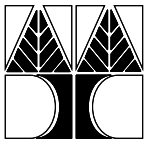

Department of Electrical and Computer Engineering
University of Cyprus

Graduate Prospectus 2006-2007

Table of Contents

FOR THE MOST UP-TO-DATE VERSION OF THE GRADUATE PROSPECTUS, CHECK http://www.ece.ucy.ac.cy/

INTRODUCTION

Electrical and computer engineering is a key engineering discipline, at the heart of today's technology frontier. It deals with the design of the electrical, electronic, magnetic, and optical machines and devices used in the telecommunications, information, manufacturing, transportation, power, and health industries, and elsewhere. The scientific tools used in electrical and computer engineering include various areas of Physics (that involve, for example, the study of electrical, electromagnetic and optical phenomena), Mathematics (partial differential equations, complex analysis, theory of probability, systems theory, combinatorics, and optimization among others), and Computer Science (for example computer programming and data structures, etc.)

The Department of Electrical and Computer Engineering at the University of Cyprus provides high quality degree programs at both the undergraduate and graduate levels. These programs emphasize fundamental principles that prepare students for leadership roles in a challenging and rapidly changing technological world. Research and innovation is achieved in an environment that fosters cooperation between faculty, students, industry, and research organizations. The faculty in the Department of Electrical and Computer Engineering is comprised of world-class, experienced academicians, who are leaders in their field of expertise.

All programs of studies at the University of Cyprus are based on the European Credit Transfer and Accumulation System (ECTS). The ECTS system is based on a total estimation of the workload needed by a student to complete the various components of a program, and appropriate allocation of ECTS units to these components. The number of ECTS units corresponding to the workload of a full-time student. At any level, is 30.

The Department offers the following four graduate degrees:

- M.Sc. in Electrical Engineering
- M.Sc. in Computer Engineering
- Ph.D. in Electrical Engineering
- Ph.D. in Computer Engineering

ACADEMIC STAFF AND RESEARCH

The current members of the academic staff are:

- Marios Polycarpou, *Professor and Chair*
- Charalambos Charalambous, *Associate Professor*
- George Ellinas, *Assistant Professor*
- George Georgiou, *Assistant Professor*
- Christos Panayiotou, *Assistant Professor*
- Constantinos Pitris, *Assistant Professor*
- Julius Georgiou, *Lecturer*
- Elias Kyriakides, *Lecturer*
- Maria Michael, *Lecturer*
- Stavros Toumpis, *Lecturer*

Research in the Department currently focuses on the following areas:

- Power and Renewable Energy Systems
- Biomedical Engineering
- Signal and Image Processing
- Electromagnetics, Microwaves, Antennas and Optics
- Nanotechnology
- Telecommunications Systems and Networks

- Decision, Control and Automation Systems
- Integrated Circuit Design
- Digital Hardware Design and Test
- High Performance Computing and Architectures
- Computer Networks
- Computational Intelligence and Robotics

For more information on the Faculty of the Department, their individual research, and the various research laboratories please contact the Department or visit the Department's webpage (http://www.ece.ucy.ac.cy/).

ADMISSION TO THE GRADUATE PROGRAM

The graduate program of the Department is overseen by the Graduate Studies Committee. The committee is chaired by the coordinator of graduate studies. The coordinator and the members of the committee are appointed by the Department Council among the faculty members.

The Department admits new graduate students each year at the Master and Doctoral levels. The number of new admissions fluctuates each year and depends on the needs of the Department and the quality of the candidates.

Applications are submitted to the Department and are evaluated by the Committee of Graduate Studies Committee, which makes recommendations to the Department Council for final approval. Eligible applicants must hold a University degree granted by an institution recognized in the country where it operates. The degree must have been judged as equivalent to a University degree by the Cyprus Council for Recognition of Higher Education Qualifications. Applicants who do not hold their first degree at the time of application, but will hold such a degree before the commencement of the graduate program, are also eligible to apply but must submit a letter from their University's Registrar verifying that they are indeed eligible to graduate. The decision on their admission does not become official until the degree has been successfully produced.

Each application for admission should include:

- A cover letter clearly stating the graduate degree the candidate wishes to apply for.
- A completed application form.
- A Curriculum Vitae indicating the student's education, academic and research experience, any publications, awards, etc.
- A short statement (at most two pages long) stating the reason the candidate wishes to join the program, the candidate's professional and research experience, future goals, etc.
- At least three letters of recommendation from academic or professional advisors.
- Copies of representative publications, if any (no more than three).
- Copies of all degrees and transcripts. If applicable, a letter from the Registrar of the student's current university verifying the expected graduation date should be included (as described above).
- Copies of any other supporting material, such as exams, honors, award, etc.

The application material can be submitted in either Greek or English (application forms are provided in both languages).

The criteria for the evaluation of the candidates are the following:
- Academic background
- Research background
- Recommendation letters
- Additional qualifications

Familiarity with the English language is strongly recommended.

MASTER OF SCIENCE DEGREES

The Department offers the following Master of Science degrees:

- Masters of Science (M.Sc.) Degree in Electrical Engineering
- Masters of Science (M.Sc.) Degree in Computer Engineering

To be awarded the M.Sc. degree, the student must complete at least 90 ECTS units of graduate level coursework, research work, and seminar attendance. The average duration for a M.Sc. degree is 1.5 years. The maximum duration allowed for a M.Sc. degree is set by the University regulations and is currently 4 academic years.

Students admitted into the M.Sc. program of Electrical Engineering not holding an undergraduate degree in Electrical Engineering must possess fundamental knowledge of basic concepts in the following areas: Signals and Systems, Electromagnetics and Microwaves, Circuits and Electronics. Similarly, students admitted into the M.Sc. program of Computer Engineering not holding an undergraduate degree in Computer Engineering must possess fundamental knowledge of basic concepts in the following areas: Computer Architecture and Organization, Operating Systems and Algorithms. The student's Academic Advisor is responsible to guide the student in acquiring the missing knowledge. This can be done by specifying a maximum of 4 additional courses from the above areas (possibly from the corresponding undergraduate program of the Department).

Student Advising

Academic Advisor: Every M.Sc. student is assigned, upon admission into the program, an Academic Advisor who is a faculty member of the ECE department. The Academic Advisor, assigned by the Graduate Studies Committee during the admission evaluation process, should be from an area of research which is related to but not necessarily identical to that of the student. The Academic Advisor's main responsibility will be to define in consultation with the student his/her academic plan, including courses for the semesters prior to the selection of a Research Supervisor.

Research Supervisor: By the end of the second semester, every M.Sc. student must find a Research Supervisor. The Research Supervisor will act as the permanent Academic Advisor, and in addition will be responsible for overseeing the research conducted by the student. The Research Supervisor is approved by the Graduate Studies Committee, in consultation with the student and the suggested advisor. If the student fails to find a Research Supervisor, then he/she can consult his/her Academic Advisor for alternative solutions.

ECTS Requirements

A minimum of 90 ECTS units must be obtained, distributed as follows:

- At least 56 ECTS units of graduate-level courses.
- 4 ECTS units of graduate-level seminars.
- At least 30 ECTS units of an original research study, documented by a M.Sc. thesis.

The following rules apply:

- At most 16 ECTS units, out of the 56 ECTS units for courses, can come from directed study courses such as ECE 711-712.
- It is possible for the student to enroll in graduate courses offered by another department from the University of Cyprus or any other accredited university. Units outside the

Department are approved by the Graduate Studies Committee, and are not to exceed 18 ECTS units, unless approved by the Department Council.

- For students who completed graduate level courses as a part of other graduate programs, at most 18 ECTS units from these courses can count towards the 56 ECTS units for graduate coursework, after approval by the Department Council.
- To satisfy the 4 ECTS requirement for seminars, each student must attend at least 25 departmental graduate seminar presentations, during the time registered in the ECE graduate program. The graduate seminar coordinator is responsible for assigning the final grade.

M.Sc. Thesis

M.Sc. Thesis Committee

The M.Sc. Thesis Committee members are proposed by the Graduate Studies Committee, in consultation with the student's Research Supervisor, after a written request by the latter, and approved by the Department Council. The Thesis Committee will consist of the student's Research Supervisor and two additional faculty members with related research interests. One of the members of the Thesis Committee can be a qualified individual who is external to the Department. Qualified individuals are considered holders of a Ph.D. or M.D. degree, with extensive knowledge in the research subject. The student's Research Supervisor will be the chairperson and coordinator of the Thesis Committee.

Thesis Proposal

The student must present a brief written thesis proposal to the Thesis Committee at least 4 months before the intended date of graduation. The thesis proposal should be in a generally accepted proposal format and must contain a description of the proposed research; results already obtained, if any; expected results; and a complete bibliography which includes the current state of art.

Progress Report

Midway towards the completion of his/her research the student must submit a progress report to the Thesis Committee members for feedback.

Submission of the M.Sc. Thesis

Once the Thesis is ready, the Research Supervisor and student must submit a Thesis Submission Form to the Graduate Studies Committee, which indicates the date of the Thesis Defense. Two weeks prior to the defense date, the student should also provide the title, abstract, short biography, and list of conference and journal publications and presentations to the Department's secretary, for circulation around the university community. At least two weeks prior to the defense date, the student must provide copies of the Thesis to each member of the Thesis Committee for feedback.

Defense of the M.Sc. Thesis

The student must defend the scientific research findings of his/her M.Sc. Thesis during an oral defense which takes place before the Thesis Committee, and is open to the public.

The procedure for the defense is comprised of three stages:

- An oral presentation of the thesis in an open lecture lasting 30-45 minutes, with additional time available for questions from the public.
- A closed discussion between the student and the members of the Thesis Committee.
- Meeting of the Thesis Committee to make its final deliberation.

After completion of the defense, the Thesis Committee submits a written substantiated proposal, including the earned grade (which must be either Excellent, Very Good, Good, or

Unsatisfactory) and, when appropriate, suggestions to the student, to the Graduate Studies Committee. The Graduate Studies Committee must make the recommendation to the Department Council which will assign the grade. In the case of rejection of the thesis, the candidate is entitled to ask for a repetition of the defense procedures for at most one more time. The terms of resubmission of the thesis are set out in writing by the Thesis Committee. If the defense is satisfactory, the Thesis Committee will sign the thesis and submit to the department two original copies, one for the department records and one for the University Library. An electronic version of the thesis in PDF format will also be submitted for the Department records and for dissemination.

