1, M/M/c, M/M/1 loss, machine repairman, and more general models. Queueing networks, Jackson networks, BCMP. Discrete event simulation; generation of random variates; generation of arrival processes; simulation of Markov chains. Simulation software. Applications and case studies.

Basic understanding of mathematical and statistical models of computers and networks. Understanding of major building blocks of simulation software. Capability of statistical analysis and interpretation of simulation results.

**321-8751 Introduction to VLSI**

Introduction: MOS transistors, CMOS logic, basic gates and memory elements, CMOS

Knowledge of the accurate (non-ideal) MOS transistor behavior. Understanding of the parameters that affect the speed and power consumption of modern CMOS VLSI digital circuits. Knowledge of main methodologies for designing CMOS VLSI circuits. Layout design ability of CMOS VLSI circuits. Knowledge of the advantages and disadvantages of main CMOS circuit families. Knowledge of the sequencing methodologies of static CMOS circuits. Knowledge of the structure and function of semiconductor memories.

321-8601 Information Theory


This course offers an introduction to the theory of information and its applications to communication systems. Emphasis is given on the design, analysis and application of error detection and correction codes.

321-8000 Game Theory


Trying to model the interaction of rational entities, with respect to antagonistic or cooperative nature.
321-88151 Dynamical Systems

Linear systems, linearization of nonlinear dynamical systems, Newtonian systems, Lagrangian dynamics, Hamiltonian systems, canonical transformations, Hamilton-Jacobi theory, physical and geometric principles of relativity, Einstein equations, field theory, space-time variations, dynamics of cosmological models, special topics.


321-6353 Parallel and Distributed Computing


Familiarity with the process of analyzing and transforming a problem into a parallel program using the C programming language and MPI.

321-10752 Mobile and Wireless Networks Security


This course covers the major security and privacy topics in wireless and mobile networking. The main learning objectives of this course are: To conceptualize the wireless terrain idiosyncrasies in terms of security and privacy; to impart state-of-the-art technologies of wireless network security; to analyze the various categories of threats, vulnerabilities, countermeasures in the area of wireless and mobile networking; to familiarize students with the issues and technologies involved in designing a wireless system that is robust against attack. The course considers basic security topics and technologies in the follow-
ing standards: UMTS (3GPP), IEEE 802.11, IEEE 802.16. Security problems of MAC and especially its upper layers will be emphasized. The aforementioned objectives are fulfilled through course lectures, paper readings, and extensive laboratory exercises.

321-7602 Practice

Practice in a real business environment.
Familiarity of the student with the conditions and requirements of real working environments.

321-0151 English Language (TOEFL)

See course 321-0161.

9th semester

321-7102 Diploma Thesis

Complete an original development and/or research project.
Deeper approach in a field of the student’s interest. Familiarity with the process of addressing and solving complex problems.

321-5402 Information Systems Strategy and Investment

Skills of creating information systems strategic plan in a firm, for the support and enrichment (e.g., new products, services, geographical regions) of its overall strategy.

321-7405 Knowledge Engineering and Knowledge Systems

Systems that represent, organize and utilize knowledge. Semantic Networks, Systems

On completion of this module, students are expected to be able: to explain the role of knowledge engineering within Artificial Intelligence, to identify and explain the various stages in the development of a knowledge based system, to design and develop a rule-based knowledge based system, to design and develop a case-based knowledge based system, to design and Develop Bayesian reasoning systems, to understand the mathematical foundations of Bayesian networks, to compare and contrast rule- and case-based knowledge based systems, to design and develop Semantic Web concepts and ontologies, to compare and contrast Semantic Web markup Technologies, and to build Ontologies and Reasoning systems in Protégé.

**321-5605 Human – Computer Interaction**


Upon successful completion of this course, students should be able to: design, implement and evaluate effective and usable graphical computer interfaces, describe and apply core theories, models and methodologies from the field of Human – Computer Interaction (HCI), describe and discuss current research in the field of HCI, implement simple graphical user interfaces using the Java Swing toolkit, describe special considerations in designing user interfaces for older adults.

**321-6255 Internet Protocols and Architectures**


Upon successful completion of this course, students should be able to: design, implement and evaluate effective and usable graphical computer interfaces, describe and apply core theories, models and methodologies from the field of Human – Computer Interaction (HCI), describe and discuss current research in the field of HCI, implement simple graphical user interfaces using the Java Swing toolkit, describe special considerations in designing user interfaces for older adults.

321-10651 Satellite Communications

Introduction to satellite-link subsystems and examination of the geometrical theory of geosynchronous and geostatic satellites. Orbit mechanics. Specialized topics on the satellite channel (e.g. satellite antennas) and analysis of the satellite link in terms of radiated and received power, signal-to-noise ratios, and random effects. Analog and digital modulation and multiple access techniques and their implementation in satellite communication systems. Emphasis on the matched filter and calculation of the probability of error in digital communication systems. Detailed examination of the satellite transponder. Emphasis on transponder signal processing and the effects of nonlinearities in satellite amplifiers. Development of satellite networks based using multiple access techniques. Digital Video Broadcasting and applications.

