UNIVERSITY of NICOSIA | DEPARTMENT OF ENGINEERING

Computer/Electrical Engineering Student Handbook

2018 – 2019

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Message from the Department Head

Dear student,

Welcome to the Department of Engineering. The fields of Electrical and Computer Engineering are subject to a constant change and evolution due to new advances in technology and its application to new branches of today's society. Entertainment toolboxes (e.g., televisions, stereos, gadgets, MP3 players, play stations, etc.), communication devices (e.g., mobile phones, Blackberries, PDAs, GPS, etc.), and computers have become essential and play an important role in everyday life. They affect all sectors of today's society including education, entertainment, research, telecommunications, transportation, industry and home automation, space exploration, business, media, and many more. This ever-increasing use of technology offers expanding career opportunities in system design, manufacturing, integration, process control, operation, troubleshooting, maintenance, automation, software development and computers. At no time in history has engineering played such an important role in improving the standard of living and the quality of life, boosting productivity and reducing unemployment, creating wealth and prosperity. Engineering plays an important role in other sectors of life including healthcare and medicine. Electrical/electronic devices and smart robots are used on a daily basis to assist doctors in critical medical procedures and surgeries that require high precision and caution. At the dawn of a new millennium, engineering, science and technology have more to offer for the well being of humanity and the future of the planet we all share.

The Department of Engineering at the University of Nicosia has a major role to play in this technological progress. During the four-year program, our graduates acquire enough theoretical knowledge and laboratory experience to become the future leaders of science and engineering. Our goal is to create engineers with a solid foundation in basic engineering principles and concepts, but also a concrete and valuable knowledge on specialized topics ranging from power and automation systems, communications and fibre optics to computer networks, microwave, and VLSI system design. Areas of specialization include power systems, electronics, digital systems, microprocessors, computer networks, information theory, telecommunications, fibre optics, cellular communications, microwaves, antennas for wireless communications, and more. In our department we seek to attract students who demonstrate creative analytical thinking, persistence and discipline, self-motivation, and intelligence. As the engineering field is extremely demanding, future engineering students must be able to adapt to a new dynamic environment and react positively to new challenges and opportunities. Students are taught to be independent thinkers, create independent types of work, perform high-tech projects, write technical reports, perform research on cutting-edge technology, and present their work before classmates and faculty members. In the Department of Engineering, we are committed to excellence in teaching and research in order to safeguard high quality standards among our graduates and promote evolution and technological advancement.

The two programs on Electrical and Computer Engineering are based on both theoretical lectures and laboratory experiments with emphasis given on the design and development of systems and modules. These courses are supported by advanced equipment and state-of-the-art hardware and software facilities for experimentation. Our programs conform to the undisputable academic guidelines set by international accreditation bodies such as the Accreditation Board for Engineering and Technology (ABET) in the United States. The curricula of both programs have been reviewed by the Cyprus Scientific and Technical Chamber (ETEK) and our graduates are in a position to register now as licensed Engineers with ETEK. They include a considerable number of

major and elective courses of theoretical and applied nature which build program diversity and contribute to a foundation of a broad range of skills for career positions in academia and industry. Students in the two engineering programs take courses of basic Science (e.g., Physics), Mathematics, Computer Science, Information Technology (IT), Electronics, Design, Business, English Language, and Liberal Arts in order to prepare for a professional career in industry or to pursue advanced post-graduate studies in engineering or a related field. The process of system analysis and design is emphasized throughout all years of study, and as a matter of fact, projects are included in all the major theoretical and laboratory courses. This provides the theoretical foundation and the practical skills for our students to successfully complete a demanding final-year project at the end of their undergraduate journey.

The Engineering Department at the University of Nicosia offers, among others, two undergraduate programs in the following disciplines:

- Computer Engineering (BSc)
- Electrical Engineering (BSc)

The curriculum leading to the degree of Bachelor of Science (BSc) in any of the two engineering programs is intended to qualify students to begin a professional career in that field of Engineering or to pursue further advanced post-graduate studies at the level of Masters and/or Doctorate degree. The major engineering courses of the Bachelor's program contain, apart from theory and fundamental principles, elements of analysis and design, as well as significant laboratory work. The duration of the two programs, for a full-time student, is 4 years, and it requires a minimum of 240 ECTS credits for graduation.

The faculty members teaching in our programs are experienced and highly qualified academics; many of them have industry-related background and/or have worked abroad in other universities. All hold postgraduate qualifications and the majority of them hold relevant PhD degrees. Most of the faculty are also actively engaged in research and have published and continue to publish papers in international scientific journals and conference proceedings. Moreover, they maintain research collaborations and/or links with other universities and institutions abroad and in Cyprus, including the University of North Carolina, the Arizona State University, the City University of New York, University of Surrey, University of Patras, National Technical University of Athens (NTUA), and Bank of Cyprus Oncology Centre. Research work is carried out in the areas of Numerical Methods in Electromagnetics, Electromagnetic Theory, Antenna Analysis and Design, the Finite Element Method, the Method of Moments, Communications, RFID systems in Healthcare Applications, Communications Management, EMC, Biomedical Engineering, System Automation, Programmable Logic Controllers (PLCs), Signal and Image Processing, Texture Analysis, Statistical Pattern Recognition, Computer Vision, Medical Imaging (SPECT, MRI), Image Reconstruction from Projections, Computers in Education, E-Learning and M-Learning, Adaptive Waveform Design, Bayesian Target Tracking, Sequential Monte Carlo Methods, Radar Waveform Design, Time-Varying Signal Processing, Compressive Sensing, Adaptive Waveform Design, Photothermal Physics and Instrumentation, Semiconductor Characterization, Photothermal Gas Sensors, Photonic Crystals, Non-Destructive Techniques in Archaeometry, Vertical Integration and Routing/Signaling mechanisms in IP/WDM Networks, Physical Layer Constraints in Optical Networks, Fault Tolerant Networks, Wireless Backhaul, Access Networks, FTTx Solutions and Architectures, Sensor Networks, Management of Wireless Networks, Distributed Police-Based Management (PBM), Self and Autonomic Networking, Mesh and Mobile Ad Hoc Networks (MANET), Frameworks for Next Generation Mobile Networks and Services, Distance Temperature Surveillance, Automated Targeting System, Construction of an Integrated Inductive-Capacitive component for Absorbing Harmonic Modulation in the Power Grid,

Programming of Integrated Circuits: PICs, PLAs and PLCs, Digital Design CAD Tools Development, Very Large Scale Integration (VLSI) Design, Verification and Testing, Design for Testability, High Quality Digital Circuit Testing, Self-Testing Architectures, ICT in Education, High Frequency Antennas, Engineering Education, Automation and Control, and System Modeling and Identification.

During your studies, you will be assigned an academic advisor who will help you choose courses, plan your studies, advise you on academic matters and help you achieve your educational goals and objectives. In addition to your academic advisor, the Program Coordinator and the Head of the Department will be available to provide information related to the curriculum, academic matters, department policies, accreditation, transfers to and from other Universities, research, career opportunities etc.

On behalf of the Electrical & Computer Engineering faculty I would like to welcome you to the Department and wish you success in your studies and a rewarding and fruitful time at the University of Nicosia.

Prof Anastasis Polycarpou
Head of the Department of Engineering

About this Booklet

This booklet has been written in order to provide you with a detailed guide to the BSc programs offered in Computer Engineering and Electrical Engineering by the Department of Engineering of the School of Sciences & Engineering at the University of Nicosia. It is designed to cover your basic information needs with respect to these programs. More specifically it

- provides the aims, objectives, learning outcomes, a short description and career opportunities of the two Engineering programs offered
- provides a summary of departmental policies
- presents a list with the full-time faculty members supporting our programs along with the necessary contact information
- indicates the new academic paths of the two programs as these have been approved by the ECPU/DIPAE
- offers a suggested semester breakdown which indicates the order of courses to be taken each semester during your studies
- provides a list of the major courses along with their pre- and co-requisites
- provides a brief description of the major courses.

Please read it carefully to familiarize yourself with your program. You should also consult the Academic Policies booklet and any other leaflet distributed by the Department of Academic Affairs in order to familiarize yourself with the academic rules, policies and regulations of the University.

This document is now available on the University of Nicosia (UNic) website at www.unic.ac.cy.

PROGRAMS

Bachelor of Science (BSc) in Computer Engineering

Aims and Objectives

The *Bachelor of Science in Computer Engineering* program is intended to qualify students to begin a professional career in the field of Computer Engineering, as engineers, or to pursue further advanced post-graduate studies at the level of Masters or Doctorate degrees. The major engineering courses of the Bachelor's program contain, apart from theory and fundamental principles, elements of analysis and design, as well as significant laboratory work.

The graduate of this program should:

- have a fundamental understanding of a broad spectrum of topics in Computer Engineering
- have advanced knowledge and in-depth understanding of at least one of the specialization areas of Computer Engineering
- have a firm grasp of the basic knowledge of mathematics, physics, and possibly chemistry as a foundation for further post-graduate studies
- be able to communicate technical ideas effectively through both oral presentations and written reports
- have developed independent thinking and problem solving skills to tackle real-world Computer Engineering problems
- have extensive hands-on laboratory experience in designing hardware and software solutions to challenging real-world problems in Computer Engineering
- have acquired an interdisciplinary fundamental knowledge for a more fulfilling and rewarding career
- have adequate software programming skills that are needed in the process of analysis and design of computer engineering problem solutions
- be a well-rounded individual, knowledgeable of fields outside of science and engineering including business, and liberal arts
- be well prepared for either an entry level job in Computer Engineering or further study toward an advanced post-graduate Masters and/or Doctorate degree

Learning Outcomes

Upon the completion of this program, the student will gain the following:

- Solid foundation in fundamental areas of mathematics such as differential and integral calculus, linear algebra and discrete mathematics, science including physics and engineering; knowledge of probability and statistics applicable to computer engineering. Ability to apply this knowledge to solve engineering problems
- Breadth of knowledge in basic areas of computer engineering including electric circuits, digital and analogue electronics, numerical methods, signals and systems, signal processing, microprocessors, computer organization and architecture, data communication and computer networks, programming, systems analysis and design, data structures and operating systems
- In-depth knowledge and technical expertise in at least one of the specialized fields of computer systems and networks and software engineering and applications
- Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- Ability to identify, formulate and solve engineering problems using techniques, skills, creative thinking and modern engineering tools necessary for engineering practice
- Knowledge of basic electrical and electronic components and their use in analogue and digital circuits
- Ability to design a system, component, or process to meet desired needs
- Ability to develop and use models for the analysis and design of computer systems
- Ability to design, conduct and troubleshoot laboratory work involving engineering technology as well as analyze and interpret data
- Ability to use software packages and write computer programs to solve engineering problems
- Ability to function on a multi-disciplinary team and to perform in leadership roles
- Knowledge of contemporary issues
- Ability to communicate ideas effectively
- Understanding of the importance of considering economic, social and ethical factors in engineering design and practice
- Recognition of the need for and an ability to engage in life-long learning

Description

The Computer Engineering program is an interdisciplinary program that consists of specialized courses from mainly two departments of the School of Sciences and Engineering: the Department of Engineering and the Department of Computer Science. Acquiring a Bachelor's degree in the Computer Engineering from the University of Nicosia will give you all it takes to successfully design and build sophisticated computer systems and software platforms for numerous applications. Such applications include avionics and robotic arms, process automation and control, computer games and gadgets, entertainment boxes and animation movies, computer graphics and rendering, computer networks, and microcontrollers. To successfully design computer systems for any of these applications, it requires software programming skills and algorithm design, gained primarily from Computer Science courses, but also hardware design and system analysis techniques learnt from Engineering courses.

Computers are fully integrated into our everyday lives; we are fully dependent on them even though there are voices around us that oppose to this evolution and technological development. For a computer scientist to conquer the field of computers, it does not take only to have knowledge of programming languages but also knowledge of computer architecture, hardware design techniques, circuit analysis, information theory, signal processing, very large scale integration design, digital ICs, etc.

The Computer Engineering program consists of a large variety of major computer engineering and computer science courses including microprocessors, electronics, signals and systems, electronic communications, digital signal processing, C++, data structures, operating systems, software engineering, computer graphics, algorithms, microprocessor interfacing, and many more. The program also provides a solid foundation and fundamental knowledge on mathematics, physics, chemistry, social sciences, humanities, business, and language expression.

The duration of the program is four years which is broken down into 8 semesters. A full-time student usually registers for 30 ECTS credits per semester which corresponds to 6 courses, accordingly. The total number of credits that must be completed before graduation is 240.

The Computer Engineering program has a large pool of elective courses from which a student can choose according to his own preferences. In that way, one can specialize in selective areas which may include software programming, computer networks, computer architecture, operating systems, databases, or computer hardware design.

Career Opportunities

Computer engineers can be employed in a variety of industry sectors ranging from academic and research organizations to government agencies and private companies. Their duties involve use of electrical and computer skills, hardware design techniques, and programming expertise to develop computer products for a plethora of applications including computer games, animation movies, entertainment gadgets, multimedia equipment, computer-aided control equipment, supercomputers, or application-specific microcontroller and integrated circuits. Computer engineers often work in the field of Information Technology (IT) which is a rapidly growing field that affects every aspect of our lives. We live in a world of computing and information with plethora of applications in the financial market (e.g., banks), retail business, commerce and e-commerce, trading, telecommunications, transportation, education, etc. Everything we do nowadays involves use of computers and microcontrollers. Our new car is a good example: fully loaded with accessories and innovative features such as proximity sensors, humidity sensors, cruise control, electronic traction system and steering, emergency alarms, air-bags, security system, and more. All these external sensors and accessories communicate through electrical means with a micro-computer which is pre-programmed to control every aspect of the car's functionality in order to ensure, above all, the safety of the passengers. This micro-computer was designed, built, and programmed for this specific task by a creative group of Computer Engineers. In simple words, a Computer Engineer can

- program computers and microcontrollers to perform a specific type of job
- analyze user needs and design an application-specific computer system
- interface external devices with computers and microcontrollers in order to control processes via stepping motors and hydraulics (e.g., robot arms in automobile industry)
- develop smart software to automate and control routine jobs
- write software for computer graphics and animated movies
- design and build gadgets and other entertainment boxes
- design innovative computer architectures and networks for optimized processing
- of information and data transfer
- use Assembly, High-level languages (C++, Java, etc.) and Databases to develop user-friendly application platforms for a variety of industry sectors (e.g., payroll system of a company)
- teach computer technology and programming in high schools or even at universities, provided they have the required degrees
- work as consultant for the computer industry

Bachelor of Science (BSc) in Electrical Engineering

Aims and Objectives

The Bachelor of Science in Electrical Engineering program is intended to qualify students to begin a professional career in the field of Electrical Engineering, as engineers, or to pursue further advanced post-graduate studies at the level of Masters or Doctorate degrees. The major engineering courses of the Bachelor's program contain, apart from theory and fundamental principles, elements of analysis and design, as well as significant laboratory work.

