



SOUTH-WEST UNIVERSITY "NEOFIT RILSKI"
2700 Blagoevgrad, 66 Ivan Mihailov str.
tel.: +359/73/88 55 01, fax: +359/73/88 55 16
e-mail: info@swu.bg
<http://www.swu.bg>

INFORMATION PACKAGE **/ECTS/**

FIELD OF HIGHER EDUCATION: **5. TECHNICAL SCIENCES**
PROFESSIONAL FIELD: **5.3. COMMUNICATION AND COMPUTER ENGINEERING**
SPECIALTY: **COMPUTER SYSTEMS AND TECHNOLOGIES**

QUALIFICATION CHARACTERIZATION
OF SPECIALTY "COMPUTER SYSTEMS AND TECHNOLOGIES"
Professional field: 5.3. Communication and Computer Engineering
Educational and qualification degree: Master of Science
Professional qualification: Computer Engineer
Period of study: 2 years (4 semesters)
Form of training: Regular

REQUIREMENTS FOR THE SPECIALIST PREPARATION

Engineers graduated the Master degree program "Computer Systems and Technologies" must be prepared to perform activities such as: design, manufacture and operation of facilities and devices in computer and communication systems and networks, research, implementation, modeling and operation of facilities, specialized technological equipment and means for connection with stationary and mobile objects, exploitation and maintenance of information resources and technologies for the implementation of marketing activities in the field of computer and communication equipment and technology, design and maintenance of technical means for automation, control and technological support of mobile communication systems; design and programming of computer means for communication facilities control; ensuring quality of service by measuring and monitoring the parameters of computer and communication networks and systems, as well as application of methods for digital processing and information protection.

Obtaining the knowledge, skills and competences for these activities requires training, providing:

- Theoretical knowledge, graduates to be able to design and exploit facilities and equipment of analog, digital and optical principle of work, of systems for processing and transmission of analog and digital information.
- Practical knowledge, skills and habits, learned during the seminars, laboratory and

practical exercises, adapted with the nature of their future work, adaptability in accordance with the changing conditions in the specialists realization, both individually and as a team. Use of modern computer technology for automation of labor and business.

This knowledge is acquired on the basis of fundamental and special training and specialized courses in the area of computer and information technologies, enhancing the professional skills of the specialist.

Specialists' training in Master degree program "Computer Systems and Technologies" is consistent with Bulgarian and world experience, based on a thorough analysis of curriculum and syllabuses for similar specialties of local and foreign universities and colleges.

PROFESSIONAL SKILLS AND COMPETENCE

Masters students in the specialty "Computer systems and technologies" acquire special skills in the field of computer components, assemblies, devices and systems, as well as of their setting up, diagnostics, repairing and maintenance; of maintaining the standards and performance of computer systems and equipment; of application of computer and information technologies in setting up, control, diagnostics and maintenance of computer and telecommunications systems and networks.

Master degree graduates in the specialty "Computer Systems and Technologies" receive professional competence in development, use, deployment and operation of systems in the field of computer and communication systems - fixed, mobile, wireless communications; processing, storage and transmission of information; security and information protection technologies.

**DEGREE COURSE OF COMPUTER SYSTEMS AND TECHNOLOGIES
CURRICULUM**

First academic year			
First semester	ECTS credits	Second semester	ECTS credits
Signals and systems	5	Computer architectures	5
Data transmission and computer communications	5	Microprocess technics	5
Tehnique scheme	5	Computer networks	5
Mathematics for engineers	5	Sensors and sensor networks	5
Materials and building elements in electronics	5	Conventional technics	5
Electric and special measurements	5	<i>Elective choice</i>	5
	Total: 30		Total: 30
Second academic year			
Third semester	ECTS credits	Fourth semester	ECTS credits
Embedded microprocessor systems	6	Optimization of discrete structures	5
Computer networks design	6	<i>Elective choice</i>	5
Multimedia technologies	6	<i>Elective choice</i>	5
Engineering experiment theory	6	Diploma Thesis	15
<i>Elective choice</i>	6		
	Total: 30		Total: 30

TOTAL: 120 CREDITS FOR TWO ACADEMIC YEARS

ANNOTATION OF COURSES

SIGNALS AND SYSTEMS

ECTS credits: 5	Semester: I
Evaluation: exam	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Prof. Svetla Radeva, DSc, PhD – svetla_radeva@swu.bg