Concentration Areas

Currently, the ECE Department offers to M.Sc. students several areas of concentration, in both Electrical Engineering and Computer Engineering. As the department grows in size, the number of areas of concentration will also grow.

Concentration Areas for the M.Sc. Degree in Electrical Engineering: Telecommunications Systems and Networks, Signal and Image Processing, Biomedical Engineering, Integrated Circuit Design, Nanotechnology, Electromagnetics, Microwaves, Antennas and Optics, Decision, Control, and Automation Systems, and Power and Renewable Energy Systems.

Concentration Areas for the M.Sc. Degree in Computer Engineering: High Performance Computing and Architectures, Computer Networks, Digital Hardware Design and Test, Integrated Circuit Design, and Computational Intelligence and Robotics.

DOCTOR OF PHILOSOPHY DEGREES

The Department offers the following Doctor of Philosophy degrees:

- Doctor of Philosophy Degree (Ph.D.) in Electrical Engineering
- Doctor of Philosophy Degree (Ph.D.) in Computer Engineering

A graduate student becomes a candidate for a Ph.D. degree after being admitted to the Electrical Engineering or Computer Engineering Ph.D. program, and successfully taking the Ph.D. Qualifying Examination of the Department. The requirements for obtaining a Doctor of Philosophy Degree the requirements are the following:

- Successful completion of at least 240 ECTS units of graduate level coursework, seminars, and research.
- Completing at least one semester of Teaching Assistantship.
- Passing the Ph.D. Qualifying Examination.
- Approval of the Doctoral Dissertation Proposal.
- Successful defense of the Doctoral Dissertation.

According to University regulations, the minimum time period for completing a Ph.D. degree is 3 academic years. The maximum time period for completing a Ph.D. degree is 8 academic years for both full-time and part-time students.

Students admitted into the Ph.D. program of Electrical Engineering not holding an undergraduate degree in Electrical Engineering must possess fundamental knowledge of basic concepts in the following areas: Signals and Systems, Electromagnetics and Microwaves, Circuits and Electronics. Similarly, students admitted into the M.Sc. program of Computer Engineering not holding an undergraduate degree in Computer Engineering must possess fundamental knowledge of basic concepts in the following areas: Computer Architecture and Organization, Operating Systems and Algorithms. The student's Academic Advisor is responsible to guide the student in acquiring the missing knowledge. This can be done by specifying a maximum of 4 additional courses from the above areas (possibly from the corresponding undergraduate program of the Department).

Student Advising

Academic Advisor

Upon admission into the graduate program, every Ph.D. student is assigned an Academic Advisor who is a faculty member of the ECE department. The Academic Advisor, assigned by the Department Council during the admission evaluation process, should be from an area of research which is related to but not necessarily identical to that of the student. The Academic Advisor's main responsibility will be to define, in consultation with the student, his/her academic plan, including courses for semesters prior to the selection of a Research Supervisor.

Research Supervisor

By the end of the second semester, every Ph.D. student must find a Research Supervisor. The Research Supervisor will act as the permanent Academic Advisor, and in addition will be responsible for overseeing the research conducted by the student. The Research Supervisor of the student is approved by the Graduate Studies Committee, in consultation with the student and the suggested advisor. If the student fails to find a Research Supervisor, then he/she can consult his/her Academic Advisor for alternative solutions.

ECTS Requirements

A minimum of 240 ECTS units must be completed, distributed as follows:

- At least 56 ECTS units of graduate-level courses.
- 4 ECTS units of seminars.
- At least 180 ECTS units of an original research study leading to the Doctoral Thesis.

The following rules apply:

- At most 16 ECTS units, out of the 56 ECTS units for courses, can be replaced by directed study courses such as ECE 751 and 752.
- Holders of M.Sc. or equivalent degrees may be partially or fully exempted from the graduate courses requirement (up to 56 ECTS units). This can be requested in consultation with the student's Academic Advisor/Research Supervisor and is subject to approval by the Department Council.
- It is possible for the student to enroll in graduate courses offered by another Department from the University of Cyprus or any other accredited University. Units outside the Department are approved by the Graduate Studies Committee, and are not to exceed 18 ECTS units unless approved by the Department Council.
- For students who completed graduate level courses as a part of other graduate programs, at most 18 ECTS units from these courses can count towards the 56 ECTS units for graduate coursework, after approval by the Graduate Studies Committee.
- The 180 ECTS units requirement for the dissertation research can be fulfilled by taking Ph.D. research stages (ECE 761-764, 30 ECTS units each), Ph.D. research courses (ECE 765-768, 15 ECTS units each) and/or Ph.D. writing stages (ECE 771-772, 30 ECTS units each). The Ph.D. research stages ECE 761-764 are compulsory for all Ph.D. students and can only be taken one-by-one per semester, for four consecutive semesters. The research stage courses ECE 765-768 are optional and can be taken in parallel with other graduate courses. If, after completing all research stages, the student has not defended his/her doctoral dissertation, then he/she is required to sign up for ECE 771-772.
- To satisfy the 4 ECTS requirement for seminars, each student must attend at least 25 seminar presentations, during the time registered in the ECE graduate program. In addition, the student must give a presentation in the seminar series on a research topic of his/her choice. The completeness of the presentation and the thoroughness of the understanding of the subject will be evaluated, and feedback will be given to the student in case the subject of the presentation is directly related to his thesis research work. The graduate seminar coordinator is responsible for assigning the final grade.

Becoming a Ph.D. Candidate

A student becomes a Ph.D. Candidate after successfully taking the Ph.D. Qualifying Examination of the Department. The guidelines on all the necessary procedures to be followed for taking the Qualifying examination are given below.

Ph.D. Qualifying Committee

The Research Supervisor is responsible for submitting a written request to the Graduate Studies Committee to form the student's Qualifying Examination Committee. The Ph.D. Qualifying Examination Committee consists of the student's Research Supervisor, who is also the Committee's Chair, and two other members. One of the members of the Ph.D. Qualifying Committee can be a Ph.D. or M.D. holder from another department of the University of Cyprus or another University or Research Institute who has extensive knowledge in the subject of the examination. The Qualifying Examination Committee is proposed by the Graduate Studies Committee, after the recommendation of the Research Supervisor, and is approved by the Department Council.

Ph.D. Qualifying Committee Meeting

For students who hold a M.Sc. degree, the Ph.D. Qualifying Examination Committee meeting should take place within one year of the date of the entry of the student into the Ph.D. program. For students who do not hold a Masters degree, the Ph.D. Qualifying Examination Committee meeting should take place within one and a half years of the date of the entry of the student into the Ph.D. program.

The student and the Ph.D. Qualifying Examination Committee will meet to:

- Define the general area of the student's research leading to the Ph.D. degree.
- Define the contents of the Ph.D. Qualifying Examination, by specifying reading material which is essential in evaluating the background and specialized knowledge appropriate to the student's general area of research. Such reading material could be chosen from courses, texts and any other material judged important in preparing the student in his/her general area of research.
- Set the date of the Ph.D. Qualifying Examination, which should be no later than four months from the date of the Ph.D. Qualifying Committee Meeting.

Ph.D. Qualifying Examination

The purpose of this examination is for the Ph.D. Qualifying Committee to evaluate the student's ability to think creatively and independently, and the background knowledge and level of specialized knowledge of the student in his/her likely area of research. The time duration of the oral examination should be no longer than 3 hours. Any student who fails the Ph.D. Qualifying Examination is permitted a second and final examination at a date, within the four months of the first examination, decided by the Ph.D. Qualifying Committee. Failure at the second examination will result in the permanent removal of the student from the Ph.D. program. After the Ph.D. Qualifying Examination, the Qualifying Committee submits for approval its substantiated suggestion, including the earned grade, to the Department Council.

Doctoral Dissertation

A successful completion of a doctoral dissertation requires 180 ECTS units for research, an approved dissertation research proposal, and a successful defense of the dissertation. The various guidelines and procedures to be followed for carrying out the doctoral dissertation proposal and defense are discussed below.

Dissertation Proposal Committee

The three members of a student's Dissertation Proposal Committee are approved by the Graduate Studies Committee, after the recommendation of the Research Supervisor. The Dissertation Proposal Committee consists of the student's Research Supervisor, who also chairs the Committee, and two other members. One member of this Committee can be either a member of the academic staff from a different department of the University of Cyprus or another University or Research Institution, or a qualified individual. Qualified individuals are considered holders of a Ph.D. or M.D. degree, with extensive knowledge in the research subject.

Submission and Presentation of the Dissertation Proposal

The student must present a brief written dissertation proposal to the Dissertation Proposal Committee at least 8 months prior to the tentative dissertation defense date. The dissertation proposal should be in a generally accepted proposal format and must contain a statement of proposed research, results already obtained, if any, and expected results, including a complete bibliography which includes the current state of body of knowledge at the time of the writing of the proposal. The written proposal must be given to the Dissertation Proposal Committee members at least two weeks prior to the presentation of the proposal.

The proposal presentation will be an oral presentation of the written statement by the student, and then a period in which he/she will be questioned on the proposal by the Proposal Committee. The presentation part of the proposal should not exceed 50 minutes.

Any student whose proposal is considered unsatisfactory will be invited to make any necessary changes and present the proposal at a later date specified by the Committee. Students will only be allowed to continue their research provided their proposal has been judged acceptable. The proposal is approved by the Graduate Studies Committee, after the recommendation of the Dissertation Proposal Committee.

Doctoral Dissertation Committee

A 5 member Doctoral Dissertation Committee is proposed by the Graduate Studies Committee, after the recommendation of the Research Supervisor, and approved by the Department Council. The Committee must be formed at least 3 months prior to the final defense of the dissertation.

The Committee must be comprised of the following members:

- 3 members from the academic staff of the ECE Department, including the student's Research Advisor.
- 1 member from another University or Research center.
- 1 member from another department of the University of Cyprus or another University or research center, or another qualified individual.