The graduate of this program should:

- have a fundamental understanding of a broad spectrum of topics in Electrical Engineering
- have advanced knowledge and in-depth understanding of at least one of the specialization areas of Electrical Engineering
- have a firm grasp of the basic knowledge of mathematics, physics, and possibly chemistry as a foundation for further post-graduate studies
- be able to communicate technical ideas effectively through both oral presentations and written reports
- have developed independent thinking and problem solving skills to tackle real-world Electrical Engineering problems
- have extensive hands-on laboratory experience in designing hardware and software solutions to challenging real-world problems in Electrical Engineering
- have acquired an interdisciplinary fundamental knowledge for a more fulfilling and rewarding career
- have adequate software programming skills that are needed in the process of analysis and design of electronic engineering problem solutions
- be a well-rounded individual that is knowledgeable of fields outside of science and engineering including business, and liberal arts
- be well prepared for either an entry-level job in Electrical Engineering or further studies toward an advanced post-graduate Masters and/or Doctorate degree

Learning Outcomes

Upon the completion of this program, the student will have the following:

- Solid foundation in fundamental areas of mathematics such as differential and integral calculus, linear algebra and differential equations, science including physics and engineering; knowledge of probability and statistics applicable to electrical engineering. Ability to apply this knowledge to solve engineering problems
- Breadth of knowledge in basic areas of electrical engineering including electric circuits, digital and analogue electronics, numerical methods, signals and systems, digital signal processing, microprocessors, electromagnetics, electric machines, digital integrated circuits, digital signal processing, control systems, and principles of communications
- In depth knowledge and technical expertise in at least one of the specialized fields of communications and signal processing, microwaves, antennas and optics, and power and automation systems.
- Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- Ability to identify, formulate and solve engineering problems using techniques, skills, creative thinking and modern engineering tools necessary for engineering practice
- Knowledge of basic electrical and electronic components and their use in analogue and digital circuits
- Ability to design a system, component, or process to meet desired needs
- Ability to develop and use models for the analysis and design of components and systems
- Ability to design, conduct and troubleshoot laboratory work involving engineering technology as well as analyze and interpret data
- Competency in computer fundamentals and in applying computers to solve engineering problems
- Ability to function on a multi-disciplinary team and to perform in leadership roles
- Knowledge of contemporary issues
- Ability to communicate ideas effectively
- Understanding of the importance of considering economic, social and ethical factors in engineering design and practice
- Recognition of the need for and an ability to engage in life-long learning

Description

The Electrical Engineering program combines courses in the areas of power systems, control systems, electronics, communications, signal processing, information theory, electromagnetics, microwave circuits and devices, networks, microprocessors, computers, and software programming. It is also supported by foundation courses in mathematics, physics, chemistry, social sciences, humanities, business administration, and language expression.

The program prepares students to enter the highly competitive world of power, electronics, information technology, communications, and computers. When you think of electrical engineering think of all the advanced electrical/electronic equipment that we all use in today's world. Think of the iPod and the cell phone, the play station and the computer, the LCD/Plasma television set and the Global Positioning System (GPS), the microwave oven and the industrial robotic arm, the dashboard of a new car, or the avionics of an Airbus 380. All these are electronic devices that have been designed and built by a group of intelligent and dedicated electronic engineers.

A degree in Electrical Engineering will give you the necessary credentials and basic knowledge to begin an exciting career in the constantly growing world of electronics and information. This field is demanding because it is constantly changing; however, it is also rewarding in terms of salaries, achievement, self-satisfaction, and contribution to the technological advancement of today's electronic world. It also provides opportunities to talented, self-motivated, and creative engineers to enter the global high-tech market and become key players of tomorrow's technological innovations.

The duration of the program is four years which is broken down into 8 semesters. A full-time student usually registers for 30 ECTS credits per semester which corresponds to 6 courses, accordingly. The total number of credits that must be completed before graduation is 240.

The Electrical Engineering program has a large pool of elective courses from which a student can choose according to his own preferences. In that way, one can specialize in selective areas which include (a) Power and Automation Systems, (b) Communications and Signal Processing, and (c) Microwaves, Antennas and Optics.

Career Opportunities

By pursuing a degree in Electrical Engineering at the University of Nicosia, a student acquires technical knowledge and analytical skill to effectively tackle engineering problems and provide viable solutions. During the 4-year course of studies, the student learns hardware and software design techniques that can be used effectively in the development and testing of a prototype electronic product. The student also acquires all basic engineering and foundation courses to successfully continue for a post-graduate degree in the same or related field. This will open the doors for possible jobs in academia or in other research organizations. Most of our graduates, however, begin a career in the local IT industry, telecommunications companies, software development companies, and the government sector. For example, an Electrical Engineer that has recently graduated from the University of Nicosia can effectively work in the field of Telecommunications and cellular telephony. The engineer is the person responsible for evaluating user needs and analyzing all the parameters involved in order to choose the most suitable telecommunication system for a given coverage area, number of users, type of services, quality of service, and so on. In a software company, an engineer is responsible for analyzing the needs of the user in order to design efficient software for a number of high-tech applications. An example is the design of an automated system that packages pills in plastic bottles in a pharmaceutical company. The engineer is not only responsible for the hardware design of the system but also for the design and proper operation of the software that controls all devices attached. A possible solution to such a design problem is a Programmable Logic Controller (PLC) which can be programmed and interfaced to the system hardware by competent Electrical Engineers. In short, an Electrical Engineer can

- be employed by Telecommunication companies to design and monitor large-scale telecommunication systems
- be employed by Electric companies in order to work in power generating plants, distribution networks, etc.
- be employed by companies dealing with any kind of home and outdoors automation systems
- work in Software companies to design and develop algorithms that provide solutions to engineering type of application problems
- program logic controllers and interface with sensitive electronic and power devices for the purpose of industrial automation and control
- design electronic circuits that perform important functions for a wide range of applications. Good examples are mobile phones, electronic gadgets, televisions, cameras, CD players, etc.
- design and implement algorithms that improve network traffic, reduce time delays, eliminate noise and interference, etc.
- work as IT engineers to set up Local Area Networks (LANs) and monitor data traffic and quality of service
- be employed as a High-School teacher in the field of Technology and Electronics

Department Policies

In this section, some of the policies of the Department of Engineering are presented. Specifically you will be introduced to those policies that deal with student standing, grading, lab performance evaluation, special grades, etc.

Equal Opportunities

The Department of Engineering and the University of Nicosia at large realize and accept the need for an equal opportunities policy. We are committed to providing equal opportunities to all students. We are committed to operating and functioning in such a way that no direct or indirect discrimination occurs regarding the admission, advising and assessment of students and the treatment of any individual on grounds of gender, race, sex, age, nationality, color, special needs, social and economic background, marital status, political, social or religious belief. We strongly oppose to any practices that, directly or indirectly promote any kind of discrimination and result in individuals not being treated solely on the basis of their merits and abilities. To this end, we will resolve any such practices and will refer serious cases to the Disciplinary Committee.

Intellectual Integrity/Plagiarism

Intellectual integrity is one of the ideals for which the University of Nicosia stands. Students are expected to adhere to high standards of intellectual integrity and honesty. Cheating and plagiarism are contrary to the ideals of our university. Cheating is defined as dishonesty of any kind in connection with assignments and examinations. It applies to both giving and receiving unauthorized help. Plagiarism is defined as presenting the work of someone else as one's own. Cheating and plagiarism will be treated as a disciplinary offence in addition to failure in that particular assignment or examination.

Student Standing/Grades

The following table illustrates the various academic standing categories that the Department adopts. Brief explanations follow.

Number of Credits (1)	Good Academic Standing (2)	Probation (3)	Ineligibility (4)
48 - 88	1.3 and over	1.00 – 1.299	less than 1.0
90 - 148	1.7 and over	1.30 – 1.699	less than 1.3
150 - 208	1.85 and over	1.70 – 1.849	less than 1.7
210 - 270	2.0 and over	1.85 – 1.999	less than 1.85

Good Standing: A student is considered to be in good academic standing if he/she satisfies the criteria of columns (1) and (2) above.

Academic Probation: At the end of each academic semester, students with a Cumulative Point Average (CPA) below what is required for good academic standing will be placed on academic probation as shown in column (3) above. Students may also be placed on academic probation because of excessive withdrawals (Ws). All students placed on academic probation will receive a letter informing them of their status and will be encouraged to increase their CPA. There will also be a warning that should the student's CPA drop below the low end of each scale, he/she may be ineligible to register.

Academic Ineligibility: students with a CPA below the lower cut-off points shown in column (4) become ineligible to continue their studies. In case of extenuating circumstances, students may be allowed a one-semester extension but only after they see the Academic Dean and a definite study plan and performance objectives are agreed upon. If students fail to meet these objectives, they will be dismissed from the College without further notice. Students may also be dismissed because of continued course withdrawals (Ws).

The following sections explain the policies of the Department in special cases dealing with the course grading, exams and performance evaluation.

Credit by Examination

Credit by Examination refers to course credits that can be earned by a student without attending the course, but instead by taking an examination (comprised of the most substantial assessment component of the course – could be written exam, course portfolio, etc). In order for a student to be eligible for a Credit by Examination for a course, s/he should provide evidence that either

- s/he has covered the course material
- s/he has acquired the required knowledge/skills/competences through professional experience and/or prior experience and/or prior learning

Credit by Examination grades are given based on the numerical mark of the examination, according to the University marking scheme. The grade appears on the student's transcript and the course credits are included in the earned credits.

Make-Up Examination/Test

For all announced examinations missed, the faculty teaching the course may or may not give a make-up test. If a make-up test is given, the student must pay a make-up examination fee. When no make-up test is given, the student's grade will be based on the remaining tests.

No student may miss a final examination. Failure to take the final examination without permission or official withdrawal will receive zero in that exam. In case of unavoidable absence, the student must call prior to the test, report the reason for the absence, and give a telephone number where he can be reached. The faculty member and the Administration may ask for verifiable evidence and reserve the right to accept or reject any reason as a valid excuse. A doctor's certificate is not necessarily a valid excuse. In

the case of a valid excuse a grade of "I" is given and the student has one month to remove it, by taking a make-up examination, otherwise zero marks will be recorded in that exam.

Incomplete/Deferred

A grade of incomplete ("I") will only be given to a student who justifiably missed the final exam. However, the "I" will have to be removed within a period of one month. If this is not possible due to medical or other reasons, then the grade is changed to deferred "DE".

Withdrawal

A grade of "W" is recorded in two cases: (a) administrative withdrawal ("WA") which is when a lecturer decides to withdraw a student from a class due to excessive amount of absences or when a final year project is not completed on time (see section on senior year projects below), and (b) student withdrawal ("WS") which is when a student decides to withdraw from a class because he/she cannot cope with it. There is a deadline for student withdrawal which is usually the last day of classes in the semester.

Senior Year Projects

Senior year projects are expected to be completed within one semester. In case after one semester the project is incomplete, the student receives a "W" but he/she is allowed to register again in the next semester without charge. If after the second semester the project is still not completed, the project advisor may grant an extension in such a way that the total time given to the student to complete the project does not exceed one year. In that case the student receives again a grade of "W". If after a year from the start of the project it is still incomplete, then the student automatically gets a "W" and he has to re-register for the project.

Homework, Laboratory Reports and Performance, Class Projects

Homework assignments, laboratory reports and other class projects have to be turned in by the specified deadlines. Late work will NOT be accepted. If a student will be absent on the due date then he/she should arrange for the homework/lab report/class project to reach the faculty member by the due date.

For laboratory work students will be evaluated for their performance in the laboratory during every lab session/experiment. Students who miss an experiment without a valid verifiable reason get a zero for the laboratory performance and a zero for the laboratory report in that specific experiment. Students who miss more that 3 laboratory sessions automatically receive a grade of "W".

Studying Engineering at the University of Nicosia

The nature of the Engineering programs and their subjects require that students spend considerable amount of their studying time in the Engineering and Computer laboratories and in the library.

The University's Engineering and Computer laboratories are equipped with state-of-the-art hardware and software. The Engineering labs are situated on the ground floor of the Research & Technology building (Radio Communications Lab, Electrical/Computer Engineering Lab) and the main Computer labs are situated on the ground and first floors of the main building in Rooms Rooms A19, A20, B101, B111, B113, B117.

Primary Engineering Lab: R&T B12

Furthermore, the University campus has a Chemistry Lab on the first floor of the main building. You are strongly advised to utilize these resources in the best possible way since it is very important that you gain practical experience. Please consult the timetables displayed outside each lab in order to find out the times during which the labs are free and available for use.

The Engineering lab instructors are the faculty who teach the theoretical coursework. Beyond that, engineering students may use the labs without supervision in order to perform experimental work as part of a project, assignment, or other work assigned by the faculty. The Computer labs are managed by specialists and, during the peak hours of operation, trained assistants selected from senior Computer Engineering and Computer Science students are on duty. The combination of excellent educational technology and professional management makes the learning environment rich and dynamic. If you require any further help, please contact the users support group located in Room B-105.

Secondary Engineering Lab: R&T B14

The University libraries provide engineering students with the opportunity to access a large and wide range of engineering books, magazines, journals and other related printed material. Moreover, you can access CD-ROM and on-line databases of information, as well as audio and video tapes. You are strongly advised to take advantage of the resources available in our library and use them extensively during your studies at the University. Check the library's web page at www.library.unic.ac.cy and get all the information you need while you are sitting at your desk at home.