Department: Communication and Computer Engineering –
technical_kktt@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

The teaching course on Signals and Systems treat fundamental knowledge on continuous and discrete signals and systems at time and frequency area. The students receive knowledge on spectral analysis of periodic and non-periodic signals, kind of spectra and their basic characteristics. The topics, connected with signal modulation, methods of amplitude modulation and their influence on the width of frequency bandwidth and increasing of throughput of communication system, transformation of analog signals into digital, kind of digital filters, optimal linear filtration and noise stable coding of signals are detailed considered. This fundamental course on Signals and Systems gives to students the necessity amount of knowledge for their professional skills at followed specialized disciplines from the teaching plan of the specialty.

Purpose of the course:

The teaching discipline devoted on Signals and Systems presents to the students different possibilities of use of signals and systems, their presentation, their parameters, time and frequency characteristics which are necessary for investigation of their behavior at data transfer into communication channels connected with the main processes of data transfer, processing and storage of information.

Educational Methods:

The lectures are leading at lecture auditorium together for the students from specialties Communication Technique and Technology, Electronics and Computer Systems and Technologies. The exercises are leading for laboratory group of 10 students.

DATA TRANSMISSION AND COMPUTER COMMUNICATIONS

ECTS credits: 5	Semester: I
Evaluation: exam	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Prof. Svetla Radeva, DSc, PhD – svetla_radeva@swu.bg

Department: Communication and Computer Engineering –
technical_kktt@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

The teaching course on Data Transfer and Computer Communications presents modern trends on development of this area of communications. The discipline aims to introduce to students methods and means of data transfer at computer and communication networks. The protocol architectures of TCP/IP and OSI model for data communication are under consideration, as well as basic characteristics and parameters of communication signals, communication channels and different transportation media. The topics, connected with linear coding and modulation of digital signals, uncover and correction of bit and dynamic errors at digital data transfer and communications, coding and manipulation of digital signals, protocols for automatic control of the channel layer and data transfer regimes are detailed considered.

Purpose of the course:

The purpose of the discipline is to introduce to the students modern trends in data and computer communications, parameters of the communication signals and communication channels, uncover and correction of bit and dynamic errors at digital data transfer and communications, coding and manipulation of digital signals, protocols for automatic control of the channel layer and data transfer regimes.

Educational Methods:

The lectures are leading at lecture auditorium together with students from specialties Communication Technique and Technology, Electronics and Computer Systems and Technologies. The exercises are leading for laboratory group of 10 students.

TECHNIQUE SCHEME

ECTS credits: 5	Semester: I
Evaluation: exam	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof., Eng. Vladimir Gebov, PhD – askon@swu.bg

Department: Electrical Engineering, Electronics and Automatics –
technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

The training course includes basic issues related to analogue technique scheme, parts and related connections between them.

Purpose of the course:

Students to acquire the necessary minimum of theoretical and professional knowledge and skills for the implementation of the technique scheme and parts used in more popular provider in the world.

Educational Methods:

Lectures, individual work and scientific literature textbook exercises, brainstorming and discussion, work individually, solve problems, exercise, and Power Point presentation.

MATHEMATICS FOR ENGINEERS

ECTS credits: 5	Semester: I
Evaluation: exam	Hours per week: 2 lectures+2 exercises
Course type: lectures+ exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Prof. Ilia Giudjenov – iliadg@swu.bg

Department: Mathematics – technical_kktt@swu.bg

Faculty: Mathematics and Natural Sciences – pmf@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-58 85 31

Assistant: Chief Assist. Prof. Anka Markovska, PhD – a.markovska@swu.bg

Department: Electrical Engineering, Electronics and Automatics – technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

The course in Mathematics for Engineers includes some special concepts of mathematical analysis, like Fourier series, Functions of complex variables, elements of the operation calculation. Also some elements of the theory of the probability and mathematical statistics are considered.

Purpose of the course:

Students should obtain knowledge for Mathematics, which is a basic mathematical discipline. This knowledge is necessary for studying of the main technical sciences.

Educational Methods:

Lectures and seminars.