Members of the Committee external to the Department must hold a Ph.D. or M.D. degree, and have extensive knowledge in the research subject. The chair of this Committee is a member of the academic staff of the ECE department, but not the student's Research Advisor.

Submission of the Doctoral Dissertation

The doctoral dissertation must include significant research findings in current scientific and/or technical topics through basic and/or applied research, which will lead to new scientific knowledge in Electrical and Computer Engineering, and/or prototypes which were not available in the scientific community. The basic/applied research must be original, innovative, and of high academic caliber so that it can be judged acceptable for publication in internationally recognized academic journals.

Once the dissertation is ready, the Research Supervisor and student must submit a Doctoral Dissertation Submission request to the Doctoral Dissertation Committee. Three weeks prior to the defense date, the student must provide the title, abstract, short biography, and list of conference and journal publications and presentations to the Department's secretary, for circulation around the university community. At least two weeks prior to the defense date, the student must provide copies of the doctoral dissertation to each of the member of the Doctoral Dissertation Committee.

University rules require that a doctoral dissertation can be submitted only after the student advances to the Candidate level (passes the Ph.D. Qualification Examination) and successfully completes the four research stage semesters (correspond to ECE 761-764).

Defense of Doctoral Dissertation

The student must defend the scientific research findings and the quality of his/her doctoral dissertation during an oral defense which takes place before the Doctoral Dissertation Committee, and is open to the public.

The procedure for the defense comprises of three stages:

- An oral presentation of the dissertation in an open lecture lasting 30-45 minutes, with additional time available for questions from the public.

- Closed discussion of the dissertation between the student and the members of the Committee.
- Meeting of the Committee to make its final deliberation.

In case the Doctoral Dissertation Committee deems the defense satisfactory, it submits to the Department Council a written substantiated proposal, including, when appropriate, the suggestions to the student, for approval. Upon such approval, all necessary material is forwarded to the University Senate for ratification of the Ph.D. degree. The members of the Doctoral Dissertation Committee must sign the approved dissertation and submit to the Department two original copies, one for the Department records and one for the Library. An electronic version of the thesis in PDF format will also be submitted by the student for keeping in the Department records and for dissemination.

In case the Doctoral Dissertation Committee proposes modifications, the final University Senate approval is given after a written assurance by the student's Research Advisor that the modifications have been carried out.

In the case of rejection of the dissertation, the Ph.D. candidate is entitled to ask for a repetition of the defense procedures for at most one more time. The terms of resubmission of the dissertation are set out in writing by the Doctoral Dissertation Committee.

FINANCIAL SUPPORT

The University of Cyprus supports many graduate students through teaching assistantships, the number of which depends on the needs of the Department. There are also some additional funding opportunities, information on which may be available through the Office of Student Affairs. An increasing number of students are financially supported through external research programs. Students working for a research project may be eligible for a partial tuition waiver.

MINIMUM PERFORMANCE REQUIREMENTS

A student who fails a graduate course is allowed to register for the same course at most one more time.

The Department Council must address the question of the permanent withdrawal of a student in the following cases:
- The student fails for the second time a graduate-level course.
- The student fails two courses during the same semester.
- The cumulative grade point average of a student is below 5 out of 10 for two consecutive semesters.

GRADUATE COURSES

The table below lists all currently offered graduate courses. Additional details on each course are provided in the following pages.

Course Number	Course Title	ECTS Units
ECE 621	Random Processes	8
ECE 622	Information Theory	8
ECE 623	Digital Signal Processing	8
ECE 624	Principles of Digital Communications	8
ECE 625	Wireless Communication Networks I	8
ECE 626	Image Processing	8
ECE 628	Communication Theory	8
ECE 629	Fiber Optic Communication Systems and Networks	8
ECE 631	Foundations of Systems Engineering	8
ECE 632	Modern Decision and Control Systems	8
ECE 634	Introduction to Computational Intelligence	8
ECE 635	Optimization Theory and Applications	8
ECE 643	Radio and Microwave Wireless Systems	8
ECE 645	Optics and Photonics	8
ECE 646	Advanced Antenna Theory	8
ECE 648	Introduction to Photonics	8
ECE 649	Electromagnetic Waves and Antenna Theory	8
ECE 653	Advanced Real-Time Systems	8
ECE 654	Advanced Computer Networks	8
ECE 655	Advanced Operating Systems	8
ECE 656	Advanced Computer Architecture	8
ECE 657	Computer-Aided Design for VLSI	8
ECE 658	Computer Systems' Performance Evaluation and Simulation	8
ECE 659	VLSI Design	8
ECE 660	VLSI Test	8
ECE 661	Logic Synthesis and Optimization	8
ECE 662	Physical Design Automation	8
ECE 663	Distributed Systems	8
ECE 664	Digital Design with FPGAs	8
ECE 665	Instrumentation and Sensors	8
ECE 667	Microwave and Radio-Frequency Circuits	8
ECE 671	Neurophysiology and Senses	8
ECE 680	Power System Analysis	8
ECE 681	Power System Operation and Control	8
ECE 682	Renewable Sources of Energy - Photovoltaics	8
ECE 701	M.Sc. Graduate Seminar	4
ECE 704	Ph.D. Graduate Seminar	4
ECE 711-712	Directed Study for M.Sc. Students I and II	8
ECE 721-722	M.Sc. Thesis I and II	15
ECE 731-732	Ph.D. Qualifying Examination I and II	0
ECE 751-752	Directed Study for Ph.D. Students I and II	8
ECE 761-764	Research Stage of Ph.D. Dissertation IA, IIA, IIIA and IVA	30
ECE 765-768	Research Course for Ph.D. Dissertation IB, IIB, IIIB and IVB	15
ECE 771-772	Writing Stage of Ph.D. Dissertation I and II	30
ECE 799	Special Topics in Electrical and Computer Engineering	8

ECE 600	Incomplete for M.Sc. students			I	T	L	H	P	ECTS
								☐	0
Year: PG	Core ☒	Elective ☐	Prerequisites:						
Description:	M.Sc. students should enroll to this course if they have fulfilled their ECTS requirements but have not defended their M.Sc. thesis								

ECE 621	Random Processes			I	T	L	H	P	ECTS
				3			8	☐	8
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 324 or equivalent					
Coordinator:	Stavros Toumpis								
Objectives:	To familiarize students with the most common stochastic processes encountered in Electrical Engineering								
Outcomes:	Demonstrate knowledge and understanding of the mathematical tools, methods and techniques used in the analysis of stochastic processes								
Description:	Fundamentals of Random Processes: definition of random processes, continuous and discrete random processes, stationarity and ergodicity. Analysis and Processing of Random Signals: power spectral density, linear system response, optimum linear systems and the Kalman filter. Markov Chains: discrete and continuous Markov chains, classes of states, recurrence properties, and limiting probabilities. Introduction to Queuing theory: Little's theorem, the M/M/1 and M/M/k/k queues.								
Bibliography:	• Alberto Leon-Garcia, *Probability and Random Processes for Electrical Engineering* • Sheldon Ross, *Probability Models* • Sheldon Ross, *Stochastic Processes* • Robert Gallager, *Discrete Stochastic Processes*								
Assessment:	Midterm examination, final examination, weekly homework.								

ECE 622	Information Theory			I	T	L	H	P	ECTS
				3			5	☒	8
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 359 and ECE 324, or equivalent					
Coordinator:	Charalambos Charalambous								
Objectives:	Provide knowledge and understanding of the principles of information transmission.								
Outcomes:	• Demonstrate knowledge and understanding of source and channel models • Demonstrate knowledge and understanding of Shannon's theory. • Ability to apply the above tools in communications systems.								
Description:	Shannon's Reliable Data Transmission Block Diagram. Entropy and Relations to Reliable Communication: Source and Channel Models. Data Compression: lossless source coding (prefix codes, Ziv-Lempel algorithm), performance limits for channel codes, performance limits. Channel Capacity: additive Gaussian channels, finite-state channels. Rate Distortion: Quantization, compression subject to fidelity criterion. Network Information Theory: multiple access channel, broadcast channel, relay channel, interference channel. The effect of uncertainty on Shannon's Reliable Data Transmission Blocks.								

Bibliography:	Thomas Cover and Joy Thomas, *Elements of Information Theory*, John Wiley and Sons Inc., 1991
Assessment:	Two tests and a final examination. Homework assignment and design project.

ECE 623	**Digital Signal Processing**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Coordinator:	Constantinos Pitris								
Objectives:	Provide knowledge and understanding of analysis tools for digital signal processing.								
Outcomes:	• Demonstrate knowledge and understanding of discrete-time signal representation and analysis tools. • Ability to analyze discrete-time signals using the z-transforms, discrete Fourier transform (DFT), Fast Fourier transform (FFT). • Ability to design digital filters using Infinite Impulse Response (IIR) and Finite Impulse Response (FIR). • Ability to utilize DSP software tools.								
Description:	Discrete-time signals and systems; Fourier and Z-transform analysis techniques, the discrete Fourier transform; elements of FIR and IIR filter design, filter structures; FFT techniques for high speed convolution; quantization effects.								
Bibliography:	A.V. Oppenheim and R.W. Schafer, *Discrete-Time Signal Processing*, Prentice Hall.								
Assessment:	Two tests and a final examination. Design project.								

ECE 624	**Principles of Digital Communications**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Coordinator:	George Ellinas								
Description:	Elements of communication theory and information theory applied to digital communication systems. Amplitude and angle modulation (AM, FM, FDM). Sampling and quantization (PCM systems, TDM; digital modulation techniques). Maximum-Likelihood receivers. Information sources, source coding and channel capacity.								

ECE 625	**Wireless Telecommunication Networks I**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			8	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	Communications or Networks course					
Coordinator:	Stavros Toumpis								
Objectives:	To familiarize students with the theory, the basic principles, and the state of the art of current wireless telecommunication networks								
Outcomes:	Demonstrate knowledge and understanding of the basic engineering principles and overall operation on wireless telecommunication networks.								