Faculty of the Computer/Electrical Engineering Programs

The following is a list of the full-time faculty members teaching the major courses in the Engineering programs. You may contact them by paying a personal visit to their office, by telephone or by e-mail. Please note that faculty members display on their office doors their student advising hours during which they are available to provide help and assistance to students. Alternative meetings can be arranged outside these hours by contacting the lecturer directly. The phone numbers of faculty members are 2284-Ext.

Name	Office	Ext	Email
Prof Anastasis Polycarpou, BSc, MSc, PhD Professor & Head of the ECE Department	RT B3	2514	polycarpou.a@unic.ac.cy
Dr George Gregoriou, BSc, MSc, PhD Associate Professor & Dean of the School of Sciences & Engineering	M-209A	1650	gregoriou.g@unic.ac.cy
Dr Marios Nestoros, BSc, PhD Associate Professor and Associate Dean of the School of Sciences & Engineering	RT B7	2517	nestoros.m@unic.ac.cy
Dr Antonis Hadjiantonis, BEng, MEng, PhD Assistant Professor & Academic Coordinator of the Electrical Engineering Program	RT B5	2516	hadjiantonis.a@unic.ac.cy
Dr Andreas Michaelides, BSc, MSc, PhD Assistant Professor	RT A12a	2520	michaelides.a@unic.ac.cy
Dr Ioannis Kyriakides, BSc, MSc, PhD Assistant Professor	RT B6	2519	kyriakides.i@unic.ac.cy
Dr Stelios Neophytou, Dipl-Ing, PhD Assistant Professor & Academic Coordinator of the Computer Engineering Program	RT B6	2518	neophytou.s@unic.ac.cy
Mr Andreas Serghiou, BSc, MBA (MIS) Associate Lecturer & Computer Engineering Program Coordinator	RT A14a	2523	serghiou.a@unic.ac.cy

Beyond the major and elective Engineering courses, our students take courses in Mathematics, Computer Science, Physics, Chemistry and other physical science courses. The faculty members shown on the list below, even though they belong to the other two Departments of the School of Sciences, teach such courses for students in our programs:

Name	Office	Ext	Email
Prof Athena Stassopoulou, BSc, PhD Professor & Head of the Department of Computer Science	B-224	1648	stassopoulou.a@unic.ac.cy
Prof Constantinos Mavromoustakis, PhD Professor & Associate Head of the Department of Computer Science	B-217	1730	mavromoustakis.c@unic.ac.cy
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Dr Marios Christou, BSc, MSc, PhD Professor	RT B5	2515	christou.ma@unic.ac.cy
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Dr Harald Gjermundrod, BSc, MSc, PhD Associate Professor	B-224	1729	gjermundrod.h@unic.ac.cy
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The Academic Path

Your academic path shows the courses that you must complete in order to graduate. They are grouped in categories that are referred to as requirements or electives. In each category, there is a minimum and maximum number of credit hours that must be satisfied. In order to plan your studies, you have to study carefully your academic path and consult with your academic advisor and the Department of Academic Affairs before choosing your courses. The main categories in you academic path are:

MAJOR REQUIREMENTS:	Required major courses
MAJOR ELECTIVES:	Additional major elective courses
MATH REQUIREMENTS:	Required courses in Mathematics
SCIENCE ELECTIVES:	Elective courses in Science (e.g. Physics, Chemistry, etc.)
BUSINESS ELECTIVES:	Elective courses in Business Administration
LANGUAGE REQUIREMENTS:	English and communication courses
LIBERAL ARTS ELECTIVES:	Elective courses in Liberal Arts

The academic paths are given in the following pages. Please note that the codes *F* (Fall), *S* (Spring) *and Su* (Summer) under the *Semester* column of the following tables indicate the semester when courses are *usually* offered.

Please consult with the Department of Academic Affairs for information about the timetable of courses. The *prerequisite* of a course is the required course that you must have *before* you register. The *co-requisite* of a course is a course that you must be taking concurrently. Please bear in mind that depending on your proficiency in the English language you may have to take additional English courses.

Finally, incoming students may be required to take a mathematics placement test in order to decide whether they should be allowed to register for MATH-190 Calculus I or take MATH-180 Algebra and Trigonometry. According to the latest departmental policy, students are eligible to register for MATH-190 if they are:

- Public school graduates with a minimum grade of 15/20 in intensive («ενισχυμένα») mathematics in their leaving certificate
- Private school or international graduates with a minimum grade of 75/100 in intensive mathematics in their high school diploma

All other students must register for MATH-180 Algebra and Trigonometry.

Bachelor of Science in Computer Engineering Path

SUBJECT AND CODE	SEMESTER OFFERED	WEEKLY HOURS	NO OF ECTS CREDITS
MAJOR REQUIREMENTS			**120**
COMP-111 PROGRAMMING PRINCIPLES I	F, S	4	6
COMP-113 PROGRAMMING PRINCIPLES II	F, S	4	6
COMP-201 SYSTEMS ANALYSIS AND DESIGN	F, S	3	6
COMP-211 DATA STRUCTURES	F, S	3	6
COMP-354 OPERATING SYSTEMS	S	3	6
ECE-100 ELECTRIC CIRCUITS I	F, S	3	6
ECE-101 ELECTRIC CIRCUITS I LAB	F, S	3	2
ECE-102 ELECTRIC CIRCUITS II	F, S	4	6
ECE-103 ELECTRIC CIRCUITS II LAB	F, S	3	2
ECE-110 DIGITAL SYSTEMS	F, S, Su	4	6
ECE-111 DIGITAL SYSTEMS LAB	F, S	3	2
ECE-210 ELECTRONICS I	F, S	3	6
ECE-211 ELECTRONICS I LAB	F, S	3	2
ECE-212 ELECTRONICS II	F, S	4	6
ECE-213 ELECTRONICS II LAB	F, S	3	2
ECE-220 MICROPROCESSORS	S	4	6
ECE-221 MICROPROCESSORS LAB	S	3	2
ECE-290 NUMERICAL METHODS USING MATLAB	F	3	6
ECE-322 COMPUTER ORGANIZATION AND ARCHITECTURE	F, S	3	6
ECE-324 DATA COMMUNICATION AND COMPUTER NETWORKS	S	3	6
ECE-330 SIGNALS AND SYSTEMS	F, S	4	6
ECE-332 PROBABILITY AND RANDOM SIGNALS	S	3	6
ECE-430 DIGITAL SIGNAL PROCESSING	F	3	6
ECE-492 SENIOR YEAR PROJECT	F, S	1	6

Bachelor of Science in Computer Engineering Path (continued)

SUBJECT AND CODE	SEMESTER OFFERED	WEEKLY HOURS	NO OF ECTS CREDITS
COMPUTER ENGINEERING ELECTIVES			**min 30**
Students should take at least three courses from one of the two areas of specialization below. Subject to approval, a student may select up to two Electrical Engineering program electives.			
COMPUTER SYSTEMS AND NETWORKS			
COMP-431 COMPUTER SECURITY	F	3	6
COMP-432 NETWORK SECURITY	F or S	3	6
COMP-458 NETWORK PROTOCOLS	F or S	3	6
COMP-470 INTERNET TECHNOLOGIES	F	3	6
ECE-310 DIGITAL INTEGRATED CIRCUITS	F	3	6
ECE-320 MICROPROCESSOR INTERFACING	Su	3	6
ECE-354 DATA COMMUNICATION TECHNOLOGIES	F or S	3	6
ECE-410 PROGRAMMABLE APPLICATION SPECIFIC INTEGRATED CIRCUITS	F or S	3	6
ECE-420 INTRODUCTION TO VLSI DESIGN	F or S	3	6
ECE-422 ADVANCED COMPUTER ARCHITECTURE	F or S	3	6
ECE-424 DISTRIBUTED SYSTEMS	F or S	3	6
ECE-425 COMPUTER AIDED DESIGN FOR VLSI	F or S	3	6
ECE-426 OPTICAL NETWORKS	F or S	3	6
ECE-428 EMBEDDED SYSTEMS	F or S	3	6
ECE-490 SPECIAL TOPICS IN ELECTRICAL AND COMPUTER ENGINEERING	F, S	1 - 3	2 - 6
ECE-491 INTERNSHIP	F, S, Su	-	6
SOFTWARE ENGINEERING AND APPLICATIONS			
COMP-212 OBJECT-ORIENTED PROGRAMMING	F	3	6
COMP-213 VISUAL PROGRAMMING	F, S	3	6
COMP-263 HUMAN COMPUTER INTERACTION	F, S	3	6
COMP-302 DATABASE MANAGEMENT SYSTEMS	F, S	3	6
COMP-303 DATA MINING	F or S	3	6
COMP-320 COMPUTER GRAPHICS	F	3	6
COMP-321 THEORY OF COMPUTATION	F, S	3	6
COMP-370 ALGORITHMS	F, S	3	6
COMP-399 SPECIAL TOPICS IN COMPUTER SCIENCE	F, S	1 - 3	2 - 6
COMP-401 SOFTWARE ENGINEERING	F, S	3	6
COMP-402 ADVANCED DATABASES	F, S	3	6
COMP-405 ARTIFICIAL INTELLIGENCE	F	3	6
COMP-412 INTERNET PROGRAMMING	F, S	3	6
COMP-413 SYSTEMS PROGRAMMING	S	3	6
COMP-421 COMPILER DESIGN	S	3	6
ECE-491 INTERNSHIP	F, S, Su	-	6

Bachelor of Science in Computer Engineering Path (continued)

SUBJECT AND CODE	SEMESTER OFFERED	WEEKLY HOURS	NO OF ECTS CREDITS
MATH REQUIREMENTS			**36**
MATH-101 DISCRETE MATHEMATICS	F, S	3	6
MATH-190 CALCULUS I	F, S	4	8
MATH-191 CALCULUS II	F, S	4	8
MATH-270 CALCULUS III	S	4	8
MATH-280 LINEAR ALGEBRA	F, S	3	6
SCIENCE ELECTIVES			**min 30**
CHEM-106 GENERAL CHEMISTRY	F, S	5	8
MENG-250 ENGINEERING MECHANICS: STATICS	F or S	3	6
MENG-252 ENGINEERING MECHANICS: DYNAMICS	F or S	3	6
PHYS-150 GENERAL PHYSICS I	F, S	5	8 (R)
PHYS-160 GENERAL PHYSICS II	F, S	5	8 (R)
PHYS-270 GENERAL PHYSICS III	F or S	4	8
PHYS-305 SEMICONDUCTOR PHYSICS AND TECHNOLOGY	F or S	3	6
BUSINESS ELECTIVES			**min 6**
ACCT-110 ACCOUNTING I	F, S, Su	3	6
BADM-234 ORGANIZATIONAL BEHAVIOR	F, S, Su	3	6
ECON-261 PRINCIPLES OF MICROECONOMICS	F, S, Su	3	6
MGT-281 INTRODUCTION TO MANAGEMENT	F, S, Su	3	6
MKTG-291 MARKETING	F, S, Su	3	6
LANGUAGE REQUIREMENTS			**12**
ENGL-101 ENGLISH COMPOSITION	F, S, Su	3	6
BADM-332 TECHNICAL WRITING AND RESEARCH	F, S	3	6
LIBERAL ARTS ELECTIVES			**min 6**
COMM-200 BUSINESS AND PROFESSIONAL COMMUNICATIONS	F, S, Su	3	6
ESCI-200 SOCIETY AND ENVIRONMENT	F or S	3	6
HIST-260 CYPRUS HISTORY AND CULTURE	F	3	6
PHIL-120 ETHICS	F, S, Su	3	6
PSY-110 GENERAL PSYCHOLOGY I	F, S, Su	3	6
SOC-101 PRINCIPLES OF SOCIOLOGY	F, S, Su	3	6
TOTAL CREDIT HOURS			**240**

R = Required
F = Fall Semester
S = Spring Semester
Su = Summer Term

Note: some Computer Engineering Elective courses may not be offered every year.