MATERIALS AND BUILDING ELEMENTS IN ELECTRONICS

ECTS credits: 5	Semester: I
Evaluation: ongoing assessment	Hours per week: 2 lectures+2 exercises
Course type: lectures+ exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Prof.Eng. Valeri Vatchkov, PhD, v.vatchkov@swu.bg

Department: Electrical Engineering, Electronics and Automatics – technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

The course introduces students with basics of Physics of semi-conductors and PN transition, composition, principles of function, characteristics, parameters and identical schemes of the semi-conductors and passive build up elements in Electronics, as well as in the chip production. Some typical applications are studied. The behavior of the materials in a magnetic field is being studied, which is the basis of Electronics, Communications and Computer Engineering. Classification based on a few criteria is carried out and the materials are divided into four big groups: isolators, conductors, semi-conductors and magnetic materials. Basically the characteristics of the resistors, condensers and magnetic cores for inductive coils are being studied.

Purpose of the course:

The goal of *Materials and build up elements* is to show to students the basics of Physics of Semi-conductors and PN transition. Classification based on a few criteria is carried out and the materials are divided into four big groups: isolators, conductors, semi-conductors and magnetic materials. The basic electric identities of the above are studied as well as the characteristics of the most common representatives. At the same time and independent of the relatively theoretical character of the Course, as well as its Methodological basis paedagogics, the students are introduced to the composition, principles of functioning, characteristics, parameters and identical schemes of the semi-conductor and passive build up elements in Electronics in discrete as well as in chip production.

Educational Methods:

The Course is held in lecture halls. The exercises are carried out in groups, and the groups consist of 10 to 14 students. The students have individual problem solving exercises, work out and present presentations of the projected systems.

ELECTRIC AND SPECIAL MEASUREMENTS

ECTS credits: 5	Semester: I
Evaluation: ongoing assessment	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assist. Prof., Eng. Uliana Paskaleva, PhD – paskaleva_6@swu.bg, uli_6@abv.bg

Department: Electrical Engineering, Electronics and Automatics – technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

The course introduces students with basics of electric and special measurements and methods and tools for measuring electrical values.

Purpose of the course:

To familiarize students with the basic theoretical questions of measurement methods and tools for measuring electrical values. Understanding the basic metrological characteristics of measurement systems to learn to use in the laboratory, basic instrumentation (for voltage, current, power, energy, phase difference, frequency, parameters of bipolar, etc.).

Educational Methods:

Lecture, demonstration, power point presentations, conversation, discussion, conference, analysis of problems, laboratory measurements, laboratory tests. Use interactive methods of training and during lectures and laboratory exercises.

COMPUTER ARCHITECTURES

ECTS credits: 5	Semester: II
Form of assessment: exam	Hours per week: 2 lecture + 2 exercises
Course form: lectures+ laboratory exercises	Course status: Compulsory
	Specialty: Computer Systems and Technologies

Lecturer: Assoc. Prof. Ljudmila Taneva, PhD – lucy_t@swu.bg

Department: Electrical Engineering, Electronics and Automatics – technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Course description:

The course "Computer Architectures" is part of the curriculum and includes 10 summarized topics. The form of control is current control and final exam. The subject covers the modern uniprocessor and multiprocessor computer systems. The course aims to build knowledge in architecture for parallel processing of different levels and skills to create software support for them. Computer architectures are presented in the context of methods to ensure parallel instruction execution threads, processes and tasks in a variety of topologies, connections and memory organization and within the popular models for parallel programming. Provided laboratory practicum is focused on hardware-software interface in computer architectures. It deepens the knowledge of programming and the management of system resources.

Course objective:

The objective of the course "Computer Architectures" is to build knowledge in the architecture for parallel processing and create skills in their software support. Also, to present methods for addressing segmentation and memory protection mechanisms for handling exceptions and interrupts, architectural maintenance service hierarchy of memory, parallel execution of instructions types of data processed, parallel computer architectures and models for parallel programming, performance and performance parallel computer architecture, planning and management of memory, processes and cargo in parallel computer architectures

Education methods:

Teaching methods: The lectures are conducted in the classical way as students get acquainted step by step with the provided material. The workshops are conducted in the laboratory of the department, equipped with PCs and training simulators / emulators. After each topic the students prepare a draft report containing the goal and tasks set, experimental data obtained during the exercise and the conclusions for the examined problems.