Description:	Introduction and overview. Characteristics of the mobile radio environment-propagation phenomena. Cellular concept and channel allocation, Dynamic channel allocation and power control. Modulation Techniques. Multiple Access Techniques: FDMA, TDMA, CDMA. Second-generation, digital wireless systems. Performance analysis: admission control and handoffs. 2.5G/3G mobile wireless systems: packet-switched data. Wireless LANs and personal-area networks. Wireless ad hoc networks. Wireless Sensor Networks.
Bibliography:	• *Mobile Wireless Communications,* Mischa Schwarz • *Wireless Communications,* Andrea Goldsmith • *Wireless Communications and Networks*, William Stallings
Assessment:	Midterm examination, final examination, weekly homework.

ECE 626	**Image Processing**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Coordinator:	Constantinos Pitris								
Objectives:	Introduction of the principles of modern image processing; a brief review of signals and systems.								
Outcomes:	• Demonstrate knowledge and understanding of digital image representation and analysis tools. • Ability to analyze digital images using a variety of tool in the time and frequency domain. • Ability to utilize image processing software tools.								
Description:	Two-Dimensional (2-D) Signals and Fourier Transform; 2-D Z-Transform and Stability Testing; 2-D DFT, DCT, FFT; 2-D FIR Filter Design and Implementation; image processing basics; edge detection; rank 0order (median) filtering, motion estimation; image enhancement; image restoration; image coding; advanced topics.								
Bibliography:	Gonzalez, Woods, *Image Processing*								
Assessment:	Two tests and a final examination. Design project.								

ECE 628	**Communication Theory**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3	1		5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 359 and ECE 324, or equivalent					
Coordinator:	Charalambos Charalambous								
Objectives:	Provide knowledge and understanding of advanced communication systems and some applications.								
Outcomes:	• Ability to analyze and evaluate communication systems in the presence of noise. • Demonstrate knowledge and understanding of access techniques FDMA, TDMA CDMA and random access. • Demonstrate knowledge and understanding of information theory and coding. • Ability to apply the above tools in communications systems.								

Description:	Noise in communication systems, signal-to-noise ratio. Performance of analog and digital communication systems under noise. Error probabilities and error control. Access techniques: FDMA, TDMA, CDMA, random access. Coding. Applications.
Bibliography:	• B.P. Lathi, *Modern Digital and Analog Communications Systems*, Oxford University Press: 1989 • L.W. Couch, *Modern Communication Systems Principles and Applications*, Prentice-Hall: 1995 • R.E. Ziemer and W.H. Tanser, *Principles of Communications: Systems, Modulation, and Noise*, Wiley, 1995 • J.G. Proakis and M. Salehi, *Communication Systems Engineering*, Prentice Hall, 1994 • J.D. Gibson, *Principles of Analog and Digital Communications*, Prentice Hall, 1993. • S. Haykin, *An Introduction to Analog and Digital Communications*, • A.V. Oppenheim and A.S. Willsky, *Signals and Systems*, Prentice-Hall: 1997
Assessment:	Two tests and a final examination. Homework assignment and design project.

ECE 629	**Fiber Optic Communication Systems and Networks**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Coordinator:	George Ellinas								
Objectives:	To introduce EE and CE students to fiber optic communications and fiber optic networks, so that they would either be able to apply these concepts in such classes as communication theory, photonics, electrical engineering laboratories, etc. The specific objectives of this course is for the students to: ▪ Learn how light propagates in fibers. ▪ Learn about optical transmitters and receivers. ▪ Learn about physical layer effects during the transmission of light in the fiber medium. ▪ Learn about optical network and optical node architectures. ▪ Learn how to route optical connections and how to reroute them in the event of a failure.								
Outcomes:	After the completion of this course the students should be able to: ▪ Solve basic fiber optic transmission problems. ▪ Design a fiber optic transmission link and assess its performance. ▪ Design switch fabric and node architectures ▪ Use routing and channel assignment techniques. ▪ Use restoration techniques.								
Description:	Optical Fibers, Geometrical-Optics Description, Dispersion, Fiber Loss, Nonlinear Optical Effects, Optical Transmitters, LED, LASER, Optical Receivers, Photodetectors, Receiver noise, Receiver sensitivity, Optical amplifiers, Dispersion compensation, Multichannel optical systems, Design and Performance of optical systems, optical networks, switch fabrics, node architectures, routing and wavelength assignment techniques, grooming, multicasting and fault detection and restoration.								

Bibliography:	• *Fiber Optic Communication Systems*, G. Agrawal, 2nd Edition, Wiley, 1997. • *Multiwavelength Optical Networks: A Layered Approach*, T. Stern and K. Bala, Prentice Hall, 1999.
Assessment:	Homework, simulation project, and examinations.

ECE 631	**Foundations of Systems Engineering**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Coordinator:	Marios Polycarpou								
Description:	Algebraic structures, review of vector spaces and linear algebra; topological structures; optimization; review of numerical analysis; state-space and input-output descriptions of systems; observability, controllability, and matrix fraction descriptions; observable, controllable canonical forms, and minimum realizations; linear quadratic regulator, pole placement, observers and compensators.								

ECE 632	**Modern Decision and Control Systems**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Coordinator:	Charalambos Charalambous								
Description:	A continuation of a first course in decision and control systems. Frequency response and state space methods for designing feedback control systems will be covered. Other practical control design issues that will be covered include digital control systems, robust control, adaptive control systems and intelligent control. Case studies for modern control systems design will be investigated.								

ECE 634	**Introduction to Computational Intelligence**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3	1		5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Coordinator:	Marios Polycarpou								
Objectives:	Provide knowledge and understanding of optimization techniques and learning algorithms.								
Outcomes:	• Demonstrate knowledge and understanding of optimization methods and solution tools. • Demonstrate understanding of learning algorithms. • Ability to formulate and solve optimization problems.								
Description:	Introduction to the tools and methods in the design, analysis, optimization, and control of industrial systems. Topics include neural networks and their application in complex system modeling, fuzzy logic, information fusion methods, and optimization schemes. MATLAB used as the software platform. Topics in more details: Optimization Methods; Gradient methods, Linear Programming, Constrained Problems and Lagrange Multiplier Method, Search Method, Ordinal Optimization, Genetic Algorithms, Application. Neural Networks: Basic concepts, Backpropagation algorithm, Competitive learning, Data clustering networks, Application in hierarchical modeling for complex systems, application examples. Knowledge representation methods.								

Bibliography:	• C. Bishop, *Neural Networks for Pattern Recognition*, Oxford University Press, 1996 • L.X. Wang, *A Course in Fuzzy Systems and Control* • M. Mitchell, *An Introduction to Genetic Algorithms*
Assessment:	Two tests and a final examination. Design project.

ECE 635	**Optimization Theory and Applications**	**I**	**T**	**L**	**H**	**P**	**ECTS**
		3			6	☐	**8**
Year: PG	Core ☐ Elective ☒ Prerequisites:						
Coordinator:	Christos Panayiotou						
Description:	Optimization for non-liner systems without constraints: Gradient based and Newton Techniques, convex optimization. Optimization with constraints and Lagrange methods. Dynamic programming. Applications in engineering systems.						
Bibliography:	• D. Bertsekas, *Non-Linear Programming* • D. Bertsekas, *Dynamic Programming*						
Assessment:	Midterm examination, final examination and weekly homework.						

ECE 643	**Radio and Microwave Wireless Systems**	**I**	**T**	**L**	**H**	**P**	**ECTS**
		3			5	☐	**8**
Year: PG	Core ☐ Elective ☒ Prerequisites:						
Coordinator:	George Georgiou						
Description:	Antennas: Radiation from elementary dipoles, Patterns and the far field, Directivity, gain, efficiency, polarization, Monopoles and dipoles; patch antennas, Antenna arrays/beam-steering; Wireless Propagation and Links: Friis transmission equation, Diffraction and propagation over obstacles, Multipath propagation in urban environments, Antenna diversity; introduction to smart antennas, Link equation and link budgets, Radio/microwave links; Receivers: Receiver figures of merit (sensitivity, dynamic range, intersymbol interference, intermodulation etc.), noise in cascaded systems, noise figure, noise temperature, Heterodyne and homodyne receiver architectures, Image-reject receivers; Wireless Systems: Fixed wireless access, Wireless cellular concept; personal communication systems, Satellite communications, GPS, Radars, Remote sensing and radiometers.						

ECE 645	**Optics and Photonics**	**I**	**T**	**L**	**H**	**P**	**ECTS**
		3			5	☐	**8**
Year: PG	Core ☐ Elective ☒ Prerequisites:						
Coordinator:	Constantinos Pitris						
Description:	Introduction to optics, optoelectronics, lasers and fiber-optics; light sources and propagation of light; lenses and imaging; ray tracing and lens aberrations; interference of light waves, coherent and incoherent light beams; modulators and propagation in waveguides and fibers; photons in semiconductors, semiconductor lasers, detectors and noise effects.						

ECE 646	**Advanced Antenna Theory**	**I**	**T**	**L**	**H**	**P**	**ECTS**
		3			5	☐	**8**
Year: PG	Core ☐ Elective ☒ Prerequisites:						
Coordinator:	George Georgiou						

Description:	Fundamental Antenna Parameters: System aspects. Fundamental Electromagnetic Theorems: Reciprocity, duality, radiation integral. Wire and Mobile Communications Antennas: Dipoles, loops, ground-effects. Phased Arrays I: Linear & circular, base station antennas. Phased Arrays II: 2D-arrays, infinite-array model, multimedia satellite front-ends. Self-Impedance: Integral equations and moment methods. Mutual-Impedance: Induced EMF method. Aperture Antennas I: Equivalent currents, rectangular apertures, horn-antennas. Aperture Antennas II: Plane-wave expansion, slots, Babinet's principle. Broadband Antennas: Self-complementarity, spirals, log-periodic, Yagi-Uda. Integrated-Circuit Antennas: Patch and micromachined antennas, miniaturization. Beam Forming and Adaptive Arrays: Butler matrix, adaptive algorithms.