This lesson aims at understanding the methods of analysis and design of satellite communication systems. This course provides the necessary knowledge of the basic principles and characteristics of satellite communication networks, and the field of their efficient application. The course enables analysis and design of satellite links for various types of services and familiarity with the terms and techniques related to performance evaluation and the availability of such links. Upon completion of this course, the students will have acquired the background to understand the principles of analysis and design of satellite systems and be able to analyze and design elementary links and satellite orbits in system level.

321-9402 Broadband Networks

Client-server model vs. P2P model, BOOTP and DHCP protocols, The Domain Name System (DNS), Differentiated Services (DiffServ) protocol and Resource ReSerVation Protocol (RSVP), Virtual Private Networks (VPN), Mobile IP and mobility management in Next Generation networks, Software-Defined Networking – SDN, Network
Function Virtualization – NFV, Cloud Infrastructures and Services, Multicasting and Network coding, Data transmission over power line transmission networks, Visible Light Communication Networks, Machine to machine M2M networks over internet, Green Technologies In Next-Generation Networks, Fiber Optic Internet Technologies. Students will develop familiarity with advanced topics of internet protocols and architectures.

321-6554 Multimedia


Understanding of basic meanings concerning the representation, coding and transmission of multimedia data. Skill of analyzing the individual features of the different multimedia data (e.g., image, sound, video). Skill of developing multimedia applications.

321-7852 Microprocessors


Knowledge of the internal architectural parts of a microprocessor, as well as of the basic principles and elements of microprocessor-based systems. Ability to interconnect a microprocessor to memories and peripheral devices. Ability of advanced assembly programming.

321-99001 Numerical Analysis

Errors, Computer Arithmetic, Error method and algorithm, Linear Systems, Method of Gauss, Gauss-Jordan, factorization LU, Method Choleski, Iterative method of Jacobi,

Comprehension of the basic numerical methods to solve problems in Science and Technology.

**321-6605 Computer Vision**

Image formation - Feature-based image alignment - Structure from motion - Computational photography - Feature detection and matching - Dense motion estimation - Image stitching - Stereo correspondence – Recognition.

The course provides basic knowledge for understanding and using computer vision systems. The student learns the basic principles and common techniques for the designing and development of computer vision systems.

**321-9002 Computational Complexity**


This course will give an overview of advanced topics in computational complexity including the P versus NP problem, randomness, and applications of NP-complete problems.

**321-8552 Language Engineering**


Familiarity with the basic principles of language engineering. Ability to apply morpho-syntactic parsing method. Ability to develop stochastic grammars. Familiarity with semantic and pragmatic analysis methods. Ability to use available language resources. Understanding of approaches to practical applications including information extraction, machine translation, and natural language generation.
321-99100 Regulatory and Social Issues in Information Society


The objective of this course is the discussion and the closer examination of issues concerning the conceiving, understanding and dealing with information and communication technologies and their application by users, society and economic, technological and political organizations.

10th Semester

321-7102 Diploma Thesis

Complete an original development and/or research project.

Deeper approach in a field of the student's interest. Familiarity with the process of addressing and solving complex problems.
Student Services

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

- Full medical and hospital care, which includes: medical examination, hospital examination, pharmaceutical care, clinical examinations, examination at home, births, physiotherapy, dental care and orthopedics.

- Discount tickets for public transport, including ferry, for traveling inside the country, according to the law. The discount is interrupted throughout periods of possible suspension of study, military service, loss of student status or upon graduation or completion of six years of study.

- Free meals under conditions which relate to individual and family financial situation. Free meals stop when a student successfully completes their studies, or after six (6) years from registration, regardless of whether they have completed their studies.

- Student loans depending on students’ financial situation and their performance in their studies. 50% of the amount of the loan awarded to each student is a scholarship and the remaining 50% is an interest-free loan.
**Scholarships**

Scholarships are awarded to students based on their academic performance and financial condition. The Greek State Scholarship Foundation awards scholarships and prizes to students who excelled: a) in the examinations for entering the Department and b) in semesters’ examinations for each academic year. The scholarships are granted according to the students’ economic situation and academic performance. For awards, which consist of a written certificate and a grant, only the performance of the student is taken into account. In addition to the above scholarships, institutions such as the City Samos, the North Aegean Administrative Division and other local organizations award students with some scholarships based on their performance in studies.

As far as the prerequisites, supporting documents, and application periods for the various scholarships are concerned, the students are advised to contact the Department’s Secretariat.