MICROPROCESS TECHNICS

ECTS: 5	Semester: II
Assessment: exam	Hours per Week: 2 lectures+2 exercises
CourseType: lectures+ laboratory exercises	Course Status: Compulsory
	Specialty: Computer Systems and Technologies

Lecturer: Assoc. Prof. Ljudmila Taneva, PhD – lucy_t@swu.bg

Assistant: Chief Assist. Prof. Anton Stoilov, PhD – antonstoilov@swu.bg

Department: Electrical Engineering, Electronics and Automatics –
technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Course Description:

The "Microprocess Techniques" course aims to familiarize the students with the theory and the current trends in the construction of microprocessor systems for the industry and various other fields. Topics include the classical design methods as well as the technical means and methods for transmitting and processing information. Included are some of the most popular microprocessor families, various multifunctional elements and the basic principles of their software.

Course Aims:

The purpose of this course is to provide students with the necessary knowledge and skills for design, building and maintenance of modern microprocessor systems. The study material includes the basic principles of operation of the microprocessor systems as well as their main blocks - CPU, memory, interface circuits, etc. The studied processor is from the popular microprocessor family Texas Instruments. The course includes also the modern trends in microprocessor technology and its applications.

Teaching Methods:

In the teaching process are included multimedia for better visualization of the material, as well as development systems (kits) with Microcontrollers and other HW modules for hands on experience. For better understanding and enhancement of the teaching, it is possible to carry out demonstrations to illustrate the lecture material.

COMPUTER NETWORKS

ECTS credits: 5	Semester: II
Evaluation: exam	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof., Eng. Valentin Hristov, PhD – v_hristov@swu.bg
Department: Communication and Computer Engineering –
technical_kktt@swu.bg
Faculty: Faculty of Engineering – technical@swu.bg
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62

Annotation:

The course discusses the problems concerning design, building and application of computer networks. The lectures begin with introduction to computer networks, principles of building, historical development and their contemporary classification. Open system interconnection model of ISO is presented. Teaching course includes basic principles of building and functioning of Local Area Networks (LAN) illustrated by practical technical solutions in LAN Ethernet. The lectures on the most popular in the world computer network Internet present its basic characteristics, principles of functioning and application. The laboratory work helps to better rationalization of lecture material and contribute to formation of practical skills.

Purpose of the course:

The aim of the course is to acquaint students with the basic principles, standards and tendencies of development in the field of computer networks. This will help them in future to professionally solve system tasks in the area of network communications.

Educational Methods:

Lectures (with slides, multimedia projector) and additional text materials; laboratory work (based on instructions) with a tutorial for every laboratory theme.

SENSORS AND SENSOR NETWORKS

ECTS credits: 5	Semester: II
Evaluation: exam	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof., Eng. Ivanka Georgieva, PhD – vanyakg@swu.bg
Department: Electrical Engineering, Electronics and Automatics – technical_eea@swu.bg
Faculty: Faculty of Engineering – technical@swu.bg
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62

Assistant: Chief Assist. Prof., Eng. Filip Tsvetanov, PhD – ftsvetanov@swu.bg
Department: Communication and Computer Engineering – technical_kktt@swu.bg

Annotation:

The course on "Sensors and sensor networks" covers basic questions relating to the characteristics, structures and operating principles of sensors, design and construction of sensor networks. Exam in "Sensors and sensor networks" will acquire the necessary minimum of theoretical knowledge and practical skills in the choice of sensors, and design and construction of wired and wireless sensor networks.

Purpose of the course:

The aim of the "Sensors and sensor networks" is students to receive broad basic knowledge of the physical essence and structure of sensors, principles of operation, the processing of signals, construction of intelligent sensors and sensor networks. To learn about the fields of application interfaces to sensors and the criteria for their selection, to acquire practical skills for embedding sensors in systems for management and control of technological processes and monitoring processes.

Educational Methods:

Lectures, individual work with scientific literature, textbooks work, brainstorming and discussions, individual problem solving, exercises and the Power Point presentation.