ECE 648	**Introduction to Photonics**	**I**	**T**	**L**	**H**	**P**	**ECTS**
		3	1		5	☒	**8**
Year: PG	Core ☐ Elective ☒ Prerequisites:	ECE 333 or equivalent					
Coordinator:	Constantinos Pitris						
Objectives:	Provide an introduction to the fundamentals of photonics, optoelectronics and fiber optics.						
Outcomes:	• Demonstrate knowledge and understanding of the fundamentals of photonics optoelectronics and fiber optics. • Ability to apply the fundamentals in the design of optical systems.						
Description:	This course will cover the primary components of a fiber optic system, namely, optical fibers, emitters (semiconductor lasers and light emitting diodes), and photodetectors. It will also provide an overview of the characteristics and underlying physics of guided wave devices and optoelectronic integrated circuits.						
Bibliography:	• K. Lizuga, *Elements of Photonics* • B. Saleh, *Fundamentals of Photonics*						
Assessment:	Two midterm and final examinations. Homework assignment and design project.						

ECE 649	**Electromagnetic Waves and Antenna Theory**	**I**	**T**	**L**	**H**	**P**	**ECTS**
		3	1		5	☐	**8**
Year: PG	Core ☐ Elective ☒ Prerequisites:	ECE 331 or equivalent					
Coordinator:	George Georghiou						
Objectives:	Application of Maxwell's equations in free space and other simple analytical cases Understanding and application of concepts such as Radiation, Poynting's vector, polarisation, retarded potential etc at high frequency Application of Antenna theory concepts in the design and analysis of antennas						
Outcomes:	Ability to solve Maxwell's equations at high frequencies when the displacement current is important Good understanding and application of Antenna theory concepts						

Description:	Review of Maxwell's equations and the wave equations. Solution of the wave equations in free space, wave velocity, wave impedance, Poynting's vector and polarization. Retarded potential functions, EM wave generation with a conducting current, the short uniform current dipole, the small uniform current loop, the radiated electric and magnetic fields. Near and far field expressions for **E** and **H**. Radiation pattern and radiation resistance of the dipole and the loop. Radiation lobes, half power beamwidth, beam angle, beam efficiency, directivity, directive gain, power gain, antenna efficiency, frequency bandwidth, antenna input impedance. Short and long dipoles**,** Folded dipoles, monopoles, ground plane considerations. Travelling wave antennas, Broadband antennas, and Frequency independent antennas. Spiral antennas, log periodic antennas, Array antennas. Yagi Uda arrays. Reflector antennas, feed configuration for parabolic antennas. Arrays, array factors, AM broadcast antenna towers, TV and FM antennas, satellite arrays. Antenna patterns, amplitude patterns, phase patterns. Feed methods, balanced feeds, coaxial feeds, waveguide feeds, impedance matching, stub tuners, baluns, horns.
Bibliography:	*Antennas and Radio wave Propagation,* R. E. Collin, McGraw Hill *Antennas,* J D Kraus , 2nd Ed McGraw Hill , 1988 *Advanced Electromagnetism: Foundations, Theory and Applications*, Terence W. Barrett (Editor), Dale M. Grimes (Editor), World Scientific Publishing *Electromagnetic Theory and Wave Propagation*, S.N. Ghosh, CRC Press
Assessment:	Final exam, Midterm, Assignment.

ECE 653	**Advanced Real-Time Systems**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Coordinator:	Christos Panayiotou								
Description:	Basic computer architecture and hardware elements relevant to the study of real-time issues; low-level input/output devices, interrupt controllers, and CPU cores; software design and specification methods such as flowcharts, state transition diagrams (finite state automata), and Petri nets; real-time kernels, including task scheduling, interrupt latency, and communication and synchronization of tasks; system performance.								

ECE 654	**Advanced Computer Networks**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3	1		5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 360 or equivalent					
Coordinator:	Christos Panayiotou								
Description:	This course covers advanced principles of computer networks. Topics include network architecture, direct link networks, packet switching networks, internetworking, network protocols, flow control, congestion control, traffic management, resource allocation, pricing and applications. The course will also provide a systems and control perspective into communication networks research. It will emphasize on fundamental systems issues in networking and survey a variety of techniques that have recently been used to address them, including, queuing theory, optimization, large deviations, Markov decision theory, and game theory.								

ECE 655	**Advanced Operating Systems**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 310 or equivalent					

Coordinator:	Christos Panayiotou
Description:	In-depth investigation of the major areas in the design and analysis of current and future operating systems, with focus on distributed and multiprocessor systems. Other topics include process synchronization, concurrency, mechanisms, virtual memory, distributed systems, computer security, and computer system performance analysis.

ECE 656	**Advanced Computer Architecture**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			9	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 213 and ECE 313, or equivalent					
Coordinator:	Maria K. Michael								
Objectives:	This course covers advanced techniques in high performance microprocessor design. It is a project-based course and students learn and develop their skills from simulation, design and quantitative analysis of experimental results. This course covers advanced topics of computer architecture such as pipelining, instruction level parallelism, memory hierarchy, VLIW and Superscalar processor design philosophies, multithreading etc. The course intends to give a picture on recent technology trends and state-of-art platforms such as chip-multiprocessor, network processor and Networks on Chips.								
Outcomes:	As primary outcomes students: • Understand the organization of modern computer systems and the functionality of their components. • Understand instruction sets, addressing modes, and their underlying execution. • Compare different architectures and apply relevant performance metrics. • Understand issues like pipelining, instruction level parallelism, memory hierarchy, processor design philosophies, multithreading and multiprocessor environments. As secondary outcomes students: • Use probabilistic and statistical methods to evaluate the performance of software and/or hardware system. • Write clear and effective technical prose for a technical audience. • Be able to discuss major trends in industry and current research activities within the discipline. • Demonstrate an ability to function on multi-disciplinary teams. • Demonstrate an ability to identify, formulate, and solve engineering problems. • Demonstrate an understanding of professional and ethical responsibility.								
Description:	The format of the class is lecture and discussion. Students will work on a project related but not limited to a topic discussed in the course. Students can work on design and implementation of several real world problems such as network processors and embedded systems, microprocessor architectures and energy efficient and reliable systems. The projects can lead to operational prototype systems and/or publishable papers. Most importantly, experiences from the projects will benefit the student in future job search and career development.								
Bibliography:	*Computer Architecture: A Quantitative Approach, 3rd Edition* by John L. Hennessy and David A. Patterson. Morgan Kaufmann, ISBN: 1-55860-596-7								

Assessment:	Two midterm and final examinations, semester project, regular homework, and lab assignments.

ECE 657	**Computer Aided Design for VLSI**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3		3	4	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 212 and ECE 213, or equivalent					
Coordinator:	Maria K. Michael								
Objectives:	Provide and introduction to the fundamentals of Computer-Aided Design (CAD) tools for the design, analysis, test, and verification of digital Very Large Scale Integration (VLSI) systems.								
Outcomes:	• Demonstrate knowledge and understanding of fundamental concepts in CAD. • Demonstrate knowledge of computational and optimization algorithms and tools applicable to solving CAD related problems. • Gain experience in analyzing and developing CAD algorithms and tools. • Gain experience in using commercial CAD tools for VLSI.								
Description:	Principles for the automated synthesis, verification, testing and layout of VLSI circuits, concentrating on the CMOS technology. Basic CMOS technology and design rules. Hardware modeling with VHDL. Algorithms and graph theory concepts for design automation. Logic-level synthesis and optimization of combinational and sequential circuits. Simulation. The physical design automation cycle and CMOS technology considerations. Timing analysis and verification. Fault modeling and testing. Lab component: Usage of existing academic and commercial CAD tools for several of the above problems. Development (in C/C++) of selected CAD algorithms. Good knowledge and experience in programming and digital circuit design are required.								
Bibliography:	• M.J.S. Smith, *Application-Specific Integrated Circuits*, Addison-Wesley Pub Co, 1997. • S.M. Trimberger, *An Introduction to CAD for VLSI*, Domencloud Publishers, Revised edition, 1990. • G.De Micheli, *Synthesis and Optimization of Digital Circuits,* McGraw-Hill, 1994. • N.A. Sherwani, *Algorithms for VLSI Physical Design Automation*, Kluwer Academic Publishers; 3rd Ed., 1999.								
Assessment:	Two midterm and final examinations, regular homework, lab assignments, and final project.								

ECE 658	**Computer Systems' Performance Evaluation and Simulation**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3	1		5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 324 or equivalent					
Coordinator:	Christos Panayiotou								
Objectives:	Provide knowledge and understanding of the analytical tools used for assessing the performance of computer systems, with emphasis on computer communication networks.								

Outcomes:	• Demonstrate knowledge and understanding of the basing tools used for the analysis and performance evaluation of computer networks. • Ability to apply these tools for performance
Description:	Poisson process. Markov chains: birth and death processes. Basic queuing theory. Little's Law. Intermediate queuing theory: M/G/1, G/M/m queues. Advanced queuing theory: G/G/m queue, priority queue, network of queues, etc. Queuing applications in computer systems.
Bibliography:	• G.N. Higginbottom, *Performance Evaluation of Communication Networks*, Artech House, 1998. • L. Kleinrock, *Queueing Systems*, Wiley-Interscience, 1975
Assessment:	Two midterm and final examinations, homework assignments, and design project.

ECE 659	**VLSI Design**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3	1	2	3	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 210 and ECE 205, or equivalent					
Coordinator:	Julius Georgiou								
Objectives:	Provide an introduction to the design, analysis and layout of digital Very Large Scale Integration (VLSI) circuits.								
Outcomes:	• Demonstrate in-depth knowledge of MOS transistor theory and the CMOS technology • Knowledge in characterization and performance evaluation of VLSI circuits • Ability to use commercial and/or academic Computer-Aided Design tools to design, layout, simulate and verify VLSI circuits.								
Description:	MOS transistor theory, standard CMOS design (primitive and complex gates, transmission gates and tri-states), CMOS processing technology and layout design (silicon semiconductor technology, process steps, N-well/P-well/SOI processes, design layers, design rules, layout optimization), circuit characterization and performance estimation, CMOS logic structures, basic memory elements (design and optimization), design of VLSI combinational systems, VLSI testing, subsystem design (data-path and arithmetic units), memory (RAM, multi-port RAM, ROM, content-addressable). Lab component: Usage of CAD tools for the design, layout, simulation, characterization, and performance estimation of digital VLSI circuits and systems.								
Bibliography:	• N. Weste, K. Eshraghian, M.J.S. Smith, *Principles of CMOS VLSI Design: A Systems Perspective with Verilog/VHDL Manual***,** Pearson Addison Wesley; 2nd Ed., 2000. • W. Wolf, *Modern VLSI Design: A systems approach*, Prentice-Hall, 1994 • W. Wolf**,** *Modern VLSI Design: System-on-Chip Design,* Prentice Hall, 3rd Ed., 2002.								
Assessment:	Two midterm and final examinations, lab assignments, and design project.								