*More information is available on the Department’s website:*

http://www.icsd.aegean.gr

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**Student Club**

Students’ parallel activities are part of their academic life and contribute positively to the development of their personality. The main venue for such activities is the Student Club. The purpose of the Student Club is entertainment, sports and the development of the artistic inclinations of the students. The University seeks to extend the activities of the Club and encourages the establishment of new committees.
Student Association – Student Groups

The Student Association supports sporting, recreational, artistic, academic and other activities through student groups that operate independently. Student groups are open to all undergraduate and postgraduate students of the Department, while there is always the possibility of setting up new groups. Currently there exist the following groups:

<table>
<thead>
<tr>
<th>Student Group</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men and Women Sports Teams</td>
<td>Faculty of Science Trainer:</td>
</tr>
<tr>
<td></td>
<td>Euripides Gerontis</td>
</tr>
<tr>
<td></td>
<td>Email: <a href="mailto:egerontis@aegean.gr">egerontis@aegean.gr</a></td>
</tr>
<tr>
<td>Artistic group</td>
<td>Email: <a href="mailto:ieee@aegean.gr">ieee@aegean.gr</a></td>
</tr>
<tr>
<td>Music group</td>
<td>Email: <a href="mailto:artsam@aegean.gr">artsam@aegean.gr</a></td>
</tr>
<tr>
<td>Astronomy group</td>
<td>Email: <a href="mailto:musicteam@aegean.gr">musicteam@aegean.gr</a></td>
</tr>
<tr>
<td>University of the Aegean Juggling club</td>
<td>Email: <a href="mailto:aristarchos@samos.aegean.gr">aristarchos@samos.aegean.gr</a></td>
</tr>
<tr>
<td>Cycling club</td>
<td>Email: <a href="mailto:jugglingc@aegean.gr">jugglingc@aegean.gr</a></td>
</tr>
<tr>
<td>Faculty of Science Football Club (participates in the local championship of the Greek Football Federation)</td>
<td>Email: <a href="mailto:samos_sthe_fc@aegean.gr">samos_sthe_fc@aegean.gr</a></td>
</tr>
<tr>
<td>Chess group</td>
<td>Email: <a href="mailto:skaki@samos.aegean.gr">skaki@samos.aegean.gr</a></td>
</tr>
<tr>
<td>Students cafeteria – “Algorithm of Taste”</td>
<td>Email: <a href="mailto:flesxi@aegean.gr">flesxi@aegean.gr</a></td>
</tr>
<tr>
<td>Students magazine – “Φ” (“Phi”)</td>
<td>Email: <a href="mailto:f@samos.aegean.gr">f@samos.aegean.gr</a></td>
</tr>
<tr>
<td>Students Radio Station “Choros” (“Space”) 94.2 FM</td>
<td><a href="http://xoros.samos.aegean.gr">http://xoros.samos.aegean.gr</a></td>
</tr>
<tr>
<td>Dancing group</td>
<td>Email: <a href="mailto:xoros94.2@samos.aegean.gr">xoros94.2@samos.aegean.gr</a></td>
</tr>
<tr>
<td></td>
<td>Email: <a href="mailto:samosdance@aegean.gr">samosdance@aegean.gr</a></td>
</tr>
</tbody>
</table>
The Library of the University Unit of Samos is housed in a renovated neoclassical building of 1903, the «Chatziganneio». 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
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, ARTEMIS), which have modern computer systems, software products and hardware instruments, for supporting the teaching and research needs of the Department. Additionally, in Emporiki building, there is a fully equipped teleconference room.
# Academic calendar 2014-2015

## WINTER SEMESTER

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning of courses</td>
<td>29.09.2014</td>
</tr>
<tr>
<td>End of courses</td>
<td>16.01.2015</td>
</tr>
<tr>
<td>Semester duration</td>
<td>13 weeks</td>
</tr>
<tr>
<td>Examination period</td>
<td>From 19.01.2015 to 13.02.2015</td>
</tr>
<tr>
<td>Holidays</td>
<td></td>
</tr>
<tr>
<td>28.10.2014: National Holiday</td>
<td></td>
</tr>
<tr>
<td>17.11.2014: Polytechnion Anniversary</td>
<td></td>
</tr>
<tr>
<td>22.12.2014-06.01.2015: Christmas Holidays</td>
<td></td>
</tr>
<tr>
<td>30.01.2015: Religious Holiday (Trion Ierarhon)</td>
<td></td>
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</tbody>
</table>

## SPRING SEMESTER

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Beginning of courses</td>
<td>16.02.2015</td>
</tr>
<tr>
<td>End of courses</td>
<td>29.05.2015</td>
</tr>
<tr>
<td>Semester duration</td>
<td>13 weeks</td>
</tr>
<tr>
<td>Examination period</td>
<td>From 2.06.2015 to 26.06.2015</td>
</tr>
<tr>
<td>Holidays</td>
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<tr>
<td>23.02.2015: Monday, the first day of Lent</td>
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</tr>
<tr>
<td>25.03.2015: National Holiday</td>
<td></td>
</tr>
<tr>
<td>06.04.2015-17.04.2015: Easter Holidays</td>
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</tr>
<tr>
<td>01.05.2015: First of May Holiday</td>
<td></td>
</tr>
<tr>
<td>Students’ elections: the exact date has not yet been decided</td>
<td></td>
</tr>
<tr>
<td>01.06.2015: Religious Holiday (Holy Spirit)</td>
<td></td>
</tr>
</tbody>
</table>