Bachelor of Science in Electrical Engineering Path

SUBJECT AND CODE	SEMESTER OFFERED	WEEKLY HOURS	NO OF ECTS CREDITS
MAJOR REQUIREMENTS			**120**
COMP-111 PROGRAMMING PRINCIPLES I	F, S	4	6
ECE-100 ELECTRIC CIRCUITS I	F, S	3	6
ECE-101 ELECTRIC CIRCUITS I LAB	F, S	3	2
ECE-102 ELECTRIC CIRCUITS II	F, S	4	6
ECE-103 ELECTRIC CIRCUITS II LAB	F, S	3	2
ECE-110 DIGITAL SYSTEMS	F, S, Su	4	6
ECE-111 DIGITAL SYSTEMS LAB	F, S	3	2
ECE-210 ELECTRONICS I	F, S	3	6
ECE-211 ELECTRONICS I LAB	F, S	3	2
ECE-212 ELECTRONICS II	F, S	4	6
ECE-213 ELECTRONICS II LAB	F, S	3	2
ECE-220 MICROPROCESSORS	S	4	6
ECE-221 MICROPROCESSORS LAB	S	3	2
ECE-290 NUMERICAL METHODS USING MATLAB	F	3	6
ECE-310 DIGITAL INTEGRATED CIRCUITS	F	3	6
ECE-330 SIGNALS AND SYSTEMS	F, S	4	6
ECE-332 PROBABILITY AND RANDOM SIGNALS	S	3	6
ECE-340 ELECTROMAGNETICS I	F	3	6
ECE-342 ELECTROMAGNETICS II	S	3	6
ECE-350 PRINCIPLES OF COMMUNICATIONS	S	3	6
ECE-360 ELECTRIC MACHINES	F	3	6
ECE-364 CONTROL SYSTEMS	S	3	6
ECE-430 DIGITAL SIGNAL PROCESSING	F	3	6
ECE-492 SENIOR YEAR PROJECT	F, S	1	6

Bachelor of Science in Electrical Engineering Path (continued)

SUBJECT AND CODE	SEMESTER OFFERED	WEEKLY HOURS	NO OF ECTS CREDITS
ELECTRICAL ENGINEERING ELECTIVES			**min 30**
Students should take at least three courses from one of the three areas of specialization below. Subject to approval, a student may select up to two Computer Engineering program electives.			
COMMUNICATIONS AND SIGNAL PROCESSING			
ECE-324 DATA COMMUNICATION AND COMPUTER NETWORKS	F or S	3	6
ECE-352 ELECTRONIC COMMUNICATIONS	F or S	4	6
ECE-354 DATA COMMUNICATION TECHNOLOGIES	F or S	3	6
ECE-426 OPTICAL NETWORKS	F or S	3	6
ECE-432 SPEECH PROCESSING	F or S	3	6
ECE-434 NEURAL NETWORKS & FUZZY SYSTEMS	F or S	3	6
ECE-436 IMAGE PROCESSING	F or S	3	6
ECE-450 INFORMATION THEORY AND CODING	F or S	3	6
ECE-452 DIGITAL COMMUNICATIONS	F or S	3	6
ECE-454 WIRELESS COMMUNICATIONS	F or S	3	6
ECE-456 SATELLITE COMMUNICATION SYSTEMS	F or S	3	6
ECE-490 SPECIAL TOPICS IN ECE	F , S	3	6
ECE-491 INTERNSHIP	F, S, Su	-	6
MICROWAVES, ANTENNAS AND OPTICS			
ECE-440 MICROWAVE CIRCUITS	F or S	4	6
ECE-442 PRINCIPLES OF LASERS	F or S	3	6
ECE-444 ANTENNAS FOR WIRELESS COMMUNICATIONS	F or S	3	6
ECE-446 FIBER OPTICS	F or S	4	6
ECE-490 SPECIAL TOPICS IN ECE	F, S	3	6
ECE-491 INTERNSHIP	F, S, Su	-	6
POWER AND AUTOMATION SYSTEMS			
ECE-362 POWER SYSTEM ANALYSIS	F or S	3	6
ECE-460 INTRODUCTION TO ROBOTICS	F or S	3	6
ECE-462 POWER ELECTRONICS	F or S	3	6
ECE-464 DIGITAL CONTROL SYSTEMS	F or S	3	6
ECE-466 ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	F or S	3	6
ECE-467 RENEWABLE ENERGY SOURCES & TECHNOLOGIES	F or S	3	6
ECE-468 POWER SYSTEM PROTECTION	F or S	3	6
ECE-469 ELECTRICAL DESIGN, PLANNING AND REGULATIONS	F or S	3	6
ECE-490 SPECIAL TOPICS IN ECE	F, S	3	6
ECE-491 INTERNSHIP	F, S, Su	-	6

Bachelor of Science in Electrical Engineering Path (continued)

SUBJECT AND CODE	SEMESTER OFFERED	WEEKLY HOURS	NO OF ECTS CREDITS
MATH REQUIREMENTS			**36**
MATH-190 CALCULUS I	F, S	4	8
MATH-191 CALCULUS II	F, S	4	8
MATH-270 CALCULUS III	S	4	8
MATH-280 LINEAR ALGEBRA	F, S	3	6
MATH-330 ORDINARY DIFFERENTIAL EQUATIONS	S	3	6
SCIENCE ELECTIVES			**min 30**
CHEM-106 GENERAL CHEMISTRY	F, S	5	8
MENG-250 ENGINEERING MECHANICS: STATICS	F or S	3	6
MENG-252 ENGINEERING MECHANICS: DYNAMICS	F or S	3	6
PHYS-150 GENERAL PHYSICS I	F, S	5	8 (R)
PHYS-160 GENERAL PHYSICS II	F, S	5	8 (R)
PHYS-270 GENERAL PHYSICS III	F or S	4	8
PHYS-305 SEMICONDUCTOR PHYSICS AND TECHNOLOGY	F or S	3	6
BUSINESS ELECTIVES			**min 6**
ACCT-110 ACCOUNTING I	F, S, Su	3	6
BADM-234 ORGANIZATIONAL BEHAVIOR	F, S, Su	3	6
ECON-261 PRINCIPLES OF MICROECONOMICS	F, S, Su	3	6
MGT-281 INTRODUCTION TO MANAGEMENT	F, S, Su	3	6
MKTG-291 MARKETING	F, S, Su	3	6
LANGUAGE REQUIREMENTS			**12**
ENGL-101 ENGLISH COMPOSITION	F, S, Su	3	6
BADM-332 TECHNICAL WRITING AND RESEARCH	F, S	3	6
LIBERAL ARTS ELECTIVES			**min 6**
COMM-200 BUSINESS AND PROFESSIONAL COMMUNICATIONS	F, S, Su	3	6
ESCI-200 SOCIETY AND ENVIRONMENT	F or S	3	6
HIST-260 CYPRUS HISTORY AND CULTURE	F	3	6
PHIL-120 ETHICS	F, S, Su	3	6
PSY-110 GENERAL PSYCHOLOGY I	F, S, Su	3	6
SOC-101 PRINCIPLES OF SOCIOLOGY	F, S, Su	3	6
TOTAL CREDIT HOURS			**240**

R = Required
F = Fall Semester
S = Spring Semester
Su = Summer Term

Note: some Electrical Engineering Elective courses may not be offered every year.

Planning your Studies: Semester Breakdown

Choosing the courses that you will study during each semester is very important and requires some planning. In order to plan properly your studies, you need to consult with your academic advisor and the Department of Academic Affairs. You should also get familiar with your academic path and the semester timetable of courses offered which is available before the semester starts from the Department of Academic Affairs.

During pre-registration and registration periods, your advisor and the Department of Academic Affairs will help you choose the courses for each semester. You are strongly advised to go prepared to your consultation meetings. This preparation will result in shortening the time needed for deciding what to register for. More importantly, the preparation process will help you develop your initiative and contribute to your development as an independent learner. One of our institutional aims is to help you develop your personality, mature as a person and become an independent, self-confident, decisive and educated person. Your initiative in learning, working towards your goals and objectives, making decisions and becoming an active member of our Department will be greatly appreciated.

In the next sections you are presented with a recommended semester breakdown for every program offered by the Department. Please bear in mind that each recommended option is one of many possible that you have. The choice of courses and the sequence in which you take them also depends on your proficiency in the English language, your Mathematics background and on any preferences you may have in choosing courses based on their scheduled days and times.

Bachelor of Science in Computer Engineering Semester Breakdown

COURSE CODE	COURSE TITLE	CREDITS
	YEAR 1	
Fall Semester		
ECE-100	Electric Circuits I	6
ECE-101	Electric Circuits I Lab	2
ENGL-101	English Composition	6
MATH-190	Calculus I	8
PHYS-150	General Physics I	8

		30
Spring Semester		
ECE-102	Electric Circuits II	6
ECE-103	Electric Circuits II Lab	2
ECE-110	Digital Systems	6
ECE-210	Electronics I	6
ECE-211	Electronics I Lab	2
MATH-191	Calculus II	8

		30
	YEAR 2	
Fall Semester		
COMP-111	Programming Principles I	6
ECE-111	Digital Systems Lab	2
ECE-212	Electronics II	6
ECE-213	Electronics II Lab	2
MATH-280	Linear Algebra I	6
PHYS-160	General Physics II	8

		30
Spring Semester		
ECE-220	Microprocessors	6
ECE-221	Microprocessors Lab	2
MATH-101	Discrete Mathematics	6
MATH-270	Calculus III	8
	Science Elective	8

		30

Bachelor of Science in Computer Engineering Semester Breakdown (continued)

COURSE CODE	COURSE TITLE	CREDITS
	YEAR 3	
Fall Semester		
COMP-201	Systems Analysis and Design	6
COMP-113	Programming Principles II	6
ECE-290	Numerical Methods Using MATLAB	6
ECE-330	Signals and Systems	6
	Science Elective	6

		30
Spring Semester		
COMP-211	Data Structures	6
ECE-322	Computer Organization and Architecture	6
ECE-324	Data Communication and Computer Networks	6
ECE-332	Probability and Random Signals	6
	Engineering Elective	6

		30
	YEAR 4	
Fall Semester		
BADM-332	Technical Writing and Research	6
ECE-430	Digital Signal Processing	6
	Business Elective	6
	Engineering Elective	6
	Engineering Elective	6

		30
Spring Semester		
COMP-354	Operating Systems	6
ECE-492	Senior Year Project	6
	Engineering Elective	6
	Engineering Elective	6
	Liberal Arts Elective	6

		30

Bachelor of Science in Electrical Engineering Semester Breakdown

COURSE CODE	COURSE TITLE	CREDITS
	YEAR 1	
Fall Semester		
ECE-100	Electric Circuits I	6
ECE-101	Electric Circuits I Lab	2
ENGL-101	English Composition	6
MATH-190	Calculus I	8
PHYS-150	General Physics I	8

		30
Spring Semester		
ECE-102	Electric Circuits II	6
ECE-103	Electric Circuits II Lab	2
ECE-110	Digital Systems	6
ECE-210	Electronics I	6
ECE-211	Electronics I Lab	2
MATH-191	Calculus II	8

		30
	YEAR 2	
Fall Semester		
COMP-111	Programming Principles I	6
ECE-111	Digital Systems Lab	2
ECE-212	Electronics II	6
ECE-213	Electronics II Lab	2
MATH-280	Linear Algebra I	6
PHYS-160	General Physics II	8

		30
Spring Semester		
ECE-220	Microprocessors	6
ECE-221	Microprocessors Lab	2
MATH-270	Calculus III	8
MATH-330	Ordinary Differential Equations	6
	Science Elective	8

		30

Bachelor of Science in Electrical Engineering Semester Breakdown (continued)

COURSE CODE	COURSE TITLE	CREDITS
	YEAR 3	
Fall Semester		
ECE-290	Numerical Methods Using MATLAB	6
ECE-310	Digital Integrated Circuits	6
ECE-330	Signals and Systems	6
ECE-340	Electromagnetics I	6
ECE-360	Electric Machines	6

		30
Spring Semester		
ECE-332	Probability and Random Signals	6
ECE-342	Electromagnetics II	6
ECE-350	Principles of Communications	6
ECE-364	Control Systems	6
	Engineering Elective	6

		30
	YEAR 4	
Fall Semester		
BADM-332	Technical Writing and Research	6
ECE-430	Digital Signal Processing	6
	Engineering Elective	6
	Engineering Elective	6
	Science Elective	6

		30
Spring Semester		
ECE-492	Senior Year Project	6
	Engineering Elective	6
	Engineering Elective	6
	Business Elective	6
	Liberal Arts Elective	6

		30

Engineering Courses and Pre/Co-requisites

COURSE CODE/NAME	PREREQUISITES	COREQUISITES
ECE-100 Electric Circuits I	NONE	MATH-190
ECE-101 Electric Circuits I Lab	NONE	ECE-100
ECE-102 Electric Circuits II	ECE-100	MATH-191
ECE-103 Electric Circuits II Lab	ECE-101	ECE-102
ECE-110 Digital Systems	NONE	NONE
ECE-111 Digital Systems Lab	ECE-110	NONE
ECE-210 Electronics I	ECE-100	NONE
ECE-211 Electronics I Lab	ECE-101	ECE-210
ECE-212 Electronics II	ECE-210	NONE
ECE-213 Electronics II Lab	ECE-211	ECE-212
ECE-220 Microprocessors	ECE-110, ECE-212	NONE
ECE-221 Microprocessors Lab	ECE-111, ECE-211	ECE-220
ECE-290 Numerical Methods Using MATLAB	MATH-191, MATH-280	NONE
ECE-310 Digital Integrated Circuits	ECE-110, ECE-212	NONE
ECE-320 Microprocessor Interfacing	ECE-220, ECE-221	NONE
ECE-322 Computer Organization and Architecture	ECE-110, COMP-111	NONE
ECE-324 Data Communication & Computer Networks	ECE-110, MATH-191	NONE
ECE-330 Signals and Systems	ECE-102	NONE
ECE-332 Probability and Random Signals	ECE-330	NONE
ECE-340 Electromagnetics I	MATH-270, MATH-330, PHYS-160	NONE
ECE-342 Electromagnetics II	ECE-340	NONE
ECE-350 Principles of Communications	ECE-330	NONE
ECE-352 Electronic Communications	ECE-212, ECE-213, ECE-330	NONE
ECE-354 Data Communication Technologies	ECE-324	NONE
ECE-360 Electric Machines	ECE-102	NONE
ECE-362 Power System Analysis	ECE-360	NONE
ECE-364 Control Systems	ECE-330	NONE
ECE-410 Programmable Application Specific Integrated Circuits	ECE-111, ECE-220	NONE
ECE-420 Introduction to VLSI Design	ECE-111, ECE-220, ECE-310	NONE
ECE-422 Advanced Computer Architecture	ECE-322	NONE
ECE-424 Distributed Systems	ECE-324, COMP-354	NONE
ECE-425 Computer Aided Design for VLSI	ECE-111, ECE-220	NONE
ECE-426 Optical Networks	ECE-354	NONE
ECE-428 Embedded Systems	COMP-354	NONE
ECE-430 Digital Signal Processing	ECE-330, MATH-280	NONE
ECE-432 Speech Processing	ECE-332, ECE-430	NONE
ECE-434 Neural Networks and Fuzzy Systems	MATH-191, COMP-111	NONE

COURSE CODE/NAME	PREREQUISITES	COREQUISITES
ECE-436 Image Processing	ECE-332, MATH-280	NONE
ECE-440 Microwave Circuits	ECE-342	NONE
ECE-442 Principles of Lasers	ECE-342, PHYS-305	NONE
ECE-444 Antennas for Wireless Communications	ECE-342	NONE
ECE-446 Fiber Optics	ECE-210, ECE-350	NONE
ECE-450 Information Theory and Coding	ECE-332	NONE
ECE-452 Digital Communications	ECE-332, ECE-350	NONE
ECE-454 Wireless Communications	ECE-350	NONE
ECE-456 Satellite Communication Systems	ECE-350	NONE
ECE-460 Introduction to Robotics	MATH-280, PHYS-150	NONE
ECE-462 Power Electronics	ECE-102, ECE-212	NONE
ECE-464 Digital Control Systems	ECE-364	NONE
ECE-466 Electric Power Generation, Transmission and Distribution	ECE-360, ECE-362	NONE
ECE-467 Renewable Energy Sources and Technologies	ECE-210	NONE
ECE-468 Power System Protection	ECE-360, ECE-362	NONE
ECE-469 Electrical Design, Planning and Regulations	ECE-362	NONE
ECE-490 Special Topics in Electrical and Computer Engineering	Specified by the Department	
ECE-491 Internship	Approval by the Department	
ECE-492 Senior Year Project	Approval by the Department	