CONVERTIONAL TECHNICS

ECTS credits: 5	Semester: II
Evaluation: ongoing assessment	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Chief Assist. Prof. Ivo Angelov, PhD – ivo.angelov@swu.bg
Department: Communication and Computer Engineering – technical_kktt@swu.bg
Faculty: Faculty of Engineering – technical@swu.bg
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62

Annotation:

The course "Power Conversion Techniques and Power Supplies" introduces students to the power supply and converter devices used to power electronics equipment and computers. The principles of operation and design of the most common power supply and converter devices are discussed. Particular attention is paid to the converters of electric energy and the network power systems. At the base of the course are uncontrolled and controlled rectifiers and filters, linear and switched mode DC voltage stabilizers, inverters. Special attention is paid to UPS, autonomous and non-traditional sources of electricity. There is also laboratory practicum through which, practical skills are obtained and the students' ongoing knowledge is monitored.

Purpose of the course:

The aim of the course is to provide knowledge about the principles of operation and the structure of the most common power supply and converter devices. At the base of the course are uncontrolled and controlled rectifiers and filters, linear and switched mode stabilizers, overvoltage and overcurrent protections, inverters and others.

Educational Methods:

Lectures are conducted in the classic way. Active methods are used by laboratories in a laboratory equipped with the necessary equipment and models, tests are conducted to control knowledge, and solving of relevant practical tasks is assigned.

EMBEDDED MICROPROCESSOR SYSTEMS

ECTS: 6	Semester: III
Assessment: exam	Hours per Week: 2 lectures+2 exercises
CourseType: lectures+ laboratory exercises	Course Status: Compulsory
	Specialty: Computer Systems and Technologies

Lecturer: Assoc. Prof. Ljudmila Taneva, PhD – lucy_t@swu.bg

Assistant: Chief Assist. Prof. Anton Stoilov, PhD – antonstoilov@swu.bg

Department: Electrical Engineering, Electronics and Automatics –
technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Course Description:

The "Embedded Microprocessor Systems" course aims to familiarize the students with the theory in the construction of embedded microprocessor systems for the industry. Topics include the classical design methods as well as the technical means and methods for transmitting and processing information. Included are some of the most popular microprocessor families, various multifunctional elements and the basic principles of their software.

Course Aims:

The purpose of this course is to provide students with the necessary knowledge and skills for design, building and maintenance of modern microprocessor systems. The study material includes the basic principles of operation of the microprocessor systems as well as their main blocks - CPU, memory, interface circuits, etc. The studied processor is from the most popular microprocessor families. The course includes also the modern trends in microprocessor technology and its applications.

Teaching Methods:

In the teaching process are included multimedia for better visualization of the material, as well as development systems (kits) with Microcontrollers and other HW modules for hands on experience. For better understanding and enhancement of the teaching, it is possible to carry out demonstrations to illustrate the lecture material.

COMPUTER NETWORKS DESIGN

ECTS credits: 6	Semester: III
Evaluation: exam	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof., Eng. Valentin Hristov, PhD – v_hristov@swu.bg
Department: Communication and Computer Engineering –
technical_kktt@swu.bg
Faculty: Faculty of Engineering – technical@swu.bg
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62

Annotation:

The course discusses the problems concerning design, building and application of computer networks. The study material considered theoretical and practical knowledge and skills on basic principles, methods and tools for building computer networks for processing and transmission of data, sound and images.

Purpose of the course:

The aim of the course is to provide students with the necessary knowledge and skills for design of computer networks and students are able to apply the approaches, methods and technical tools for analysis, design and implementation of embedded systems.

Educational Methods:

Lectures (with slides, multimedia projector) and additional text materials; laboratory work (based on instructions) with a tutorial for every laboratory theme.

MULTIMEDIA TECHNOLOGIES

ECTS credits: 6	Semester: III
Evaluation: exam	Hours per week: 2 lecture+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof. Ivan Trenchev, PhD – trenchev@swu.bg

Department: Electrical Engineering, Electronics and Automatics –
technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Assistant: Assist. Prof. Fatima Sapundzhi, PhD – sapundzhi@swu.bg

Department: Communication and Computer Engineering –
technical_kktt@swu.bg

Annotation:

Multimedia is the combined use of text, graphics, sound, animation, and video. A primary objective of this course is to teach participants how to develop multimedia programs. Another objective is to demonstrate how still images, sound, and video can be digitized on the computer. Participants in this workshop will create their own multimedia courses using Adobe Maya on the windows platform.