ECE 660	**VLSI Test**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						

Coordinator:	Maria K. Michael
Objectives:	• To study the fundamental issues, recent developments, and challenges in the area of testing of VLSI circuits. • Use algorithmic principles and techniques to analyze, design, and develop CAD methods applicable to test problems. • Provide a thorough understanding of testable design techniques and popular circuit structures used to realize built-in self-test.
Description:	Comprehensive and detailed treatment of digital systems testing and testable design. Fundamental concepts as well as the latest advances are considered. Topics include fault modeling and simulation, combinational and sequential circuit test generation, memory and delay test, and design-for-testability methods such as scan and built-in self-test, and testing of embedded cores in systems-on-chip environments.
Bibliography:	• M. L. Bushnell & V. D. Agrawal, Essentials of Electronic Testing for Digital, Memory, and Mixed-Signals VLSI Circuits, Kluwer Academic Publishers, 2000. ISBN: 0-7923-7991-8 • M. Abramovici, M. A. Bruer, and A. D. Friedman, "Digital Systems Testing and Testable Design", IEEE Press, 1990. • L. Crouch, "Design-for-Test for Digital ICs and Embedded Core System", Piscataway, New Jersey: IEEE Press, 2000. Co-published with Prentice Hall PTR.
Assessment:	Midterm and final examinations, regular homework assignments, semester project, and paper presentation.

ECE 661	**Logic Synthesis and Optimization**	**I**	**T**	**L**	**H**	**P**	**ECTS**
		3			**5**	☒	**8**
Year: PG	Core ☐ Elective ☒ Prerequisites:						
Coordinator:	Maria K. Michael						
Description:	Advanced design of logic circuits. Theoretical foundations. Technology constraints. Computer-aided design tools and algorithms. Topics include two-level and multi-level synthesis and optimization of combinational circuits, sequential logic synthesis and optimization, timing optimization, technology mapping and verification.						
Bibliography:	G. De Micheli, *Synthesis and Optimization of Digital Circuits,* McGraw-Hill, 1994.						
Assessment:	Midterm and final examinations, regular homework assignments, semester project, and paper presentation.						

ECE 662	**Physical Design Automation**	**I**	**T**	**L**	**H**	**P**	**ECTS**
		3			**5**	☒	**8**
Year: PG	Core ☐ Elective ☒ Prerequisites:						
Coordinator:	Maria K. Michael						
Description:	In-depth study of different analytical and heuristic techniques for physical design automation and optimization of VLSI circuits. Emphasis on VLSI design issues encountered in deep sub-micron and nanometer technologies. Theory of circuit layout partitioning and placement algorithms. Global, detailed, and over-the-cell routing. Performance driven layout.						
Bibliography:	N.A. Sherwani, *Algorithms for VLSI Physical Design Automation*, Kluwer Academic Publishers; 3rd Ed., 1999.						
Assessment:	Midterm and final examinations, regular homework assignments, semester project, and paper presentation.						

ECE 663	Distributed Systems			I	T	L	H	P	ECTS
				3	1	2	3	☒	8
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 360 and ECE 313, or equivalent					
Coordinator:	Maria K. Michael								
Objectives:	Learning of the principles and practice underling the design of distributed systems.								
Outcomes:	Design and development of distributed applications								
Description:	This course covers the basic techniques developed to support networked computer applications. Pays attention to synchronization issues, such as global state, election, interprocess communication, distributed mutual exclusion, distributed transaction mechanisms. Also covers consistency models and protocols and replication. Fault tolerance and cryptographic security are also critical topics on distributed systems. Hence, fault models, reliable multicast, commit, checkpointing, recovery, access control, key management and cryptography issues are studied too.								
Bibliography:	• *Distributed Systems, Concepts and Design* (G.Coulouris, J.Dollimore, T.Kindberg) • *Distributed Systems: Principles and Paradigms* (A.Tanenbaum, M.Steen) • Advanced Concepts In Operating Systems (Hardcover) by Mukesh Singhal, Niranjan Shivaratri								
Assessment:	Regular homework assignments, semester project, two midterm and final examinations.								

ECE 664	Digital Design with Field-Programmable Gate Arrays			I	T	L	H	P	ECTS
				3		3	3	☒	8
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 213 and ECE 313, or equivalent					
Coordinator:	Maria K. Michael								
Objectives:	This course provides the students with fundamental FPGAs chip knowledge and its application to rapid digital system implementation using top down design in VHDL. Through lectures and laboratory assignments, students are provided learning experiences that enable them to accomplish the program outcomes listed below.								

Outcomes:	As primary outcomes students: • Design the electronic/logic circuits that form the basic building blocks of a computer system. • Demonstrate basic laboratory skills, including the use of standard laboratory equipment. • Design the architecture and organization of the basic components of a computer system. • Design, implement, verify and evaluate the operation of digital systems. • Demonstrate independent learning by using unfamiliar computer systems and software tools to solve technical problems. • Interpret the specifications of general and special purpose programming language, and use these languages to design computer systems that are correct and efficient. As secondary outcomes students: • Apply the principles of electricity modern physics to the design and analysis of circuit, system, and devices. • Develop algorithms and data structures from software specifications. • Develop computer code and analyze algorithms or computer code for correctness. • Use probabilistic and statistical methods to evaluate the performance of software and/or hardware system. • Write clear and effective technical prose for a technical audience. Be able to discuss major trends in industry and current research activities within the discipline.
Description:	The course aims in teaching modern rapid prototyping techniques using state-of-the-art software and hardware design principles. Students taking the course will learn how digital systems are designed from specifications to a fully functional and working prototype. Through the use of FPGAs prototyping boards, students will be given design specifications and will proceed to design, develop, synthesize, implement, test, debug and deliver a complete FPGAs design project.
Bibliography:	• M.J.S. Smith, *Application-Specific Integrated Circuits*, Addison-Wesley Pub Co, 1997.
Assessment:	Two midterm and final examinations, semester project, regular homework, and lab assignments.

ECE 665	**Instrumentation and Sensors**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3	1		5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 205 or equivalent					
Coordinator:	Julius Georgiou								
Objectives:	Provide an introduction to the basic components of a typical instrumentation system, with a bias towards medical instrumentation.								
Outcomes:	Demonstrate knowledge and understanding on current methods in instrumentation systems and the challenges to improve current techniques								
Description:	Signals and Noise, Sensors and Transducers, Signal Amplification, Data Acquisition and Conversion, Signal Measurements and Analysis, Signal Sources and Practical Issues. Lectures and laboratory.								

Bibliography:	• J.J. Carr, *Sensors and Circuits-Sensors,Transducers and Supporting Circuits for Electronic Instrumentation, Measurement and Control,* Prentice Hall • Carr and Brown, *Introduction to Biomedical Equipment Technology* • Webster, *Medical Instrumentation, Application and Design* , Wiley
Assessment:	Two midterm and final examinations. Homework assignments, and design project.

ECE 667	**Microwave and Radio-Frequency Circuits**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 331 or equivalent					
Coordinator:	George Georgiou								
Description:	The wave equation; Losses in conductors and dielectrics; RF/microwave transmission lines; Transients on transmission lines; Planar lines (microstrip, stripline, coplanar waveguide); Scattering parameters; 3- and 4-port devices (power dividers/combiners, couplers, isolators & circulators); Coupled lines and devices; RF/microwave filters; Microwave active circuits (RF amplifiers, mixers, receiver front ends).								
Assessment:	Midterm examination, final examination, and weekly homework.								

ECE 671	**Neurophysiology and the Senses**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Coordinator:	Constantinos Pitris								
Objectives:	Provide in depth understanding of neurophysiology and the senses. Model and analyze physiological systems at the cellular and systems levels.								
Outcomes:	• Understand the cellular and molecular basis of nervous system function • Understand how signals are generated and processed in the nervous system • Understand basis of the various sensory systems and higher functions • Understand how the nervous system develops and is modified by experience								
Description:	Advance study of neurophysiology, sensory systems and higher functions. The physiology of excitable cells with emphasis on cellular mechanisms, synaptic integration, signal processing, and sensory/motor interactions in nervous systems. Computer simulations and hands on experience with stimulating and recording neural signals								
Bibliography:	• Bear, Connors, Paradiso, *Neuroscience: Exploring the Brain* • R. H. S. Carpenter, *Neurophysiology*								
Assessment:	Two midterm and final examinations, experiments and simulations, and regular homework assignments.								

ECE 680	**Power System Analysis**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 340 or equivalent					

Coordinator:	Elias Kyriakides
Objectives:	Provide deep knowledge and understanding of the fundamental and advanced concepts of designing and analyzing power systems.
Outcomes:	• Ability to model and understand the operation of basic power system components such as transformers and transmission lines. • Demonstrate understanding of the technical, economic and environmental implications of the design of power systems. • Ability to analyze power systems under steady-state conditions and fault conditions. • Demonstrate thorough understanding of the concept of load-flow in a large power system and ability to calculate the load flows through the use of simulation tools. • Develop skills in researching particular topics related to power system analysis, demonstrate ability to conduct thorough literature review and demonstrate ability to compose research reports.
Description:	Basic and advanced concepts of power system analysis. Develop analytical skills to perform analysis of power systems. Analyze balanced and unbalanced systems using symmetrical components. study transformers and per unit sequence models, transmission line modeling, power flow solution techniques, symmetrical faults, bus impedance and admittance matrices, power system stability; projects and term papers to develop a deep understanding of the operation of power systems.
Bibliography:	• J. D. Glover and M. Sarma, *Power System Analysis*, PWS Publishing Company, 1994.
Assessment:	Homework assignments, two midterm and final examinations, design project, and term paper and presentation.