Computer, Math & Science Courses and their Pre/Co-requisites

COURSE CODE/NAME	PREREQUISITES	COREQUISITES
COMP-111 PROGRAMMING PRINCIPLES I	NONE	NONE
COMP-113 PROGRAMMING PRINCIPLES II	COMP-111	NONE
COMP-201 SYSTEMS ANALYSIS AND DESIGN	SOPHOMORE STANDING	NONE
COMP-211 DATA STRUCTURES	COMP-113, MATH-101	NONE
COMP-212 OBJECT-ORIENTED PROGRAMMING	COMP-113	NONE
COMP-213 VISUAL PROGRAMMING	COMP-113	NONE
COMP-263 HUMAN COMPUTER INTERACTION	NONE	NONE
COMP-302 DATABASE MANAGEMENT SYSTEMS	COMP-201 AND JR STANDING	NONE
COMP-303 DATA MINING	COMP-302, MATH-225	NONE
COMP-320 COMPUTER GRAPHICS	COMP-113, MATH-191, MATH-280	NONE
COMP-321 THEORY OF COMPUTATION	COMP-211	NONE
COMP-354 OPERATING SYSTEMS	COMP-211	NONE
COMP-370 ALGORITHMS	COMP-211	NONE
COMP-399 SPECIAL TOPICS IN COMP. SCIENCE	Specified by the Department	NONE
COMP-401 SOFTWARE ENGINEERING	COMP-111, COMP-201 AND JR STANDING	NONE
COMP-402 ADVANCED DATABASES	COMP-302	NONE
COMP-405 ARTIFICIAL INTELLIGENCE	COMP-211 AND SR STANDING	NONE
COMP-412 INTERNET PROGRAMMING	COMP-113	NONE
COMP-413 SYSTEMS PROGRAMMING	COMP-212, COMP-354	NONE
COMP-421 COMPILER DESIGN	COMP-321	NONE
COMP-431 COMPUTER SECURITY	COMP-354	NONE
COMP-432 NETWORK SECURITY	COMP-358/ECE-324	NONE
COMP-458 NETWORK PROTOCOLS	COMP-358/ECE-324	NONE
COMP-470 INTERNET TECHNOLOGIES	COMP-113, COMP-358/ECE-324	NONE
MATH-101 DISCRETE MATHEMATICS	NONE	NONE
MATH-190 CALCULUS I	* see page 20	NONE
MATH-191 CALCULUS II	MATH-190	NONE
MATH-270 CALCULUS III	MATH-191	NONE
MATH-280 LINEAR ALGEBRA I	MATH-190	NONE
MATH-330 ORDINARY DIFFERENTIAL EQUATIONS	MATH-191	NONE
PHYS-150 GENERAL PHYSICS I	MATH-190	NONE
PHYS-160 GENERAL PHYSICS II	PHYS-150	NONE
PHYS-270 GENERAL PHYSICS III	PHYS-160	NONE
PHYS-305 SEMICONDUCTOR PHYSICS AND TECHNOLOGY	MATH-191, PHYS-160	NONE
CHEM-106 GENERAL CHEMISTRY	NONE	NONE
MENG-250 ENGINEERING MECHANICS: STATICS	MATH-190, PHYS-150	NONE
MENG-252 ENGINEERING MECHANICS: DYNAMICS	MENG-250, MATH-270	NONE

Short Description of Courses

COURSE CODE/NAME: ECE-100 Electric Circuits I
NO OF CREDITS: 6
COREQUISITE: MATH-190

The main objectives of the course are to: provide the student with the fundamental knowledge of basic electrical concepts that will form a major part of the foundation required to analyze the most complex electrical and electronic systems; develop a thorough understanding of the fundamental concepts of dc circuit analysis and their application to real-world problems; develop an overall understanding of electrical laws and rules, methods of analysis, and network theorems, introduced via resistive, inductive, and capacitive dc circuits; introduce the terminal behavior of the Transistor and the Operational Amplifier, so that they can be confidently used in practical designs; arouse interest in further work and research in the area of electrical/ electronic engineering.

COURSE CODE/NAME: ECE-101 Electric Circuits I Lab
NO OF CREDITS: 2
COREQUISITE: ECE-100

The main objectives of the course are to: introduce the student to the analysis, design and experimentation with dc electric circuits; bridge the gap between the idealized situations presented in the class and the real world of the laboratory; introduce the student to the fundamentals of electronic measurement techniques and instrumentation; help the future engineer develop an understanding of test equipment while stressing its use, application, and maintenance; provide the student with the basic knowledge of error detection and analysis; teach the student the required safety precautions when working with electricity; prepare the student for further scientific research; teach the students how to present experimental results and findings in a proper format of scientific report.

COURSE CODE/NAME: ECE-102 Electric Circuits II
NO OF CREDITS: 6
PREREQUISITE: ECE-100
COREQUISITE: MATH-191

The main objectives of the course are to: further enhance skills in analyzing and designing dc networks and in particular second-order transient circuits as well as op-amp circuits; develop a thorough understanding of the analysis techniques used in ac networks and their application to real-world problems; introduce the student to the systematic application of phasor and Laplace transform in circuit analysis; develop an overall understanding of concepts like frequency response of basic R, L and C elements, resonance and filters.; elaborate on ac power, three-phase circuits, mutual inductance and transformers; apply computer techniques to the analysis of electrical/electronic systems.

COURSE CODE/NAME: ECE-103 Electric Circuits II Lab
NO OF CREDITS: 2
PREREQUISITE: ECE-101
COREQUISITE: EENG-102

The main objectives of the course are to: introduce the student to the analysis, design and experimentation with ac electric circuits; bridge the gap between the idealized situations presented in the class and the real world of the laboratory; further elaborate on electronic measurement techniques and instrumentation; help the students to enhance their understanding of test equipment while stressing its use, application, maintenance and calibration; provide the student with the basic knowledge of how computer simulation and methods are used for the analysis of the experimental data; improve the student's ability to present experimental results and findings in a proper format of scientific report; teach the students how to integrate accumulated knowledge and practical skills in an assigned project.

COURSE CODE/NAME: ECE-110 Digital Systems
NO OF CREDITS: 6
PREREQUISITE: NONE

The main objectives of the course are to: introduce fundamental digital concepts and principles that are commonly used in the analysis and design of digital systems; introduce and explain the operation of fundamental logic gates that comprise the building blocks of complex digital circuits; present and demonstrate through examples techniques and mathematical models/tools that are used in the analysis and design of logic circuits; design and test fundamental digital blocks that perform specific functions; introduce the concept of system-in-a-chip through the use of PLDs and FPGAs; use fundamental digital blocks for the design of more complex digital systems including registers, sequential counters, memories, A/D and D/A converters.

COURSE CODE/NAME: ECE-111 Digital Systems Lab
NO OF CREDITS: 2
PREREQUISITES: ECE-110

Provide basic hands-on experience regarding digital circuits and digital concepts. Describe the basic implementation procedure of digital circuits as well as basic design and analysis concepts. Provide ability of using medium scale integration circuits to as well as computer software to built basic digital structures.

COURSE CODE/NAME: ECE-210 Electronics I
NO OF CREDITS: 6
PREREQUISITE: ECE-100

The main objectives of the course are to: provide students with a basic background on semiconductor materials and semiconductor physics; introduce the characteristics and operation of electronic devices such as p-n junctions, bipolar-junction transistors and field-effect transistors; enable students to analyze and design biasing electronic circuits involving diodes, BJT, JFET and MOSFET; provide knowledge about common electronic circuit applications of semiconductor devices such as rectifier and power supply circuits; develop skills for troubleshooting and simulating electronic circuits.

COURSE CODE/NAME: ECE-211 Electronics I Lab
NO OF CREDITS: 2
PREREQUISITE: ECE-101
COREQUISITE: ECE-210

The main objectives of the course are to: accompany and reinforce concepts introduced during the Electronics I lecture course; provide students with hands-on experience with elementary electronic devices; relate large and small-signal models of diodes, bipolar transistors and JFETs to their actual behavior in practical electronic circuits; develop the necessary practical skills required for constructing electronic

circuits and making measurements using various lab instruments; introduce students to common safety and professional practices in electronic engineering; help students develop written communications skills by writing formal laboratory reports focusing on technical content, organization, completeness, clarity, presentation, accuracy, and promptness.

COURSE CODE/NAME: ECE-212 Electronics II
NO OF CREDITS: 6
PREREQUISITE: ECE-210

The main objectives of the course are to: introduce general single and multistage amplifier concepts; provide a solid knowledge and understanding of small-signal BJT amplifiers in low, mid-band and high frequencies as well as small-signal JFET amplifiers; enable students to analyze and design single and multistage transistor amplifiers for analog applications; develop an understanding of the operational amplifier and its electronic applications; develop skills for troubleshooting and simulating the dc and ac operation of fundamental electronic circuits.

COURSE CODE/NAME: ECE-213 Electronics II Lab
NO OF CREDITS: 2
PREREQUISITE: ECE-211
COREQUISITE: ECE-212

The main objectives of the course are to: accompany and reinforce concepts introduced during the Electronics II lecture course; provide students with hands-on experience with small-signal transistor amplifiers and operational amplifier applications; relate small-signal models of bipolar transistors and JFETs to their actual behavior in practical electronic circuits; develop the necessary practical skills required for constructing electronic circuits and making measurements using various lab instruments; provide the student with the experience of designing, simulating, constructing, testing and debugging a multistage amplifier circuit; introduce students to common safety and professional practices in electronic engineering; help students develop written communications skills by writing formal laboratory reports focusing on technical content, organization, completeness, clarity, presentation, accuracy, and promptness.

COURSE CODE/NAME: ECE-220 Microprocessors
NO OF CREDITS: 6
PREREQUISITE: ECE-110, ECE-212

The main objectives of the course are to: provide the student with a thorough grounding in Microprocessor programming and operation principles and demonstrate the merging of software and hardware concepts into firmware in microprocessor-based systems; introduce the 16/32-bit microprocessor as a component for an electronic system in general and not only as the basis of a personal computer; provide the student with the fundamental knowledge on how to develop software using assembly language programming to control an application interface microprocessor; develop a thorough understanding of how DOS and BIOS function calls can be used to control the keyboard, display, and various other components in the computer system; compare and contrast instructions, for the 80286, 80386, 80486, Pentium, Pentium Pro and Core 2 processors with the 8086/8088 microprocessors.

COURSE CODE/NAME: ECE-221 Microprocessors Lab
NO OF CREDITS: 2
PREREQUISITE: ECE-111, ECE-211
COREQUISITE: ECE-220

The main objectives of the course are to: help the students bridge the gap between the idealized situations presented in the associated theoretical course and the real world of the laboratory by carrying out selected hardware/software experiments using 8088 and 80386 microprocessor circuit board trainers and a personal computer; provide the student with practical experience that relate to microprocessor architecture, programming, and interfacing techniques in realistic applications; develop the skills in measuring and analyzing bus signals and acquire hands on experience on the 8/32-bit microprocessors and associated chip sets; provide the students with the fundamental knowledge on how to read and understand microprocessor's technical drawings and do fault finding; enable the students to use the Microsoft Macro Assembler to develop assembly programs for the Intel family of microprocessors.

COURSE CODE/NAME: ECE-290 Numerical Methods using MATLAB
NO OF CREDITS: 6
PREREQUISITE: MATH-191, MATH-280

The main objectives of the course are to: introduce the most essential numerical methods and computational techniques; provide understanding of basic mathematical concepts and principles which, along with numerical methods, can be used for the solution of problems in science and engineering; provide understanding of computational issues and commonly-used terms such as round-off error, degree of accuracy, rate of convergence, machine precision, etc; introduce MATLAB programming for the implementation of numerical algorithms for the solution of problems in science and engineering; develop computationally efficient and accurate algorithms for the solutions of problems.

COURSE CODE/NAME: ECE-310 Digital Integrated Circuits
NO OF CREDITS: 6
PREREQUISITE: ECE-110, ECE-212

The main objectives of the course are to: offer extensive knowledge and a broad foundation on the operation and design of digital integrated circuits; explain the DC and transient behavior of a broad family of digital integrated circuits; provide the knowledge and tools needed for the analysis and design of digital integrated circuits; provide understanding of the major differences among the various families and designs of digital integrated circuits; introduce students to proper software used for modeling and analysis of digital integrated circuits; demonstrate the operation and design of basic digital blocks.

COURSE CODE/NAME: ECE-320 Microprocessor Interfacing
NO OF CREDITS: 6
PREREQUISITES: ECE-220, ECE-221

This course intends to give satisfactory knowledge of microprocessors interfacing in modern computer systems. It introduces standard interfacing techniques and mechanisms and explains the interface modules and I/O systems of the microprocessor. Moreover, the course describes the interfacing with standard computer system peripherals such as the memory, the monitor and the keyboard, as well as non-standard and even customized components.

COURSE CODE/NAME: ECE-322 Computer Organization and Architecture
NO OF CREDITS: 6
PREREQUISITE: ECE-110, COMP-111

The main objectives of the course are to: understand performance metrics; be introduced to an instruction set architecture; understand instruction types, register sets, addressing modes; understand flow-of-control, subroutine call and return mechanisms; understand the Structure of machine-level programs; be

introduced to Arithmetic of Computers; construct an ALU; implement in hardware several Instructions like Addition, Subtraction, Multiplication and Division; be introduced to pipelining and memory hierarchy.