Purpose of the course:

The course aims to give the students knowledge of the existing standards and basic techniques related to the recording and reproduction of both sounds and images, and the concept of sampling which is fundamental to digital media technologies.

Educational Methods:

Lectures and seminars.

ENGINEERING EXPERIMENT THEORY

ECTS credits: 6	Semester: III
Evaluation: exam	Hours per week: 2 lectures+2 exercise
Course type: lectures + laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof. Dimitrina Kerina, PhD – d_kerina@swu.bg

Assistant: Ass. Prof. Fatima Sapundzi, PhD – sapundzhi@swu.bg

Department: Communication and Computer Engineering and Technologies – technical_kktt@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

Main topics of the course are: Theoretical foundations of engineering experiment, Planning and organization of engineering experiment, Statistical methods for processing of experimental results and Methodology development and defence of master's thesis.

Purpose of the course:

The course in Theory of Engineering Experiment aims to provide theoretical and practical knowledge of M. Sc. Degree students for the development and defence of Master's thesis.

Educational Methods:

Lectures are prepared on Power point. The contemporary technical equipment as multimedia, software, models, etc. is used for these lectures. Lectures are visualized by demonstrations and laboratory tasks performance during the laboratory classes.

OPTIMIZATION OF DISCRETE STRUCTURES

ECTS credits: 5	Semester: IV
Evaluation: exam	Hours per week: 2 lectures+1 exercise
Course type: lectures + laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Prof. Ivan Mirchev, D.Sc. – mirchev@swu.bg

Department: Informatics – informatics@swu.bg

Faculty: Mathematics and Natural Sciences – pmf@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-58 85 31

Assistant: Assist. Prof. Fatima Sapundzhi, PhD – sapundzhi@swu.bg

Department: Communication and Computer Engineering –

technical_kktt@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

In this course are considered some elements of the following main topics:

- introduction in graph theory (essential concepts and definitions. modeling with graphs and networks, data structures for networks and graphs;
- computational complexity;
- heuristics;
- tree algorithms (spanning tree algorithms. variations of the minimum spanning tree
- problem. branchings and arborescences);
- shortest-path algorithms (types of shortest-path problems and algorithms, shortest- paths from a single source, all shortest-path algorithms, the k- shortest-path algorithm, other shortest paths).

Purpose of the course:

Students should obtain basic knowledge and skills for solving optimization problems for graphs and networks.

Educational Methods:

Lectures, tutorials, individual student's work.

PROGRAMING I

ECTS credits: 5	Semester: II
Evaluation: ongoing assessment	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Elective
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof. Ivan Trenchev, PhD – trenchev@swu.bg

Department: Electrical Engineering, Electronics and Automatics –
technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

This subject is aimed at students with little or no programming experience. It aims to provide students with an understanding of the role computation can play in solving problems. It also aims to help students, regardless of their major, to feel justifiably confident of their ability to write small programs that allow them to accomplish useful goals. The class will use the Python programming language.

Purpose of the course:

This course has been designed for independent study. It provides everything you will need to understand the concepts covered in the course.

Educational Methods:

Lectures and seminars.

COMPUTER DESIGN

ECTS credits: 5	Semester: II
Evaluation: ongoing assessment	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Elective
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof., Eng. Stoycho Stefanov, PhD – ststephanoff@swu.bg
Department: Mechanical Engineering and Technologies – technical_mtt@swu.bg
Faculty: Faculty of Engineering – technical@swu.bg
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62

Annotation:

Course "Computer design" is designed to introduce students to the methods of image creation and standards related to engineering graphics.

The course is related to training on technical drawing, mathematics and informatics in primary and secondary school.

Students need to master the necessary knowledge and to develop skills and competencies to implement and reading graphic images of geometric and technical objects.

Purpose of the course:

Students should learn the theoretical material, to acquire skills and competences count and prepare sketches, drawings and other design documents to use them in the study of technical disciplines subsequent semesters and in pursuance of their future profession.

Educational Methods:

Lectures and practical exercises.