ECE 681	**Power System Operation and Control**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			5	☒	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:	ECE 340 or equivalent					
Coordinator:	Elias Kyriakides								
Objectives:	Provide knowledge and understanding of the main issues in power system generation, operation, planning, and control.								
Outcomes:	• Demonstrate deep knowledge and understanding of the main issues in power system operation and planning. • Ability to analyze interconnected power systems. • Understanding of basic power system planning terms such as economic dispatch and unit commitment and ability to solve this type of optimization problems. • Demonstrate knowledge and understanding of load and frequency control. • Ability to design power systems to operate optimally. • Develop skills in researching particular topics related to power system operation and control, demonstrate ability to conduct thorough literature review and demonstrate ability to compose research reports.								

Description:	Learn the basics of power system generation, operation, and control. Study system operation terms like economic dispatch, optimal power flow, unit commitment, automatic generation control (AGC), and learn how to apply these ideas to power systems. Dynamic and linear programming will be introduced and applied to solve power system problems. Production costing and fuel scheduling. State estimation in power engineering. Deregulation of the power industry, restructuring, and auctions. Advanced problems in power system operation and planning.
Bibliography:	• A. J. Wood and B. F. Wollenberg, *Power Generation, Operation, and Control*, John Wiley & Sons Inc., 1996.
Assessment:	Homework assignments, two midterm and final examinations, design project, term paper and presentation.

ECE 682	**Renewable Sources of Energy: Photovoltaics**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3	1		5	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Coordinator:	George Georghiou								
Objectives:	Introduction of renewable sources of energy with emphasis on photovoltaics Overview of the current state in Cyprus Overview of the history of PV, PV development and market drivers Device physics, physics of PV systems and solar radiation concepts Analysis at the Cell and Module Levels Analysis and description of PV systems Limitations in efficiency Overview of the current fabrication technologies and applications in PV technology								
Outcomes:	To introduce the current state of PV technologies in Cyprus and worldwide and to emphasize the need for further development To provide good understanding and application of device physics, PV systems and solar radiation concepts To undertake analysis at the cell, module and system level To review current fabrication technologies with application to PVs								
Description:	Introduction to renewable energy sources with main emphasis on photovoltaic (PV) energy conversion. Current state in Cyprus and potential. Types of photovoltaic systems. History of photovoltaic technology development. Current status: Technology, Policy, Markets. Solar insolation. Short review of semiconductor properties. Generation, recombination and the basic equations of device physics. Efficiency limits, losses, and measurements. Physics of photovoltaic systems, including basic operating principles, design and technology, and performance of individual solar cells and solar cells systems. Current fabrication technologies. Design of cells and modules. Other materials. Applications.								

Bibliography:	GREEN, M.A., *SOLAR CELLS: OPERATING PRINCIPLES, TECHNOLOGY AND SYSTEM APPLICATIONS*, Prentice Hall 1982, reprinted by University of New South Wales, 1992 TREBLE, F.C.(ed), *GENERATING ELECTRICITY FROM THE SUN*, Pergamon Press 1991, Publisher: Pergamon; 1st ed edition BOYLE, G.(ed) *RENEWABLE ENERGY: POWER FOR A SUSTAINABLE FUTURE*, Oxford University Press, 1996, Publisher: Oxford University Press, USA (June 1, 1996), Language: English, WENHAM, S.R., GREEN, M.A & WATT, M.E., *APPLIED PHOTOVOLTAICS,* University of New South Wales, Centre for Photovoltaic Devices & Systems, GREEN, M.A., *SILICON SOLAR CELLS: ADVANCED PRINCIPLES AND PRACTICE*, University of New South Wales, Centre for Photovoltaic Devices & Systems 1995
Assessment:	Final exam, midterm, regular assignments.

ECE 701	**M.S. Graduate Seminar**			**I**	**T**	**L**	**H**	**P**	**ECTS**
								☐	**4**
Year: PG	Core ☒	Elective ☐	Prerequisites:						
Description:	Seminars exploring current research and topical issues in electrical and computer engineering, addressed at the general theme of innovation. Seminars are organized in blocks with related content, and are presented by prominent outside speakers as well as by faculty members and graduate students. Each seminar includes a presentation, in addition to wide-ranging discussions among speakers, faculty, and students. Discussions involve issues such as relations between presented research areas, requirements for further advances in the “state-of-the-art”, the role of enabling technologies, the responsible practice of research, and career paths in engineering. The course requires successful attendance of at least 25 seminar presentations. The graduate seminar coordinator is responsible for assigning a pass/fail grade.								

ECE 704	**Ph.D. Graduate Seminar**			**I**	**T**	**L**	**H**	**P**	**ECTS**
								☒	**4**
Year: PG	Core ☒	Elective ☐	Prerequisites:						
Description:	Seminars exploring current research and topical issues in electrical and computer engineering, addressed at the general theme of innovation. Seminars are organized in blocks with related content, and are presented by prominent outside speakers as well as by faculty members and graduate students. Each seminar includes a presentation, in addition to wide-ranging discussions among speakers, faculty, and students. Discussions involve issues such as relations between presented research areas, requirements for further advances in the “state-of-the-art”, the role of enabling technologies, the responsible practice of research, and career paths in engineering. The course requires successful attendance of at least 25 seminar presentations and at least one seminar presentation given by the student. The graduate seminar coordinator is responsible for assigning a pass/fail grade.								

ECE 711-712	**Directed Study for Masters Students I and II**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				2			**6**	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						

Description:	Opportunity for individual study at the Master level, of topics related to electrical and computer engineering not covered by other subjects offered by the Department. The students can initiate the arrangements and file a proposal, with consultation with one of the faculty. Requires submission of a final report, describing the material examined and the work performed.

ECE 721-722	**M.Sc. Thesis I and II**			**I**	**T**	**L**	**H**	**P**	**ECTS**
								☐	**15**
Year: PG	Core ☒	Elective ☐	Prerequisites:						
Description:	Graduate work leading to the completion of research and writing of a Diploma Thesis. To be arranged by the student and his/her Research Supervisor. Refer to the *M.Sc. Diploma Thesis* section of the graduate guide for additional information.								

ECE 731 - 732	**Ph.D. Qualifying Examination I and II**		**I**	**T**	**L**	**H**	**P**	**ECTS**
							☐	**0**
Year: PG	Core ☒	Elective ☐	Prerequisites:					
Description:	Candidacy Examination. Ph.D. students are required to register for ECE 731 during the semester the examination takes place. In the event of failure, a student is permitted a second and final examination, to be taken within the four months of the first examination. In this event, the student must register for ECE 732. Refer to the *Ph.D. Candidacy* section of the graduate guide for additional information.							

ECE 751-752	**Directed Study for Ph.D. Students I and II**		**I**	**T**	**L**	**H**	**P**	**ECTS**
			2			6	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:					
Description:	Opportunity for individual study at the Ph.D. level, of topics related to electrical and computer engineering not covered by other subjects offered by the Department. The students can initiate the arrangements and file a proposal, with consultation with one of the faculty. Requires submission of a final report, describing the material examined and the work performed.							

ECE 761-764	**Research Stage of Ph.D. IA, IIA, IIIA and IVA**		**I**	**T**	**L**	**H**	**P**	**ECTS**
							☐	**30**
Year: PG	Core ☒	Elective ☐	Prerequisites:					
Description:	Graduate research leading to a doctoral dissertation. To be arranged by the student and his/her Research Supervisor. Refer to the *Doctor of Philosophy Degrees* section of the graduate guide for additional information.							

ECE 765-768	**Research Course for Ph.D. Dissertation IB, IIB, IIIB and IVB**		**I**	**T**	**L**	**H**	**P**	**ECTS**
							☐	**15**
Year: PG	Core ☐	Elective ☒	Prerequisites:					
Description:	Graduate research leading to a doctoral dissertation. Can be taken in conjunction with other graduate courses. To be arranged by the student and his/her Research Supervisor. Refer to the *Doctor of Philosophy Degrees* section of the graduate guide for additional information.							

ECE 771-772	**Writing Stage of Ph.D. Thesis I and II**	**I**	**T**	**L**	**H**	**P**	**ECTS**
						☐	**30**

Year: PG	Core ☐	Elective ☒	Prerequisites:	
Description:	Program of graduate work leading to the writing of a doctoral dissertation. To be arranged by the student and his/her Research Supervisor. Refer to the *Doctor of Philosophy Degrees* section of the graduate guide for additional information.			

ECE 799	**Special Topics in Electrical and Computer Engineering**			**I**	**T**	**L**	**H**	**P**	**ECTS**
				3			6	☐	**8**
Year: PG	Core ☐	Elective ☒	Prerequisites:						
Description:	A seminar-type presentation and discussion of special topics in electrical and computer engineering. Opportunity for graduate students and instructors to investigate a topic of common interest. Topic and responsible faculty announced each term, as subjects of interest are identified. These subjects are given independently or sequentially, as circumstances require.								

Short Biographies of the Academic Faculty

Marios Polycarpou, Professor

Marios M. Polycarpou received the B.A. (Cum Laude) degree in Computer Science and the B.Sc. (Cum Laude) degree in Electrical Engineering from Rice University, Houston, TX, USA in 1987. He then received the M.S. and Ph.D. degrees in Electrical Engineering from the University of Southern California, Los Angeles, CA, in 1989 and 1992 respectively. In 1992, he joined the Department of Electrical and Computer Engineering and Computer Science, University of Cincinnati, Cincinnati, Ohio, USA where he reached the rank of Professor. In 2001 he joined the newly established Department of Electrical and Computer Engineering at the University of Cyprus, where he is a Professor and interim Department Head. His teaching and research interests are in systems and control, adaptive and intelligent control, neural networks and computational intelligence, fault diagnosis and cooperative control. Dr. Polycarpou has published more than 140 articles in refereed journal, conference proceedings and edited books. He was the recipient of the William H. Middendorf Research Excellence Award at the University of Cincinnati (1997) and was nominated by students for the Professor of the Year award (1996). Dr. Polycarpou currently serves as Editor-in-Chief of the *IEEE Transactions on Neural Networks*. He is a Senior Member of IEEE and an Associate Editor of *the International Journal of Applied Mathematics and Computer Science* (1/02-present), and past Associate Editor of *the IEEE Transactions on Automatic Control* (1999-2002) and Associate Editor of the *IEEE Transactions on Neural Networks* (1998-2004). He served as Vice President, Conferences, of the IEEE Neural Network Society (2002-2003). He was invited as Keynote Plenary Speaker at the joint 2001 IEEE International Conference on Control Applications and IEEE International Symposium on Intelligent Control (CCA/ISIC'01), Mexico City, Mexico, September 2001, and served as Program Chair of the 15th IEEE International Symposium on Intelligent Control, Patras, Greece, July 2000. His research has been funded by DARPA, US Air Force, American Water Works Association (AWWA), Federal Highway Administration (FHWA), ONR, NASA, Ohio DOT, and US Army.