COURSE CODE/NAME: ECE-324 Data Communication and Computer Networks
NO OF CREDITS: 6
PREREQUISITES: ECE-110, MATH-191

The main objectives of the course are to: introduce the basic characteristics of computer networks and how their effective design and standardization takes place; establish an understanding of the ISO OSI layer model and compare it to the TCP/IP suite; examine and distinguish the various forms of multiplexing (like time-, space-, wavelength- and frequency- and code-division multiplexing); establish the concept of a switched network and the various technologies it may adopt. Specifically compare and contrast the circuit- and packet-switching technologies; explore routing schemes; provide the basic design principles of wired and wireless communication networks; introduce the student to the computer simulation of network functionalities (using NS2 and/or MATLAB and/or C/C++) like routing and messaging; briefly introduce the major high-speed network architectures, technologies and standards of today's telecom; discuss current and future networking trends.

COURSE CODE/NAME: ECE-330 Signals and Systems
NO OF CREDITS: 6
PREREQUISITE: ECE-102

The main objectives of the course are to: develop an understanding of the need to model signals and systems; investigate continuous time signals and their transformations; investigate continuous time systems with emphasis on LTI systems; introduce signal convolution; introduce the Fourier series, the Fourier transform the Laplace transform and z-transform along with their properties; expose the student to various signal- or system- related MATLAB projects.

COURSE CODE/NAME: ECE-332 Probability and Random Signals
NO OF CREDITS: 6
PREREQUISITE: ECE-330

The main objectives of the course are to: study random variables and random processes as they apply in the electrical and computer engineering disciplines; understand a set theory approach to probability; develop an understanding of discrete and continuous random variables and how they can be used to model and analyze systems; introduce probability density functions and cumulative distribution functions, and how they can be used to characterize engineering systems; introduce sets of random variables and how they relate to electrical engineering applications; provide students with the basics of stochastic processes and their application to signal processing and communications systems.

COURSE CODE/NAME: ECE-340 Electromagnetics I
NO OF CREDITS: 6
PREREQUISITES: MATH-270, MATH-330, PHYS-160

The main objectives of the course are to: develop knowledge and understanding of vector algebra and vector calculus including coordinate systems and integration along lines, surfaces and volumes; introduce the laws of electrostatics and boundary conditions across dielectric interfaces; develop skills and techniques that can be used to calculate the voltage potential and electric field from a distribution of charges in either one of the three coordinate systems; introduce Laplace's and Poisson's equations along with boundary conditions, and use of analytical and computational techniques for the solution of boundary

value problems; develop an understanding of the postulates and governing laws of magnetostatics and use of this knowledge to calculate the magnetic field from current distributions in either one of the three coordinate systems; use the fundamentals of electrostatics and magnetostatics to calculate capacitance, resistance, and inductance of structures that conform to the Cartesian, Cylindrical, or Spherical coordinate system.

COURSE CODE/NAME: ECE-342 Electromagnetics II
NO OF CREDITS: 6
PREREQUISITE: ECE-340

The main objectives of the course are to: introduce students to a physical understanding of the main principles and fundamental laws on which electromagnetic wave propagation is based; explain the behavior of electromagnetic waves in different media including material discontinuities and material with dielectric losses; provide students the knowledge and the ability to solve typical electromagnetic wave problems; introduce the concept of transmission line and provide tools (e.g., Smith Chart) that can be used for the solution of such problems; provide a deep understanding of wave propagation inside waveguides including reference to cavity resonators; provide an overview of antennas and antenna systems including important characteristics and figures of merit.

COURSE CODE/NAME: ECE-350 Principles of Communications
NO OF CREDITS: 6
PREREQUISITE: ECE-330

The main objectives of the course are to: introduce the need of electrical signal communication; present energy and power signals and signal distortion; introduce and analyze various analog and digital modulation techniques; prove the sampling theorem and use it in digital signal communication; explore various digital transmission concepts.

COURSE CODE/NAME: ECE-352 Electronic Communications
NO OF CREDITS: 6
PREREQUISITES: ECE-212, ECE-213, ECE-330

The main objectives of the course are to: relate the theoretical aspect of analog communications to the practical design of electronic communications circuits; analyze the behavior of tuned circuits and oscillators; introduce amplitude and frequency modulation and analyze common radio frequency transmitter and receiver circuits; study the effect of noise on analog communications.

COURSE CODE/NAME: ECE-354 Data Communication Technologies
NO OF CREDITS: 6
PREREQUISITES: ECE-324

The main objectives of the course are to: refresh the OSI layer model and reanalyze the basic concepts used in networks (like multiplexing, switching etc.); introduce the major high-speed network architectures, technologies and standards of today's telecom; provide a through analysis of SONET/SDH operation and position it in terms of current and future telecom trends (why it came to be, where is it strong, where is it weak); introduce the ATM and investigate why it was strong and why is it now weak; perform basic ATM network designs and explore the concept of statistical multiplexing via simulation; provide the MPLS fundamentals; provide comparison with ATM; introduce the necessary building blocks (optical Mux, Dmux and OXC's) for λ-routed networks and investigate their performance via simulation; help develop a circuit-

switched network simulation tool(using NS2 and/or MATLAB and/or C/C++) that measures performance in terms of blocking probability.

COURSE CODE/NAME: ECE-360 Electric Machines
NO OF CREDITS: 6
PREREQUISITE: ECE-102

The course will initially engage in a thorough analysis of major electromechanical principles adapted by various types of electric machines as transformers, motors and generators. Studying the functional properties of the different types of electric machines will provide the understanding for their specific applications and the knowledge for their operation. The later will be supported by experimental presentations of the machines during and after the lecture. The course will focus on widely known types of machines, dc motors/generators, the ac motor, the synchronous motor/generator and transformers up to some basic motor control techniques.

COURSE CODE/NAME: ECE-362 Power System Analysis
CREDITS: 6
PREREQUISITE: ECE-360

The course engages in the analysis of the electric power system. The concept lies in the presentation of the three-phase power system as a usual single phase AC circuit and apply conventional methods and algorithms for network analysis to determine voltages, currents etc. at any point or component of the circuit corresponding to a topological location or device in the power system. Hence objective of the course is the modeling of the devices constituting the power system starting from the generator through to transformers, transmission lines up to the industrial and domestic loads as R, L, C components on the one, and further calculating characteristic features as phase shift, power factor, fault currents, distortion of the signal through harmonic modulations etc. on the other. A vital tool for the analysis of the three phase power system is the symmetric components method as it provides essential information about the state of symmetry in the three phases, leakage and short currents.

COURSE CODE/NAME: ECE-364 Control Systems
NO. OF CREDITS: 6
PREREQUISITE: ECE-330

The main objectives of the course are to: provide solid knowledge foundation on feedback control principles; introduce fundamental analysis tools using state variable and frequency response methods for determining control system performance; develop skills for the design of feedback control systems.

COURSE CODE/NAME: ECE-410 Programmable Application Specific Integrated Circuits
NO OF CREDITS: 6
PREREQUISITES: ECE-111, ECE-220

Provide an introduction to the design process of digital systems using field programmable integrated structures, such as PLDs, CPLDs, and FPGAs, and to provide a thorough understanding of the different Application Specific Integrated Circuit (ASIC) architectures, design methodologies, and design tools.

COURSE CODE/NAME: ECE-420 Introduction to VLSI Design
NO OF CREDITS: 6
PREREQUISITES: ECE-111, ECE-220, ECE-310

Give an introductory perspective of the modern digital Very Large Scale Integration circuits examining technology, design analysis and performance. Provide hands-on experience of layout level design and simulation.

COURSE CODE/NAME: ECE-422 Advanced Computer Architecture
NO OF CREDITS: 6
PREREQUISITE: ECE-322

The main objective of the course is to provide the students with the opportunity to study high-performance and supercomputer architectures used to solve very large-scale problems and computationally intensive applications, which are not realistically solvable on typical computers.

COURSE CODE/NAME: ECE-424 Distributed Systems
NO OF CREDITS: 6
PREREQUISITES: ECE-324, COMP-354

The main objectives of the course are to: explore the basic concepts of distributed systems along with the distributed algorithm designs and implementations; enable students to penetrate into theory of decentralized modeling and study up-to-date concepts, algorithms and internetworking issues for building modern distributed systems; introduce to the students the conceptual model and the parts of a distributed system, and enable them to design and implement along with the basic requirements, a distributed infrastructure-based system; acquire a deep knowledge on processes, threads, virtualization, code migration, consistency and replication issues in DS; enable students to see from different views the DS enterprise as follows: (i) The viewpoint of applications, i.e., what kinds of concepts and programming skills are fitted for the design of distributed systems and applications; (ii) The viewpoint of the system designers and of the implementers, i.e., the system layers and their mapping to the design of distributed algorithms along with their implementations.

COURSE CODE/NAME: ECE-425 Computer Aided Design for VLSI
NO OF CREDITS: 6
PREREQUISITE: ECE-111, ECE-220

The main objectives of this course are to: provide the main principles of modern VLSI circuit design using computer tools; resent tool families and familiarize with popular design tools; describe the basic algorithms used for modeling, design synthesis, simulation and analysis of ICs.

COURSE CODE/NAME: ECE-426 Optical Networks
NO OF CREDITS: 6
PREREQUISITE: ECE-354

The main objectives of the course are to: develop a thorough understanding of the optical network evolution and the three generations; present the student with the basic building blocks necessary for optical networking (special emphasis on the all-optical cross-connect); situate the optical transport layer with respect to technologies like ATM and SONET/SDH; investigate the crucial mechanisms of routing, resource allocation and signaling in both working and faulty conditions; introduce the Fiber To The Home solutions and their limitations.

COURSE CODE/NAME: ECE-428 Embedded Systems
NO OF CREDITS: 6
PREREQUISITE: COMP-354

The main objectives of the course are to: motivate the need for developing embedded system applications; cover in detail the concepts of embedded systems and real-time operating system paradigms; explain in the concepts of tasks, inter-process communication, synchronization, interrupts, and timers; explain the presence of and describe the characteristics of latency in real-time systems; expose students to industrial development environment for embedded systems and industrial real-time operating systems; introduce and discuss special concerns that real-time systems present and how these concerns are addressed.

COURSE CODE/NAME: ECE-430 Digital Signal Processing
NO OF CREDITS: 6
PREREQUISITES: ECE-330, MATH-280

The main objectives of the course are to: provide the students with the mathematical tools for processing discrete signals and analyzing the behavior of discrete systems; explain the z and Fourier domain characteristics of discrete signals and systems.

COURSE CODE/NAME: ECE-432 Speech Processing
NO OF CREDITS: 6
PREREQUISITES: ECE-332, ECE-430

The main objectives of the course are to: introduce students to the fundamentals of speech signal processing and its related applications; provide students with the understanding of the various aspects of human language technology and the various signal processing tools available for exploitation; acquire the fundamentals of the digital signal processing that allows them to assimilate the concepts related to the speech processing; acquire the basic knowledge on the production and perception of speech that allows them to understand the techniques of speech signal analysis and the models applied in the different applications related to speech technology; acquire the basic knowledge on the analysis of the voice signal and their applications; identify, formulate and solve problems of digital speech processing in a multidisciplinary environment.; acquire knowledge in the use of tools for the development of applications in the scope of the digital speech processing (MATLAB); give students enough understanding to enable the student to pursue further study and/or research and development, including independent reading and contributions in the field.

COURSE CODE/NAME: ECE-434 Neural Networks and Fuzzy Systems
NO OF CREDITS: 6
PREREQUISITES: MATH-191, COMP-111

The main objectives of this course are to: introduce students to the various neural network and fuzzy systems models; reveal different applications of these models to solve engineering and other problems; introduce the theory and applications of artificial neural network and fuzzy systems to engineering applications with emphasis on image processing and control; discuss neural networks and fuzzy systems, architectures, algorithms and applications, including Back-propagation, BAM, Hopfield network, Competitive Learning, ART, SOFM, Fuzzy inference methods and expert systems.

COURSE CODE/NAME: ECE-436 Image Processing
NO OF CREDITS: 6
PREREQUISITES: ECE-332, MATH-280

The main objectives of the course are to: provide knowledge and a fundamental understanding of digital image processing principles, analytical methods and techniques; expose students to state-of-the-art

technology through a hands-on approach to digital image processing; give students the mathematical fundamentals of common digital image processing algorithms along with their implementation details; provide hands-on experience in using software for processing digital images; give experience to students to work collaboratively in teams on larger projects; develop a foundation that can be used as the basis for further study and research in image processing.

COURSE CODE/NAME: ECE-440 Microwave Circuits
NO OF CREDITS: 6
PREREQUISITE: ECE-342

The main objectives of the course are to: introduce students knowledge and fundamental principles of microwave circuit analysis and design; provide understanding of transmission lines including analytical and graphical tools for analysis and design; introduce main concepts of network analysis and signal flow graphs; introduce impedance matching techniques and tuning including multi-section matching transformers and tapered lines; provide a complete understanding of waveguide propagation, modes, and attenuation; provide the main principles and operation of power dividers, directional couplers, and hybrids; introduce techniques for the design of microwave filters; introduce software and tools for the analysis and design of microwave devices.

COURSE CODE/NAME: ECE-442 Principles of Lasers
NO OF CREDITS: 6
PREREQUISITES: ECE-342, PHYS-305

The main objectives of the course are to: provide the students with a brief history of the laser evolution; present the basic principles of laser operation making use of the background knowledge from electromagnetic theory and solid state physics; explain the radiative and non-radiative transitions between discrete energy levels of matter and how this can be achieved; analyze the conditions necessary for cavity lazing; introduce various laser types and analyze their characteristics.

COURSE CODE/NAME: ECE-444 Antennas for Wireless Communications
NO OF CREDITS: 6
PREREQUISITE: ECE-342

The main objectives of the course are to: provide an in-depth understanding of antenna operation in either transmitting or receiving mode; provide the tools and figures of merit for the characterization of antenna performance; introduce analytical techniques for the analysis of antennas and accurate prediction of antenna performance characteristics; present the most commonly used antenna configurations and explain their radiation characteristics and methods of analysis; teach students how to design antennas for various frequency bands and applications; introduce software and tools for the numerical analysis and design of wire and printed antennas.