COMPUTER SIMULATION WITH MATLAB

ECTS credits: 5	Semester: II
Evaluation: ongoing assessment	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Elective
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof. Ivan Trenchev, PhD – trenchev@swu.bg

Department: Electrical Engineering, Electronics and Automatics –
technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

MATLAB is a special-purpose language that is an excellent choice for writing moderate-size programs that solve problems involving the manipulation of numbers. The design of the language makes it possible to write a powerful program in a few lines. The problems may be relatively complex, while the MATLAB programs that solve them are relatively simple: relative, that is, to the equivalent program written in a general-purpose language, such as C++ or Java. As a result, MATLAB is being used in a wide variety of domains from the natural sciences through all disciplines of engineering to finance and beyond, and it is heavily used in industry. Hence, a solid background in MATLAB is an indispensable skill in today's job market.

Purpose of the course:

This course is not a MATLAB tutorial. It is an introductory programming course that happens to use MATLAB to illustrate general concepts in computer science and programming.

Students who successfully complete this course will:

- become familiar with general concepts in computer science
- gain an understanding of the general concepts of programming
- obtain a solid foundation in the use of MATLAB.

Educational Methods:

Lectures and seminars.

INTEGRATED COMPUTER SYSTEMS AND NETWORKS

ECTS credits: 6	Semester: III
Evaluation: exam	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof., Eng. Valentin Hristov, PhD – v_hristov@swu.bg
Department: Communication and Computer Engineering – technical_kktt@swu.bg
Faculty: Faculty of Engineering – technical@swu.bg
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62

Annotation:

The syllabus discusses the following main topics: physical representation and storage of information in computer systems; digital write/read processes to/from magnetic type cartridge; fault detection and correction during the process of information storage on magnetic type cartridge; visual information registration methods; organization of the write process by means of indication; organization of the read process from the visual information cartridges; optical disc-based memories; speech input/output devices in computer systems, etc.

Purpose of the course:

The aim of this course is to acknowledge students with: computer systems information cartridges; data organization and access methods to different areas on such cartridges; logical structure and organization of various peripheral systems which are part of the computer systems.

Educational Methods:

Lectures are presented using advanced visualization tools. The lab exercises are guided according the laboratory exercises textbook. Students prepare separate protocols for each topic being checked by the assistant.

WIRELESS COMMUNICATION SYSTEMS

ECTS credits: 6	Semester: III
Evaluation: exam	Hours per week: 2 lectures+2 exercises
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof. Alexey Stefanov, PhD – astef@swu.bg

Assistant: Prof. Filip Atanasov Tsvetanov, PhD - ftsvetanov@swu.bg

Department: Communication and Computer Engineering –
technical_kktt@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

The course introduces basic wireless technologies, protocols and services common on wireless networks. The course introduces basic wireless technologies, protocols and services common on wireless networks. Are represented the building blocks of wireless communications, client hardware and infrastructure. Also examined architecture of wireless local, global, public and personal networks. Described are the standard and additional infrastructure services and protocols. Also examined architecture of wireless local, global, public and personal networks. Described are the standard and additional infrastructure services and protocols. Emphasis is put on the correct choice of type of communication, components, and network configuration, choice of components and construction and study of application software for the industrial communication network.

Purpose of the course:

Purpose of the course is that students acquire the theoretical knowledge and practical skills and competencies for most appropriate choice of protocol for the construction of industrial network design and industrial network with the selected protocol. The systematization of this knowledge allowing passing to be acquainted with the methodology of their use.

Educational Methods:

The course is held in multimedia lecture halls. Practical exercises are conducted in groups; usually groups are up to 10 students.

SERVER TECHNOLOGIES

ECTS credits: 5	Semester: IV
Evaluation: ongoing assessment	Hours per week: 2 lectures+1 exercise
Course type: lectures+ laboratory exercises	Course status: Elective
	Degree course: Computer Systems and Technologies

Lecturer: Chief Assist. Prof. Anton Stoilov, PhD – antonstoilov@swu.bg
Department: Electrical Engineering, Electronics and Automatics – technical_eea@swu.bg
Faculty: Faculty of Engineering – technical@swu.bg
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62

Annotation:

The course "Server technologies" is part of the curriculum and includes 15 topics summarized in server technology with an emphasis on server administration. As a form of control in training are provided for monitoring and ongoing evaluation.

The content of the program covers the main issues related to the types of server operating systems, cloud structures, server virtualization, high performance computing, mobile applications, IP telephony server technologies for storage, WEB services and others.