Charalambos Charalambous, Associate Professor

Charalambos D. Charalambous joined the Department of Electrical and Computer Engineering at the University of Cyprus in 2003. He accepted his first tenure-track faculty position at the rank of Associate Professor with the University of Ottawa, School of Information Technology and Engineering in 1999. From 1999 to 2003, he has maintained an adjunct professorship with McGill University, Department of Electrical and Computer Engineering, where he supervised Ph.D. and M.S. students. He received the B.S. degree in 1987, the M.S. degree in 1988, and the Ph.D. degree in 1992, all in Electrical Engineering from Old Dominion University, Norfolk, Virginia. Dr. Charalambous has served on the faculty of McGill University, Department of Electrical and Computer Engineering, as a visiting professor, from 1995 to 1999; from 1993 to 1995 he was a Post-Doctoral Fellow with Idaho State University, Engineering Department. His teaching and research interests are in the theory of stochastic processes and their applications in engineering, science, and finance. His publications record spans topics in optimization of stochastic uncertain systems, games theory, control and communication systems, queuing systems, large deviations, information theory and statistical mechanics. He was invited to present his research work by many university seminar organizers, conference and workshop organizers. Dr. Charalambous is leading a research group in Information, Communication and Control of Complex Systems. He is currently an Associate Editor of the IEEE Transactions on Automatic Control, and he is a member of the Control System Society Conference Editorial Board. He was a member of the Canadian Centres of Excellence through MITACS (the mathematics of information technology and complex systems), his research received funding from the Natural Science and Engineering Research Council of Canada (NSERC), the Communications Research

Center of Canada (CRC), the Department of Defense of Canada (DND), and the Communication and Information Technology of Ontario (CITO), and in 2001 he received the Premier's Research Excellence Award of the Ontario Province of Canada.

George Ellinas, Assistant Professor

George Ellinas holds a B.S., M.S., M.Phil, and a Ph.D. in electrical engineering from Columbia University. He is currently an Assistant Professor of Electrical and Computer Engineering at the University of Cyprus. Prior to joining the University of Cyprus George was an Associate Professor of Electrical Engineering at City College of the City University of New York. Before joining the academia, George was a senior network architect at Tellium Inc. In this role, he worked on lightpath provisioning and fault restoration algorithms in optical mesh networks, and the architecture design of the MEMS-based all-optical switch. George also served as a senior research scientist in Telcordia Technologies' (formerly Bellcore) Optical Networking Research Group. George performed research for the Optical Networks Technology Consortium (ONTC), Multiwavelength Optical Networking (MONET) and Next Generation Internet (NGI) projects from 1993 to 2000. George also served as an Adjunct Assistant Professor at Columbia University and the University of Maryland, teaching courses on multiwavelength optical networking in 1999 and 2000, respectively. He was awarded a Fulbright fellowship, from 1987 to 1991, for undergraduate studies at Columbia University, and has authored and co-authored 70 journal and conference papers. George is also the holder of 24 U.S. and international patents on optical networking and has 4 U.S. patent applications currently pending.

George E. Georghiou, Assistant Professor

Studies: BA (1995), MEng (1996), MA (1997), Electrical and Information Sciences, all with distinction, University of Cambridge, PhD (1999), University of Cambridge, UK. His research interests lie predominantly in the utilization of electromagnetic fields and plasma processes for environmental, food processing and biomedical applications, BioMEMS, Nanotechnology and Power Systems. George E. Georghiou has also a special interest in the area of renewable sources of energy.

Christos Panayiotou, Assistant Professor

Christos Panayiotou has received a B.Sc. and a Ph.D. degree in Electrical and Computer Engineering from the University of Massachusetts at Amherst, in 1994 and 1999 respectively. He also received an MBA from the Isenberg School of Management, at the aforementioned university in 1999. From 1999 to 2002 he was a Research Associate at the Center for Information and System Engineering (CISE) and the Manufacturing Engineering Department at Boston University. During 2002- 2003 he was a Visiting Lecturer at the Electrical and Computer Engineering Department at the University of Cyprus. Currently, he is an Assistant Professor with the Electrical and Computer Engineering Department at the University of Cyprus. His research interests include optimization and control of discrete-event systems with applications to computer communication networks, manufacturing systems and transportation networks. Dr. Panayiotou is an Associate Editor for the Conference Editorial Board of the IEEE Control Systems Society.

Constantinos Pitris, Assistant Professor

Constantinos Pitris has completed his studies at the University of Texas at Austin (BS Honors in Electrical Engineering, 1993, MS in Electrical Engineering, 1995), Massachusetts Institute of Technology (Ph.D. in Electrical and Medical Engineering, 2000), and Harvard Medical School (MD Magna Cum Laude in Medicine, 2002). He has worked as a research

assistant at the University of Texas and Massachusetts Institute of Technology and as a postdoctoral associate at the Wellman Laboratories of Photomedicine of the Massachusetts General Hospital and Harvard Medical School. His main research interests cover the areas of optics and biomedical imaging. The overlying goal of this research is the introduction of new technologies in clinical applications for the improvement of the diagnostic and therapeutic options of modern health care systems to directly impact patient prognosis and outcome. He has been appointed to the faculty of Electrical and Computer Engineering at the University of Cyprus since June 2002 where he is currently an Assistant Professor. He is an active member of the Optical Society of America and a reviewer for Optics Letters, Applied Optics and Biomedical Optics.

Julius Georgiou, Lecturer

Julius Georgiou received his M.Eng degree in Electrical and Electronic Engineering and Ph.D. degree from Imperial College London in 1998 and 2003 respectively. During the last two years of his Ph.D. he was heavily involved in a technology startup company, Toumaz Technology, as Head of Micropower Design. In 2004 he joined the Johns Hopkins University as a Postdoctoral Fellow, before joining the University of Cyprus in 2005. His main area of expertise is in ultra low power circuit techniques and has applied them to a range of applications spanning from biomedical implants to the defense systems. He is a member of the IEEE Circuits and Systems Society, the BioCAS Technical Committee, as well as a member of the IEEE Circuits and Systems Society Analog Signal Processing Technical Committee. His research interests include Low-power analog and asynchronous-digital ASICs, implantable biomedical devices, bioinspired electronic systems, silicon-on-insulator design, sensors and related systems.

Elias Kyriakides, Lecturer

Elias Kyriakides received the Diploma of Technician Engineer in Electrical Engineering from the Higher Technical Institute, Nicosia, Cyprus in 1996 and the B.Sc. degree in Electrical Engineering from the Illinois Institute of Technology, Chicago, IL, USA in 2000 (High Honors). He received the M.S. and Ph.D. degrees in Electrical Engineering from Arizona State University, Tempe, AZ, USA in 2001 and 2003 respectively. He has worked as a Research Associate at Arizona State University from August 2000-December 2003 and as a Faculty Research Associate from January- July 2004. From August 2004 to July 2005 he was a Visiting Lecturer in the Department of Electrical and Computer Engineering at the University of Cyprus. Since August 2005, he is a Lecturer in the same department. Dr. Kyriakides is working in the area of electric power engineering. He is a Member of the IEEE, the IET, and the Technical Chamber of Cyprus. He is a reviewer for a number of journals including the IEEE Transactions on Power Delivery, the IEEE Transactions on Power Systems, and the IEEE Transactions on Education. He was the recipient of the Palais Outstanding Doctoral Student Award at Arizona State University (2004), the third prize in the IEEE poster-paper session and contest for the paper entitled "On-line identification of generator and exciter parameters" (2002), the Alumni association award at the Illinois Institute of Technology (2000), and the Presidential award at the Higher Technical Institute (1996).

Maria K. Michael, Lecturer

Maria Michael received B.S. and M.S. degrees in Computer Science from Southern Illinois University in 1996 and 1998, respectively. She worked as a Research Assistant for the Electrical and Computer Engineering dept of the University of Arizona, Tucson, during 1998-1999, and for the Electrical and Computer Engineering dept of Southern Illinois University during 1999-2002, where she completed her Ph.D. degree in Engineering Sciences

(specialization in Computer Engineering). She taught as a Lecturer at the Electrical and Computer Engineering dept at Southern Illinois University during 2001-2002, and as a Visiting Assistant Professor at the Computer Science and Engineering dept of the University of Notre Dame during 2002-2003, after which she joined the University of Cyprus. Her research interests fall in the area of Computer-Aided Design (CAD) for the design and test of modern computer systems and VLSI/ULSI circuits, with focus on the design and analysis of algorithmic methodologies for automated testing, diagnosis, timing analysis and verification, and design of testable logic (such as Built-In Self-Test). She is a Member of the IEEE (Computer Society, Circuits and Systems Society, Test Technology Technical Council, Society of Women Engineers) and the ACM (Special Interest Group on Design Automation).

Stavros Toumpis, Lecturer

Stavros Toumpis (S'98-M'03) received the Diploma in electrical and computer engineering from the National Technical University of Athens, Greece, in 1997, the M.S. degrees in electrical engineering and mathematics from Stanford University, CA, in 1999 and 2002, respectively, and the Ph.D. degree in electrical engineering, also from Stanford, in 2003. From 1998 to 1999, he worked as a Research Assistant for the Mars Global Surveyor Radio Science Team, providing operational support. From 2000 to 2003, he was a Member of the Wireless Systems Laboratory, at Stanford University. Since 2003, he is a Senior Researcher with the Telecommunications Research Center Vienna (ftw.), in Vienna, Austria. His research is on wireless ad hoc networks, with emphasis on their capacity, the effects of mobility on their performance, medium access control, and information theoretic issues.

CONTACT INFORMATION

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