COURSE CODE/NAME: ECE-446 Fiber Optics
NO OF CREDITS: 6
PREREQUISITES: ECE-210, ECE-350

The main objectives of the course are to: introduce optical communications and their evolution over the last decades; examine light generation and detection; analyze the various optical transmission limitations (attenuation, dispersion etc.); engineer (in terms of choice of equipment, transmission bandwidt5h and distance) and an optical link by considering dispersion and power limitations; provide an entry-level hands-on experience of a fiber optic link and use fiber to transmit a simple analog sound signal (experiment).

COURSE CODE/NAME: ECE-450 Information Theory and Coding
NO OF CREDITS: 6
PREREQUISITE: ECE-332

The main objectives of the course are to: introduce the concept of entropy and mutual information with relation to communication theory; explain the concept of source coding and its various implementations; cover different channel models and explain the concept of channel capacity; introduce channel coding for error detection and correction.

COURSE CODE/NAME: ECE-452 Digital Communications
NO OF CREDITS: 6
PREREQUISITE: ECE-332, ECE-350

The main objectives of the course are to: introduce communication channel models and explain the types of fading that affect a transmitted signal; explain source coding for digital transmission of a message; introduce signal detection and estimation theory; introduce channel coding for improving performance in digital communications; introduce spread spectrum communications.

COURSE CODE/NAME: ECE-454 Wireless Communications
NO OF CREDITS: 6
PREREQUISITE: ECE-350

The main objectives of the course are to: develop an in-depth understanding of the concepts behind modern wireless and cellular/mobile systems; introduce the frequency reuse concept and apply it in the design and planning of cellular/mobile systems; introduce the principles and theory of radio wave propagation; develop the skills to design radio links and estimate the link budget; introduce the operation and architecture of 2nd Generation (e.g. GSM) and 3rd Generation (e.g. UMTS) mobile systems; apply cellular design and planning knowledge in GSM systems; introduce the trends and evolution of wireless communications beyond 3G (B3G).

COURSE CODE/NAME: ECE-456 Satellite Communication Systems
NO OF CREDITS: 6
PREREQUISITES: ECE-350

The main objectives of the course are to: introduce the components of a satellite communication system; develop the principles of satellite communication system design; develop a sound understanding of the satellite communications channel; introduce satellite communications links and link budget estimation; introduce applications for satellite communication systems.

COURSE CODE/NAME: ECE-460 Introduction to Robotics
NO OF CREDITS: 6
PREREQUISITES: PHYS-150, MATH-280

The course aims at providing an introduction to robotics, the various types of robotic systems available, their applications and the methodologies used for the mathematical analysis. The main focus of the course is on robotic manipulators and covers the kinematic analysis, dynamic analysis, motion planning, control, sensors and actuators.

COURSE CODE/NAME: ECE-462 Power Electronics
NO OF CREDITS: 6
PREREQUISITES: ECE-102, ECE-212

This course provides the fundamental knowledge of converting and controlling electrical power through power semiconductor devices. In automated production lines the sequence of operation, speed, torque etc. of motors are provided by power electronic devices which in turn receive their instructions from a computer. The course leads initially through a qualified study of the components comprising the power electronics devices as power diodes, transistors, thyristors etc. and further elaborates on the concept and functioning of basic power electronic devices.

COURSE CODE/NAME: ECE-464 Digital Control Systems
NO OF CREDITS: 6
PREREQUISITE: ECE-364

The main objectives of the course are to: introduce the fundamental concepts of digital control systems. ; develop skills for the analysis and design of digital feedback systems to meet stability and other performance specifications using z-transform and state-space techniques.

COURSE CODE/NAME: ECE-466 Electric Power Generation, Transmission and Distribution
NO OF CREDITS: 6
PREREQUISITES: ECE-360, ECE-362

This course aims at providing a qualified understanding of the electrical power system starting from the generation of electricity, its transmission and distribution up to its final utilization. The assessment of the network is essential for its design to support the required function and choice of the devices constituting the power system. The course shall lead through the extensive analysis of single and three-phase circuits, simulating the transmission lines, transformers, power switches, and various types of AC and DC machines, through to the introduction of some basic power electronics concepts of converting and controlling electrical power by semiconductor devices.

COURSE CODE/NAME: ECE-468 Power System Protection
CREDITS: 6
PREREQUISITES: ECE-360, ECE-362

Malfunction of the electric power system through fault currents, overheating of machines etc. may lead apart from operational disruption to severe damages of the power devices as generators, transformers, transmission lines etc. The present course hence, introduces basic monitoring schemes of the power devices and various relaying techniques supported by digital analysis to protect the power system. The course elaborates on the selective protection of generators, motors, transmission lines, capacitors, reactors, and buses.

COURSE CODE/NAME: ECE-467 Renewable Energy Sources and Technologies
CREDITS: 6
PREREQUISITES: ECE-210

COURSE CODE/NAME: ECE-469 Electrical Design, Planning and Regulations
CREDITS: 6
PREREQUISITES: ECE-362

COURSE CODE/NAME: ECE-490 Special Topics in Electrical and Computer Engineering
NO OF CREDITS: 1 - 6
PREREQUISITE: Specified by the Department

The main objectives of the course are to: introduce students to topics on emerging technologies and innovative tools of analysis and design in the areas of Electrical and Computer Engineering; provide students with knowledge on topics of current but unusual interest which are not usually covered in undergraduate curricula.

COURSE CODE/NAME: ECE-491 Internship
NO OF CREDITS: 6
PREREQUISITE: Specified by the Department

The main objectives of the course are to: provide real world work experience to the students, allow the students to explore different working options and alternatives, provide specific to targeted company training to the students, allow the students to interact with professional engineers and gain from their experience, give the companies the opportunity to assess the knowledge and capabilities of the students, establish communication between students and companies creating potential employment opportunities, and stablish communication between companies and the department for further collaboration in training and research.

COURSE CODE/NAME: ECE-492 Senior Year Project
NO OF CREDITS: 6
PREREQUISITE: Approval by the Department

The main objectives of the course are to: teach students important research techniques and practices; introduce students to practical engineering design; create the foundation where the students will have the opportunity to utilize theoretical knowledge and engineering tools/techniques acquired throughout the years in order to design, build, and test their idea in a laboratory environment; promote team work and practical experience in a multi-disciplinary environment; teach students how to write proper reports and how to present their work in front of their colleagues; ensure that students know how to properly set up appropriate measurement and troubleshooting procedures including proper use of laboratory equipment; promote engineering ethics and respect to the environment and society; teach students how to properly plan their activities in order to successfully achieve their design goals and, more importantly, how to meet their own deadlines.

COURSE CODE/NAME: COMP-111 Programming Principles I
NO OF CREDITS: 6
PREREQUISITE: None

The main objectives of the course are to: introduce students to structured programming by means of the syntax and semantics of a structured high-level programming language; provide students a good working

knowledge of a programming language. This includes programming constructs such as expressions, selection statements, loops, functions and arrays; provide practical experience in problem solving, coding, debugging, and testing; guide the student in order to develop good programming practices; obtain a foundation that will allow the student to pursue more advanced programming topics.

COURSE CODE/NAME: COMP-113 Programming Principles II
NO OF CREDITS: 6
PREREQUISITE : COMP-111

The main objectives of the course are to: build on the knowledge already acquired in Programming I by focusing on the more advanced concepts of procedural programming; enable the students to develop algorithmic thinking and problem solving; introduce dynamic memory allocation; provide practical experience in manipulating data strings, arrays, pointers and structures; provide the fundamentals of recursion; introduce students to I/O file stream and data files; introduce Object-Oriented Programming.

COURSE CODE/NAME: COMP-201 Systems Analysis and Design
NO OF CREDITS: 6
PREREQUISITES: Sophomore Standing

The main objectives of the course are: address different types of organizational needs which may undertake some information technology-based solution; introduce the various aspects of feasibility and their use in the determination of project feasibility; examine several development methodologies which may be used to manage the software development process. Such methodologies include: Structured Systems Analysis and Design Methodology (SSADM) and the Systems Development Life Cycle (SDLC); agile and iterative methodologies including Prototyping, Rapid Application Development and other agile software development approaches; Object-Oriented Analysis and Design using UML and other methodologies; examine a variety of information gathering techniques and their potential use; cover formal project management techniques and team dynamics; identify, evaluate (Cost vs. Benefit analysis), and suggest different systems acquisition alternatives; briefly discuss security, validation, and privacy issues relating to data maintenance and accessibility; address the objectives for effective design (input, output, database, data entry procedures). Introduce human-computer interaction and incorporate its principles in the software design; discuss successful information system implementation by addressing training requirements and possibilities, physical conversion strategies, and the need for evaluation.

COURSE CODE/NAME: COMP-211 Data Structures
NO OF CREDITS: 6
PREREQUISITE: COMP-113, MATH-101

The main objectives of the course are to: introduce students to Abstract Data Types (ADT); provide practical experience to advanced programming techniques and data structures including tables, linked lists, queues and stacks; introduce students to advance recursion such as the divide-and-conquer and backtracking; obtain a foundation that will allow students to use storage media, methods of representing structured data and techniques for operating on data structures; introduce students to searching and sorting algorithms; introduce students to Binary Trees and graphs.

COURSE CODE/NAME: COMP-212 Object Oriented Programming
NO OF CREDITS: 6
PREREQUISITE: COMP-113

The main objectives of the course are to: learn the basic principles of the object-oriented programming with specific reference to the Java programming language; penetrate and acquire the knowledge for simple object-oriented concepts and for more complex (private classes, objects, encapsulation, inheritance and polymorphism); identify the key Object Oriented Concepts (OO Concepts) required to build an OO system; learn different Object Oriented Analysis and Design approaches (OOAD) to architect and build object oriented systems; develop a way for efficient algorithmic thinking and problem solving using the object-oriented paradigm with the UML (Unified Modeling Language), learn the Java graphical user interfaces (GUI) and the associated libraries of SDK/Sun; describe, plan, and build simple applications using the concepts of object-oriented programming in the Java context. Students will be enforced to adopt object-oriented methods to a variety of problems, with emphasis on the Reverse Engineering (RE) paradigm.

COURSE CODE/NAME: COMP-213 Visual Programming
NO OF CREDITS: 6
PREREQUISITE: COMP-113

The main objectives of the course are to: develop algorithmic, object-based and event-driven thinking and problem solving skills; introduce the concepts of designing a graphical user interface and associate the interface with the program code; introduce the concepts and techniques of programming in general and Visual, Object-Oriented, and Event-Driven programming in a specific Visual Integrated Development Environment; Provide practical experience in developing programs that responds to exception conditions raised during execution; introduce the basic concepts of Visual Programming, namely Controls and Constructs, Variable, Decisions, Loops, Arrays, Multi-form applications, File Handling, and integrating components like Web forms, Graphics, Animation, and Sound.

COURSE CODE/NAME: COMP-263 Human Computer Interaction
NO OF CREDITS: 6
PREREQUISITE: NONE

The main objectives of the course are: provide an overview of concepts on designing Human Computer Interfaces in making computer-based systems comprehensive, friendly and usable; understand the theoretical dimensions of human factors involved in the acceptance of computer interfaces; understand the important aspects of implementation of Human Computer Interfaces; identify the various tools and techniques for interface design, analysis and evaluation; identify the impact of usable interfaces in the acceptance and performance utilization of Information Systems; identify the importance of working in teams and the role of each member within an interface development phase.

COURSE CODE/NAME: COMP-302 Database Management Systems
NO OF CREDITS: 6
PREREQUISITE: COMP-201 and Junior Standing

The main objectives of the course are: examine databases, database management systems and their role in the organization; follow historically the development of database management systems until present time; analyze data models and data modeling techniques; cover relational database design by converting a conceptual data model to a database schema; explain normalization and use it to design normalized relational databases; cover Structured Query Language's (SQL), data definition (DDL), data manipulation (DML), and data control (DCL) components; introduce data and database administration functions; examine on-line transaction processing (OLTP) and its role in the business environment; introduce business intelligence to include on-line analytic processing (OLAP), data warehousing, data mining.

COURSE CODE/NAME: COMP-303 Data Mining
NO OF CREDITS: 6
PREREQUISITE: COMP-302, MATH-225

The main objectives of the course are to: provide understanding of what is Data Mining; determine when and how we can use Data Mining tools; introduce the concepts and techniques of pre-processing of the data to be analyzed; introduce the concepts and techniques of statistical methods, Decision Trees, Clustering Methods and Association Rules from data.

COURSE CODE/NAME: COMP-320 Computer Graphics
NO OF CREDITS: 6
PREREQUISITES: COMP-113, MATH-191, MATH-280

The main objectives of the course are to: introduce students to the design and construction of models that represent information in ways that support the creation and viewing of images; provide practical experience to two-dimensional and three-dimensional transformations, i.e. scaling, rotations, translation, and sheering; introduce students to the design of devices and techniques through which a person may interact with the model or the view; introduce students to techniques for rendering a model, and the design of ways the image may be presented; provide practical experience to API programming using OpenGL; introduce students to a three-dimensional environment for enhancing interaction between a human user and a computer-created world.

COURSE CODE/NAME: COMP-321 Theory of Computation
NO OF CREDITS: 6
PREREQUISITES: COMP-211

The main objectives of the course are to: be familiar with the basic theoretical principles in Computer Science; know various types of finite automata; be familiar with formal definitions of programming languages and their connection with finite automata; have learnt material on Turing machines and computability; have a deeper theoretical understanding of the algorithmic complexity classes.

COURSE CODE/NAME: COMP-354 Operating Systems
NO OF CREDITS: 6
PREREQUISITE: COMP-211

The main objectives of the course are to: introduce Operating System structuring methods like monolithic, layered, modular, micro-kernel models; provide deep knowledge of abstractions, processes, and resources; make aware the concept of protection through the transition between user and system(kernel) mode; thoroughly discuss OS structures like ready list, process control blocks, and so forth; provide deep knowledge of the concept of processes and threads; thoroughly discuss dispatching, context switching, preemptive, and non-preemptive scheduling; cover in detail the "mutual exclusion" problem and some solutions; provide knowledge of deadlock including: causes, conditions, and prevention; provide knowledge of synchronization models and mechanisms (semaphores, monitors, condition variables, rendezvous); explain in detail physical memory, memory management hardware, paging, and virtual memory.