Which receives ongoing assessment over weak on "Server administration" will acquire the necessary knowledge in the application of modern technologies and methods for building advanced server systems and technologies.

Purpose of the course:

The aim of the course "Server technologies" is for students to acquire knowledge to work with different types of server systems and provide a variety of WEB services and applications. To learn about the application areas of server technology and the types of WEB services and applications. Students acquire knowledge about the application of modern methods of administration of server systems and various techniques for creating WEB services and applications.

Educational Methods:

Lectures are illustrated with computers, multimedia projector and LCD panel, demonstrational software, visual aids, boards and diagrams.

DIGITAL COMMUNICATIONS

ECTS credits: 5	Semester: IV
Evaluation: ongoing assessment	Hours per week: 2 lectures+1 exercise
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof., Eng. Valentin Hristov, PhD – v_hristov@swu.bg
Department: Communication and Computer Engineering – technical_kktt@swu.bg
Faculty: Faculty of Engineering – technical@swu.bg
Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.
Phone: +359-73-88 51 62

Annotation:

This course gives an overview of modern telecommunication networks and technology for multiplexing and transmission of signals in communication networks plesiochronous (PDH) and Synchronous Digital Hierarchy (SDH). Students will become familiar with synchronous transport networks (SDH networks) as well as the subscriber's access to communication networks and networks for subscriber access. The course examines digital network with integrated services (ISDN), and broadband integrated services (VISDN). Particular attention is paid to the ATM networks of their architecture, protocols, signaling and routing traffic in ATM networks and their management. Students will acquire basic knowledge and next-generation networks (NGN networks) starting to build hard thanks to technological developments in the field of communications.

Purpose of the course:

The aim of this course is to acknowledge students with objectives, physical nature and technological features of integrated computer systems, computer networks and network technologies. To learn about the application areas of the types of computer networks, communication environments, and the main protocols and network services on the Internet.

Educational Methods:

Lectures are presented using advanced visualization tools. The lab exercises are guided according the laboratory exercises textbook. Students prepare separate protocols for each topic being checked by the assistant.

CODING AND DATA COMPRESSION

ECTS credits: 5	Semester: IV
Evaluation: ongoing assessment	Hours per week: 2 lectures+1 exercise
Course type: lectures+ laboratory exercises	Course status: Compulsory
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof., Peter Boyvalenkov – peter@moi.math.bas.bg

Department: Mechanical Engineering and Technologies

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

The course is an elective in the fourth semester and aims to provide students with knowledge and skills on the problems of coding and compression of data. The course focuses on noise protection coding linear and cyclic codes. Discussed are basic strategies for data compression and Huffman coding and Lampe-Ziv coding.

Purpose of the course:

The aim of the course "Coding and data compression" is to provide students with knowledge of the fundamental aims, objectives and methods of encryption and compression of data loss and without loss of quality.

Educational Methods:

Lectures and exercises.

DYNAMIC WEB APPLICATIONS

ECTS credits: 5	Semester: IV
Evaluation: ongoing assessment	Hours per week: 2 lectures + 1 exercise
Course type: lectures+ laboratory exercises	Course status: Elective
	Degree course: Computer Systems and Technologies

Lecturer: Assoc. Prof. Stanko Shtrakov, PhD – sshtrakov@swu.bg

Department: Electrical Engineering, Electronics and Automatics –
technical_eea@swu.bg

Faculty: Faculty of Engineering – technical@swu.bg

Address: 2700 Blagoevgrad, 66 Ivan Mihailov str.

Phone: +359-73-88 51 62

Annotation:

The subject "Web design" focuses on gaining knowledge and skills in the field of Internet programming. The course covers the basic principles of programming with HTML and some software packages for creating WEB sites. Students learn the basics of programming languages PHP, Java and Java Script and the use of database applications for the Internet.

The laboratory work helps to better rationalization of lecture material and contribute to formation of practical skills.

Purpose of the course:

The course aims to provide students with knowledge of modern programming languages (visual and object programming) and their application to solve different types of problems, and some of the main tools for creating WEB applications.

Educational Methods:

Lectures (with slides, multimedia projector) and additional text materials; laboratory work (based on instructions) with a tutorial for every laboratory theme.