COURSE CODE/NAME: COMP-370 Algorithms
NO OF CREDITS: 6

PREREQUISITE: COMP-211

The main objectives of the course are to: provide understanding how to evaluate the efficiency of an algorithm; present a variety of techniques for designing algorithms; provide a wide variety of data structures and should be able to use them appropriately to solve problems; build a foundation of fundamental algorithms.

COURSE CODE/NAME: COMP-399 Special Topics in Computer Science
NO OF CREDITS: 2 - 6
PREREQUISITE: Specified by the Department

Determined by the topic; special topics will be selected from the area of computer science with the intention to keep the students informed about current developments and directions in the respective field of study. The specific topic may be of mutual interest to the student and faculty member or appropriate for group study.

COURSE CODE/NAME: COMP-401 Software Engineering
NO OF CREDITS: 6
PREREQUISITES: COMP-111, COMP-201 and Junior Standing

This course aims to provide students with the application of theory, knowledge, and practice to develop software systems that satisfy the requirements of users and customers in an effective and efficient way. The main objectives of this course are to: describe all phases of the life cycle of a software system, including requirements analysis and specification, design, construction, testing, deployment, and operation and maintenance; demonstrate tools for managing software development; analyzing and modeling software artifacts; assessing and controlling quality; and for ensuring a disciplined, controlled approach to software evolution and reuse; present the "good practice" tools, methods, and approaches that are most applicable for a given development environment.

COURSE CODE/NAME: COMP-402 Advanced Databases
NO OF CREDITS: 6
PREREQUISITES: COMP-302

The main objectives of the course are: make students aware of the various database models (emphasis on post-relational models) and database systems; provide students with deep knowledge for developing database applications and fundamental knowledge for developing web-based database applications; cover in detail all aspects of the SQL language (including security, authorization, optimization, embedded SQL); thoroughly discuss the object-oriented database model, standards and languages and compare this model with the relational model; discuss Data Warehousing, OLAP, Data Mining, Web Technology and XML introduce state-of-the art research in the area of databases.

COURSE CODE/NAME: COMP-405 Artificial Intelligence
NO OF CREDITS: 6
PREREQUISITES: COMP-211 and Senior Standing

The main objective of the course is to develop an understanding of the theory and practice of Artificial Intelligence. The course is designed to cover the fundamental issues associated with the field such as: problems and search, knowledge representation and reasoning, game playing, rule-based systems. Advanced topic areas such as probabilistic reasoning and Bayesian networks are also introduced.

COURSE CODE/NAME: COMP-412 Internet Programming
NO OF CREDITS: 6
PREREQUISITES: COMP-113

The main objectives of the course are to: introduce a concept of WWW and the Internet; introduce Domain Name System; introduce and use name server configuration; introduce and use IIS and Apache WEB servers; introduce and use Microsoft WEB development platform; introduce cloud computing (Microsoft Azure); obtain knowledge and practical experience of ASP.NET programming; obtain knowledge and practical experience of database (ADO.NET) programming.

COURSE CODE/NAME: COMP-413 Systems Programming
NO OF CREDITS: 6
PREREQUISITES: COMP-212, COMP-354

The main objectives of the course are to: introduce the Unix operating system and the environment and tools it provides for developing system programs; introduce the tools, language and OS libraries needed to develop command line applications in an effective manner; explain in detail structure and organization of the file system and develop applications that are using buffered and unbuffered I/O; explain the concept of processes and develop applications that dynamically create processes and synchronize their interaction; introduce signals and signal handlers as well as develop applications which are using signals; explain the concept of multi-threaded applications and develop multi-applications that are using various synchronization mechanisms; expose the students to scripting and how it can be used as simple system programs.

COURSE CODE/NAME: COMP-421 Compiler Design
NO OF CREDITS: 6
PREREQUISITES: COMP-321

The main objectives of the course are to: present and explain the compilation phases; discuss the application of regular expressions in lexical scanners; discuss parsing (concrete and abstract syntax, abstract syntax trees) and application of context-free grammars in recursive-descent parsing and bottom-up parsing; discuss declarations and types; provide student with knowledge on run-time environments, intermediate code representations and code generation principles

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COURSE CODE/NAME: COMP-431 Computer Security
NO OF CREDITS: 6
PREREQUISITES: COMP-354

The main objectives of the course are to: motivate and appreciate the need for computer security and protection; provide student deep knowledge on computer security technology and principles, including cryptographic tools, user authentication, access control, and formal models for multilevel computer security; expose students to techniques to manage security of computers and users by means of contemporary host-based intrusion detection/prevention tools, physical security measures, auditing, logging; explain various operating systems security models, policies.

COURSE CODE/NAME: COMP-432 Network Security
NO OF CREDITS: 6
PREREQUISITES: COMP-358 or ECE-324

The main objectives of the course are to: motivate the need for network security practices in organizational units; provide students with deep knowledge on various concepts of classical computer and network security paradigms; build foundations to assess contemporary security policies and security mechanisms within organizations and illustrate the balance of the managerial and technical aspects of network security; expose students to current security practices that are exercised in Cypriot/International organizations.

COURSE CODE/NAME: COMP-458 Network Protocols
NO OF CREDITS: 6
PREREQUISITE: COMP-358 or ECE-324

The main objectives of the course are to: emphasize on network protocols instead of network architectures and include programming of networked applications; cover in depth the TCP/IP suite of protocols examining IP and related protocols (ICMP, ARP), IP routing (BGP, OSPF), Mobile IP, Transport Layer protocols (TCP, UDP), and related specifications (SMTP, HTTP, DNS), IGPs, EGPs, and Routing Protocols (RIP); the Protocol Suite of TCP/IP (ARP/RFC 826, Reverse Address Resolution Protocol (RARP), RIP Operational Types etc.), multiservice servers using TCP/UDP, tunneling at the transport and application levels, Application level gateways, External data representation; Internet Protocol Version 6 (IPv6) including IPv6 routing comparison with IPv4 routing using CIDR. OSPF, RIP, IDRP, and IS-IS and modifications; cover in a great extend the file P2P sharing existing protocols; enable students to learn about the behavior of each examined protocol via Simulation techniques; design a new protocol based on an already existing using a simulation tool/ develop a simulation in evaluating an already implemented protocol/Simulation experimental procedure/simulating a protocol based scenario.

COURSE CODE/NAME: COMP-470 Internet Technologies
NO OF CREDITS: 6
PREREQUISITE: COMP-113, COMP-358 or ECE-324

The main objectives of the course are to: learn about the nature of the Internet; Internet Services and Protocols. World-Wide-WEB Services; sockets and Client/Server structures, N-tier architecture of the global internet; servers and state management; web usability, server configuration and server based executable and scripts; thin and thick client scripting; gain knowledge about the HTTP Protocol; HTTP servers and clients, Hypertext Reference Model; RFC2965 - HTTP State Management Mechanism; gain knowledge about the TCP/IP stack and protocols (TCP/IP Tutorial, RFC 1180) and application interface; architecture of the World Wide Web; using a Uniform Resource Identifier (URI) to Access a Resource, Representation Management, URI persistence, Linking and access control; learn the Web caching and the utilizing notation currently used. Client site caching control; WEB Proxies; Web caching includes additional configuration and administration of Squid Cache; web Introduction to XML & Web Technologies; briefly cover the Web Programming: HTML, XHTML, Object Models, Styles, Dynamic content, DHTML; learn about how to programming the WEB using Client scripting, JavaScript, Jscript, VB Script and demonstrate to students the Perl and ASP scripting; learn about the Socket Programming (Unix, Winsock, .NET); learn about the Semantic Web and enable students to perform literature research and survey on the WWW.

COURSE CODE/NAME: PHYS–150 General Physics I
NO OF CREDITS: 8
PREREQUISITE: MATH-190

This course is calculus based and aims at introducing students to the basic concepts of mechanics. Laboratory experiments and computer applets/simulations enhance and consolidate the basic principles discussed in the theoretical section of the course. Upon completion, students should be able to

demonstrate an understanding of the principles involved and display analytical problem-solving ability for the topics covered.

COURSE CODE/NAME: PHYS–160 General Physics II
NO OF CREDITS: 8
PREREQUISITE: PHYS-150

This course is calculus based and aims to introduce students to the basic concepts of electricity and magnetism. Upon completion, students should be able to demonstrate an understanding of the principles involved and display analytical problem-solving ability for the topics covered. Laboratory experiments and computer applets/simulations enhance and consolidate the basic principles discussed in the theoretical section of the course.

COURSE CODE/NAME: PHYS-270 General Physics III
NO OF CREDITS: 8
PREREQUISITE: PHYS-160

This course is calculus based and aims at introducing students to the basic concepts of waves, optics, and thermal physics. Upon completion, students should be able to demonstrate an understanding of the principles involved and display analytical problem-solving ability for the topics covered. Computer applets/simulations enhance and consolidate the basic principles discussed in the theoretical section of the course.

COURSE CODE/NAME: PHYS-305 Semiconductor Physics & Technology
NO OF CREDITS: 6
PREREQUISITES: PHYS-160, MATH-191

The course aims at providing a basic understanding of the physical principles, processes and technology that underpin modern semiconducting devices. It examines the concept of crystal structure as well as the various types of crystal bonds. The fundamental ideas of quantum mechanics are presented and applied in the propagation of electron waves in the crystal lattice. The electron-hole statistics in equilibrium, the free carrier generation and recombination processes, as well as excess carrier transport are examined. The electrical behavior of a p-n junction under forward and reverse bias is investigated and its use as a photovoltaic component and light emitter are discussed. The course also provides information on the fabrication steps of semiconductor wafers and the processes of doping and annealing.

COURSE CODE/NAME: MATH-101 Discrete Mathematics
NO OF CREDITS: 6
PREREQUISITE: None

The course covers the fundamentals of Discrete Mathematics with emphasis on applications in computing. More specifically, the course objectives are to: introduce students to mathematical reasoning, in order to formulate logical arguments and construct proofs; familiarize students with the basic concepts and methods of set theory, relations and functions; introduce students to graphical modeling of computer algorithms with specific applications.

COURSE CODE/NAME: MATH-190 Calculus I
NO OF CREDITS: 8
PREREQUISITE: MATH-180 or MPT

The main objectives of the course are to: understand the notion of the limit and be able to evaluate them; understand the continuity of trigonometric functions; understand the derivative and make use of different differentiation techniques; use the derivative to analyze functions; introduced to the integral as a summation and evaluate indefinite and definite integrals.

COURSE CODE/NAME: MATH-191 Calculus II
NO OF CREDITS: 8
PREREQUISITE: MATH-190

The main objectives of the course are to study the: indeterminate forms of limits; inverse trigonometric functions; methods of integration; introduction to sequences; infinite series and convergence tests; polynomial approximations and power series; use integration to evaluate area and volume.

COURSE CODE/NAME: MATH-270 Calculus III
NO OF CREDITS: 8
PREREQUISITE: MATH-191

The main objectives of the course are to: introduce students to coordinate systems, lines and planes in three dimensions; develop all necessary concepts and skills for performing all basic vector algebra operations; familiarize students with functions of two and three variables; develop the theory and techniques of partial differentiation; introduce students to double and triple integration; define vector fields and vector differential operators; present the fundamental concepts that will enable students to work with basic identities.

COURSE CODE/NAME: MATH-280 Linear Algebra I
NO OF CREDITS: 6
PREREQUISITE: MATH-190

The main objectives of the course are to: provide the fundamental theory of Linear systems of equations; introduce the students to the theory of Matrices, and develop the necessary skills in order for the students to be able to apply the theory of Matrices in the Linear Systems theory; provide the notions of eigenvalues, eigenvectors, and diagonalization of square matrices; develop the theory of vectors in $\mathbf{R}^n$, familiarize the students with the theory of Linear transformations and expose them on some of their main applications, develop the necessary skills to the students, in order to be capable of comprehending abstract algebraic notions, related to vector space theory; offer the fundamental concepts and the elementary theory of finite dimensional vector spaces.

COURSE CODE/NAME: MATH-330 Ordinary Differential Equations
NO OF CREDITS: 6
PREREQUISITE: MATH-191

The main objectives of this course are: to provide students with all the necessary techniques for solving first order ordinary differential equations; to familiarize students with the concepts of linear independence, fundamental solutions, general solutions and Initial Value Problems; to develop and demonstrate solution methods for linear higher order equations; the introduction of applications and modelling using Ordinary Differential Equations; to provide students with the fundamentals of the power series method; familiarize students with the Laplace Transform and its applications.

COURSE CODE/NAME: CHEM-106 General Chemistry
NO OF CREDITS: 8
PREREQUISITE: None

The aims of this course are to give students an introduction to the basic principles of general chemistry, to assist in the development of strong problem-solving skills, to help cultivate critical thinking in the approach to learning, and to help in the acquisition of sound hands-on practical skills in the chemistry lab.

COURSE CODE/NAME: MENG-250 Engineering Mechanics: Statics
NO OF CREDITS: 6
PREREQUISITES: MATH-190, PHYS-150

The main objectives of the course are to: provide a thorough understanding of the principles governing the forces applied on objects in equilibrium; provide the necessary tools and mathematical background for the analysis of objects in equilibrium; develop problem solving skills for a wide variety of practical engineering problems that involve objects at rest; introduce techniques and methodologies for the effective analysis of objects and structures at rest; introduce the concepts of supports and loads that are acting on a structural system under equilibrium conditions; develop the ability to determine internal and external forces and bending moments of structures and machines.

COURSE CODE/NAME: MENG-252 Engineering Mechanics: Dynamics
NO OF CREDITS: 6
PREREQUISITES: MENG-250, MATH-270

The main objectives of the course are to: introduce the fundamental principles governing the dynamics of particles and motion of rigid bodies in one, two and three-dimensional spaces; study the motion of objects and the interaction between the forces acting on objects and their induced motion based on a Newtonian formulation of the governing equations; develop an understanding of the physical principles governing rigid body motion and problem solving skills that can be applied to a variety of practical engineering problems.